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STUDY OF THE TOURIST AND RECREATIONAL LOAD IN THE “KOLSAI LAKES” STATE NATIONAL NATURE PARK, KAZAKHSTAN

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Abstract: The growing popularity of ecological tourism has led to a significant increase in tourist flows and, consequently, a rise in anthropogenic impacts on the ecosystems of natural areas. This phenomenon poses challenges to the delicate balance of these ecosystems, requiring detailed study and intervention. Studying the dynamics of this process is essential to assess its impact and develop effective measures to prevent critical stress that could lead to irreversible negative changes in the natural environment. The transition to circular tourism is also a major challenge. Using the example of the State National Natural Park “Kolsai Lakes,” located in the southeast of the Almaty region of Kazakhstan, the authors proposed a comprehensive approach to determining the maximum permissible tourist and recreational load. This approach includes expert assessments, calculation methods, and systematic monitoring observations to evaluate the capacity of the park's ecological routes and paths. The research focused on ensuring that these natural areas can sustain their ecological integrity while accommodating visitors. The practical outcomes of the research included the development of recommendations aimed at reducing anthropogenic impacts on the park's routes and paths. These recommendations encompass a combination of technical solutions, organizational strategies, and managerial measures designed to balance tourism with environmental preservation. The measures proposed align with global principles of sustainable tourism and reflect the need for integrated approaches to managing natural resources. The main results emphasize the critical importance of sustainable management methods in maintaining the ecological integrity of the “Kolsai Lakes” State National Nature Park. These findings were derived from field research, where the authors conducted on-site evaluations to gather data and analyze the environmental conditions. The insights gained were systematically organized and presented in tabular form within the article. The study underlines the necessity of ongoing monitoring and adaptive management to address the evolving challenges posed by ecological tourism.

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By implementing the recommended measures, the park authorities can mitigate potential environmental risks while fostering a harmonious relationship between tourism and nature conservation. This research contributes valuable knowledge to the field of sustainable tourism, offering practical strategies that can be applied to other natural areas facing similar challenges.

Keywords: ecological and curcular tourism, recreation, specially protected natural area, carrying capacity, national natural park, tourist and recreational load

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INTRODUCTION

Ecotourism, as one of the areas of nature-oriented tourism, has become increasingly popular in recent years. Moreover, despite the fact that this type of tourism conceptually cannot be mass, it is gradually becoming commercially profitable, attracting the attention of the tourism business and forming the basis for further investment. Accordingly, the role of ecotourism in the socio-economic development of territories is increasing (Kropinova et al., 2023).

At the same time, the natural process of urbanization stimulates the population's interest in tourism and recreational activities in the natural environment (Anokhin & Kropinova, 2021), realizing the need for physical and emotional recovery through communication with nature and a positive "aftertaste" this kind of travel. An important component of any ecological tour is environmental education and fostering a responsible attitude towards the environment (Freude, 2019; Zhoya et al., 2024). This is especially important for the younger generation (Bagretsov et al., 2018).

Therefore, the formation of an environmental culture, knowledge of the native land, awareness of problems and understanding of the need to preserve ecosystems and biodiversity is of particular importance today (Dowling & Fennell, 2003), creating the foundation for sustainable development of territories and local communities in the future (Carvache-Franco et al., 2020; Issakov et al., 2023a).

The increased interest in recreation and tourism facilities in specially protected natural areas is due to the limited ability of the population to move within the country and abroad due to the COVID-19 pandemic, with a continuing (and even increased) need for outdoor recreation (Aktymbayeva et al., 2023). However, the implementation of this need entails an increase in the load on the components of the environment and ecosystem, which leads to a disruption of the natural balance, degradation of natural complexes, making them unsuitable over time for the purposes of tourism and recreation (Akiyanova et al., 2020). The closer the object is located to large populated areas, the higher the increase in negative impacts. However, with the improvement of transport infrastructure, the distance barrier is no longer a guarantee of the preservation of a natural site (which can be observed in the example of national natural parks near the city Almaty).

In many cases, the time for making optimal decisions on the conservation of ecosystems and the civilized organization of ecotourism has already been lost, which requires the adoption of more drastic measures and coordinated actions of all interested structures. With the growing responsibility at the global level, ecotourism resource management becomes inevitable for its sustainable requirements (Ashok et al., 2022). The role of eco-tourism is noted in the state program for the development of the tourism industry of the Republic of Kazakhstan for 2019-2025.

The essence of ecotourism is, on the one hand, to satisfy the human need to communicate with nature, solitude, study and knowledge of nature and culture on the other hand, to solve environmental problems, primarily in specially protected natural areas. At the same time, it is also expected to achieve a balance of interests: environmental (consisting in the protection of natural values from the flow of tourists and recreationists); economic (related to the extraction of material benefits from tourists visiting natural areas); social (achieving harmony with nature and providing the population with the opportunity for complete spiritual and physical relaxation in communication with it).

At the same time, maintaining a balance of environmental and social interests is possible only with proper organization and skillful management of the tourist movement (Niyazbekova et al., 2019).

It is important, while preserving the ecological purity of natural areas undisturbed, to ensure access to them for the broad masses of the population. The research underscores the need for a balanced approach that accommodates both the growing demand for ecotourism and the imperative to protect vulnerable natural habitats. The proposed recommendations are not only aimed at mitigating the immediate impacts of tourist activity but also at fostering long-term resilience within the park's ecosystems. By implementing the suggested technical, organizational, and managerial strategies, it is possible to maintain the park's ecological balance while ensuring that it remains an attractive destination for visitors. Furthermore, the approach developed in this study can serve as a model for other protected areas facing similar challenges, contributing to the broader efforts of sustainable tourism and conservation in Kazakhstan and beyond.

LITERATURE REVIEW

Many experts in the field of ecotourism identify an ecological trail as one of the main tools for ensuring this balance in specially protected natural areas - a specially equipped route passing through various ecological systems, unique natural sites, tourist attractions that have aesthetic, environmental or historical value, on which participants (tourists and excursionists) receive oral (with the help of a guide) or written (stands, sold-out houses, etc.) information about these objects (Chizhova et al., 1989; Koshim et al., 2023). The organization and development of eco-trails allows us to largely solve the problems of regulating tourist flows, redirecting them along a specific route, thereby easing the anthropogenic load on the natural environment and satisfying the needs of tourists to communicate with nature (Ogutu et al., 2023). The development of ecological tourism in specially protected natural areas (SPNA) has specific features associated with compliance with the requirements of environmental legislation (Hahinan et al., 2022). An important point in fulfilling the environmental function of an ecological trail is the regulation of the recreational load on the trail, which does not exceed the recreational capacity of natural monuments. The recreational capacity of a natural territorial complex is usually defined as the product of the permissible load value and the area of the natural territorial complex (Kolotova, 1998).

The development of norms for recreational loads is aimed at establishing the maximum permissible flows of visitors and the mode of use of the ecological trail, subject to its sustainable functioning. Calculation of permissible loads, as a rule, is an integral part of project documents for the development of environmental areas (Law of the Republic of Kazakhstan On Specially Protected Natural Areas, 2023), but today there is no unified approach (and, moreover, no unified methodology) for regulating recreational loads that would take into account all a complex of factors that determine them and thus corresponded to the real conditions of practice (The Concept for the development and placement of specially protected natural areas of the Republic of Kazakhstan until 2030). Information search, selection and analysis of approaches and methods acceptable for the objects under study, taking into account the natural and socio-economic conditions of natural territories, is a necessary part of any research to determine the impact of tourist and recreational activities on the sustainability of ecosystems. The authors reviewed and analyzed foreign (Butler, 1996; Janeczko & Gucma, 2015; McCool & Lime, 2001; Nakajima & Ortega, 2016; Zhu et al., 2023) and domestic (Aliyeva et al., 2020; Rahimbaev, 2017; Seitimova et al., 2021; Issakov et al., 2023b) approaches to determining the recreational capacity of territories and methods for calculating recreational loads on eco-trails, and identified their optimal combinations for determining permissible loads. In the research case of this article, authors studied the works and scientific materials of authors in one way or another related to the topic of our research (Oborin, 2010; Ermakova, 2009; Kolotova, 1998).

The importance of this paper lies in its contribution to the field of sustainable tourism management within protected natural areas, a subject of increasing global relevance as more people seek nature-based experiences. By focusing on the "Kolsai Lakes" State National Nature Park, a significant ecological and cultural landmark in Kazakhstan, the study addresses the pressing issue of balancing environmental conservation with the economic benefits of tourism. The research not only provides a scientifically grounded methodology for assessing and managing tourist and recreational loads but also offers practical solutions that can be adapted and applied in other national parks and protected areas. This work is particularly vital in the context of Kazakhstan, where the rapid development of the tourism sector presents both opportunities and challenges for conservation. By advancing knowledge in this area, the document supports sustainable development goals, contributes to the implementation of circular tourism and the preservation of natural heritage for future generations.

MATERIALS AND METHODS

In August 2021, field work was carried out on the project territory of the State National Nature Park "Kolsai Lakes". RGI State National Nature Park "Kolsai Lakes" was created by a Decree of the Government of the Republic of Kazakhstan dated February 7, 2007 No. 88. Geographically, the main territory of the park is located on the northern macro-slope of the eastern part of the Kungey Alatau ridge, which belongs to the Northern Tien Shan.

The northern border coincides with the border of the forest fund of the Kegen State Forestry Institution and runs along the Shelek River until the Zharbulak River flows into it. The southern border coincides with the state border with Kyrgyzstan, which runs along the watershed of the Kungey Alatau ridge. Generally, the total area of the national park is 161,045 hectares, including 148,238 hectares in the Kegen district and 12,807 hectares in the Talgar district according to the territorial and administrative division of Kazakhstan (Moldagaliyeva et al., 2024).

Figure 1 shows the ratio of the areas of functional zones based on the results of functional zoning: a protected area with 67,962 hectares, a restricted economic activity area - 66,917 hectares, an environmental stabilization area - 16,715 hectares, tourist and recreational activities area - 9,451 hectares.

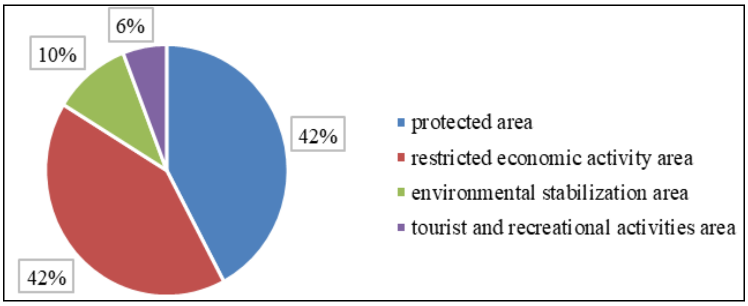

Figure 1. The Ratio of areas of functional zones in SNNP "Kolsai Lakes" (Source: Project / Kazak Zhobalau-Kurylys LLP, 2020)

Field research is due to the need to obtain primary information for calculating the norms of the maximum permissible norms of recreational loads on tourist excursion routes and eco-trails of the project areas, as well as taking into account a set of influencing factors, both objective and subjective, which is necessary to obtain reliable results and develop recommendations for regulation of the flow of tourists, taking into account the standards and arrangement of routes/trails. Of the foreign methods that are used to evaluate recreational development projects of territories of varying degrees of development, the most common are (Tsaregorodtseva et al., 2014): - Environmental Impact Assessment; - Assessment of Carrying; - Visitor Impact Management; - Limits of Acceptable Change.

The essence of our research methodology boils down to finding the boundary of the stable state of various natural complexes against the background of recreational changes or digressions, for which five stages are usually identified, as well as measuring the loads that bring the complex to the boundaries of the stable state. In general, the methodology for assessing current capacity (sometimes translated as assessment of carrying capacity) necessarily specifies the object to be assessed, for example, the current capacity (CC) of the environment. Tourism CC is defined as the ability of an ecosystem to support the viability of organisms, including their productivity, adaptability and ability to regenerate. We can say that CC sets a threshold level of anthropogenic impact, the excess of which leads to deterioration of the resource base of the ecosystem.

In our study, we relied on the well-known interpretation of the definition of recreational load on a territory, which is most often used by domestic researchers, and which has a formula that is simple to describe, but not easy to calculate, without certain conventions. The actual recreational load is determined by measurements, the expected one is calculated using the formula (Chizhova et al., 1989):

$$R = \frac{Ni}{Si}$$

where R is the recreational load, Ni is the number of visitors to recreational facilities, Si is the area of the recreational territory.

It is recommended that the number of visitors simultaneously present in the recreation area be 10-15% of the population living in the accessibility zone of the recreation facility.

RESULTS AND DISCUSSION

A review of the scientific literature related to CC and visitor loads allows us to identify five main ideas that are important for understanding the nature of recreational loads and which must be combined within any of their management programs. The magnitude of the recreational load in a given territory is associated with various indicators of loads, although their ratio varies quite widely for individual types of loads in accordance with the measure of visitor use and particular situational factors. Therefore, increased exposure is not always linearly related to increased visitor density. Some types of recreational activities lead to a fairly rapid development of stress, unlike other types. Subsequent expansion of such recreational activity may vary depending on factors such as the types of movement or equipment used, the psychology of visitors, and the size and behavior of the group. Recreation impacts vary depending on the nature of the area and seasonal changes, even at certain levels of visitor attitudes for this type of recreation, as a result, recreational use depends significantly on time, place and human activity (Eagles et al., 2006). The main brand of the territory of the national park is the Kolsai Lakes and Lake Kaiyndy. Accordingly, the main flow of tourists and recreationists flocks here, often exceeding the maximum permissible norms of tourist and recreational load and creating an excessive impact on the ecosystem.

Despite the fact that the zone of tourist and recreational activity is relatively small, together with the zone of limited economic activity, currently has the most significant impact on changes in landscape and ecobiodiversity.

By the time of studying and writing the article, the State National Natural Park “Kolsai Lakes” offers 5 hiking and horseback riding routes in their territory: "Village Saty - Lake Kaiyndy" (No. 1), "Village Saty - Saty Pass" (No. 2), "Lake Lower Kolsai - Sarybulak Pass" (No. 3), "Village Kurmety - Lake Middle Kolsai" (No. 4), "Village Kurmety - Mount Kyzemshek" (No. 5) and a water route along the waters of Lake Lower Kolsai. Mountain routes are mainly on foot, but most of them can be covered (in whole or in part) on horseback. The presence of highways in the gorges will allow the delivery/removal of tourists at a distance of up to 15-20 km. On the busiest routes in the directions of lakes Kaiyndy and Kolsai, an increased impact on forest ecosystems is visually observed, expressed in an increase in the network of trails near the main route, the presence of small debris, disturbance of the soil layer and other signs of intense anthropogenic impact. The dirt road to the parking lot (where the trail begins) is intensively used by local drivers working as taxis in non-road vehicles (with a capacity of 5-11 passengers) and others, making, on average, 2 trips per day (on weekends).

With the commissioning of an asphalt access road, the flow of visitors increased significantly (more than 120 000 visitors in August 2021 versus 83 000 in 2020 and 46 000 for the same period in 2018). The situation, in our opinion, requires a response and the establishment of a threshold number visitors over a period of time. At the same time, it is necessary to develop new routes and trails in neighboring gorges, as well as improve the logistics of hiking routes, reducing peak loads by dispersing the flow. The explored gorges of the Taldy River, Kurmety River and Saty River have good potential in this regard. A positive experience of the park is the installation of signs along the route containing information about the distances from the beginning of the trail to its end point, and the approximate time to cover this distance. However, to date, most of the signs have been broken (in most cases, only poles remained, without signs).

According to preliminary data, 70% of the population of the village of Saty provides hospitality services to visitors to the area. In addition to the existing ones, new guest houses, hotels and glampings are appearing (including in the neighboring villages of Karabulak and Kurmety), providing more comfortable conditions, which allows us to predict an increase in the duration of the tourist season and an improvement in the quality of service for tourists as a result of increased competition (in the village of Saty at present 81 guest houses are currently operating). The situation of systemic coordination of the activities of local communities interested in the development of domestic and inbound tourism.

As scientific research for materials for the article, the authors organized a trip to this location for a detailed analysis of the data, during which the necessary materials were collected for each route: field observations were carried out, a visual assessment of the current ecological state of the trails was carried out, photographs of characteristic sections of the routes were taken and trails, as well as linking characteristic points of the route to the terrain using GPS. The received primary information, as the methodology for calculating the maximum permissible loads on project sites (routes and trails) is developed, will be supplemented based on the monitoring results.

In the case of scientific observation, authors prepared a generalized description of the certified routes and trails of the State National Natural Park “Kolsai Lakes”, which is shown in Table 1.

Table 1. Routes of the State National Nature Park “Kolsai Lakes”

No.	Name of the route/trail	Current state	Recommendations for improvement
1	“Village Saty - Lake Kaiyndy”	From the village of Saty to the lake Kaiyndy. Dirt road from the highway to the parking lot below the lake (trailhead). The condition is satisfactory. Vegetation degradation is observed. The entire route is quite comfortable for tourists. There are equipped areas (entrance area and the end point of the route). The horse trail is separated from the walking trail.	Update signs and information boards during the whole journey. Develop a technological map of the excursion. Make a rope descent. Threat: the entry of organic substances into the aquatic environment of the lake, which leads to a decrease in oxygen in the water and increases the process of eutrophication.
2	“Village Saty – Saty Pass”	A picturesque, accessible for various categories of visitors, radial route up the Saty River gorge. No degradation of the vegetation cover is visually observed.	The route is equipped. It is necessary to carry out monitoring, update signs and information boards, and equip parking areas.
3	“Lake Lower Kolsai – Sarybulak Pass”	The most popular direction, in some places there are equipped areas for recreation, benches, signs and full resthouses (which requires updating). Degradation of the vegetation cover is observed, in some places significant, with the formation of “fans” of paths, exposure of the root system of trees, erosion and swamping of individual areas.	It is necessary to change the logistics of flows (separation of hiking and horse trails), engineering equipment and safe plowing of individual areas (flooring, railings, fences, etc.), updating infrastructure, equipping recreation areas, installing waste bins, toilets, signs, limiters of dangerous directions, etc. It is necessary to separately consider the areas below the 1st lake (area use) and the path (route) network.
4	“Village Kurmety - Lake Middle Kolsai”	A picturesque but unpopular route. In the initial part of the route, behind the barrier, there is an equipped clearing for rest. No vegetation degradation is observed.	The route is partially equipped. Signs should be restored /repaired, rest areas should be equipped, and notice boards, information boards and awnings should be provided.
5	“Village Kurmety - Mount Kyzemshek”	A promising scenic route partially equipped. No vegetation degradation is observed. Campsites are equipped with fire pits and recreation areas.	The route is partially equipped and not popular. The logistics of the route should be changed (start from the Kurmety gorge). Infrastructure equipment is required with the equipment of short-term recreation areas and bivouac clearings, taking into account the predominant use of equestrian tourists.

In addition to providing services on tourist routes, the national park provides services to visitors with transport, hotel services, escort services by an inspector-guide, provision of horses, consultations, etc. At the same time, it is not possible to trace the dynamics of visits to routes and trails due to the lack of statistical data in the State National Park. This is partly due to the fact that the arrangement and maintenance of the trails, and, consequently, the collection of fees for their operation, is leased to LLP “J.S. Travel”. Although the “Kolsai” post states that checks are “payment is processed” for each individual route. According to the results of a survey of park employees, almost the entire volume of visits falls on Lower Lake Kolsai and Lake Kaiyndy. Demand for other routes is sporadic (1-2 groups per season). The most popular route is along the Kolsai gorge, in particular, the section of the trail between the First and Second Lakes.

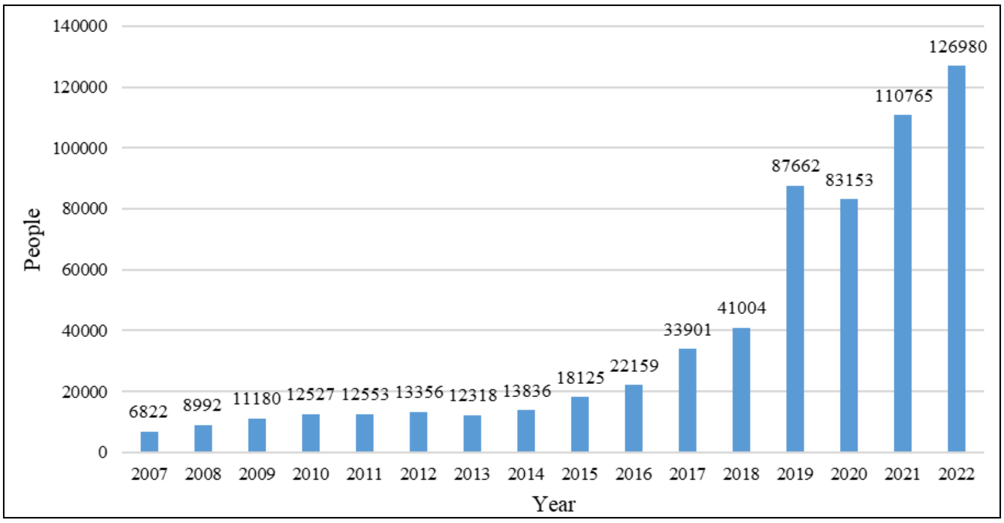

Figure 2. Dynamics of visits to the State National Nature Park “Kolsai Lakes”

From the materials of the adjustment of the master plan (2009), routes of the State National Natural Park "Kolsai Lakes" in the case of 100% demand can serve 2,600 people per month and 7,800 per year. The same document states that "the routes of the State National Natural Park "Kolsai Lakes" of different directions can accommodate 4,600 people monthly with the demand for routes at 100%." At the same time, taking into account international recommendations and the peculiarities of the territory of the State National Park, it is advisable to observe the load on the routes of no more than 1-2 groups (up to 20-25 people) per day. These loads are acceptable when carrying out improvement of routes, especially in that part where tourists travel on foot and on horseback, especially at sightseeing stops. However, the real load on routes and trails today significantly exceeds the standards determined by the Park Management Plan (calculated by the "Terra" company), as well as those obtained as a result of calculations by a group of UNDP experts (2019) (Artemyev et al., 2020). Dynamics of the total number of visitors according to the State National Natural Park "Kolsai Lakes" looks like this (Figure 2).

The multiple increase in the number of visitors, provoked by improved transport accessibility, requires the adoption of urgent comprehensive measures to regulate the tourist flow. At the stage of developing a methodology for determining maximum permissible loads, in order to avoid a vacuum of action that could lead to irreversible consequences, the authors recommended a number of priority measures to reduce anthropogenic influence.

During the scientific and applied analysis, as part of the authors' visit and conducting field research directly in the park itself, in order to qualitatively solve the research problems, we proposed recommendations for improving the situation regarding tourist congestion of the trails, which are given in Table 2.

Table 2. Preliminary recommendations for regulating the tourist flow and infrastructural equipment of routes and ecological trails of the State National Nature Park "Kolsai Lakes"

Load control	Security and information support	Environmental education and cooperation
– Limitation of flow within the limits of the calculated recreational capacity (for sites) / maximum recreational load (for routes and trails) up to the introduction of a temporary ban on visiting certain areas and trails (with the proposal of alternative options for the duration of the ban); – Monitoring (at least three times a season, but preferably monthly); – Removal of the parking lot behind the barrier/checkpoint (organization of delivery to the lake: equipment of an eco-trail for hikers; eco-taxi /shuttles; equestrian route. In the future, a cable car option similar to the Shymbulak ski resort); – Identification and arrangement of parking and rest areas (sale of only guaranteed free places/sites); – Advance electronic booking (50/50); – Changing route logistics; – Separation of walking and equestrian areas.	– Installation of decking and fencing in areas of expansion/branching of the main trail (recommendations for choosing locations - after processing GPS tracks and photo recording data, in agreement with park specialists); – Installation of tourist navigation signs (including prohibition signs) (style and design - according to the design concept); – Development of tourist maps and guides (including electronic versions), "reading" information offline via QR code; – Linking to the area and setting up notices (information about the park, routes, visiting rules, measures against violators of the Rules, etc.); – Development of leaflets with valuable information (as a type of souvenir, so that this does not cause additional litter); – Organization of a tourist police station (consultations, control, administrative impact on violators - emphasis on behavior in places where tourists gather); – Initiation and creation of a ranger service (functions similar to tourist police with an emphasis on enforcing environmental legislation, mainly on routes); – Medical aid and rescue station (seasonally, possibly at the visitor center); – Hire of trekkers for tourists going on routes; – Limitation of the number of swimming facilities in the waters of Lake Kolsai, movement between piers - strictly according to the route, according to the approved passport.	– Organization of a visitor center – Production and installation of small architectural forms on sites and along routes, united by the idea of environmental education and training; – Organization of volunteer work (Regulations, rights and responsibilities, etc.); – Organization of environmental actions; – Agreements with universities, colleges, schools and other organizations (to streamline the flow, load the off-season, etc.); – Development of a general design code (design concept) for the park; – Search and attraction of partners (including foreign ones); – Preparation of applications for grants through international organizations/funds.

In recent years, there has been an increase in negative impacts on the ecosystem of the park's mountain lakes. Thus, over the past 15 years, the water level in Lake Kaiyndy has decreased by almost 8 meters. The process of destruction of the natural dam is underway, which threatens to worsen the mudflow danger for downstream objects, including the village of Algabas, and also threatens the existence of the unique lake itself.

The use of the water area of Lake Nizhny Kolsai for tourist and recreational purposes has led to a deterioration in water quality, its pollution, and the creation of preconditions for silt formation. The degradation of the soil cover around the lake is visually noted, which requires a comprehensive survey of the territory in order to determine the dangerous effects on vegetation, wildlife, and aquatic biosystems. It should be noted that there is an increased load on the trail between the Lower and Middle Kolsai lakes. The situation is aggravated by the use of this section for parallel movement of both pedestrian and horse-riding tourists, which, in the presence of waterlogged sections of the trail and soft soils, leads to an expansion of the width of its surface and damage to the adjacent territory. The sharp increase in overnight visitors to complexes located in close proximity to the coast is also a cause for concern.

Disposal of waste generated as a result of serving visitors is not always possible without damaging the environment (in particular, the used waste collection and removal system, the quality of septic tanks and the availability of a sufficient number of toilets have repeatedly raised questions among specialists). One of the primary tasks is to determine the permissible tourist and recreational load (both on routes and on recreational sites), as well as organizing monitoring in order to quickly respond to changes in the environmental situation and take adequate measures.

As a result of the research conducted to study the tourist and recreational load in the natural park, a number of important aspects were identified that influence the natural environment and the level of comfort of visitors (Figure 3).

As a result of the study conducted to study the tourist and recreational load in the State National Natural Park, a number of important aspects were identified that influence the natural environment and the level of comfort of visitors. Based on the data obtained, the following scientific conclusions can be drawn:

Dynamics of tourist flow: The study revealed significant fluctuations in tourist flow over time, which warns against possible overload and the need to balance the popularity of the park with its sustainability.

Impact on Biodiversity: Data analysis confirmed that tourism activity has an impact on local biodiversity. This highlights the importance of implementing effective management strategies aimed at preserving the natural park ecosystem.

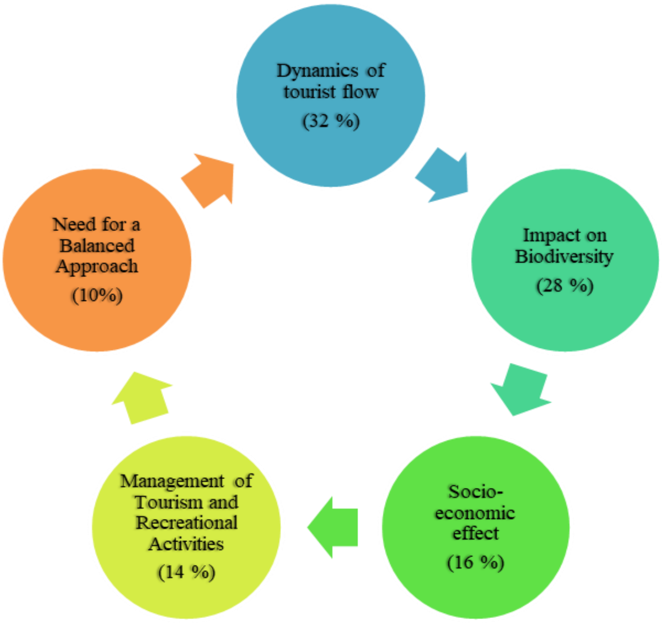

Figure 3. Aspects influencing the level of comfort of visitors of the State National Nature Park “Kolsai Lakes”

Socio-economic effect: The identified positive contribution of tourism to the regional economy indicates the importance of tourism development in state national natural parks as a tool for socio-economic development. Management of Tourism and Recreational Activities: The scientific study provides valuable recommendations for managing tourism activities in a natural park, including the implementation of restrictions, educational programs and modern monitoring technologies.

Need for a Balanced Approach: For long-term sustainability, it is important to develop and implement a balanced approach that considers the needs of tourists while also protecting the natural environment and cultural heritage of the park.

CONCLUSIONS

The preservation of tourist and recreational attractiveness directly depends on the characteristics of environmental management in a given territory and the results to which it leads. In a case of the research preliminary assessment actions were carried out and recommendations were prepared for regulating the loads on the routes and trails of the State National Nature Park “Kolsai Lakes”. Subsequent work involves monitoring and clarification of preliminary data through comprehensive problem solving using refined and supplemented interpretation data from field research, including cartographic material, survey data, comparative analysis and testing of various methods for determining permissible loads, etc. The results obtained are planned to be replicated for similar operating conditions of ecological trails. The resulting scientific conclusion allows for a better understanding of the relationships between tourism and recreational activities and the natural environment in state-owned national natural parks, and also provides a basis for the development of effective tourism management and development strategies to achieve circular tourism in this context.

To achieve sustainable tourism development in the region, it is necessary to continue research aimed at studying the long-term effects of recreational load on ecosystems. An important aspect is the introduction of innovative monitoring methods, such as the use of drones and satellite data, for more accurate and timely collection of information. It is also necessary to consider the possibility of integrating local communities into the management and decision-making process, which will take into account their interests and increase the effectiveness of the implemented strategies. These measures will help not only to preserve the natural heritage, but also to promote the socio-economic development of the region.

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REVEALING THE COMPETITIVENESS OF RURAL TOURISM: EXPLORING TANGIBLE AND INTANGIBLE RESOURCES IN SARAWAK (MALAYSIA) AND HENAN PROVINCE (CHINA)

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Abstract: Tourism activities significantly impact a country's economy, environment, community, and visitors. In the Malaysian context, rural communities have adopted rural tourism as an alternative source of income. The competitiveness of a tourism destination is crucial for the long-term profitability of rural tourism destinations. The tourism experience is a critical factor for tourists when choosing a destination. Therefore, it is essential to focus not only on attractions but also on a destination's infrastructure, image, and hospitality. However, current literature lacks a single study that examines the impact of both tangible and intangible resources on the competitiveness of rural tourism destinations, using mobile technology as a moderating variable with a multi-group analysis approach. Thus, the present study aims to investigate the tangible and intangible tourism assets that determine the competitiveness of rural tourism destinations, with the moderating effects of mobile technology use. The results were then compared between Sarawak, Malaysia, and Henan province, China, to provide a better understanding of rural tourism destination competitiveness in the Asia region. A total of 525 datasets were collected (233 from Sarawak and 292 from Henan) for analysis in the current study. A partial least squares multi-group analysis (PLS-MGA) was employed to compare Sarawak and Henan. The results revealed a strong and positive correlation between rural tourism destination competitiveness and factors such as destination appeal, destination image, and service quality. Furthermore, it was found that mobile technology use moderated the relationship between destination image and rural tourism destination competitiveness. Theoretically, the findings contribute to existing literature and the theory of competitiveness by offering additional insights into destination competitiveness. The results also serve as an important reference for scholars interested in extending research on destination competitiveness, particularly in the field of rural tourism. Practically, tourism practitioners in Sarawak, Malaysia, and Henan province, China, can use the findings as a reference for decision-making, especially in policy-making and marketing strategies. ICT developers can also refer to this study when designing mobile technologies, with a focus on better integrating mobile technology into tourism infrastructure. Finally, both the limitations of the study and suggestions for future research are discussed.

Keywords: tourism infrastructure, destination image, destination appeal, service quality, mobile technology, Malaysia, China

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INTRODUCTION

Tourism activities significantly impact many countries' economy, environment, community, and visitors (Irani et al., 2022; Nadia et al., 2022). The tendency of rural communities adopting rural tourism as a substitute source of income has also been observed in Malaysia's rural areas (Chin et al., 2022). As a result, it has been proven that in developing and developed countries, rural tourism is a great development strategy for the community of rural areas (Chi & Han, 2021).

Various facilities will emerge in rural areas through rural tourism, including hotels, transportation, accommodations, and souvenir centres, which directly or indirectly contribute economically to the community. Additionally, the interaction between visitors and the local community will enhance the community's knowledge (Nurlena et al., 2021). Therefore, rural tourism has become a priority for tourism industry development today because an increasing number of tourists seek rural destinations to relax and escape from everyday stress (Jacobs et al., 2020). In the government's strategic planning for tourism development, which includes resource allocation and policy formation, evaluating destination competitiveness has become essential. Furthermore, the term "destination competitiveness" is also commonly used to describe sustainable development in the travel and tourist industry (Zainuddin et al., 2021). This drives many countries invest in destination development due to tourism's global economic success. Competitiveness in the rural tourism refers to

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the competence of a rural destination to captivate and retain tourists by offering unique, appealing, and sustainable experiences that stand out from other tourism options. This competitiveness is necessary for the sustainable profitability of rural tourism destinations, especially amid rising domestic and international competition (Rafee et al., 2024).

Furthermore, tourism experience is the most important factor for tourists to choose a destination. Hence, it is imperative to emphasize not just attractions but also destinations' infrastructure, image, and hospitality (Chan et al., 2023). For this, tourism asset is a major concern to ensure the tourism competitiveness. Tourism asset are categorised into tangible and intangible assets (Santos et al., 2020). While man-made attractions like tourism infrastructure and natural resources are regarded as tangible assets, the destination's reputation and image are regarded as intangible assets (Apostolopoulos & Gayle, 2002). The present investigation regards destination appeal and tourism infrastructure as tangible assets, as they provide visitors with a physical sense of fulfilment. Conversely, intangible tourism assets include destination image and service quality, as they provide psychological motivation and satisfaction that attract travellers.

Technological change is driving economic development, shifting competitive advantages from natural resources to technology. Consequently, many organizations are using mobile technology to stay competitive (Chan et al., 2022). Thus, the use of mobile technology as an enhancer is vital to be investigated in various sectors. As a result, past studies has examined the use of mobile technology as a moderator in learning and education platforms (Seckman, 2019). According to the Sarawak's post-covid development strategy for 2030, tourism is one of the major sectors that Sarawak would embark in, and digital transformation is the enabler of the development plan (Sarawak Economic Action Council, 2021). Nevertheless, there has not been any research that uses mobile technology as a moderator to study the tangible and intangible tourism assets in Sarawak and Henan in relation to the competitiveness of rural tourism destinations, which can influence the regions' total destination competitiveness. Past studies focused on the nature resources, cultural heritage, communities, accessibility, and so on of the destination competitiveness (Chin et al., 2014; Chin et al., 2022; Chong et al., 2018; Lo et al., 2019; Zili, 2022). Nonetheless, in the current literature, no single study examines the impact of both tangible and intangible resources on the competitiveness of rural tourism destination by using mobile technology use as a moderating variable in Sarawak and Henan. Furthermore, no study has used the partial least squares multigroup analysis (PLS-MGA) method to examine these impacts between Sarawak, Malaysia, and Henan province, China.

To bridge the aforementioned gaps, this study developed a research framework grounded in the theory of competitiveness and examine how tangible (such as destination appeal and tourism infrastructure) and intangible (such as destination image and service quality) tourism assets impact the competitiveness of rural tourism destinations. Additionally, the study will examine the use of mobile technology as a moderating variable in examining the rural tourism destinations in Sarawak and Henan. Additionally, a PLS-MGA will be conducted to compare the perspectives between Sarawak, Malaysia and Henan Province, China. According to Sarawak's post-covid development strategy 2030, the present study is anticipated to support the Sarawak state's growth in the information and communication technology (ICT) and rural tourism sectors. It is believed that this study would also help the Henan province to maintain a sustainable rural tourism industry. Additionally, by presenting empirical data from the perspectives of two distinct countries, the current study is anticipated to contribute to the theory of competitiveness in the context of rural destination competitiveness and act as a reference for researchers undertaking future research.

LITERATURE REVIEW

Competitiveness Theory

According to the World Economic Forum, a territory's productivity is determined by a combination of policies, institutions, and circumstances that make it competitive. The productivity level affects the economy's welfare and investment returns, with higher competitiveness leading to better growth, greater investment returns, and serving as a key indicator of economic development (Zeibote et al., 2019). Competitiveness theory incorporates the concepts of competitive advantages and comparative resources, which are commonly utilised to form the theoretical basis for developing research models related to destination competitiveness by the scholars (Ritchie & Crouch, 2003; Thong et al., 2023; Zehrer et al., 2017). Factor endowments, including facilities and natural resources, that are readily available in a destination are referred to as comparative advantage, whereas efficient long-term utilization of these resources is referred to as competitive advantage (Nadalipour et al., 2019; Thong et al., 2024). Competitiveness theory's central ideas of comparative and competitive advantage provide a strong theoretical and applied foundation for analysing the reciprocal link between the four suggested determinants (destination appeal, tourism infrastructure, destination image, and service quality) of destination competitiveness of rural tourism. Given that the explanations on how human-made (such as tourism infrastructure, destination image, and service quality) and natural (such as destination appeals) elements work together to improve destination competitiveness in rural tourism, the Theory of Competitiveness is relevant to this study. This includes both competitive and comparative advantages from the tourists' perspective.

Rural Tourism Destination Competitiveness

The growing importance of rural tourism as a major source of income for local communities and economic activity has drawn the attention of industry stakeholders, governments, and non-governmental organizations (NGOs) (Saravanan & Sundara Rajan, 2024; Yaccob et al., 2023). The ability of a destination to boost tourism spending, regularly draw more visitors, assure they have incredible experiences at reasonable prices, improve the standard of living for community members, and protect the environment for future generations all contribute to the competitiveness in the tourism sector (Knežević Cvelbar et al., 2016). Moreover, Roman et al. (2020) articulated that competitiveness can be measured using both hard criteria, such as economic infrastructure and structural changes, and soft criteria, like education, human capital, reputation, and services. Soft criteria are more difficult to measure and are associated with longer cycles, whereas hard criteria are simpler to measure and may be evaluated over shorter time periods. In more economically developed regions, the reliance on soft criteria for development and competitiveness is greater. Hence, according to Rafee et al. (2024), the rural destination can be competitive if the destination preserve and sustain the natural environment, ensure the cultural experiences, innovative in the tourism activities, improve accessibility, execute effective marketing strategy, collaborate with the local community, and adapt to the visitors' preferences. Past study had proved the importance of studying rural tourism destination competitiveness for tourism sustainability of a nation (Jia et al., 2022).

Destination Appeal

Krešić & Prebežac (2011) define destination appeal as encompassing the destination's people, landscape, tourist activities, culture, history, climate, and food. Essentially, destination appeal pertains to the cultural and natural resources of a tourism destination, instead of its constructed facilities. Natural resources or amenities are essential parts of the tourism assets that make up rural tourism (Nooripoor et al., 2021). The fundamental elements that make a destination appealing are its core attractions, which serve as the key factor to draw travellers and influence their decision to choose one location over another (Lee et al., 2009). The "pull factor" that contributes to the competitiveness of rural tourism destinations is the destination appeal. The destination appeal includes both attractions and impediments, as recommended by the Calgary's tourist competitiveness model (Elbaz et al., 2023). Therefore, it is believed that a destination appeal plays a significant role in determining a destination competitiveness. Past studies has evidenced the destination appeals impacting destination competitiveness positively (John et al., 2023; Wilde & Cox, 2008). Therefore, it can be hypothesized that:

H1: Destination appeal is positive significantly associated to the rural tourism destination competitiveness.

Destination Image

Destination image defined as the aggregate of qualities, attributes, and advantages that visitors associate with a destination. It represents the opinions and perceptions that tourists have of a particular place as a whole (Line & Hanks, 2016). Destination image encompasses cognitive, affective, and conative dimensions, shaping perceptions and emotions about a place and influencing behavioural intentions toward that destination (Tasci et al., 2022). Furthermore, destination images can be divided into projected and received images from the standpoints of marketing and tourists' behaviour. While the projected image plays a central role in shaping the received image, these two perceptions often diverge significantly. Numerous elements, including psychological, cultural, political, historical, economic, personality characteristics, and other sociodemographic aspects, are held accountable for the differences between projected and received images (Bui et al., 2022). Destination image plays a crucial role in influencing purchasing behaviour, fostering repeat visits, building tourist loyalty, and enhancing destination competitiveness include rural tourism destination competitiveness (Moliner-Tena et al., 2024; Woyo & Slabbert, 2023). Positive experiences related to a rural destination's tourism assets, products, and local community behaviour can enhance tourists' perception of the destination image, thereby directly influencing rural tourism destination competitiveness (Tse & Tung, 2022). The strong correlation between destination image and destination competitiveness has been demonstrated by earlier studies (Slocum, 2023). Hence, it is hypothesized that:

H2: Destination image is positive significantly associated to destination competitiveness in rural tourism.

Service Quality

Service quality encompasses all activities undertaken by a tourism practitioners to meet tourists' expectations to achieve satisfaction (Meidina et al., 2022). In another word, Service quality refers to a destination's capability to offer services that enrich the visitor's experience (Cronjé & du Plessis, 2020). Tourist satisfaction is often linked to the concept of service quality at a tourist destination, which reflects the overall quality of the tourist offerings at that location (Arıcı et al., 2023; Boro, 2022). Enhanced service quality not only result in higher customer satisfaction and loyalty, but also fostering repeat visits and boosting profitability (Kerdpitak, 2022; Pandey et al., 2022). On the other hand, low-cost tourism encourages the establishment of reasonably priced travel packages and services. This decrease in visitor spending impacts tourism competitiveness and significantly affects the tourism service quality (Burbano et al., 2022).

Destinations must compete globally to attract tourists by offering high-quality travel services. Therefore, improving consumer satisfaction and service quality has emerged as a key strategy for increasing destination's tourism performance and competitiveness (Ibrahim & El-Maksoud, 2022; Nastabiq & Soesanto, 2021). Given its ability to improve service performance, increase market share, and generate profits while offering a sustainable competitive advantage in rural destination, service quality is viewed as a vital competitive advantage (Susanto et al., 2022). Previous research has demonstrated the connection between service quality and destination competitiveness (Ferreira & Perks, 2020; Mustafa et al., 2020). Grounded on the discussion above, a hypothesis is developed as below:

H3: Service quality is positive significantly associated to destination competitiveness in rural tourism.

Tourism Infrastructure

Infrastructure refers to the basic facilities, instruments, and installations that must be constructed in order for the public's economic and social systems to work (Dalimunthe et al., 2020). The development of tourism necessitates the completion of infrastructure that supports sustainable development (Mai et al., 2020). Tourism Infrastructure consists of physical facilities and amenities in an area created to serve tourists, community members, and certain specific objectives

(Nguyen, 2021). The availability of tourism infrastructure has a significant impact on travellers' decisions over the choice of travel destination (Chi et al., 2020). Hence, tourism infrastructure is an imperative factor, which can be more important than transportation in attracting tourists arrival (Seetanah, 2006). Studies on the competitiveness of rural tourism destinations are crucial because of the emphasis of the ongoing progress and development of tourism services, along with the development of basic infrastructure (Mustafa et al., 2020). By providing travellers with necessary travel facilities, tourism infrastructure has the potential to increase competitiveness and encourage more tourism revenue (Nguyen, 2021). Therefore, improved infrastructure would enhance tourist travel experiences which indirectly and directly impact tourist arrival rates. Previous investigations has demonstrated the strong correlation between the tourism infrastructure and the competitiveness of destination (Agina & Nwambuko, 2023; Yan et al., 2022). Henceforth, a hypothesis is proposed as follow:

H4: Tourism infrastructure is positive significantly associated to destination competitiveness in rural tourism.

Mobile Technology Use (moderator)

Mobile technology is any portable electronic devices that have a liquid-crystal display (LCD), equipped with many software applications, and able to project digital images by operating with a touch screen or digital keypad. Mobile gadgets that are often used include tablets, mobile phone, laptop computers, and so forth (Fietzer & Chin, 2017). Tourism is an economic sector where mobile technology plays a crucial role. It assists businesses with daily operations, enhances customer experiences, and makes destinations more attractive to potential visitors, thereby promoting sustainable tourism (Giotis & Papadionysiou, 2022). The content that presented by the mobile technology is greatly appreciated by the tourists especially in their trip for the purpose of information seeking, making reservations, ticketing, and many more (Camilleri et al., 2023; Parapanos & Michopoulou, 2023). The use of mobile technology as a moderator variable has yet been noticed in any research to examine the tangible and intangible tourism assets in relation to the competitiveness of rural tourism destinations, despite the growing trend in the tourism sector. However, as a result of the changes of tourist industry by the technology, mobile technology can be an inventive instrument for boosting the competitiveness of tourist destinations and tourism assets by producing more comparative and competitive advantages (Lasisi et al., 2023; Mandić & Garbin Praničević, 2019; Rucci et al., 2022). Being the first, this study explores how leveraging mobile technology use may enhance the tangible and intangible tourism assets in order to boost the competitiveness of rural tourism destinations in Sarawak and Henan. Thus, it is hypothesized that:

H5: Mobile technology use is moderating the relationship between destination appeal and rural tourism destination competitiveness.

H6: Mobile technology use is moderating the relationship between destination image and rural tourism destination competitiveness.

H7: Mobile technology use is moderating the relationship between service quality and rural tourism destination competitiveness.

H8: Mobile technology use is moderating the relationship between tourism infrastructure and rural tourism destination competitiveness.

Based on the abovementioned literature review and formulated hypotheses, the research framework of the present research is depicted in Figure 1.

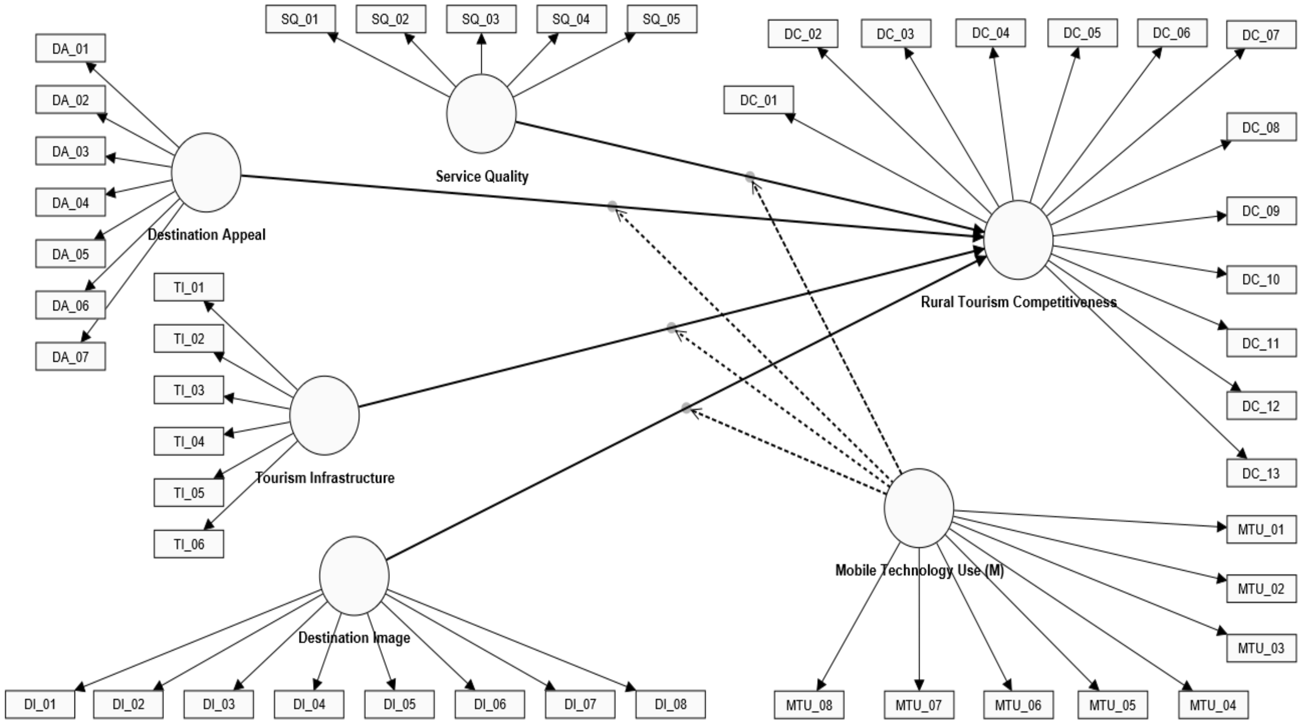

Figure 1. Conceptual framework

METHODOLOGY

The research employed a quantitative methodology, employing numerical assessment and examination to ascertain the potential correlation between the suggested independent variables (destination appeal, tourism infrastructure, destination image, and service quality), dependent variable (rural tourism destination competitiveness), and moderator (mobile technology use). Purposive sampling, a non-probability sampling approach, was used to select respondents. Participants were visitors from Sarawak, Malaysia, and Henan Province, China, who were at least eighteen years old and have visited rural tourism destinations. In Sarawak, the primary study locations include the Annah Rais Bidayuh Longhouse (Kuching), Bario Kelabit Highlands (Miri), Rumah Benjamin Angki (Kanowit), Kampung Po Ai Melugu (Sri Aman), and Bawang Assan Homestay (Sibu). This research was conducted cross-border with researchers from Henan, China. Henan is a significant tourism province in China due to its long history, rich culture, and abundant natural tourism resources (Zhao & Wang, 2021). The province has prioritized tourism growth, rich in rural tourism resources, expanding at a faster pace than Sarawak, making it valuable to compare the two regions (Du et al., 2024). The findings could benefit the rural tourism industry in both areas.

The G*Power software was utilized to figure out the minimum sample size. Grounded on the developed research model, a priori power analysis with a power of 0.95, significance level of 0.05, and medium effect size (0.15) was applied. A minimum sample size of 160 from each region is required. A closed-ended questionnaire has been distributed to the respondents at the selected research sites. The measurement items were adapted from previous research (Chi & Qu, 2008; Dwyer & Kim, 2003; Su et al., 2017). The questionnaire has been divided into two major sections which is Section I and Section II. Section I is designed to collect demographic information about the respondents. Whereby, Section II is developed by the adapted measurement items from past studies, gathering respondents' perceptions of the influence of both tangible and intangible resources on the competitiveness of rural tourism destinations, with mobile technologies serving as a moderating variable. The respondents' level of agreement with the measurement items will be evaluated using a seven-point Likert scale, which goes from 1 (strongly disagree) to 7 (strongly agree).

To promote higher accessibility and a greater survey response rate, this study utilized online platforms: Google Forms in Sarawak and WenJuanXing in China for data collection. The data was gathered between December 1, 2022, and February 28, 2023. The two main statistical software programs that used to analyze the data of the present study are SPSS and SmartPLS. Prior to the measurement and structural analysis, preliminary analysis will be carried out using the SPSS in order to eliminate missing data and straight-line issues. Following that, the research will employ PLS-MGA in compliance with the suggested 5000-bootstrap technique (Hair et al., 2023). SmartPLS software was used for the PLS-MGA analysis. PLS-MGA was used to assess the constructs' validity and reliability and then identify the correlations between the suggested independent, dependent, and moderator variables (Hair et al., 2022, 2023; Henseler et al., 2016).

FINDINGS

Common method bias

In this study, the survey was participated by a total of 535 tourists visited the rural tourism destinations within the study selected regions (i.e., Sarawak and Henan province), nonetheless, as straight-lining responses on a similar scale of 3s were witnesses, thus 10 responses were omitted from further analyses. As a result, only 525 (N=233 from Sarawak and N=292 from Henan) rows of data remained and used for auxiliary analyses. SmartPLS version 4.0 (Ringle et al., 2015) was used to perform PLS-MGA analysis. Additionally, the data was gathered from a single source, thus the test of full collinearity was performed to assess the issue of common method bias (Kock, 2017), where the values of variance inflation factor (VIF) should not surpass 5. According to the findings of the current study, the common method bias is absent as presented in Table 1 (VIF ≤ 5).

Table 1. Testing of full collinearity (Source: Authors' own compilation)

Full Sample (n = 525)				
Destination Appeal	**Destination Image**	**Mobile Technology Use**	**Service Quality**	**Tourism Infrastructure**
2.009	1.747	1.116	2.466	2.090
Sarawak (n = 233)				
Destination Appeal	**Destination Image**	**Mobile Technology Use**	**Service Quality**	**Tourism Infrastructure**
2.272	1.459	1.763	2.141	1.959
Henan Province (n = 292)				
Destination Appeal	**Destination Image**	**Mobile Technology Use**	**Service Quality**	**Tourism Infrastructure**
1.165	1.263	1.069	2.246	2.030

Assessment of the measurement model

Numerous evaluations based on the research model were carried out to guarantee the reliability and validity of the data obtained. To determine the measuring scales' discriminant validity, convergent validity, and reliability, the confirmatory factor analysis (CFA) was performed. Table 2 illustrates that all items' loadings and average variance extracted (AVE) satisfied the minimum criteria of 0.50 (Bagozzi et al., 1991; Fornell & Larcker, 1981). Additionally, the composite reliability (CR) of all the constructs reached 0.70 or higher (W. W. Chin, 2010), confirming the internal consistency.

Moreover, Heterotrait-Monotrait (HTMT) criterion (Table 3) is a more reliable and accurate method in determining discriminant validity (Henseler et al., 2015). The correlation between two constructs is estimated using the HTMT criterion under the assumption of perfect measurement (i.e. perfect reliability). This correlation, also known as the disattenuated correlation, reflects the true correlation between the constructs and free from measurement error. A disattenuated correlation of 1 signifies a lack of discriminant validity between the two constructs (Hair et al., 2022).

Table 2. The summary of the constructs' validity and reliability (Note: Items with low loading were omitted - DEL = Omitted)

Construct	Item(s)	Loading	CR^a	AVE^b	Loading	CR^a	AVE^b	Loading	CR^a	AVE^b
		Full sample (n = 525)			Sarawak (n = 233)			Henan Province (n = 292)		
Destination Appeal	DA_01	0.826	0.939	0.687	0.762	0.856	0.500	0.787	0.901	0.568
	DA_02	0.821			0.697			0.808		
	DA_03	0.853			0.709			0.816		
	DA_04	0.876			0.726			0.821		
	DA_05	0.857			DEL			0.793		
	DA_06	0.791			0.636			0.615		
	DA_07	0.776			0.702			0.596		
Destination Image	DI_01	0.642	0.893	0.545	0.675	0.864	0.515	0.513	0.822	0.486
	DI_02	DEL			DEL			DEL		
	DI_03	0.719			0.763			DEL		
	DI_04	0.694			DEL			DEL		
	DI_05	0.802			0.788			0.825		
	DI_06	0.756			0.678			0.718		
	DI_07	0.790			0.686			0.767		
	DI_08	0.753			0.709			0.617		
Mobile Technology Use	MTU_01	DEL	0.856	0.604	0.657	0.877	0.506	DEL	0.814	0.475
	MTU _02	DEL			0.791			DEL		
	MTU _03	DEL			DEL			DEL		
	MTU _04	0.571			0.732			0.897		
	MTU _05	0.813			0.681			0.640		
	MTU _06	0.871			0.732			0.553		
	MTU _07	0.818			0.663			0.575		
	MTU _08	DEL			0.715			0.724		
Rural Tourism Destination Competitiveness	DC_01	0.763	0.936	0.532	0.646	0.932	0.515	0.671	0.904	0.516
	DC_02	0.652			0.646			DEL		
	DC_03	0.796			0.659			0.761		
	DC_04	0.784			0.689			0.762		
	DC_05	0.827			0.820			0.833		
	DC_06	0.769			0.756			0.726		
	DC_07	0.761			0.826			0.757		
	DC_08	0.788			0.747			0.776		
	DC_09	0.738			0.759			0.504		
	DC_10	0.755			0.525			0.621		
	DC_11	0.624			DEL			DEL		
	DC_12	0.637			DEL			DEL		
	DC_13	0.530			DEL			DEL		
Service Quality	SQ_01	0.579	0.843	0.525	0.617	0.852	0.538	0.737	0.837	0.571
	SQ_02	0.833			0.704			0.828		
	SQ_03	0.884			0.799			0.892		
	SQ_04	0.628			0.745			DEL		
	SQ_05	0.649			0.786			0.508		
Tourism Infrastructure	TI_01	0.758	0.934	0.704	DEL	0.830	0.500	0.780	0.949	0.758
	TI_02	0.838			0.658			0.859		
	TI_03	0.860			0.703			0.903		
	TI_04	0.829			0.599			0.882		
	TI_05	0.875			0.737			0.888		
	TI_06	0.869			0.810			0.907		

Table 3. The Constructs' Discriminant Validity (HTMT Criterion) (Note: DA: Destination Appeal; DI: Destination Image; MTU: Mobile Technology Use; DC: Rural Tourism Destination Competitiveness; SQ: Service Quality; TI: Tourism Infrastructure)

Full Sample (n = 525)	**DA**	**DI**	**MTU**	**DC**	**SQ**	**TI**
DA						
DI	**0.639**					
MTU	**0.187**	**0.169**				
DC	**0.690**	**0.723**	**0.195**			
SQ	**0.651**	**0.664**	**0.134**	**0.634**		
TI	**0.523**	**0.430**	**0.063**	**0.484**	**0.826**	
Sarawak (n = 233)	**DA**	**DI**	**MTU**	**DC**	**SQ**	**TI**
DA						
DI	**0.141**					
MTU	**0.100**	**0.157**				
DC	**0.510**	**0.261**	**0.162**			
SQ	**0.304**	**0.538**	**0.165**	**0.609**		
TI	**0.311**	**0.357**	**0.111**	**0.541**	**0.840**	
Henan (n = 292)	**DA**	**DI**	**MTU**	**DC**	**SQ**	**TI**
DA						
DI	**0.572**					
MTU	**0.670**	**0.465**				
DC	**0.355**	**0.663**	**0.365**			
SQ	**0.769**	**0.500**	**0.690**	**0.336**		
TI	**0.795**	**0.345**	**0.611**	**0.249**	**0.775**	

Furthermore, the findings on convergent validity from the Sarawak and Henan as well as the full sample are shown, revealing that the measurement model provided adequate proof of validity and reliability.

Assessment of the measurement invariance

The measurement invariance of composite models (MICOM) is a crucial initial evaluation that must be completed before the beginning of multi-group analysis (MGA). This step is vital to ensure that the research models produce consistent results, despite of whether the characteristics are identical or varying. In the current study, the proposed research model was assessed using this invariance test to guarantee that both respondents from both Sarawak and Henan interpret the measurements in a similar manner. Following the guidelines of (Henseler et al., 2016), the MICOM process typically includes three steps: configural and compositional invariance tests, as well as examining the equality of means and variances. Table 4 reveals that the factor structure and the number of constructs and measurement items loaded in the measurement models for Sarawak and Henan were the same.

Testing for configural invariance between the Sarawak and Henan was part of the MICOM analysis. Subsequently, a permutation test was employed to evaluate compositional invariance in order to guarantee the composite scores of the two groups were identical. In the present research model, compositional invariance is indicated by the c value of 1 and falls within the 95% confidence interval, which is presented in Table 4.

Lastly, the equality of composite mean values and variances between the two visitor groups (actual and potential) was assessed and is presented in Table 4. The ratios of composite mean values and variances for each construct did not significantly differ, according to the statistical results. Therefore, the model estimates are consistent for both Sarawak and Henan, demonstrating the richness and relevance of related components.

Table 4. The findings of MICOM

Composite	**cValue (=1)**	**95% Confidence Interval**	**Compositional Invariance**
Destination Appeal	1.000	[0.999; 1.000]	Yes
Destination Image	1.000	[0.996; 1.000]	Yes
Mobile Technology Use	1.000	[0.920; 1.000]	Yes
Rural Tourism Destination Competitiveness	1.000	[0.998; 1.000]	Yes
Service Quality	1.000	[0.992; 1.000]	Yes
Tourism Infrastructure	1.000	[0.998; 1.000]	Yes
Composite	**Difference of the Composite's mean value (=0)**	**95% Confidence Interval**	**Equal Mean Values**
Destination Appeal	0.002	[-0.147; 0.146]	Yes
Destination Image	0.000	[-0.157; 0.143]	Yes
Mobile Technology Use	0.001	[-0.155; 0.148]	Yes
Rural Tourism Destination Competitiveness	-0.002	[-0.143; 0.151]	Yes
Service Quality	-0.001	[-0.145; 0.141]	Yes
Tourism Infrastructure	-0.005	[-0.150; 0.136]	Yes
Composite	**Difference of the Composite's variance ratio (=0)**	**95% Confidence Interval**	**Equal Variances**
Destination Appeal	0.002	[-0.175; 0.165]	Yes
Destination Image	0.003	[-0.179; 0.193]	Yes
Mobile Technology Use	-0.005	[-0.223; 0.190]	Yes
Rural Tourism Destination Competitiveness	0.004	[-0.200; 0.208]	Yes
Service Quality	-0.003	[-0.181; 0.173]	Yes
Tourism Infrastructure	0.003	[-0.191; 0.184]	Yes

Evaluation of the structural model

Using SmartPLS version 4.0 (Ringle et al., 2024), the outcomes of the hypothesis testing are displayed in Figure 2 and Table 5. T-values for one-tailed hypothesis tests should typically be at least 1.645 ($p < 0.05$) or 2.33 ($p < 0.01$). Based on the current statistical data for the full sample, four of the eight direct relationship hypotheses were found to be supported. This suggests that there is a direct and positive relationship between destination competitiveness of rural tourism and destination attractiveness (H1), destination image (H2), and service quality (H3).

Table 5. Hypotheses testing's summary (Note: DA: Destination Appeal; DI: Destination Image; MTU: Mobile Technology Use; DC: Rural Tourism Destination Competitiveness; SQ: Service Quality; TI: Tourism Infrastructure; S: Support; NS: Not Support)

		Full Sample (n = 525)			**Sarawak (n = 233)**			**Henan (n = 292)**		
H	**Path**	**Std. Beta**	***t*-value**	**Decision**	**Std. Beta**	***t*-value**	**Decision**	**Std. Beta**	***t*-value**	**Decision**
H1	DA → DC	0.347	7.941	**S**	-0.033	0.381	NS	0.337	7.787	**S**
H2	DI → DC	0.322	7.412	**S**	0.495	7.480	**S**	0.041	0.788	NS
H3	SQ → DC	0.143	2.739	**S**	0.035	0.477	NS	0.257	3.623	**S**
H4	TI → DC	0.066	1.452	NS	0.057	0.702	NS	0.206	3.284	**S**
H5	MTU * DA → DC	-0.016	0.390	NS	-0.096	1.240	NS	0.048	0.855	NS
H6	MTU * DI → DC	0.142	2.713	**S**	0.142	2.055	**S**	-0.058	1.106	NS
H7	MTU * SQ → DC	0.033	0.722	NS	0.000	0.001	NS	0.028	0.349	NS
H8	MTU * TI → DC	-0.131	2.923	NS	-0.046	0.694	NS	-0.110	1.723	NS

Furthermore, it was discovered that the association between destination competitiveness of rural tourism and destination appeal (H6) was moderated by the mobile technology use. Subsequently, Table 6 presents the coefficient of determination (R2) for the intention to stay at urban homestays was 0.576 for the full sample, 0.377 for Sarawak, Malaysia, and 0.450 for Henan, China. This means that over 57.67%, 37.7%, and 45% of the constructs were explained, respectively, suggesting a substantial model (Cohen, 1988).

Table 6. Results of Q^2, $R^{2,}$ and f^2

Construct	**Full Sample (n = 525)**		**Sarawak (n = 233)**		**Henan (n = 292)**	
	R^2	f^2	R^2	f^2	R^2	f^2
Destination Appeal		0.141		0.001		0.178
Destination Image		0.140		0.269		0.002
Mobile Technology Use		0.014		0.011		0.025
Tourism Infrastructure		0.005		0.003		0.038
Service Quality		0.020		0.001		0.053
Rural Tourism Destination Competitiveness	0.576		0.377		0.450	

PLSpredict was then employed to evaluate predictive relevance. This method uses a holdout sample through a 10-fold process to produce individual-level predictions for a construct or item (Shmueli et al., 2019). Predictive relevance is deemed strong if all item in PLS-LM differences is less than those in the linear regression (LM) model. It is deemed moderate if the majority of the differences are lesser. When a small percentage of items satisfy this requirement, the predictive relevance is deemed to be low (Shmueli et al., 2019). The majority of the prediction errors in this PLS model were less than those in the LM model, suggesting a moderate level of predictive power for the entire dataset. Due to the fact that all of their prediction errors were smaller than the LM models, both the Sarawak and Henan showed significant predictive power (Table 7).

Table 7. The result of PLSpredict

Item	**PLS_RMSE**	**LM_RMSE**	**PLS-LM**	**Q^2_predict**
Full Sample (n = 525)				
DC_01	0.888	0.895	-0.007	0.413
DC_02	0.975	0.996	-0.021	0.233
DC_03	1.002	1.010	-0.008	0.384
DC_04	0.942	0.964	-0.022	0.286
DC_05	0.979	1.005	-0.026	0.369
DC_06	0.934	0.961	-0.027	0.288
DC_07	1.010	0.994	0.016	0.316
DC_08	0.913	0.933	-0.02	0.337
DC_09	0.887	0.913	-0.026	0.318
DC_10	0.965	0.998	-0.033	0.296
DC_11	0.953	0.989	-0.036	0.164
DC_12	0.921	0.939	-0.018	0.216
DC_13	0.933	0.956	-0.023	0.143
Sarawak (n = 233)				
DC_01	0.913	0.995	-0.082	0.136
DC_02	0.935	0.974	-0.039	0.108
DC_03	1.000	1.099	-0.099	0.133
DC_04	0.877	0.959	-0.082	0.116
DC_05	0.966	1.020	-0.054	0.228
DC_06	0.786	0.841	-0.055	0.146
DC_07	0.914	0.953	-0.039	0.233
DC_08	0.882	0.927	-0.045	0.151
DC_09	0.859	0.947	-0.088	0.174
DC_10	0.969	1.052	-0.083	0.206
DC_11	0.933	1.009	-0.076	0.125
DC_12	0.896	0.977	-0.081	0.175
DC_13	0.926	1.020	-0.094	0.051
Henan Province (n = 292)				
DC_01	0.866	0.844	0.022	0.263
DC_02	1.012	0.986	0.026	0.208
DC_03	0.945	0.966	-0.021	0.174
DC_04	0.935	0.968	-0.033	0.283
DC_05	1.036	1.041	-0.005	0.119
DC_06	1.020	0.991	0.029	0.286
DC_07	0.886	0.904	-0.018	0.268
DC_08	0.876	0.906	-0.03	0.074
DC_09	0.943	0.962	-0.019	0.116
DC_10	0.866	0.844	0.022	0.263

Assessment of the group differences

The analysis proceeded with a PLS-MGA, utilizing the Welch-Satterthwait Test, to explore discrepancies between Sarawak and Henan provinces (Sarstedt et al., 2011). Path coefficient variances between these datasets are detailed in Table 8. The initial purpose of this study was to evaluate the differences across proposed hypotheses, specifically whether the influence of each determinant on destination competitiveness is more pronounced of rural tourism in Sarawak compared to Henan province. According to the statistical findings (refer to Table 8), hypotheses H2 and H6 were substantiated.

Table 8. Areas' Path differences (Note: DA: Destination Appeal; DI: Destination Image; MTU: Mobile Technology Use; DC: Rural Tourism Destination Competitiveness; SQ: Service Quality; TI: Tourism Infrastructure)

Hypothesis	**Path**	**Sarawak**	**Henan**	***p*-Value**
		Beta	Beta	
H1	DA → DC	-0.033	0.337	0.000
H2	DI → DC	0.495	0.041	0.000
H3	SQ → DC	0.035	0.257	0.003
H4	TI → DC	0.057	0.206	0.073
H5	MTU * DA → DC	-0.096	0.048	0.348
H6	MTU * DI → DC	0.142	-0.058	0.003
H7	MTU * SQ → DC	0.000	0.028	0.235
H8	MTU * TI → DC	-0.046	-0.110	0.002

Notably, the path coefficient for H2 was significantly higher in Sarawak (β = 0.495) than in Henan province (β = 0.041). Similarly, for H6, Sarawak exhibited a stronger path coefficient (β = 0.142) compared to Henan province (β = -0.058). Conversely, the remaining hypotheses indicated weaker path coefficients in Sarawak than in Henan province.

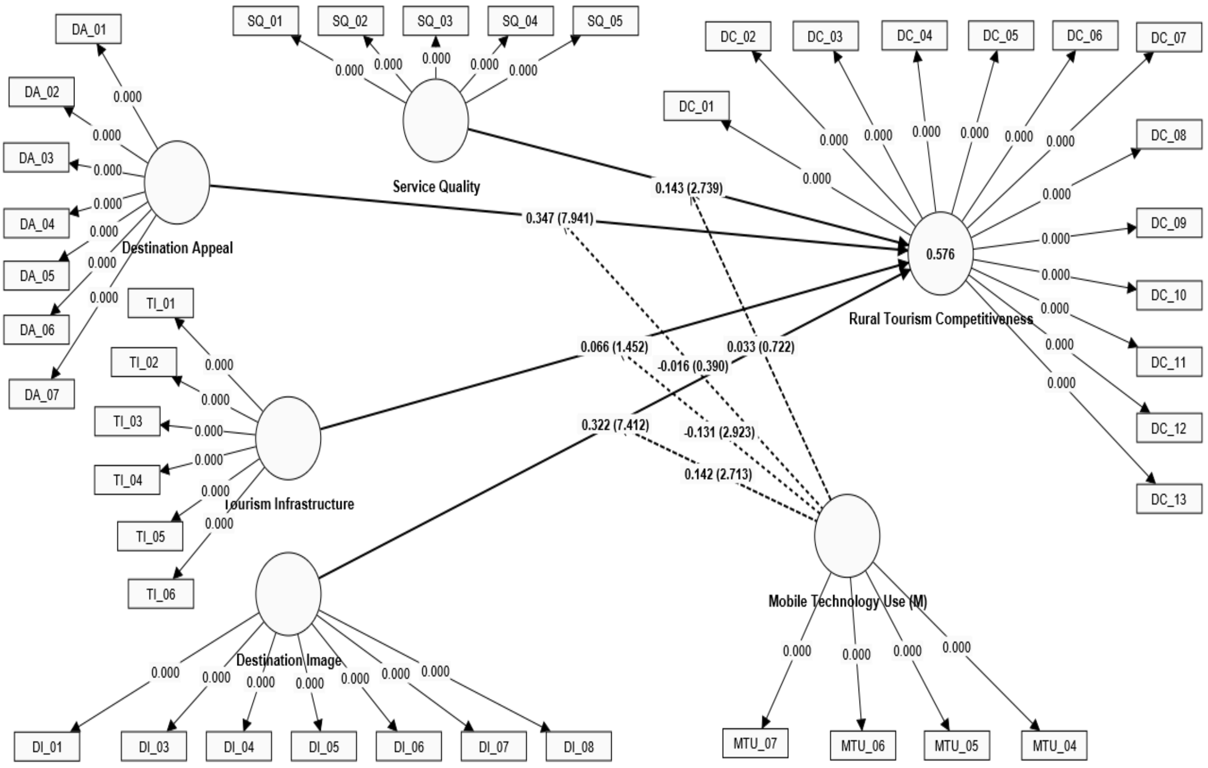

Figure 2. The proposed conceptual model with path coefficients and *t*-values of full sample

DISCUSSION

Using mobile technology use as a moderating variable, the current study examined the tangible (destination appeal and tourism infrastructure) and intangible (destination image and service quality) assets with regard to the competitiveness of rural tourism destinations. Eight hypotheses were developed to predict the proposed relationships. Table 5 and Figure 2 presented the result and the decision of the current study.

As indicated in Table 5, in accordance with full sample's result, H1 (destination appeal; β: 0.347, t: 7.941), H2 (destination image; β: 0.322, t: 7.412), H3 (service quality; β: 0.143, t: 2.739) is significantly associated to destination competitiveness of rural tourism. Hence H1, H2 and H3 are deemed as supported. This result is parallel with the past studies (Ferreira & Perks, 2020; John et al., 2023; Mustafa et al., 2020; Slocum, 2023; Wilde & Cox, 2008). Furthermore, the association between destination image and destination competitiveness of rural tourism is moderated by mobile technology use (β: 0.142, t: 2.713), supporting H6. This result also corresponds with the conclusions drawn from prior studies (Lasisi et al., 2023; Mandić & Garbin Praničević, 2019; Rucci et al., 2022).

Surprisingly, H4 (tourism infrastructure; β: 0.066, t: 1.452) is found to be not supported in full sample. To narrow it down, H4 is supported in Henan province, China (β: 0.206, t: 3.284) but found to be insignificant in Sarawak, Malaysia (β: 0.057, t: 0.702). This might be due to the infrastructure's quality difference. Tourism infrastructure is one of the significant supporting factor for destination competitiveness as evidence by previous studies (Chambers, 2010; Rheeders, 2022). The full sample found to be not supported might due to Sarawak's less developed infrastructure especially at the rural area to support the competitiveness (Bernama, 2023a, 2023b). Whereas, Henan province has one of the best infrastructure at the rural area in China (Zhou et al., 2023). Therefore, the result reflected that Henan is found to be supported but not Sarawak may be due to the different quality of the infrastructure of both areas.

Moreover, it is discovered that the relationship between destination appeal and destination competitiveness of rural tourism is not moderated by the use of mobile technology, which disproves H5 (β: -0.016, t: 0.390). This hypothesis is rejected in both area (Sarawak; β: -0.096, t: 1.240) (Henan; β: 0.048, t: 0.855).

The reason behind may because mobile technology usually used for information seeking, information sharing and making reservation in in a trip (Fan et al., 2019). Whereby, the fundamental of destination appeal in the rural tourism setting is the tangible attraction of the destination such as natural resources or man-made facilities which the tourists can feel, see, smell, and touch (Lee et al., 2009; Nooripoor et al., 2021). Therefore, information seeking and sharing provided by mobile technology maybe a tool to know about the destination attractions, but it cannot be enhancing the destination appeal in terms of providing complete tourism experience involving human senses. However, in order to ensure a satisfaction of a tourists, great tourism experience is needed (Liu et al., 2023), whereby tourists' satisfaction is one of the core factor that influence destination competitiveness (Bernini et al., 2020). Thus, the use mobile technology cannot moderate destination appeal and destination competitiveness of rural tourism.

Furthermore, it is discovered that there is no discernible moderating influence of mobile technology use on the association among service quality and the destination competitiveness of rural tourism (β: 0.033, t: 0.722). Henceforth, H7 is rejected with both rejected result from Sarawak (β: 0.000, t: 0.001) and Henan (β: 0.028, t: 0.349).

The result may suggest that service quality is basically based on the human interaction and hospitality of the service providers. There are some parts of the services can be delivered by mobile technology, but the core services need the human touch to deliver. As articulated by Li et al. (2021), technology may be useful in some part of service delivery, but its unsociability, lack of humanity, and psychological loss are the disadvantages of the tourists receive the services from technology. Tourism is a cultural, social, and economical phenomenon that people travel to other places for different experiences (Baggio, 2019). Therefore, the core service quality delivery should be by human and built facilities to allow the tourists experience the local culture and hospitality, whereas the mobile technology can only assist in certain part of service delivery. This may explain the insignificant of mobile technology use in moderating service quality and destination competitiveness of rural tourism.

Finally, the outcomes suggested that the association among tourism infrastructure and destination competitiveness of rural tourism is negatively moderated by the use of mobile technology, indicating that H8 (β: -0.131, t: 2.923) with both Sarawak (β: -0.046, t: 0.694) and Henan (β: -0.110, t: 1.723) has been rejected. This result may suggested that although mobile technology can provide information about the infrastructure (Akdu, 2020; Fan et al., 2019), but there is no direct influence toward the quality and availability of the infrastructure itself. The idea of smart tourism is integrating mobile technology into physical infrastructure to provide the better service to the tourists by equipping the information only (Park et al., 2020). However, the mobile technology has yet to be able to directly manage the infrastructure as the complexity and difficulty of integrating mobile technology into the existing management system (Han et al., 2021). This could be the cause of the negative moderating effect that mobile technology use has in the association among destination competitiveness and tourism infrastructure in rural tourism. Many improvements and innovations in mobile technology are needed to be fully integrated into the tourism infrastructure in order to provide good travel experience to the tourists.

CONCLUSION

In conclusion, this study suggests the destination competitiveness of rural tourism is positively and strongly correlated with tangible tourism asset (destination attractiveness) and intangible assets (destination image and service quality). In addition, the employment of mobile technology use positively moderates the association between destination image and destination competitiveness of rural tourism. The disparate findings between Sarawak and Henan indicate notable differences in each region's tourism resources. As a result, this study offers vital empirical evidence for assessing the competitive of both Malaysia and China's rural tourism.

Implications

The present investigation is expected to contribute to the current literature as well as the theory of the competitiveness in the form of providing more insights to the destination topic related to destination competitiveness. The result serves as an important reference for scholars who are interested in extending the study of destination competitiveness especially in the field of rural tourism. The result also serves as empirical evidence to prove the recommendations of Theory of Competitiveness. Other than that, the tourism practitioners from Sarawak, Malaysia and Henan province, China can use the current study as a reference in decision making especially in policy making and marketing strategy. The ICT developer can refer the current study in developing the mobile technology, such as a better way to integrate mobile technology into the tourism infrastructure.

Limitations

The current research is limited in terms of research sites as there is only two areas (Sarawak & Henan) were selected from Malaysia and China. Besides, the current study only limited in the tourism assets such as destination image, destination appeal, service quality, and tourism infrastructure to determine the destination competitiveness. There are many more factors to destination competitiveness of rural tourism were not included in the current investigation. Furthermore, this study adopted the cross-sectional study which the data was gathered in same period of time, whereas the perception of the respondents may differ in different period of time.

Directions of future research

It is advised that in order to obtain more comprehensive data to ensure higher accuracy of the findings, future research can be expanded to include additional states in Malaysia and provinces in China. Moreover, many tourism assets such as natural resources, cultural heritage, and accommodation that can determine the destination competitiveness can be included in the future study. Lastly, the future study can adopt longitudinal approach to collect more comprehensive and accurate data.

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DEFINING A SUSTAINABLE TOURISM PERSPECTIVES IN EASTERN PART OF BALKHASH-ALAKOL BASIN

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Abstract: This study focuses on the existing shortcomings of greening, absence of parks for long-term development of Eastern part of the Balkhash-Alakol Basin (Destination). We identifyed these issues through GIS analysis. And study aims to underline the importance of Destination's green development. We had done verification visually by radar and optical images by using GIS technology, as well as by field survey methods land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Eastern part of the Balkhash-Alakol Basin. In addition, using GIS analysis we identified Destination's area growth from 944 to 1 437 square meters (in the period from 2013 to 2023). In order to define Destination's sustainable perspectives, we carried out regression analyses of air traffic of domestic and international destinations with the correlation of national currency to USD. Analyses show that regression reveals a 38.9% of error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly 60 % of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the national currency rate (Tenge) to USD. Given the Destination's growth and the variability in domestic, international passenger numbers, it is necessary to create conditions for the development of Alternative Ecosystem Services in the form of specialized green parks, green lanes, and tourist pathways. This approach can lead to the creation of green areas and parks that not only provide recreational opportunities but also contribute to the conservation of biodiversity, cultural integrity and the overall well-being of the local community. Also, considering the existing environmental issues, an important perspective is to sustain the life cycle of the Destination in the stage of green development.

Keywords: the GIS analyses, regression analyses, domestic and international passengers, greening, alternative ecosystem services, sustainable development

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INTRODUCTION

Today, the Republic of Kazakhstan (hereinafter - Kazakhstan) is putting the efforts in the sustainable development way. This development also relates to the natural and unique Tourist Destinations of Kazakhstan. Nowadays Kazakhstan's biodiversity and ecosystems create high economic value for many sectors of the country's economy and stakeholder groups. Kazakhstan has focused on developing knowledge and skills related to the green economy, developing small and medium-sized enterprises and strengthening the capacity of local communities. Additional attention was paid to the introduction of new opportunities such as Eco-tourism, protected areas (Asian Forest Corporation Organization, 2022).

Meanwhile, the Travel & Tourism Competitiveness Reports indicate that there is a fluctuation in the indexes of Environmental Sustainability, Human, cultural and Natural resources of Kazakhstan's tourism competitiveness, and the country having a low score predominantly a decline have been shown in the indexes between 2007 and 2024 (Figure 1). Moreover, Kazakhstan is one of the countries with low forest cover. According to the Committee of Forestry and Wildlife of the Ministry of Ecology, Geology and Natural Resources the Kazakhstan forests occupy 5% of the country's territory, with an area of 13.6 million hectares, saxaul accounts for almost half of this (UNDP Kazakhstan, 2022).

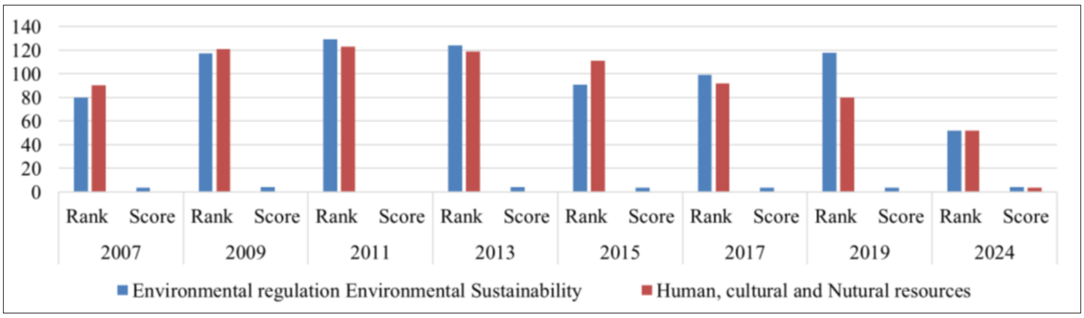

Figure 1. Travel & Tourism Competitiveness Report: Authors' data processing

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[*] Corresponding author

According to the Concept of the development of the tourism industry of Kazakhstan in the tourist season increases the impact on resort areas (destinations). And it is necessary to emphasize the issue of arrangement of tourist routes (walking trails, bicycle routes). Despite the huge potential, except for the territories of state National Natural Parks and Natural Museums-Reserves, many trails are insufficiently equipped, which does not allow tourists to walk comfortably. In order to ensure the safety of tourists and increase the comfort of travel, it is important to ensure that approaches to the development and classification of walking trails throughout Kazakhstan are in compliance with a single standard (Concept of development of the tourism industry of the Republic of Kazakhstan for 2023 - 2029 year, 28.03.2023: 10-12). Maintaining tourism and environment are balanced, it helps to create socio-ecological resilience of an area (Heslinga et al., 2020).

Furthermore, there are also issues of rational use of water resources in Protected Natural Territories (Tourist Destinations) of Kazakhstan in the way of green and sustainable development. On of the beautiful Tourist Destination surrounded by Lake Alakol (hereinafter – The Destination), there are numerous islands, rafts, spits, coastal and emergent vegetation attract masses of nesting and migrating birds. The region is a crossroads of migration routes for bird populations traveling on the one hand, to winter in India from Central and Northern Kazakhstan and Western Siberia, on the one hand, and to the Arabian Middle Eastern and North African wintering grounds on the other (Fauna and flora of Lake Alakol, Research Institute for Environmental Problems, 2014). And Lake Alakol is underlined as one of the attractive lakes for recreation. According to indicative analysis, presumably in the future in average and short-water years should be expected to reduce the level of Lake Alakol (Results of water management estimates, the General Scheme of integrated use and protection of water resources, legal acts Republic of Kazakhstan, 2016).

There are not enough natural woodlands, the main ecological impact from tourists affects directly on Lake Alakol located in the Destination. The shoreline of the lake is eroding every year and the lake itself is getting more polluted. In this regard, nature protection measures should be developed in the territory of the Destination. And for the local and foreign tourists coming to the Destination, there are main tourism activities seaside viewing and swimming.

Climatic conditions surrounding the lake are sharply continental, which is characterized by semi-arid zone of East Kazakhstan, also the landscape of the lake is not afforested surface with steppe type of vegetation cover (Jiyenbekov et al., 2019). Also, the Destination has faced significant anthropogenic impacts in recent decades, extensive flooding and loss of agricultural land surrounding Alakol Lake (Valeyev et al., 2019). The area suffers from environmental issues, particularly anthropogenic pressures on aquatic Ecosystem services and shorelines.

Maximum observed water temperature and minirilization of Lake Alakol were assessed as the main environmental variables affecting fish distribution on a local scale. Environmental change leads to homogenization of the fish fauna as a result of the disappearance of rare species and invasion of alien organisms (Mamilov et al., 2021).

Study of the Ecological condition of Lake Alakol in Zhetysu region shows that concentrations of heavy metals in soil samples taken from the shores of Lake Alakol is twice as high as the maximum permissible concentration for cobalt, and 1.75 - 3.67 times higher than the maximum permissible concentration for manganese (Seitova et al., 2023).

Degradation of zonal natural geosystems of the Destination, primarily alluvial and foothill alluvial-proluvial plains, causes a decrease in the number of plant and animal species inhabiting the geosystem. Given above, there is a need to develop Eco-tourism in the Destination. The development of Eco-tourism requires specialized green parks and green areas. For example, the creation of Eco Park can contribute to the long-term development of the Destination.

And prolongation of the life cycle of the Destination with considering environmental issues, such as the preservation of Lake Alakol by offering Alternatives Eco System Services of the specialized green parks. In addition, we conducted statistical calculations Destination's area with the comparison National currency rate to USD. Here, we carried out the Table 1 of Destination area grows for 2013 to 2023 and National currency rate to USD (National bank.kz), for the statistical calculations Area is taken by **Y**, Currency rate is **X**, for further calculations Mean value of columns is indicated as - **m**.

Table 1. Destination's area with the comparison National currency rate to USD: Authors data processing (* Natinal bank.kz)

Year	**Area (square meters)**	**USD**	**National currency of the Republic of Kazakhstan ***
	Y		**X**
2013	944	1	152
2014	944	1	179
2015	957	1	222
2016	1 168	1	342
2017	1 279	1	326
2018	1 283	1	345
2019	1 336	1	383
2020	1 338	1	413
2021	1 426	1	426
2022	1 434	1	460
2023	1 437	1	456
m	**1231**		**337**

As result, we have all the need parameters for Covariance calculation (Coefficient of variation, a statistical measure) in Microsoft Excel 2010 (Table 2). Here, in Microsoft Excel 2010 we can find the COV operator, which looks like:

COV = (Y-Ym) (X-Xm) / (X-Xm)2* (Y-Ym) 2) ^ 0,5

There are, Y- dependent variable; X-Independent variable; Xm-mean of X; Ym-mean of Y.

Final, operations with COV operator in Microsoft Excel 2010 returns us the Covariance between the Destination area grows and National currency rate to USD as: **Cov 0,973275209**

Table 2. Covariance calculation: Authors data processing

Y-Ym	X-Xm	(Y-Ym)(X-Xm)	(X-Xm)2	(Y-Ym)2
-287,3	-185	53078.9	34124.2	82562.2
-287,3	-158	45315.0	24877.9	82541.3
-274,0	-115	31435.3	13162.3	75076.0
-63,4	5	-334.5	27.8	4024.2
47,7	-11	-511.3	115.1	2271.8
51,7	8	427.4	68.4	2669.1
104,7	46	4843.1	2141.2	10954.5
106,7	76	8135.5	5817.5	11377.1
194,2	89	17333.5	7969.6	37699.5
202,3	123	24933.6	15196.2	40910.6
205,4	119	24494.3	14226.0	42174.2
		209150.8	**117726.2**	**392260.5**

Covariance 0,9 shows the strong correlation between two data set

According to calculation the growing exchange rate of the USD to National currency may cause the growth of domestic tourism, and air tickets and hotel payments are linked to the given estimates. Also, the growth in the number of tourists in the territory of the Destination is due to the fact that Kazakhstan is transboundary by land routes, the geographical location allows only to reach the seas located far abroad only through air ways.

In turn, the price of airfare is linked to changes in the dollar exchange rate, respectively, the price of accommodation and living expenses are getting more expensive. While local Destinations can be reached by train, train tickets are subsidized from the state budget and therefore are not clearly linked to the dollar exchange rate (National Company Kazakhstan Temir Zholy, 2022). This creates a very high demand for local Destinations. Measurements of the area of the Destination using archived satellite images for 2013 to 2023 and changes in the exchange rate of the national currency against the US dollar show a high correlation between the two independent variables.

STUDY AREA

The Experimental part

The study area is Destination, located on the border of Abay region of the Kazahstan. There is Alakol Lake one of the largest hydrologically closed lakes within the Balkash-Alakol Basin (Figure 2).

The area of the lake Alakol (with islands) is 2,696 square kilometers. The volume of water is 58.56 cubic km. The length of the lake is 104 km, and the width is about 52 km (Jiyenbekov et al., 2019).

Figure 2. Coastal area - Alakol lake (eastern part), captured by Drone DJI Mini 2 (Source: Authors' field survey, 2023)

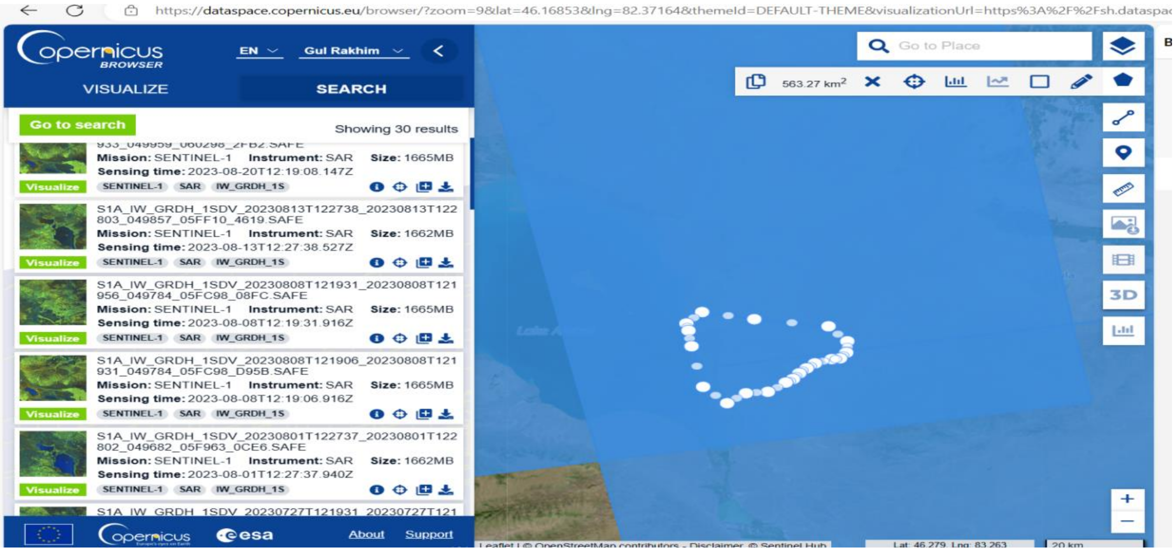
Task for carrying out: Verification visually by Radar and Optical images, as well as by field survey methods land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Destination.

Material and methods: In the experimental part **two sources were used to analyze vegetation (green) cover, the first**, Earth observation component of the European Union's Space Programme **Copernicus** (2024) (Figure 3, 4).

Second, Sentinel – 1 constellation of two imaging Radar Satellites operated by European Space Agency.

Further,S1A_IW_GRDH_1SDV_20230516T121927_20230516T121952_048559_05D73A_FBOE.SAFA satellite image (hereinafter - GRDH) had been choose and derived from **Copernicus** Data Hub (Figure 3). Obtained by the

Copernicus Sentinel-1 satellite level of GRDH in 16 May 2023 allows us to observe the Destination's land surface and coastal areas of Lake Alakol. During experimental work the GRDH was processed by using Sectional Applications Platform SNAP (Figure 5 SNAP, ESA Open Access source Software).



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Showing 30 results

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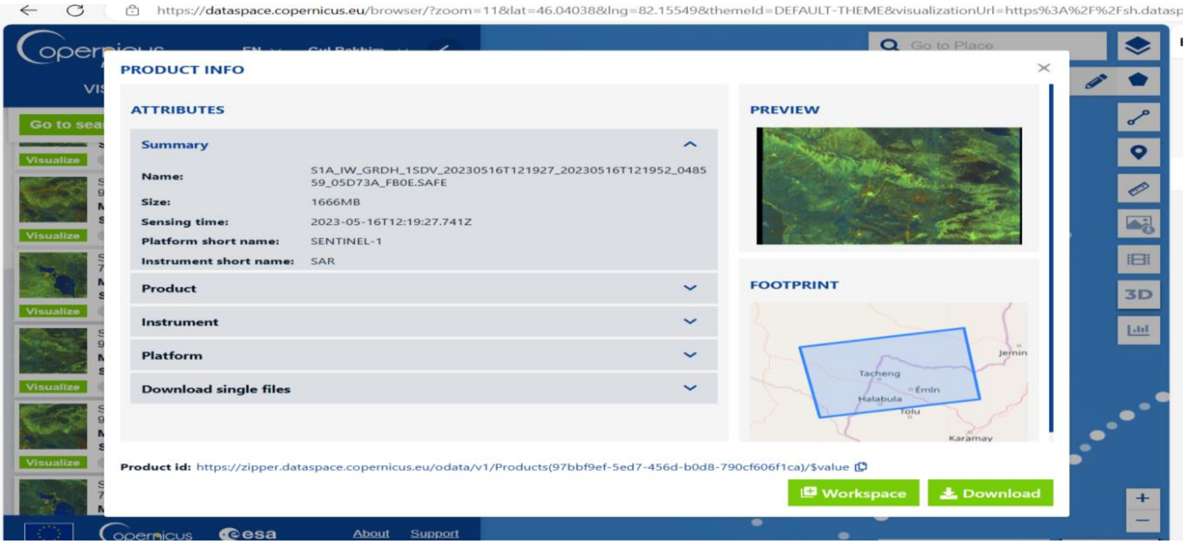
Figure 3. Copernicus Open-Access portal (Source: Authors' data processing)



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PRODUCT INFO

ATTRIBUTES

Summary

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Platform short name: SENTINEL-1
Instrument short name: SAR

Product
Instrument
Platform
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Product id: https://zipper.dataspace.copernicus.eu/odata/v1/Products(97bbf9ef-5ed7-456d-b0d8-790cf606f1ca)/$value

Figure 4. Copernicus Data Hub., GRDH, 2024 (Source: Authors data processing)

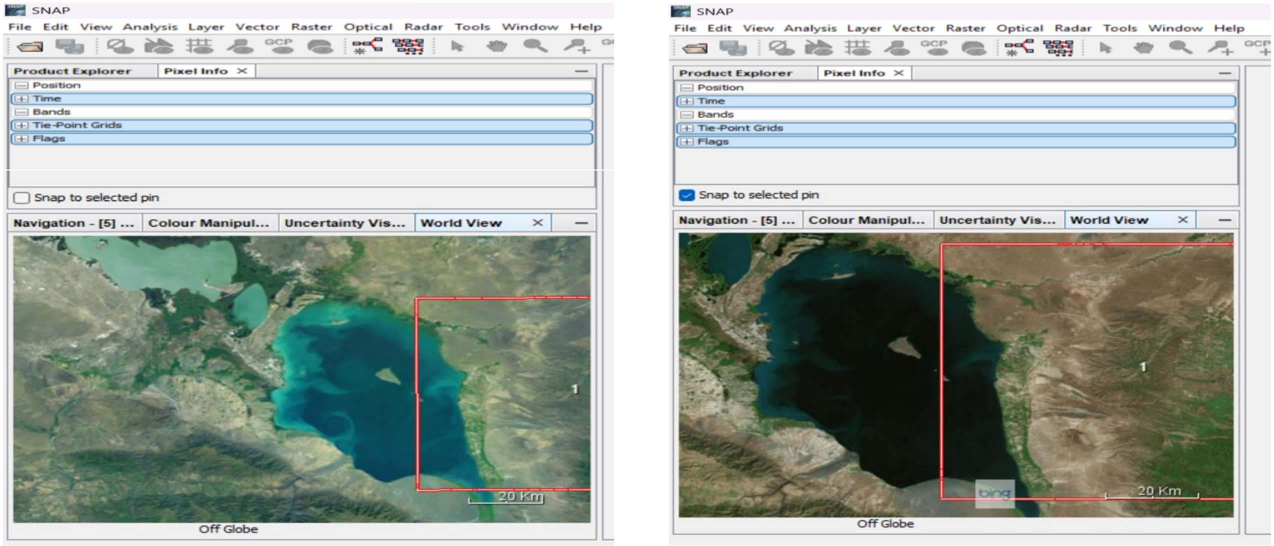
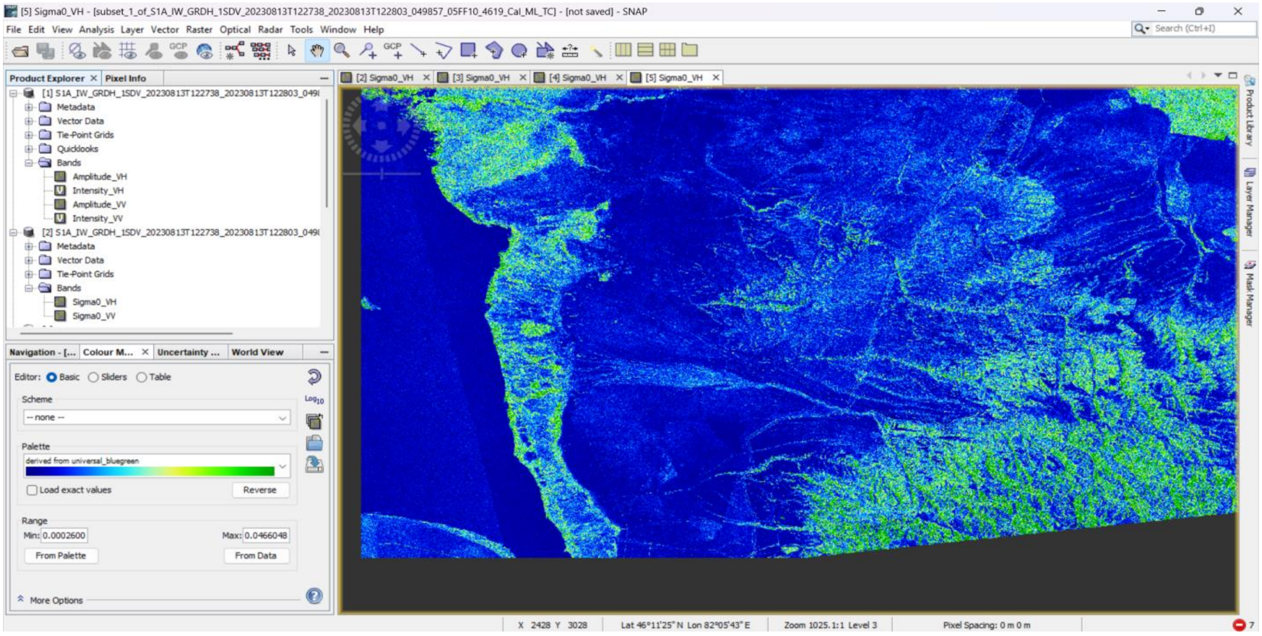


Figure 5. Sectional Applications Platform SNAP (Source: Authors' data processing)

Further, we had made following process in the SNAP: 1) Calibrations of the GRGH; 2) Geometric correction GRGH. As a result, we had received mask - Sigma Nought (Sigma 0). Further, Sigma 0 level data had been exported to Google Earth Software (Geographic Information Systems, Free Software), as a result we were able to analyze the areas with green coverage along the Alluvial Fans of the Tasty River. We was able to review that the Destination is dominated by wide homogeneous flatlands, the absence of forest cover (timber species), which, when analyzed visually using Google Earth, shows that indeed the territory of the homogenous flatlands are being predominated. Also, according to the visual analysis of the image, shrubbery is observed in the coastal side of the Destination (Figures 6, 7).



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Range Min: 0.0002600 Max: 0.0466048

X 2428 Y 3028 Lat 46°11'25" N Lon 82°05'43" E Zoom 1025.1:1 Level 3 Pixel Spacing: 0 m 0 m

Figure 6. Mask Sigma Note (Sigma O) in the SNAP, January 2024 (Source: Authors' data processing)

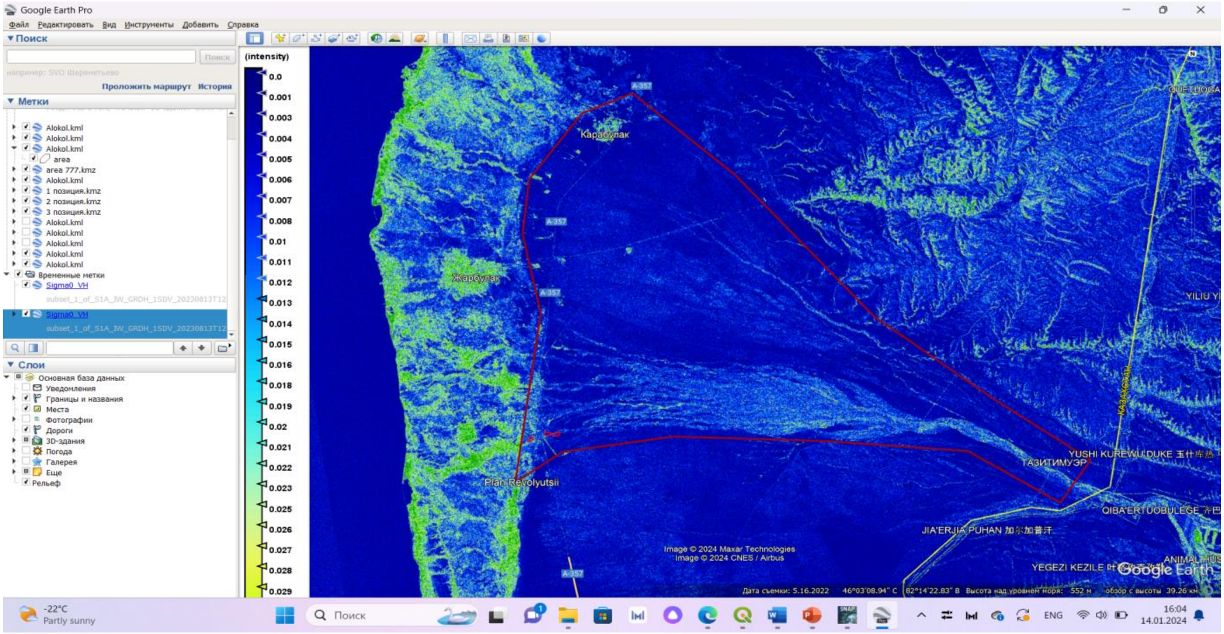

Figure 7. Alluvial Fan of the Tasty River located in the Destination Exported
Sigma Nought (Sigma 0) to Google Earth, January 2024 (Source: Authors' data processing)

In addition, for identifying the factors of Local tourism destinations growing in Kazakhstan, the Landsat 8 Archive Data were browsed in Earth Explorer Web service (https://earthexplorer.usgs.gov), the images were selected for September, the period from 2013 to 2023 years, as this month is the end of the tourist season in this destination.

The following Landsat 8 Satellite images were used:
LC08_L1TP_147028_20130925_20200913_02_T1_B8.TIF;
LC08_L1TP_146028_20140921_20200910_02_T1_B8.TIF;
LC08_L1TP_146028_20150924_20200908_02_T1_B8.TIF;
LC08_L1TP_147028_20160917_20200906_02_T1_B8.TIF;

LC08_L1TP_147028_20170920_20200903_02_T1_B8.TIF;
LC08_L1TP_146028_20180916_20200830_02_T1_B8.TIF;
LC08_L1TP_146028_20190919_20200826_02_T1_B8.TIF;
LC08_L1TP_147028_20200912_20200919_02_T1_B8.TIF;
LC08_L1TP_147028_20210915_20210924_02_T1_B8.TIF;
LC08_L1TP_147028_20220918_20220928_02_T1_B8.TIF;
LC08_L1TP_147028_20230921_20230926_02_T1_B8.TIF

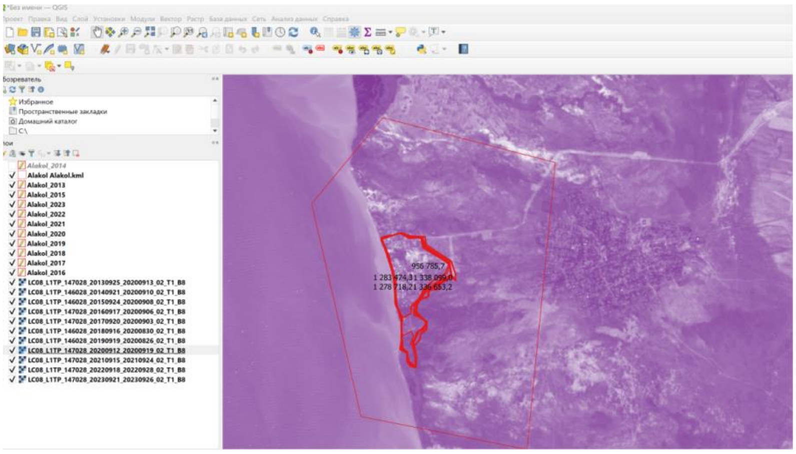

Figure 8. Overlapping analyzes, calculating of the Destination's area by using QGIS (Source: Authors' data processing)

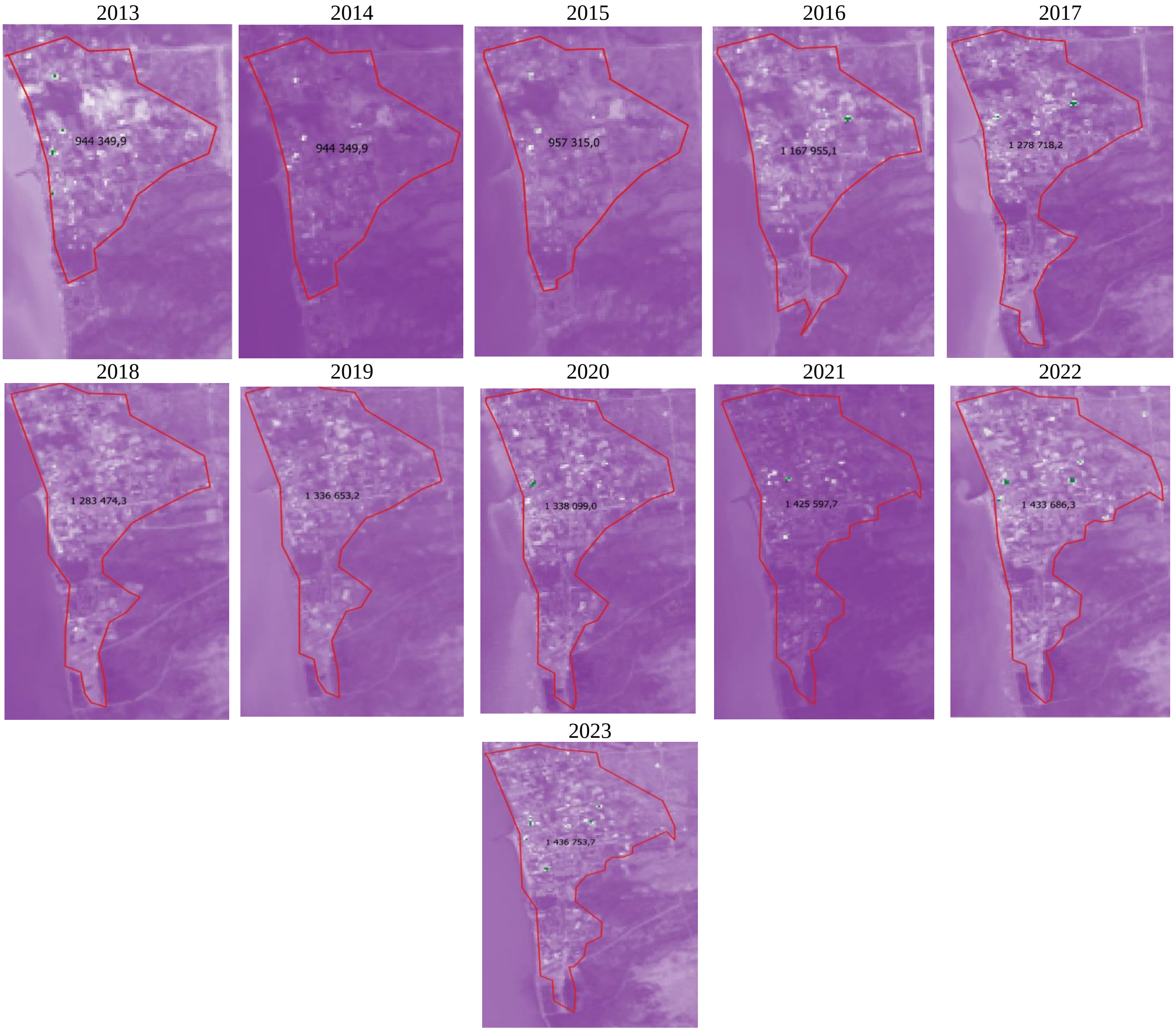

Figure 9. Destination area boundaries (sq. meters) changes for the period from 2013 to 2023 (Source: Authors' data processing)

Further, using the Open-Source Program QGIS vector layers were created and had been done calculation of the Destination's area. The vector data were created for each year from 2013 up to 2023. QGIS uses satellite images from selected layers to analyze spatial data of the studied Destination. The GIS allowed to view area spatial evolution of the Destination, which enabled to create comparative images to analyze the dynamics of the territory development (Figure 8, 9).

FINDINGS

1. Overlapping analyzes, calculating of the Destination's area by using QGIS

According to Overlapping analyzing (Figure 8) had been calculated and found Destination's area growing from **944** to **1 437 square meters (during 2013-2023)**. In accordance with the results obtained, it is possible to predict the environmental load from the increase of accommodation facilities and the number of tourists. The expansion of the territory of the recreation area requires planning the construction of facilities, sanitary and hygienic services without harming the environment.

2. Secondary data analyses on Destination's Area, accommodation and visitors' numbers

Based on official statistical sources for the period of the last 5 years (Bureau for National Statistics, 2019-2023) we are able to review number of visitors served by resort areas during 2019-2023. Residents of Kazakhstan increased their interest on the Destination during and after the COVID-19 pandemic period (NCE "Atameken" news, 2023).

From the Chart given below (Table 3) there was a significant growing number of tourists, which shows the demand for domestic tourism in the territory of the Destination in 2020, 2021. In 2020, according to the resolution of the head of the State Sanitary Doctor of East Kazakhstan region, measures were taken to comply with sanitary and hygienic norms during the stay of tourists, special attention was paid to the occupancy rate that could not exceeding of 50% in places of rest from the design capacity (Vlast.kz, 2020). And it should be noted that recreation on the shores of Lake Alakol in Eastern Kazakhstan in 2020 was allowed only from June 13, despite this number of the visitors reached **40 254** people.

Table 3. Destination statistics for the period from 2019 to 2023 (Eastern part of the Balkhash-Alakol Basin) (Source: Authors' data processing)

#	Year	Number of accommodations (guest houses)	Number of visitors served in the resort areas by the duration of staying (thousands)	Destination's Area (square meters
1	2019	167	143 480	1 336
2	2020	172	40 254	1 338
3	2021	194	95 908	1 426
4	2022	214	160 954	1 434
5	2023	220	204 277	1 437

3. Statistical calculations (multiple regressing) of Domestic and International passenger's number with the comparison the National currency rate to USD

The airline ticket prices of Kazakhstan also remain expensive for consumers (tourists) and are formed on the basis of market pricing mechanisms, where prices can be maintained, increased and decreased depending on demand, advance purchase of an air ticket, day of the week of the flight, flight departure time (Concept of development of the tourism industry of the Republic of Kazakhstan for 2023 - 2029 year, 28.03.2023, p. 13).

The chart of multiple regressing in Excel 2016 with the Number of passengers Domestic transported as Depended variable Y and International passengers as one of the independent variables (X), and the National currency Tenge rate to USD as another independent variable (Z) (Table 4).

Table 4. Domestic and International passenger's number with the comparison the National currency rate to USD (Source: Authors' data processing) (* National bank.kz)

Year	Number of passengers transported mln (Domestic)	Number of passengers transported mln (International)	National currency of the Republic of Kazakhstan to USD*	Predicting of regression dependence between factual domestic passengers and predicted with regression of international and USD rate
	Y	X	Z	Predicted Y
2013	2.12	1.56	152	1.031693801
2014	2.18	1.59	179	1.37482952
2015	2.28	1.58	222	1.856396461
2016	2.09	1.66	342	3.321528595
2017	2.16	2.04	326	3.565058708
2018	2.07	2.25	345	4.018725326
2019	2.81	2.3	383	4.510394755
2020	3.04	0.66	413	3.011807739
2021	5.30	1.16	426	3.722501964
2022	7.00	2.9	460	6.066901951
2023	8.40	3.5	480	6.97016118
				Mean: **38.9%** Error Estimation Rate

Analyzing the linear multiple regression of international and domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, reveals intriguing insights into the dynamics of air travel within the country. The study focuses on understanding the relationships between domestic and international passenger numbers, as well as the impact of fluctuations in the tenge rate to the USD dollar on these variables.

The data collected for this analysis spans a decade, providing a comprehensive view of how these factors have interacted over time. By considering domestic passengers as the dependent variable (Y), international passengers as one of the independent variables (X), and the tenge rate to USD as another independent variable (Z), the regression model aims to capture the influence of both local and global factors on air travel in Kazakhstan.

The results of the regression analysis reveal a **38.9%** of error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly **60 %** of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the tenge rate to USD. However, it also implies that there are other factors at play which are not accounted for in the current model (Table 5).

Table 5. Domestic and International passenger's number with the comparison
the National currency rate to USD (Source: Authors' data processing in Excel 2016)

FINDING OF RESULTS								
Regression statistic								
Multiplicity R		0.809595032						
R-square		0.655444115						
Normalized R-square		0.569305144						
Standard error		1.483082984						
Surveillance		11						
Dispersion analysis								
	df	**SS**	**MS**	**F**		**Significance F**		
Regression	2	33.47317345	16.73658673	7.609147246		0.014094143		
Residual	8	17.59628109	2.199535136					
Total	10	51.06945455						
Coefficients		Standard error	t - Statistics	P - Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	-2.462829259	1.616284043	-1.523760177	0.166072635	-6.189986946	1.264328428	-6.189986946	1.264328428
The variable X1	1.123415692	0.645705208	1.739827522	0.120075851	-0.365583188	2.612414573	-0.365583188	2.612414573
The variable X2	0.011460491	0.004606915	2.487671251	0.037658665	0.000836925	0.022084056	0.000836925	0.022084056
OUTPUT								
Survei-llance	**Predicted Y**	**Residuals**	**Standard residuals**	**Average appro-ximation error**				
1	1.031693801	1.088306199	0.820428347	105.4873256				
2	1.37482952	0.80517048	0.606984217	58.56511437				
3	1.856396461	0.423603539	0.319336922	22.81859226				
4	3.321528595	-1.231528595	-0.928397698	37.07716372				
5	3.565058708	-1.405058708	-1.059214763	39.41193744				
6	4.018725326	-1.948725326	-1.469062199	48.49113009				
7	4.510394755	-1.700394755	-1.281856209	37				
8	3.011807739	0.0281922605272347	0.021252961	0.936057775				
9	3.722501964	1.5774980364	1.189209532	2.37735939				
10	6.066901951	0.933098049	0.703423439	15.38014058				
11	6. 4298388297016118	1.42983882015419	1.07789545	20.51371243				
				38.978				

According to Figure 10 (diagram of prediction), the linear multiple regression of International and Domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, blue line is factual rate and orange is predicted with 38.9% of Error of Prediction.

The findings suggest that there is a significant relationship between international and domestic air passenger traffic in Kazakhstan. As international travel increases, it may have a positive spillover effect on domestic air travel, indicating potential synergies between these two segments. Additionally, the impact of the tenge rate to USD on passenger numbers highlights the importance of macroeconomic factors in shaping air travel trends.

Looking ahead, this analysis provides valuable insights for policymakers, airlines, and industry stakeholders to better understand the dynamics of air passenger transportation in Kazakhstan. By considering the interplay between international and domestic travel patterns, as well as external economic factors like currency exchange rates, decision-makers can make more informed choices to promote sustainable growth in the aviation sector. The linear multiple regression analysis of international and domestic air passenger transportation in Kazakhstan offers a specifically perspective on the complex relationships that drive air travel trends in the country.

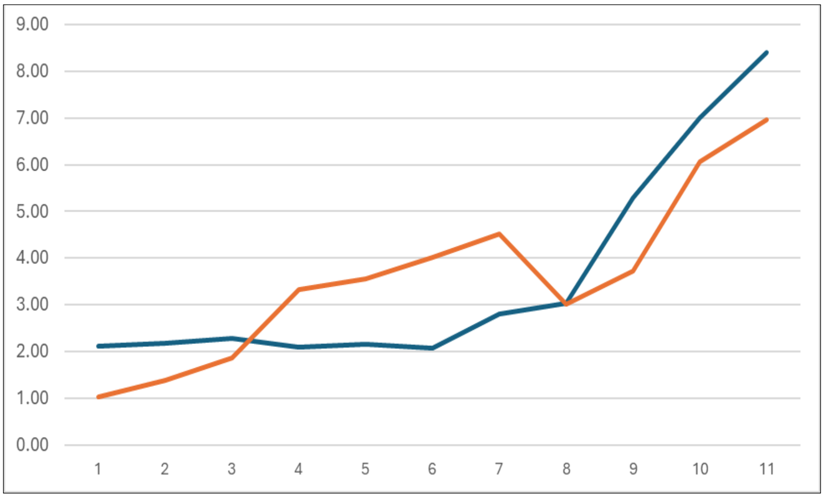

Figure 10. Graph of the linear multiple regression of International and Domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, Blue: Fact Orange: Predicted (Source: Authors' data processing)

By acknowledging the influence of both global and local dynamics, this study contributes to a deeper understanding of the factors shaping the aviation industry and lays the foundation for future research and policy interventions in this critical sector of national tourism in Kazakhstan.

CONCLUSION AND SOME LIMITATIONS

The study has a meaningful contribution for defining tourism perspectives of the Destination.

First of all, land surface cover of the Destination has not been well observed. And there is a lack of research studies on green and forest cover of the Destination. Secondly, we had done verification visually by radar and optical images by using GIS technology, as well as by field survey methods of land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Destination. Moreover, overlapping analysis had been calculated and found Destination's area growing to 1 437 square meters. This research finding will be useful for researchers in order to predict the environmental issues from the increase of accommodation facilities and the number of tourists.

And thirdly, the regression analyses of air traffic of domestic and international destinations with the correlation of National currency to USD has been carried out, it shows that regression reveals a 38.9% error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly 60 % of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the tenge rate to USD. It should be noted that, mainly Aquatic Ecosystem Services of the Lake Alakol are being provided to tourists of the Destination. In this regard, the shoreline of the lake is eroded every year, there are not provision for green construction of facilities, sufficient greenery with a long-term perspective. The following conclusions can be drawn as a result of the research work. Given the Destination's growth and the variability in domestic, international passenger numbers, it is necessary to create conditions for the development of Alternative Ecosystem Services in the form of specialized green parks, green lanes, and tourist pathways (hiking trails, bicycle trails).

This approach can lead to the creation of green areas and parks that not only provide recreational opportunities but also contribute to the conservation of biodiversity, cultural integrity and the overall well-being of the local community.

In addition, the study identified limitations in collecting secondary data for conducting correlation analysis. For example, there is no database on the population of the nearest village located close to the Destination, there are not annual statistics for the period 2013-2023. And further research could include more recommendations on how Alternative Ecosystem Services can contribute to the sustainability of the Destination.

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DIGITALISATION IN ANGLING TOURISM: INTRODUCING NEW TECHNOLOGIES TO A TRADITIONAL TOURISM PRODUCT

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Abstract: In recent years, the use of digital solutions in tourism has accelerated and smart solutions are now used even in areas that are less technology-oriented, such as angling tourism. Angling itself and angling tourism seem rather traditional, definitely not tech-savvy activities, ones that can be categorised among the ecotourism or slow tourism products. It is not to say, however, that angling tourism does not evolve and is immune to the trends released in tourism. Recently there were huge changes in the regulation and organisation of angling in Hungary (and further changes are expected to come), which brought about a surge in the number of anglers in Hungary and the development of angling tourism. By now angling has become by far the hobby in Hungary done by the largest number of people; after a steady growth for decades, the number of registered anglers has by now reached almost one million persons, i.e. approximately ten per cent of the Hungarian population are anglers (and so potential target group of angling tourism), which makes the investigation of the topic of angling tourism really important – not to mention the fact that not only domestic but also inbound angling tourism is characteristic of Hungary. Among the changes, in 2019 the electronic support of angling administration was launched through the so-called HORINFO system run by MOHOSZ, the Hungarian National Angling Association. This paper summarises the changes and their consequences, explores the current digitalisation of angling tourism, its benefits, and examines the acceptance of new technologies by anglers. The results of the research show that the digitalisation and the introduction of new technologies accelerated during the Covid-19 epidemic, but their adoption by angling tourism has been slower. The study shows the importance of digitalisation in monitoring the environmental pillar of sustainability and the interventions needed. The study also provides a thorough investigation of the Hungarian and international literature of angling tourism, rather deficient to date, and gives recommendations on the further development of the HORINFO system. The significance of the issue is enhanced by the fact that Hungary now has a National Angling Development Strategy to strategically found further angling tourism developments.

Keywords: digitalisation, angling tourism, Hungary, sustainability, monitoring

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INTRODUCTION

Angling tourism is still a poorly known and recognised form of tourism, and tourism research has largely ignored the importance of angling tourism, as evidenced by recent literature review by Hannonen and Hoogendoorn (2022). According to this study, less than 100 publications on the management of angling tourism, angling tourism in general and the impact of angling tourism were published between 1993 and 2022, although it has been proved that angling tourism is, contrary to previous assumptions, neither local nor low-income form of tourism, not an individual and not a fixed activity, but also strongly linked to the possibility of using other complementary services (sports, gastronomy, wellness) beyond the needs of family members and accompanying persons, which reinforces its "four-season" character and its significant contribution to the economy (Dérer, 2015; Hannonen & Hoogendoorn, 2022). Angling tourism is widely cited as an area of national economic importance in published international studies (Brown et al., 2012; McManus et al., 2011; Hall, 2021). According to Brainerd (2010), recreational angling has important positive social, economic and environmental impacts in Europe. Hoitsy et al. (2012) consider recreational angling tourism as a complex industry (Ivancsóné Horváth & Bánhidi, 2015).

Between 2013 and 2018, significant changes took place in the regulation and organisation of angling in Hungary. In 2016, the right to fish in natural waters was transferred to angling organisations, which marked the beginning of a new era. The process brought with it a surge in the number of anglers in Hungary (Figure 1) and the development of angling tourism. 2019 was another important milestone, when the electronic support of angling administration was launched by the HORINFO system (Horgász Informatikai Rendszer, i.e. Anglers' IT System). In this paper the authors explore the

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current digitalisation of angling tourism and analyse secondary data to investigate the adoption of new technologies by anglers, and its applicability for sustainability monitoring.

In the period of the Covid-19 epidemic, digitalisation and the introduction of new technologies have accelerated, but their adoption in angling tourism has been slower. The percentage of actual users of new technologies is still only 10-15%, but the widespread use of digitalisation can help to prevent overtourism in certain areas, to integrate previously unexplored areas into angling tourism, and to implement guided fish stocking (Ivancsóné Horváth & Happ, 2023).

LITERATURE REVIEW

Angling tourism is a special active tourism product (Csapó & Gonda 2019), as angling is a licensed activity in Hungary. Angling is open to anyone after successfully passing a free exam. Nowadays, it is an increasingly popular leisure activity, often combined with travel and services, thus fulfilling the conditions of tourism. In 2020, the Covid-19 pandemic showed that it was less vulnerable than many other tourism products, as it was one of the few outdoor activities (along with hiking, trekking and ecotourism) that could be practised even during the closedowns, and this fact led to a large increase in the number of anglers (Figure 1), but even during the economic difficulties of 2022-23, there was only a slight decline.

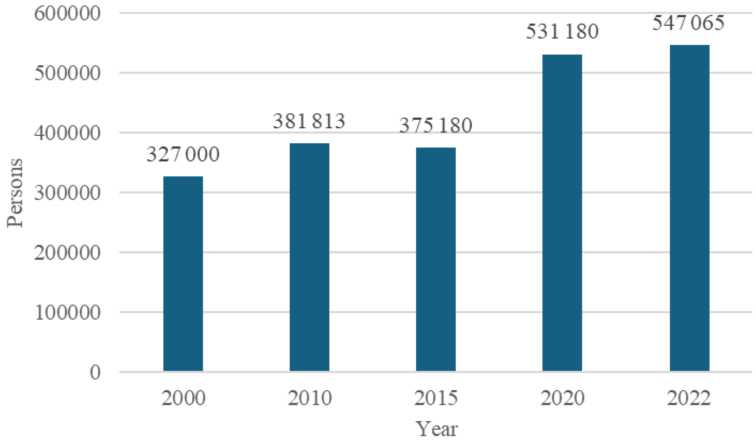

Figure 1. Growth in the number of anglers with state angling licence in Hungary, 2000-2022
(Source: Own editing based on MOHOSZ 2023 data)

Several literatures describe that angling offers a good opportunity, an equal chance for socio-economically underdeveloped areas (Wilson et al., 2001, Ditton et al., 2002, Ryglová, 2007, Navratil et al., 2009, Brown et al., 2012, Marton et al., 2016). Not only natural water bodies like seas (Vegas Macias et al., 2023), rivers, and natural lakes can be potential venues of angling tourism, but so can be artificial lakes and reservoirs, which can actually become leading tourism attractions with adequate management, especially in rural areas that do not abound in other attractions, as proven by evidence from Poland and Hungary (Duda-Gromada et al., 2010). Thus, as a narrow segment of tourism, angling tourism is given a prominent role in rural development. During and after the Covid epidemic, the demand for eco- or green tourism increased significantly compared to mass tourism (Gonda, 2022). Angling tourism is a possible alternative, in many places the only, sometimes complementary, tourist attraction. An advanced angling tourism requires angling-friendly accommodation, catering facilities and ancillary services. Angling tourism can be important for the life of a region, as it can be an opportunity to extend the programme of other holidaymakers, to extend their stay; it can attract visitors almost all year round (http://horgaszturizmus.hu). Of course, in some destinations it can also become a primary attraction, as demonstrated by the intensive and internationally renowned angling tourism on the rivers Po in Italy and Ebro in Spain (Banha et al., 2024), but there are also examples in Hungary for angling tourism being the primary or exclusive tourist attraction in the autumn-winter season around Lake Tisza, or throughout the year in the Háromfa or Bátonyterenye areas (Ivancsóné Horváth & Dérer, 2023; Halasi-Kovácsné Benkhard et al., 2013).

It should be stressed that a significant proportion of the prime destinations are linked to the less developed areas, making the development of angling tourism more valuable for a number of reasons, due to its complex social and local community impact. In addition to or as a complement to angling tourism, ecotourism can be a primary tourism product in these areas: as a result of delayed (or almost non-existent) socio-economic development, the state of nature has remained close to its original state in many of Hungary's external and internal peripheries, and this previously clearly disadvantaged situation is now a major development resource, at least in the field of eco- and angling tourism (Marton et al., 2016). Also, angling tourism can be a valuable asset in strengthening local traditions and preserving heritage, as shown by the case of the Maltese fishing village Marsaxlokk (Vegas Macias et al., 2023). Hungary is located in the Carpathian Basin, in the catchment area of the Danube River. The entire territory of the country is spotted by rivers of different sizes, the largest lake in Central Europe, Lake Balaton, is located here, but there are also many other lakes and reservoirs of great importance for angling tourism, making almost all regions of the country potential sites for angling tourism (Raffay, 2009; Raffay, 2022).

Before the river regulations started in the 19th century, a significant part of the territory of present-day Hungary was permanently or intermittently covered by water, where specific ecosystems and, based on them, specific forms of life and management systems developed. With the draining of the wetlands, the earlier land-use model disappeared, and it is largely only through the work of ethnographers and other researchers that some information about ancient land-use patterns and occupations, and, more broadly, about the way of life, has been preserved. The objectives that were the driving force behind the former water management actions (mainly to gain land for cereal production and to improve water transport) have lost much of their importance, while other aspects have become much more important (e.g. irrigation, large-scale fish farming and, more recently, recreational functions and protection against the negative effects of climate change). Today, in addition to the undoubted benefits of water management, it has been shown that it has also caused serious problems. Multidisciplinary, integrated water management, at least partial restoration of floodplain management on sites that are still suitable, could solve many of the problems and provide a way of using the former floodplains that is much more in tune with the social, economic and, of course, environmental requirements of today. If successful (social and, increasingly, professional support seems to be assured, see Lóczy et al., 2016; Schindler et al., 2016), this could have a positive impact on angling tourism, both directly (creation of valuable new ecosystems and angling sites) and indirectly (increase in the natural fish reproduction) (Raffay, 2018).

The rise of angling in tourism

The role of angling has changed from time to time throughout history. Initially, the sole purpose of the forms of catching fish that preceded sport angling was to obtain food, but today the emphasis has shifted to recreation. However, to achieve this, a change of approach was needed, and a number of major changes in fish management, organisational structure and resource allocation were necessary, based on changes in the legal framework. Angling itself was put on new grounds in 2013–2018 in Hungary, with the legislative environment being developed in several stages. Act CII of 2013 on Fish Management and Fish Conservation gives priority to the development of recreational angling and angling tourism over all other fish management uses. In 2016, the right to manage natural waters was granted to the Hungarian National Angling Association (MOHOSZ) on a lease basis and through it to the associations on a sublease basis. Commercial angling in natural waters in Hungary has thus ceased. In addition to the hectic lifestyle of our time, there is an increased demand for a civilised way of spending leisure time in nature (Ivancsóné Horváth & Ercsey, 2017), which can be provided by angling, among other things.

Angling is becoming more and more popular in Hungary, and more and more people are trying more distant angling opportunities and combining angling with other primary motivations for travelling, either at home or abroad (Ivancsóné Horváth & Dérer, 2023). Today, the number of registered anglers in Hungary is already above 1,000,000 (MOHOSZ, HORINFO data, 2023), compared to just over 400,000 in 2016. Since 2015, the number of foreigners buying a state angling card in Hungary has more than doubled. A total of 24,177 anglers from 58 countries (Figure 2) have bought state angling permits (Ivancsóné Horváth & Happ, 2023).

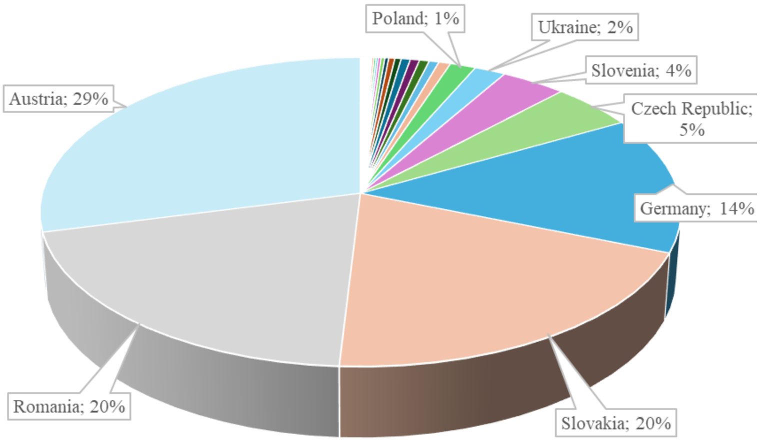

Figure 2. Foreign nationals who have bought a Hungarian state angling card, by country
(Source: MOHOSZ, HORINFO system, 2021 in: Ivancsóné Horváth & Happ, 2023)

Ecotourism, sustainability and the digitalisation of angling tourism

For travellers seeking a quality angling experience, well-regulated recreational angling is an economically viable use of natural resources that is both profitable for local communities and sustainable for ecosystems. In some parts of the world, recreational angling can be the primary tourist attraction and, if practised with an ecotourism approach, can be a vital component of sustainable development. A key attraction of ecotourism is that it can make a positive contribution to both conservation efforts and the local economy (Honey, 1999). The concept of ecotourism (Zwirn et al., 2005) encompasses 3 main dimensions: a focus on nature, sustainable management and environmental education (Blamey, 2001). Angling is generally considered to be a consumptive activity that consumes resources (Sharpley, 2006; Fennell, 2007) – although "catch and release" angling contradicts this, activities that do not provide a consumptive experience have a lesser impact and should therefore be considered clearly ecotourism. The emergence and widespread adoption of catch and release recreational angling has created unprecedented opportunities for angling ecotourism. Advances in angler ethics also contribute to the potential sustainability of recreational angling. The National Marine Fisheries Services' Angling Code of Ethics, developed with the participation of angling groups and conservationists, requires limiting catches by species and size, and using techniques that cause the least possible damage when fish are released (NMFS, 1999).

However, angling tourism must also avoid overtourism to maintain an ecological balance. Overtourism has been found not only in large cities and popular resorts, but also in natural areas (Beeton & Benfield, 2002; Weiler et al., 2018; Butler, 2018), and although it is less prevalent in angling tourism, its development must be prevented due to the fragility of ecosystems.

Angling ecotourism also faces the threat of greenwashing. If high standards are not set, some operators will use the label ecotourism to promote traditional, unsustainable angling tourism practices (Zwirn et al., 2005).

A system of sustainable tourism development guidelines and management practices is needed in all forms of tourism and in different destinations. The principles of sustainability apply to the environmental, economic and socio-cultural aspects of tourism development and an appropriate balance between these three dimensions must be struck to achieve long-term sustainability[1]. Sustainable tourism therefore

1. Optimises the use of environmental resources that are key elements in tourism development, maintaining basic ecological processes and contributing to the conservation of natural heritage and biodiversity;
2. Respects the socio-cultural authenticity of local communities, preserves their built and living cultural heritage and traditional values, and contributes to intercultural understanding and tolerance;
3. Ensures viable, long-term economic activity that delivers socio-economic benefits for all, including stable employment and income generation. It provides social services to local communities and contributes to poverty alleviation[2].

The competitiveness of tourism is closely linked to sustainability, as the quality of tourism services and the attractiveness of destinations are strongly influenced by their natural and cultural environment, as well as by the satisfaction of tourists and the well-being of the local community.

Nowadays, sustainable development and sustainability are an integral part of the debate on how tourism can use natural and social resources to generate economic benefits. This has led to a growing need for public and private stakeholders in tourism to consider the equitable distribution of economic benefits, the minimisation of negative socio-cultural impacts on local communities and tourists, and the protection and enhancement of the natural environment through tourism activities.

Tourist destinations must be constantly alert to social, economic and environmental challenges. To measure the sustainability performance of destinations, the European Commission has developed the European Tourism Indicator System (ETIS)[3]. ETIS is an indicator system that is a tool for all destinations in the tourism planning process, an easy-to-use monitoring system that allows them to collect data and information to monitor their performance year by year. It is important to underline that the indicators defined by ETIS are not a qualification system but rather an information toolkit, making the system useful for all stakeholders, policy makers, tourism businesses and other interested parties.

With the help of indicators, the following benefits can be achieved in destinations:

- better information for decision-making,
- effective risk management,
- prioritisation of potential projects,
- performance comparison,
- greater community engagement and support from tourism stakeholders,
- enhanced visitor experience,
- increasing efficiency/cost savings,
- increase in value per visitor[4].

ETIS includes 43 core indicators and an indicative set of additional supplementary indicators. The system can be used entirely on its own or integrated into existing destination monitoring systems. The indicators can be grouped into four categories:

1. destination management;
2. social and cultural impact;
3. economic value; and
4. environmental impact.

Destinations can choose the most relevant indicators that they want to monitor.

In the case of angling tourism, one possible set of indicators is aimed at controlling tourism activities. In this group, the most important indicators are the number and density of tourists. Based on the indicators used in practice, it can be seen that destinations use different indicators to map the volume of tourism. Indicators such as number of tourists, density of tourists, intensity of tourism are often used to compare with the maximum carrying capacity or to estimate this capacity (ecological constraints, infrastructure capacity, etc.) (Table 1).

Table 1. Indicators of the volume/value of tourism (Source: UNWTO: Indicators of Sustainable Development for Tourism Destinations: A Guidebook ISBN 92-844-0726-5)

Issue	Indicator
Number of tourists visiting the destination	Total number of tourists (average, monthly, peak) (categorised by type of activity)
Measuring and management of the tourism intensity of the destination	Number of tourists in the destination per square kilometre of destination: average number/peak month average/peak day

The monitoring of tourism performance and the use of indicators only become meaningful when they are used in tourism planning and management processes. Management strategies for the management of angling tourism focus on

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[1] Indicators of Sustainable Development for Tourism Destinations: A Guidebook ISBN 92-844-0726-5

[2] UNWTO Conceptual Definition 2004

[3] https://single-market-economy.ec.europa.eu/sectors/tourism/eu-funding-and-businesses/funded-projects/sustainable/indicators_en

[4] European Union (2014): The European Tourism Indicator System, ETIS toolkit for sustainable destination management

several (often case-specific) issues (Hannonen & Hoogendoorn, 2022). Looking at the research in recent years, the issue of achieving sustainability in angling tourism is also addressed by several researchers (Table 2).

Table 2. Sustainability research in angling tourism (Source: own collection)

Author	Research topic
Arlinghaus et al., 2016	Proposals to promote sustainable recreational angling at global level
Borch, 2004	Ensuring sustainable management of recreational angling
Cawley, 2017	A strategic approach to promote holistic sustainability
Greiner et al., 2013	Recreational anglers' behaviour
Solstrand, 2013	Management strategies for sustainability in angling tourism
Solstrand and Gressness, 2014	Management techniques to influence environmentally conscious behaviour

The rise of digital and smart solutions in tourism

In angling tourism, as in all areas of tourism, the use of digital tools has started, and smart technologies are emerging in more and more areas. In addition to studies of solutions in the field of tourism (Happ, 2013; Happ et al., 2020; Kökény & Miskolczi, 2022; Csapó et al., 2023), we also find studies that focus on angling tourism and examine its development through the emergence of new digital tools (Ivancsóné Horváth & Happ, 2023).

These new solutions also help to strengthen the attitude of environmental sustainability. Most studies dealing with this area are relatively new, like the study on the possibilities and challenges of the (expectedly increasing) use of digital tools in the research, monitoring and management of recreational angling (Lennox et al., 2022), or on the opportunities that digital tools provide for including fishing communities in the provision of meaningful experiences for tourists, enhancing the overall tourist experience (Vegas Macias et al., 2023).

In their call for a Digital Green Deal, Santarius et al. (2023) argue that digitalisation can be a double-edged sword regarding environmental sustainability, with its needs for materials and energy way beyond expectations, which poses a threat to transgress our planetary boundaries. In our view, however, digitalisation in angling tourism promises much more potential gains than it means threats: digital licences replacing paper-based ones, digital logging of catches allowing angling venue owners and managers to better plan fish stocking, with limited transportation needs etc. means that less resources are used in angling tourism with the smart use of digital solutions.

The use of visitor management and digital traffic diversion in a destination offers an opportunity to develop and maintain sustainable tourism and control the number of tourists. In Hungary, this can be helped by the HORGÁSZ application linked to the HORINFO Angling Information System's registration software, which allows anglers to indicate where they are, and also allows catches to be recorded online in the digital logbook, and as the catch is linked to the location, the stress on the area can be measured. The monitoring of purchasing angling licenses by angling spots allows the estimation of the annual traffic of an area, its distribution over time, and thus the measurement of seasonality. Day and week licences provide accurate data, while annual licences can only be used to calculate the turnover from the angling day data processed afterwards. It is compulsory to upload the catches of the previous year by angler, by angling venue, and by species of fish into the HORINFO system. This will allow the catch data in terms of quantity and species composition to be assessed in each angling venue, so that the fish stockings of angling organisations can be more accurately attributed to angling venues, thus preserving the species composition. Digitalisation allows spatial and temporal monitoring of angling.

Angling takes place in several venues in protected areas, but even in non-protected areas it is important to minimise negative impacts through proper planning, management and monitoring, i.e. the development of angling tourism should only be done with the ecological aspects of sustainability in mind.

METHODOLOGY

The anonymised metadata that can be extracted from the HORINFO system already offers, albeit limited, possibility to develop monitoring of angling tourism and thus to promote sustainability. The study was carried out by metadata analysis of 658,164 angling venue licence sales data anonymously for the year 2022. For the analysis, the validity period of the angling licences sold, the corresponding angling venues, the sales methods, and only the postcode and year of birth of the eligible angler were obtained, without any other data that would allow identification, thus ensuring the anonymity of the research.

The investigation covered several areas:

- Firstly, the online sales channel, one of the four sales channels[5] used for licence sales, was examined to explore the extent to which anglers use the online licencing option.
- Second, to test the monitoring indicators, the number of licences per angling venue sold and the postcode of the angler who bought the angling licence were examined. In this way, the authors were able to analyse the visitation of angling venues and the distance of the trips, the visitation of each angling venue according to whether it is a local, county, regional, national or international attraction.

The research was limited by the validity period of the licences, as the exact time of use cannot yet be determined for annual licences, and the actual venue visited for each pooled licence, only the group of angling waters, which is mostly county-specific. Both problems will be solved in the future by the mobile application, which will store both the day and the exact location of the angling trip and record in real time the species and weight of fish caught and kept.

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[5] The four channels are: direct purchase from the fish farmer; purchase from a service provider under contract with the fish farmer; purchase from a distributor under direct contract with Horgászjegy Kft; online purchase.

The investigation was not, and could not have been, exhaustive, as currently the use of the HORINFO system for licence sales is only mandatory in areas leased by the state to the Hungarian National Anglers' Association and subleased by MOHOSZ to its member organisations, not at municipal and privately owned angling waters, but in 2023 there were 2,381 registered angling venues in Hungary with a total surface area of 157,486 hectares, of which the vast majority of natural waters are state-owned: about 135,000 hectares (85.7%) belong to the MOHOSZ, so that a large part of the angling tourism can be analysed using the data obtained from the survey.

RESULTS AND DISCUSSION

For angling tourism, as a sport/water-based tourism, sustainability is a key issue, connected to all three pillars. As possible indicators for monitoring, the factors examined are mainly related to the natural pillar but can also be used indirectly to obtain more precise tourism data, as they can be used to estimate the number of angling tourists in a given area, the number of sending countries for foreigners, the average length of stay of angling tourists, and seasonality.

First, the current use of digitalisation in relation to licencing was examined, based on anglers' willingness to buy licences online. The expectation before the scheme had been that more and more anglers would recognise the benefits of the convenience. However, as the process is very slow, only a quarter of anglers are taking advantage of the online system (Figure 3).

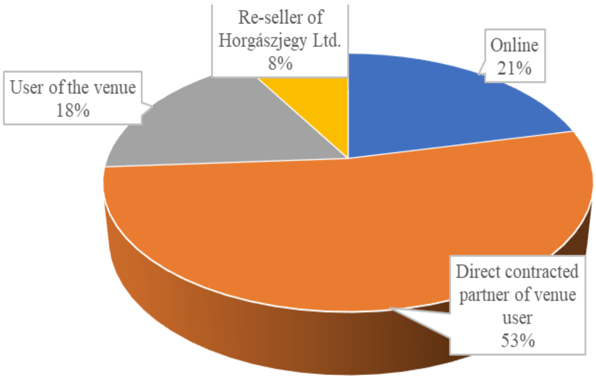

Figure 3. Distribution of angling venue licence sales between different channels in 2022 (Source: Own editing based on HORINFO, 2022)

If we look at the same data in terms of value (HUF), we find an even worse ratio, because in this case online sales only account for 8%, which means that anglers are taking advantage of online sales for day and week licences, while annual licences are still bought at various offline sales points, such as associations and angler shops. Paradoxically, this is precisely what proves the need for digital services for the development of angling tourism, as the majority of angling tourists, when travelling to distant venues for short stays of a few days or weeks, tend to buy their licences online in advance, as opposed to angling close to home, where they prefer to buy annual angling licences in the traditional way at the beginning of the year. Typically, a regional licence for a given venue is only available from points of sale near the angling venue.

The HORINFO system is constantly evolving, with more service modules being added every year. In 2023, the Discovery module was launched. The launch of the module was preceded by a lot of work on the service provider side, as all associations and federations operating in the state-owned angling venues had to fill the system with data on the waters, including a short description of the angling venue and photos, the species of fish that can be caught in the venue, the angling regulations and the position of the venue in the map (for private and municipal water managers this was only an option if they wished to enter the system to sell licences). Anglers could then use a search engine to compare the angling opportunities and value for money of the venues, and to find other angling venues in the area where they were on holiday. The services also include an angling examination module, also available here, but only available at the designated examination sites, but one can sign up for an examination date from home by selecting the examination site and practising for the examination. Table 3 summarises the benefits of the system from the provider and consumer side.

Table 3. Benefits of the HORINFO system for operators and anglers (Source: own editing)

Service provider (associations, federations, outlets)	Anglers
– Can be used as a business management system – Public registers – Simpler state and regional licencing (online/offline) – Examination surface and register available – Fish guard's application for checks – Managing bans from angling – Total catches of fish – Clearing house – Reports on sales – Internal communication channel	– Purchase of licences unlimited in space and time – Price comparison – Angling venue selection – Examination surface and register available – Catch register

Future development directions also include the sales of additional services aimed specifically at the development of angling tourism, such as accommodation, catering, and the recommendation and booking of angling guides near an angling venue. Angling guides would play a very important role in the development of angling tourism in natural venues. They are the ones who, knowing the natural waters, could guide anglers to the right angling spots, thus increasing the chances of catching fish, since angling tourists, like tourists in general, want to have as much experience as possible in as little time as possible (Raffay, 2022). On the service provider side, the disadvantages of using the system are higher costs (infrastructure, fees, commissions), aversion to digital systems, lack of signal in some places.

With the launch of the ANGLERS' APP, which will manage all the angling documents and digitally manage the catches, the number of users is expected to increase significantly as the services offered by the system will be expanded and the convenience services will be made more familiar to anglers. Another focus of the research was the development and measurability of specific sustainability monitoring indicators. Using metadata, the visitation of each site was explored. Among the indicators, it will be important to determine the angling capacity of the venues overall and by period (in a daily breakdown). The present study could only show the total number of licence sales in each area, broken down by sales period (annual, weekly, 72-hour and daily/24-hourly). Annual licences can be used on any day of the year, so the actual angling time could not be determined. Firstly, the overall distribution of licences sold across the different angling venues was analysed, which shows the distribution of angling tourism in the different areas of the country. The size of the circles in the figure indicates the number of angling venue licences sold for a given area (Figure 4).

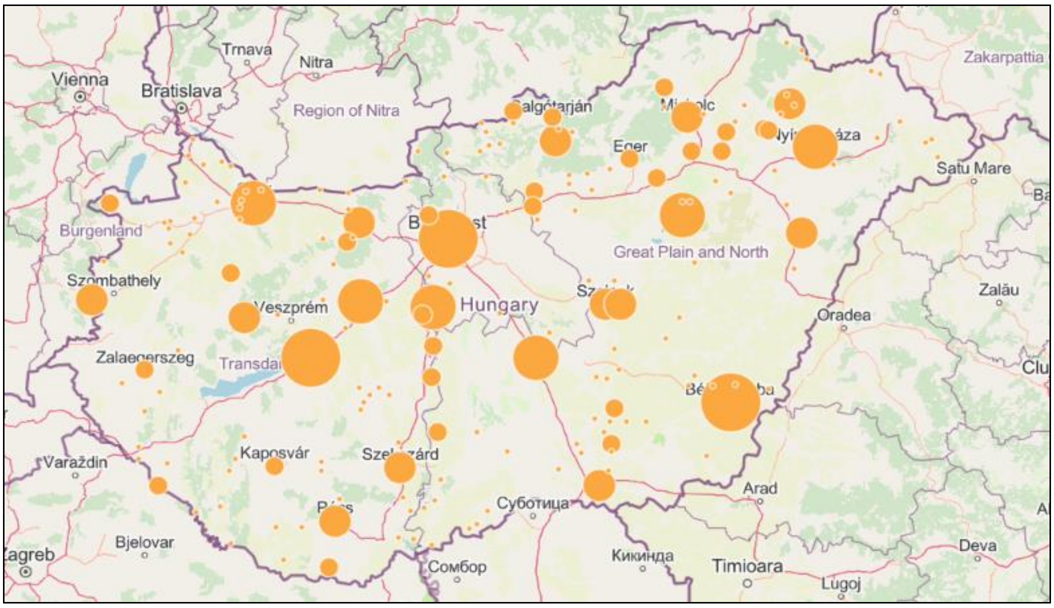

Figure 4. Distribution of angling venue licences sold through HORINFO in Hungary by fishery management right holder (2023) (Source: Dérer et al., 2023)

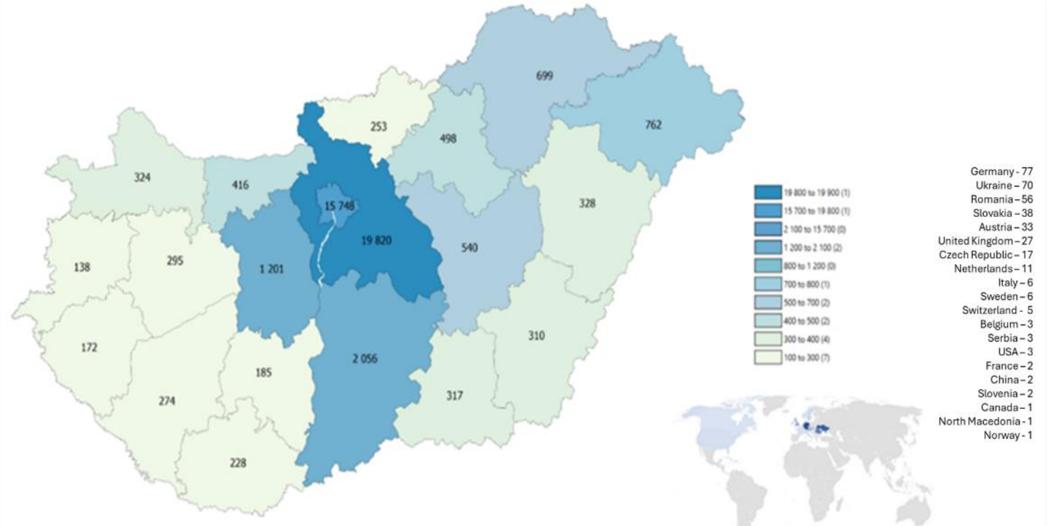

Figure 5. Distribution of angling tourists at the Danube branch of Ráckeve-Soroksár Danube Branch by place of residence (Capita/region) (Source: own editing based on data extracted from HORINFO, 2023)

After analysing the national licence sales, the regional licences issued for each venue were examined. By extracting the individual licences from the system and linking them to the angler's residence based on the angler's ID number, the research allowed the tracking of the anonymous data extracted from the anglers' movements. For the time being, this is only possible in space, as it is currently not possible to determine the exact day of angling for annual licence holders. However, once the Angling App is ready, the movements of anglers will be monitored not only in space but also in time, as anglers will have to activate location tracking on their phone after logging in, so that the specific days on which they fished can be determined for annual licences. Only a few examples are highlighted from the analyses to illustrate the applicability of digitalisation and indicators. The examples include a natural water: the Ráckeve-Soroksár Danube Branch (Figure 5); the largest reservoir in Hungary, the Tisza Lake on the Tisza River (Figure 6); and a smaller reservoir managed by an association, which has undergone very significant developments in the last decade in terms of angling tourism: the Maconka reservoir (Figure 7).

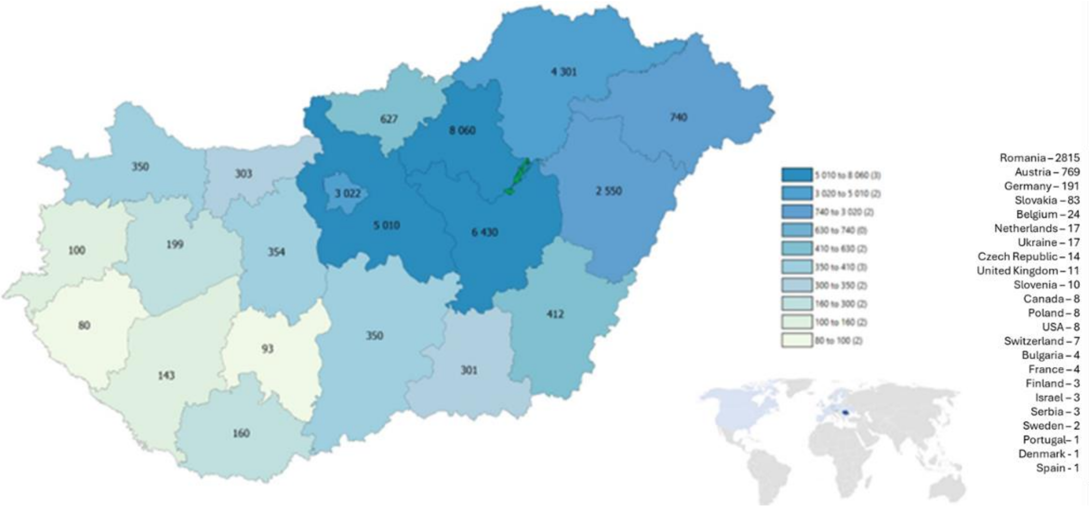

Figure 6. Distribution of angling tourists at Tisza Lake by place of residence
(Capita/region) (Source: own editing based on data extracted from HORINFO, 2023)

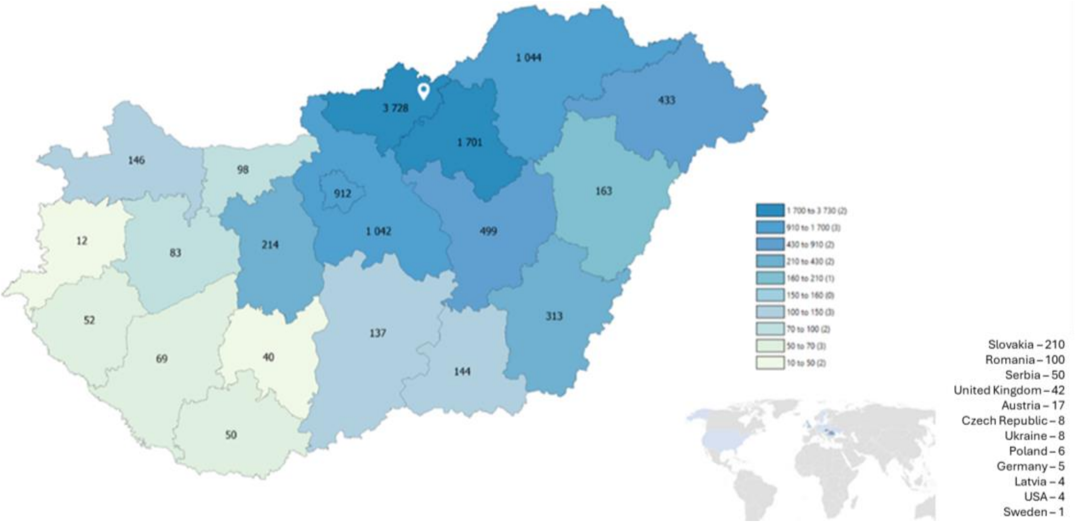

Figure 7. Distribution of angling tourists at Maconka Reservoir by place of residence
(Capita/region) (Source: own editing based on data extracted from HORINFO, 2023)

The analysis of the data shows that the number of visits to each angling venue varies and is not necessarily determined by the size of the angling venue. The Ráckeve-Soroksár Danube Branch is mainly a favourite angling spot for people living along the Danube and for those living in Budapest, while Tisza Lake, which is also a popular water tourism destination and therefore nationally known, attracts anglers from a larger catchment area, but the Maconka reservoir, which is half the size of Tisza Lake, has enjoyed similar popularity due to the developments.

CONCLUSION

The essay is a summary of the most important changes in angling tourism in recent years. The authors have presented the current state of digitalisation in angling tourism, its benefits at individual and societal level, and examined the acceptance of new technologies by anglers. The results of the research show that in the period of the Covid-19 epidemic, digitalisation and the introduction of new technologies accelerated, while their adoption in angling tourism has been slower. The study demonstrates the importance of digitalisation in monitoring the environmental pillar of sustainability and the necessary interventions. The completion of digitalisation, and thus the introduction of the Anglers' App together with the digital catch logbook, will show not only the current spatial angling movements, but also their temporality and thus become an important tool for sustainability monitoring. This is of particular importance in protected areas, where the regulation of the number of anglers and the prevention of overtourism is currently not addressed. The HORINFO system currently allows for the possibility to restrict licence sales during certain periods. In the future, it will be possible to set critical values for different water areas to limit the number of anglers during a given period.

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TOURISM EXPERIENCES, MOTIVATIONS, AND TRAVEL LIFESTYLES PREFERENCES FOR DOMESTIC TOURISTS: A CASE OF JORDAN

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Abstract: It is acknowledged that domestic tourism activities and movements have grown considerably in recent years, particularly, after the COVID-19 pandemic. However, different dimensions of domestic tourism have received scant attention in tourism research literature up till now. Therefore, the main purposes of the current study are to identify the push and pull motivations, tourism experiences and travel lifestyle preferences for a sample of tourists undertaking domestic tourism experiences in Jordan. Furthermore, this study seeks to explore the potential relationship between the push and pull motivations and travel lifestyles preferences with the tourist experience for such tourists in Jordan. A quantitative approach was used in this study, comprising of a self-administered questionnaire that involved inviting a convenience sample of 232 domestic tourists in Jordan. The present study utilized validated and reliable scales that have been extensively applied across various tourism settings to measure the motivations, tourists' experiences, and travel lifestyles. Non-parametric methods, correlation analysis and a series of multiple regressions were employed to examine the potential relationship between the different study variables. Taken together, the results revealed that the major push factors behind tourists engaging in a domestic tourism experience were relaxation, escape, and enjoyment, while the highest pull factors were weather and nature, available activities, and cost. Also, the study showed that motivations were good predictors for tourist experience and there was a weak and negative relationship between travel lifestyle and tourist experience. It is interesting to note that motivations for domestic tourism experiences for the respondents have been driven more by internal factors than by external motivations. The findings of this study have gone some way towards enhancing our understanding of tourist experience, motivations, and travel lifestyle constructs for domestic tourism in Jordan. Moreover, this study provides additional evidence about the relationship between the motivations of domestic tourists and their experiences and their lifestyles preferences. Collectively, assessment of the study variables can be helpful for evaluation of the effectiveness of domestic tourism's products, services and activities to fulfil the domestic tourists' needs and preferences.

Keywords: tourism experiences, motivations, travel lifestyles preferences, domestic tourism, The Middle East

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INTRODUCTION

The tourism industry is considered as one of the largest industries in Jordan and it is one of the major players in the local economy (Allan & Allahham, 2020). It is obvious that the tourism industry in Jordan has witnessed considerable growth in the last ten years and the tourism revenues thus have notable positive impacts on the local economy in the country (Allan & Alkushman, 2019). According to the statistics of Ministry of Tourism in Jordan, the tourism income in 2021 was US $ 2.68 billon and it augmented to US $5 .816 billion in 2022. However, the recovery in the tourism income in Jordan in 2021, from the repercussions of COVID-19 pandemic reached 90% as it was US $ 1.3 billion in 2020 (MOTA, 2023). Nevertheless, despite such substantial advancement for the tourism and hospitality industry in Jordan in quantitative and qualitative contexts, this industry is still marked with several gaps and uncertainties.

Thus, one of the main gaps is the weakness of the domestic tourism supply and its demand. Furthermore, the high cost of domestic tourism, predominantly for a large portion of low-income citizens who constitute a noteworthy segment of the overall Jordanian tourism market (Samardali, 2013). However, despite the breadth of different tourism studies and projects in Jordan, minimal studies have investigated the issue of domestic tourism. Similarly, it is axiomatic that domestic tourism is one of the least researched topics by tourism scholars and governmental bodies in the developing countries (Canavan, 2013). Relatedly, Bayih & Singh (2020) conclude that even though domestic tourism represents the largest share of tourism, it is still unconsidered and dominated by international tourism with regards to research and policies. Therefore, the main purpose of the current study is to explore the relationship between tourism experiences, tourists' motivations, and travel lifestyle preferences for a sample of domestic tourists in Jordan.

LITERATURE REVIEW

Domestic Tourism

According to UNWTO (2008), "Domestic tourism comprises the activities of a resident visitor within the country of reference, either as part of a domestic tourism trip or part of an outbound tourism trip" (IRTS 2008, 2.39). Fakfare et al. (2020) examine the relationship between domestic tourists' motivations and their intention to visit in the setting of Thailand. They further propose that pride, price, tax deduction policy, attraction, local food, ego enhancement, and knowledge gain have a significant impact on the intention to visit. It is noted that the domestic tourism has grown

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considerably as countries aimed at confronting the repercussions of the COVID-19 pandemic, which is marked with travel restrictions for international tourists, In the context of domestic tourism in Jordan, Magableh & Kharabsheh (2013) have studied antecedents of households' local demand for domestic tourism in Jordan, and they found that there are socio-economic factors (household characteristics, individual characteristics and ability variables) and other factors such as price and income influence the local demand for domestic tourism. Whilst Qatawneh et al. (2020) have investigated the impact of websites quality on locals' e-loyalty in domestic tourism in Jordan and they highlight that e loyalty to Jordanian government websites related to domestic tourism is moderate, indicating that citizens are satisfied with the e-services provided. They also conclude that e-satisfaction and e-trust both play a mediating role in the linkage between dimensions of website quality (particularly, information quality and personalization) and the e-loyalty of citizens. Elsewhere, Khdeir (2024) postulates that infrastructure and transportation problems, high cost and lack of services and facilities are the main problems that prevent Jordanians from visiting the domestic tourist destinations.

Tourism Experiences

Collectively, Uriely (2005) suggests that tourism experience is represented as a vague and miscellaneous phenomenon, which is primarily created by the person consumer. More specifically, the concept of experience is mainly utilized to describe tourists' feelings and interactions during daily life (Caru & Cova, 2003). Tung and Ritchie (2011:1369) defined tourism experience as "an individual's subjective evaluation and undergoing (i. e., affective, cognitive, and behavioural) of events related to his/her tourist activities which begins before (i. e., planning and preparation), during (i. e., at the destination), and after the trip (i. e., recollection)". Loureiro (2014) indicates that tourist experience construct has permanently been at the core of the tourism industry. Whilst Bosangit et al. (2015) prove that tourist experience is noticed as a hot topic for both practitioners and academics in the current tourism literature. The tourism experience is very significant in the tourism and hospitality context because it may be considered as the main key to destination success, innovation, and competitiveness in tourism (Ellis & Rossman, 2008). Additionally, Sustainable tourist experience can heighten destination sustainability and experience value as tools of competitive edge for any tourism destination (Smit & Melissen, 2018). On the contrary, any negative tourism experiences may result in unfavorable future behaviours and impact tourists' negative experiences (Kin et al., 2020). Pine and Gilmore (1999) hypothesized four realms or dimensions for tourism experiences (entertainment, esthetics, education, and escapism). More specifically, entertainment and esthetics reveal the passive participation of individuals in business or destination, whereas education and escapism reflect the active participation for them. Furthermore, the absorption-immersion axis indicates that the consumers 'absorb' entertaining and educational dimensions interrelated to a destination and 'immerse' in the destination resulting in esthetic or escapist experiences. In the context of tourism experience for domestic tourists, Lebrun et al. (2021) have focused on the experiences lived by domestic tourists when they visited protected natural parks in their country guided by Pine and Gilmore's 4Es model (1999). They further found that there is a positive relationship between three dimensions of the 4Es on the arousal and memory outcomes including (education, entertainment, and escapism).

Taken together, although extensive research has been conducted on domestic tourism, only a few studies have paid attention to the type and nature of tourism experience for local tourists engaging in domestic tourism activities. In the setting of Jordan, no single study exists which focused on the tourism experience for domestic tourists.

Tourists Motivations

It is recognized that better understanding push-pull motivation will assist destination marketers and promoters to enhance their tourism segments (Suhud et al., 2021). Elsewhere, Bogari et al. (2003) have postulated that tourism motivation in developing countries and Islamic culture is extremely limited and little attention has been paid to such issue from researchers. However, Mapingure et al. (2019) have concentrated on the motivations of domestic tourists in Zimbabwe. Their findings indicate that novelty, nature seeking, escape and relaxation represent the main motivation factors that arouse domestic tourists to travel domestically within Zimbabwe. Whilst Bayih and Singh (2020) have investigated the motivations of domestic tourists in Ethiopia and found that both pull and push tourism motivations were significant predictors of the tourist's overall satisfaction. Also, there were direct effects for pull motivation on revisit intention construct. Whereas Luvsandavaajav and Narantuya (2021) have explored the relationship between push and pull travel motivations with the behavioral intentions for a sample of domestic tourists in Mongolia, and they further conclude that travel motivations (push and pull factors) were significant constructs of behavioral intentions. Correspondingly, Osiako et al. (2022) state that both push and pull motivational factors have impacts on the satisfaction of domestic tourists visiting Machakos People's Park in Kenya. Lawson et al., (2021) suggest that the major push motivation factor for a sample of domestic tourists in New Zealand was to be out in the Nature, whilst the dominated three pull factors were the scenery, the rocks, and climbing at Kura Tawhiti Castle Hill Rocks. Nevertheless, studying the motivations of tourists undertaking domestic tourism experience in Jordan is still undeveloped area of study. Thus, this study seeks to shed light on domestic tourism motivations for a sample of local tourists in Jordan.

Travel Lifestyles Preferences

Overall, the main focus of lifestyle is mainly on the array of activities, interests and opinions that distinguish the way of life of individuals (Wind & Green, 2011). Relevantly**.** according to Rızaoğlu (2012), travel lifestyle could be defined as a lifestyle shaped by the information, beliefs, opinions, values that individuals develop to encounter their needs through tourism. It could be argued that the travel lifestyle is a functional variable to better understand the tourist behavior (Schul & Crompton, 1983). It is noted that tourists with different lifestyles express different tourist behaviours and consequently influence those behaviors (Gonzalez & Bello, 2002). Lawson et al. (1999: 46) state that "One of the most promising approaches to selecting target markets is lifestyle and psychographic segmentation". In the same vein, Michman (1991) suggests that segmenting the market based upon travel lifestyle is regularly the major concentration of the psychographic segmentation process in the pertinent tourism literature. Preferences in travel behaviour have an impact on both how and why people travel and represent part of personal lifestyle (Chen et al., 2009). Generally, vacation activity preferences are affected by the level of lifestyle stimulation innate in the tourist's work, social life, and leisure time activities (Wahlers & Etzel, 1985). Lee et al. (2015) examine the potential relationship between travel lifestyles preferences destination activity choices in the context of slow food. They further found that travel lifestyle preferences significantly influenced destination activity choices. Utilization of lifestyle concept in travel behavior research is predominantly in activity-based travel modeling studies. Thus, based upon the application of lifestyle construct, activity-based studies look for making important progress toward a more behavioral framework for simulating the travel behavior for families (Van Acker et al., 2016).

Despite the breadth of studies on lifestyle preferences in tourism and hospitality research, less studies have explored such issues in the context of domestic tourism in the related tourism literature.

Research design

Quantitative methodology was applied and an on-site survey using self-administered questionnaires was used as the method of data collection in the current study. A seven point Likert-type scale was used to express the level of agreement with each items, the numerical scores ranging from 'strongly disagree' (1) to 'strongly agree' (7). The population of this study included domestic tourists aged 18 and above in Jordan who have visited at least one (or more) local tourism destination in Jordan. A convenience sampling method has been used in the current study and the total size of the chosen sample was 250. Quantitative analysis was performed by using SPSS 22.0 (statistical package for social sciences) for Windows. In this study, the researcher applied existing scales and measures in the questionnaire. Therefore, the total items included in tourist motivations were adapted from (Suhud & Allan, 2022; Jang & Cai, 2002, Uysal & Jurowski, 1994). The items of tourists' experiences included in this study were adapted from (Oh et al., 2008). Whilst the items of the travel lifestyle preference were used from (Lee & Sparks, 2007). Non-parametric methods were applied to analyse the data, such as: frequencies and percentages, reliability analysis, and mean score; whilst parametric method, such as, linear regression analysis was used to check if there is a relationship (or not) between the study variables.

RESULTS

Demographics of the respondents

In terms of the demographic characteristics of the respondents in Jordan, of the 232 domestic tourists who completed the questionnaire, 92 respondents were female (40.2%), and 137 (59.8%) males. Also, the age category (18-34) was the main age group at 36.7%, whilst the age category 60 and old (7.3%), represented the smallest age group. In the context of income level, the majority of the research cohort earn an income below JOD 3000 yearly (47.9%), whilst only (8.4%) of the respondents earn above JOD 10000 per year. Regarding the preferred tourism destinations for the respondents, a substantial portion of the respondents (59.5%) prefer the natural attractions, followed by leisure destinations (24.5%) (Table 1).

Table 1. Demographics for the study cohort

Demographic Items	Value	Percent
Gender (n= 229)	Male	59.8
	Female	40.2
Age (Years) (n=229)	18-34	36.7
	35-39	14.8
	40-49	27.2
	50-59	13.4
	+60	7.3
Income (per year/JOD) (n=228)	3000 and below	47.9
	3001-6000	12.2
	6001-9000	9.6
	90001-10000	21.8
	+10000	8.4
Preferred destination (n=229)	Natural	59.5
	Archeological/historical	8.6
	Heritage	1.8
	Religious	3.7
	Leisure	24.5
	Other	1.8

Tourists' motivations

As depicted in Table 2, the mean score for the push motivations ranged from the lowest mean score 4.41 to the highest 5.99. The standard deviations for the responses to the items measuring tourists' push motivation ranged between 1.34 and 2.05, whilst the Cronbach Alpha for the items measuring push motivation was .911. Of the twelve push motivations items on the questionnaire, relaxation had the highest mean score (M= 5.93, SD= 1.26), followed by escape (M= 5.87, SD= 1.43), and then enjoyment (M= 5.69, SD= 1.43). In terms of individual items measuring push motivation, the item “To escape from the life pressure” (Escape construct) (M= 5.87, SD= 1.43) had the highest mean score (M= 5.99, SD= 1.64), whilst the item “To meet new people that have same interests” scored lowest (M= 5.54, SD= 1.75).

Table 2. The results of the push motivations for the respondents

Measures	Mean	SD	Number of the respondents (n = 232)
Knowledge gain	**5.36**	**1.59**	**228**
To learn new things	5.28	1.78	232
To increase my knowledge	5.45	1.68	228
Escape	**5.87**	**1.43**	**228**
To escape from the daily routine	5.75	1.75	229
To escape from the life pressure	5.99	1.64	232
Friendship	**4.64**	**1.74**	**226**
To travel with my friends and relatives	4.88	2.03	229
To meet new people that have same interests	4.41	2.05	229
Relaxation	**5.93**	**1.26**	**224**
to relax and rest	5.92	1.54	227
To refresh my mental and physical state	5.94	1.34	228
Enjoyment	**5.69**	**1.43**	**231**
Because it is an existing experience	5.45	1.79	232
To have fun	5.94	1.66	231
Sense of wonder	**5.56**	**1.60**	**232**
To visit unique places	5.40	1.92	232
To experience novel places	5.73	1.82	232

Collectively, the results obtained from the analysis of pull motivations of the respondents undertaking domestic tourism experiences in Jordan are illustrated in table 3. Thus, the mean score ranged from 4.23 to 5.54 and the standard deviation ranged between 1.63 and 2.10. The Cronbach Alpha for the items measuring pull motivation was .895. The highest mean scores for pull motivations were the weather and nature (M= 5.39, SD= 1.58), and activities (M= 5.20, SD= 1.64). Whereas religion had the lowest mean score (M= 4.38, SD= 1.78). Regarding the individual items measuring pull motivations, the item “Because the destination enjoys many natural features” had the highest mean score (M= 4.38, SD= 1.78). while the item “Because several historical events had happened in the destination” was lowest (M= 4.23, SD= 2.02) (Table 3). Generally, it could be argued that the strength of the push motivation for the tourists was greater than that of pull motivation.

Table 3. The results of the pull motivations for the respondents

Measures	Mean	SD	Number of the respondents (n = 232)
Heritage and historical attractions	**4.49**	**1.63**	**225**
Because the destination has significant historical and heritage sites	4.75	1.75	231
Because several historical events had happened in the destination	4.23	2.02	226
weather and nature	**5.39**	**1.58**	**228**
Because the destination has nice weather	5.25	1.76	231
Because the destination enjoys many natural features	5.54	1.70	229
Activities	**5.20**	**1.64**	**216**
Because the destination offers many activities	5.07	1.81	224
It provides recreational opportunities for all members of the family	5.34	1.81	226
Cost	**4.84**	**1.86**	**224**
Because the destination is cheap	5.01	1.97	228
Because the accommodation is cheap	4.68	2.10	225
Religion	**4.38**	**1.78**	**228**
Because the destination has spiritual and religious sites	4.49	1.93	228
Because the destination has important religious background	4.28	1.94	232

Tourists experience

Regarding tourists’ experience, its mean scores ranged from 4.29 to 5.51, whilst the standard deviations ranged between 1.23 and 2.01. The Cronbach Alpha for the tourists’ experience items was quite high at 0. 953.The main tourists’ experience factor was esthetics measure (M= 5.23, SD= 1.23), followed by education (M= 4.82, SD= 1.46). Concerning the individual items measuring tourists’ experience, the item “Just being here was very pleasant” had the highest mean score (M= 5.51, SD= 1.66), whereas the item “Activities of others were fun to watch” scored the lowest mean (M= 4.41, SD= 1.86) (Table 4).

Travel lifestyles preferences

Table 5 records the results of the measures of travel lifestyles preferences. The mean score of the measures ranged from 4.01 to 5.72 and the standard deviation ranged between 1.14 and 2.06. The Cronbach Alpha for the items measuring travel lifestyles preferences was .883. The highest mean score was for safety and predictability measure (M= 5.63, SD= 1.20), followed by travel interests (M= 5.24, SD= 1.14), and cultural experience (M= 5.17, SD= 1.27), while indecisive measure had the lowest mean score (M= 4.40, SD= 1.19). Of the items measuring travel lifestyles, the items “Undertaking a trip rather than stay at home” (M= 5.64, SD= 1.63), and “Interest in travelling” had the highest mean scores.

Table 4**.** Results of the tourists' experience measures for the study cohort

Measures	Mean	SD	Number of the respondents (n = 232)
Education	**4.82**	**1.46**	**219**
The desert tourism experience has made me more knowledgeable.	5.02	1.66	229
I learned a lot.	4.99	1.58	227
It stimulated my curiosity to learn new things.	4.79	1.81	224
It was a real learning experience.	4.48	1.72	226
Esthetics	**5.23**	**1.23**	**223**
I have a real sense of harmony by this experience.	4.87	1.64	229
Just being here was very pleasant.	5.51	1.66	228
The setting was pretty bland.	5.42	1/38	229
The setting was very attractive	5.14	1.59	228
Entertainment	**4.72**	**1.74**	**226**
Activities of others were enjoyable to watch	4.59	1.81	229
Watching others perform was charming.	4.60	1.96	228
I really enjoyed watching what others were doing.	4.41	1.86	228
Activities of others were fun to watch.	4.30	2.01	226
Escapism	**4.61**	**1.57**	**224**
I felt I played a different character here.	4.48	1.79	229
I felt like I was living in a different time or place	4.68	1.84	228
The experience here let me imagine being someone else.	4.29	2.00	226
I completely escaped from reality	4.99	1.84	230

Table 5. Results of the travel lifestyles preferences measures for the respondents

Measures	Mean	SD	Number of the respondents (n = 232)
Cultural experience	**5.17**	**1.27**	**224**
The local foods and beverages	4.66	1.82	229
A new place with new cultures and new ways of living	5.54	1.69	230
The local people and customs	5.33	1.63	226
Travel interest	**5.24**	**1.14**	**218**
Undertaking a trip rather than stay at home	5.64	1.63	224
Spending a windfall of money on holiday travel more than something else	4.44	1.84	231
Interest in travelling	5.64	1.50	225
Sports interest and information seeking	**4.27**	**1.52**	**221**
Participating in favourite sports when on holiday	4.01	1.99	228
Watching favourite sporting events when on holiday	4.17	1.96	231
Contact a travel agency for information	4.63	1.88	226
Safety and predictability	**5.63**	**1.20**	**224**
Considering the safety of holiday destinations	5.72	1.44	231
Considering the weather of the holiday destination	5.59	1.54	231
Well organized everything to be free from worry	5.60	1.58	225
Group travel	**4.61**	**1.72**	**228**
Guided tours	4.52	2.04	229
Travelling in groups	4.71	1.99	231
Indecisive	**4.40**	**1.19**	**219**
Difficulty in deciding travel destination	4.26	1.85	227
Asking the advice of friends regarding holiday spots	5.07	1.73	229
Difficulty getting information on travel	3.88	1.80	224
Variety	**4.70**	**1.37**	**22**
Visiting places with a range of shopping	4.76	1.88	231
Visiting places on the occasion of a festival	4.02	2.06	229
Visiting places with a large variety of activities and sights	5.33	1.60	226

The relationship between motivations and travel lifestyles preferences with tourist experience

Pearson's bivariate correlations between the different motivational types **(**push factors and pull factors), travel lifestyle preferences (cultural experience, travel interest, sports interest and information seeking, safety and predictability, group travel, indecisive, and variety). and tourist experience measures (education, esthetics, entertainment, and escapism) were conducted to check the intercorrelations between the study constructs. The findings showed the patterns of correlations amongst the various study variables to be most significant at $p< .01$, ranging from very strong $r = 0.89$ to weak $r = 0.17$. The findings also showed the strongest correlation to be between education and esthetics $r = 0.81^{**}$, whereas the weakest but significant correlation was between Indecisive measure and esthetics. In the context of the intercorrelations between the different motivational factors (push and pull motivations) and the tourists experience measures, the findings revealed that statistically significant positive correlations were found between the motivations and tourist experience variables. In terms of the intercorrelations between motivations and travel lifestyles measures, the results indicated that they ranged from strong $r = 0.70^{**}$ to weak $r =0.19$. in relation to the intercorrelations between tourist experience and travel lifestyle preferences, the results revealed that they ranged from strong $r = 0.\ .66^{**}$ to weak $r = 0.17$. Relatively, the results of Pearson's bivariate correlations for study variables indicated there to be a significant positive correlation between the nearby constructs, such as the motivational factors (Push and pull factors), and amongst the measures of tourist experience (Education, esthetics, entertainment, and escapism) (Table 6).

Table 6. The Correlations between the Study Variables

Variables	Education	Esthetics	Entertainment	Escapism	Push Motv.	Pull Motv.	(Cultural experience	Travel interest	sports interest	Safety	Group travel	indecisive	Variety
Education	-	.81** .000	.74** .001	75** .000	.69** .193	.59** .460	.60** .000	.47 .000	.42** .100	.42 .233	.52* .010	,23** .000	.48** .954
Esthetics		-	61** .000	.72** .000	. 68** .000	. 48** .000	.62** .000	.56** .877	.43** .000	.52** .000	.44** .000	.17** .000	.54** .000
Entertainment			-	.89** .000	.57 ** .000	. 47** .000	.37** .011	.22 .042	.60** .000	.26** .000	.66** .000	.23 .042	.39** .000
Escapism				-	.59** .000	.51** .000	. 42** .000	.28** .297	.60 ** .001	.34 ** .000	.66** .000	.21** .297	.43** ·000
Push motv.					-	.75 ** .000	.57 ** ·001	.59** .000	.57** .000	.42** .000	.50** .000	.54** .176	.46** .000
Pull motv.						-	.40** .000	.20** .000	.32** .000	.33** .000	.27** .002	.38** .000	.41** .000
Cultural experience							-	.70** .078	.44** .000	.62 ** .002	.48 ** .000	.39** .078	. 57** .078
Travel interest								-	.38** .287	.54** .136	.33** .853	.21** .000	.45** .005
Sports interest									-	.34** .000	.68** .000	.25**.297	.42** .000
Safety										-	.40**.000	.39**.136	.27**.000
Group travel											-	.19**.853	.38**.000
Indecisive												-	.40**.005
Variety													-
Mean	19.16	21.0	17.0	18.4	5.5	15.8	12.8	17.0	9.2	13.2	14.1	12.3	16.2
SD	5.8	4.9	6.9	6.3	3.8	3.4	4.5	3.6	3.4	3.5	4.1	9.7	3.5

* Correlation is significant at the 0.05 level (2-tailed); ****** Correlation is significant at the 0.01 level (2-tailed)

Table 7. The Results of the Regression Analysis between

	Regression Equations											
Independent variables	**Education**			**Esthetics**			**Entertainment**			**Escapism**		
	Bu	S.E	Bα	Bu	S.E	Bα	Bu	S.E	Bα	Bu	S.E	Bα
Intercept	.723	1.74	-	.949	1.44	-	.628	2.16	-	.879	1.91	-
Push Motv.	.15	.04	.40	.12	.03	.36	.17	.04	.35	.07	.04	.16
Pull Motv.	.06	.04	.16	.04	.02	.11	.05	.04	.10	.13	.03	.22
Cultural experience	.18	.12	.13	.16	.10	.12	-.19	.15	-.10	-.03	.13	-.22
Travel interest	.30	.11	.19	.36	.09	.25	-.13	.14	-.06	-.04	.12	-.02
Sports interest	-.23	.09	-.20	-.21	.07	-.20	.21	.11	.14	.09	.10	.06
Safety	-.18	.10	-.12	.08	.09	.05	-.26	.13	-.13	.05	.12	.03
Group travel	.52	.12	.02	.33	.10	.11	.08	.15	.09	.03	.13	.05
Indecisive	-.08	.10	-.05	-.23	.08	-.17	.11	.13	.08	-.40	.11	-.23
Varity	.10	.08	.08	.20	.09	.18	.10	.10	.06	.16	.09	.10
F-statistic (df)	F (9.17) =24.55			F (9.18) =32.68			F (9.16) = 20.73			F (9.18) = 29.94		
p-value	.000			.000			.000			.000		
R2	.55			.76			.56			.60		
Adj. R2	.53			.61			.54			.58		

Note: Bu = unstandardised beta coefficient; S.E = Standard error of Beta, Bα = standardized beta coefficient*p<.05; **p<.01

Multiple regressions analyses were conducted to test the relationships between the study constructs whereby the dimensions of the tourist experience (education, esthetics, entertainment, and escapism) served as the dependent variables, while tourist motivations (push and pull factors) and travel lifestyles preferences (cultural experience, travel interest, safety, group travel, indecisive and variety) were the independent variables. The results of regression analysis show that push motivations (Bα = .40, p<.001) was found to be good predictors for the education measure. The overall model explained 55% of variance in education, F (9.17) =24.55, p < .001. Whereas indecisive measure was weak and negative predictor for education (Bα = -.05, p<.001). Concerning items related to esthetics, push motivations (Bα = .36, p<.001), travel interests (Bα =.25, p<.001), and group travel (Bα = .22, p<.001). The overall model explained 76% of variance in esthetics. While sport interests (Bα = -.20, p<.001) and indecisive (Bα = -.17, p<.001) were negative predictors for esthetics. Moreover, examination of beta coefficients indicated that push motivations (Bα =.35, p<.001) was a significant predictor for entertainment measure. The overall model explained 56% of variance in entertainment, which was revealed to be statistically significant, F (9.16) = 20.73, p < .001. Nevertheless, most of measures of the travel lifestyles preferences were a weak or negative predictors for entertainment construct, particularly, cultural experience (Bα = -.10, p<.001), travel interest (Bα = -.06, p<.001), and safety (Bα = -.13, p<.001). The regression analysis also revealed that push factors were a significant predictor for escapism measure (Bα = .22, p<.001). The overall model explained 60% of variance in escapism, which was revealed to be statistically significant, F (9.18) = 29.94, p < .001. whereas cultural experience (Bα = -.22, p<.001), travel interest (Bα = -.02, p<.001), and indecisive (Bα = -.23, p<.001), were to be found negative predictors for escapism (Table 7).

DISCUSSION

In reviewing the literature, no data was found on the relationship between tourist motivations and travel lifestyle preferences with tourist experience in the context of domestic tourism in Jordan. This study addresses some of gaps in knowledge through exploring such relationship for a sample of domestic tourists in Jordan. Accordingly, the current study profiles the domestic tourists in Jordan, the main indicators used were gender, age, income level and preferred destination. The current investigation found that the domestic tourists were mostly males. This finding was also reported by Kabuitu et al. (2022) who found that most of the domestic tourists in Kenya were male. According to Aziz et al. (2018), travel patterns are varied between men and women due to their travel motivations, and all together men engage more in tourism experiences than women. Therefore, the main limitations for the low rate of women participation in travel were costs, commitments to family tasks and available time. The results also indicated that the respondents were mainly young and middle-aged. This finding is consistent with that of Pratomo (2017) who concluded that domestic tourists in Indonesia were found to be either young or middle-aged. What is surprising is that this study found that the majority of the respondents had low income, which was 3000 JOD and below per year. According to the World Bank statistics, Jordan is considered as one of the lower middle-income countries, with an average annual income of 4,260 USD (3020 JOD) (World Bank, 2023). This finding may be somewhat limited by the type of demographics of the study cohort as most of the respondents were young and had almost started their professional life. Another finding is that the prime attraction for the respondents was nature. It seems that the outdoor experiences have flourished in Jordan after the COVID-19 pandemic.

In terms of push motivations for the respondents, the results revealed that the leading push motivations were relaxation, escape, and enjoyment. These results corroborate the findings of a great deal of the previous work in domestic tourists' motivations. For example, Mapingure et al.(2019) found that escape and relaxation were one of the main push factors that motivate domestic tourists in Zimbabwe. Similarly, Luvsandavaajav & Narantuya (2021) stated that the prime push motivations for domestic tourists in Mongolia were relaxation and escape from their daily routine. Similarly, Pereira et al., (2019) also reported the same finding in the setting of India. The main pull motivations in this study were weather and nature, available activities, and cost. This outcome is contrary to that of Baniya & Paudel (2016), who found that affordability, variety and history and culture of place were the major pull motivations for domestic tourists in Nepal. Also, Kim et al. (2003) mentioned that the significant pull motivations for the domestic Korean tourists were accessibility and transportation, and thus this differs from the findings presented here. However, it is worth mentioning that motivations for a domestic tourism experience for the respondents have been stimulated by internal factors more than by external motivations. A possible explanation for this might be the majority of the leisure studies proved that leisure is intrinsically motivated, and people experience it for its own sake, without requiring external rewards (Neulinger, 1974).

In relations to the tourist experiences for the respondents, it could be concluded that esthetics was the leading dimension of the tourist experience for the domestic tourists in Jordan. This study supports evidence from previous observations (Hosany & Witham, 2010; Guzel, 2014; Loureiro, 2014; Allan, 2016; Kastenholz et al., 2018) who suggested that the aesthetics dimension is significant component in the tourist experience, particularly, in the outdoor setting. In the context of travel lifestyles preferences, the findings showed that safety and predictability measure, travel interest, and cultural experience were the main dimensions for the respondents. Therefore, the majority of the respondents were 'culturally safe travelers'. This finding is consistent with that of Lee & Sparks (2007) who indicated that most of Koreans respondents were "culturally safe travellers, suggesting a desire for culturally different experiences but experienced in a safe and secure way" (p. 17). The results of Pearson’s bivariate correlations among the study variables revealed that there were strong significant correlations between the adjacent measures, particularly, between the measures of the tourist experiences. Oh et al. (2008) found that the correlation between the tourist experience dimensions were statistically significant.

The regression analysis showed that push and pull motivations were significant and good predictors for the four dimensions of the tourist experience realm. This finding is consistent with those of Zhang & Walsh (2020) who suggested that the tourist experience was significantly predicted by the motivation. They further postulated that "It seems reasonable that the motivation for particular visits may come from previous tourism experience" (p. 3281). Likewise, Kim & Lee (2002) and Prayag & Ryan (2011) push motivations are key factors in the creation of tourism experience.

The results of this study indicated that travel lifestyle preferences are mainly weak or negative predictors for the tourist experience dimensions. Thus, it could be deduced that lifestyle does not have a clear impact on the tourist experience in the context of domestic tourism experiences for the study cohort. The findings of this study corroborate the thoughts of Gross & Brown (2006), who argued that tourism experiences do not fill a significant role in tourists' lifestyle.

CONCLUSION

This study was designed to explore the push and pull motivations, travel lifestyles, and tourist experience for a sample of Jordanian tourists engaging in domestic tourism experiences. The study also examined the relationship between motivations and travel lifestyles with tourist experience. The researcher found that relaxation, escape, and enjoyment were main push motivational factors for the respondents, whilst weather and nature, available activities, and cost were the prime pull motivation for the tourists. Furthermore, the study indicated that the domestic tourism experiences in Jordan were motivated by push factors rather than pull factors. The investigation of the relationship between motivations and travel lifestyle with tourist experience showed that there was a strong and significant relationship between motivations and tourist experience dimensions. Whereas there was a weak or negative relationship between travel lifestyle and tourist experience.

Investigating the tourist experiences, motivations, and travel lifestyle in the setting of domestic tourism is still an undeveloped area of study in the broader tourism literature. To date, domestic tourism has received little attention in tourism research in the Middle East, in general, and Jordan, in particular. Hence, the current study reflects a need to bridge the lacuna in the tourism literature and to develop the different dimensions of domestic tourism studies. Additionally, this study delivers implications for tourism marketers, promoters, planners, policymakers, and managers by a better understanding of tourism experiences, tourist motivations, and travel lifestyles preferences for tourists undertaking domestic tourism experiences. A number of limitations needed to be considered.

The scope of this study is limited in terms of using a convenience sample, therefore, the results cannot be generalized to other populations. Another limitation is the usage of self-reported data which might include respondents' bias, distortions, and memory failure. An additional limitation is that the selected sample is restricted to the respondents who aged 18 years old and above, thus, a future study could focus on the children as domestic tourists in Jordan, as they are a significant domestic tourism segment. Considerably more work will need to be done to determine the impact of the demographic factors, such as gender, age, and income on the domestic tourist experience.

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LEVERAGING TERRITORIAL BRANDING FOR SUSTAINABLE DEVELOPMENT AND TOURIST ATTRACTION: CASE OF ULYTAU, KAZAKHSTAN

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Abstract: The article presents a study on the branding of the Ulytau State National Nature Park, located in central Kazakhstan. The primary objective is to identify the key branding aspects that contribute not only to attracting tourists but also to ensuring the sustainable development of the region and preserving its unique natural and cultural heritage. The research emphasizes the importance of integrating Ulytau's rich historical and cultural legacy into the park's branding, promoting ecotourism, and fostering interdisciplinary collaboration among local communities, businesses, and tourism experts. One of the innovative strategies proposed in the study is the implementation of the ethno-aul (ethnic village) management model. This approach aims to enhance the authenticity and recognition of the park while providing visitors with immersive experiences of traditional Kazakh culture. The ethno-aul concept is particularly appealing to tourists interested in ethnic and cultural tourism, offering them a unique opportunity to connect with the region's heritage. By incorporating cultural experiences with environmental preservation, this model aligns with the principles of sustainable tourism and strengthens Ulytau's position as a distinctive tourist destination. The study's methodology involved interviews with stakeholders, focusing on 14 key questions related to branding strategies, park management, and the interaction between the local community, government agencies, and the business sector. These interviews provided insights into the core characteristics and challenges of the park's branding and management processes. Based on the findings, the researchers developed the Associative Molecule of the Ulytau State National Nature Park, a conceptual model that visualizes the park's primary features, attractions, and routes. This tool serves as a foundation for identifying key branding elements and enhancing the park's marketability. The Associative Molecule helps in formulating strategies for promoting various types of tourism by grouping attractions into thematic routes and offers. These strategies aim to create more appealing opportunities for tourists while supporting the socio-economic and environmental sustainability of the region. By leveraging its natural beauty, historical significance, and cultural richness, Ulytau has the potential to become a flagship destination in Kazakhstan's tourism sector. The article underscores the importance of balancing cultural heritage preservation with innovative management practices to ensure long-term sustainability. It highlights the role of collaborative efforts among stakeholders in achieving a unified vision for the park, making it a model for sustainable tourism development in Kazakhstan and beyond.

Keywords: territory branding, national park, Ulytau, ecological tourism, historical heritage, cultural experience, stakeholders, interaction

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INTRODUCTION

In the modern world, tourism is becoming an increasingly important factor in the economic and social development of regions. The attractiveness of tourist destinations often depends on their brand, which forms a unique image and distinguishes them from competitors. In this context, the issue of branding national parks, which combine natural, historical and cultural values, becomes relevant. The idea of using branding concept in the tourism industry began to be discussed in the middle of the XX century. In the context of a tourist destination, a brand includes not only the name and logo, but also the unique features that make this destination attractive to visitors (Kotler & Gertner, 2007; Azmi et al., 2023).

From the point of view of branding, a tourist destination is compared to a product or service, where the creation of a recognizable image plays a key role. Today, most authors note that branding a place is a complex process, the purpose of which is to create a unique, attractive and recognizable image of a certain location. Effective place branding can play a key role in promoting a territory, whether it's a city, region, or country. Successful branding starts with a deep understanding of a place's identity – its values, cultural characteristics, history, and unique competitive advantages. Based on these intrinsic features, the visual and verbal elements of the brand, such as the logo, slogan and corporate identity, are developed.

They should not only draw attention, but also clearly convey the essence and "character" of the place, establishing an emotional connection with the target audience. In addition, to create a strong brand of the place, a comprehensive marketing strategy is needed that will broadcast the brand through various communication channels. Only with such a holistic approach, the brand of the place will be able to win the trust and loyalty of residents, investors, tourists, as well as

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stand out among competing territories. As a result, this will increase the recognition and attractiveness of the location, and open up new opportunities for its development (Kavaratzis &Ashworth, 2006).

The branding of natural areas, especially World Heritage sites, plays a crucial role in their protection and management (Wang & Yuan, 2020). By building a strong and recognizable brand, we can raise awareness of the unique values and fragility of these places, mobilize resources to preserve them, and promote sustainable tourism. Effective branding of natural areas should be based on authenticity and integrity. It should reflect the unique characteristics and cultural significance of these places, as well as demonstrate a commitment to their protection. The brand's communication strategy should emphasize the need to preserve these territories for future generations and promote responsible visitor behavior. Branding can also promote sustainable tourism that benefits both local communities and natural areas (Li, 2021). An attractive brand can attract tourists who value nature and are interested in protecting it. Tourism revenues can be used to fund conservation efforts, creating a positive cycle in which tourism supports the protection of natural areas (Elliot &Wattanasuwan, 1998). Overall, natural area branding is a powerful tool that can be used to protect and manage World Heritage sites. By building strong and authentic brands, we can raise awareness, leverage resources, and promote sustainable tourism, ensuring that these priceless places are preserved for future generations.

One of the current trends in the field of branding of tourism destination is the formation and promotion of the tourist brand of national parks, the development of mechanisms and approaches to increase the attractiveness and recognition of national parks in the eyes of tourists (Danylyshyn et al., 2020). The formation of a strong brand of a national park can help to increase the loyalty of visitors, their satisfaction and trust in the territory. This in turn might have a beneficial effect on brand loyalty and the desire of tourists to visit the park again. By developing a unique brand identity that takes into account the values and characteristics of the park, the organizers can reveal new facets of the perception of the territory, expand its tourist and educational potential, which will not only preserve the natural heritage, but also bring human interaction with the environment to a more conscious and harmonious level (Kihima, 2014). Based on the above, within the framework of this study, the authors define the identification of key aspects of branding of specially protected areas in modern conditions on the example of the Ulytau National Park, located in Kazakhstan, as well as the description of factors that can contribute to the development of an effective strategy for the development of the park aimed at the sustainable development of the region and attracting tourists as the main goal. To achieve this goal, the following tasks were set in the study: to analyze the characteristics of the historical and cultural heritage and natural resources of the Ulytau Park; study of the characteristics of the target audience and the competitive environment; development of the management model "Ethnoaul" as a place of attraction for all market participants, acting as a center of synergy and cooperation; creation of a branding management model in Ulytau, taking into account the role of the coordinating council in aligning the efforts of various stakeholders; identification of key areas of interaction with local communities in the process of branding the territory; conducting interviews with the heads of large companies, travel enterprises and top managers of government agencies in terms of substantiating the opinion on the creation of the Associative Molecule of the Ulytau State National Natural Park.

Branding of specially protected natural areas (SPNAs) differs from the branding of other tourist destinations in its focus on environmental responsibility and sustainable development. In addition, one of the main tasks in the development of tourism in the territory of national parks is to ensure the conditions for the preservation of the unique qualities of objects located on the territory. In the process of branding a territory, it is necessary to take this aspect into account. In other words, the creation of the brand for national parks should not be limited on the formation of knowledge among tourists, but also to fostering respect and care for the environment. The formation of a strong brand of the national park increases visitor loyalty, strengthens trust in the territory and encourages repeat visits. The unique identity of the brand can open up new boundaries of perception of the territory, expand its tourist and educational potential and contribute to a more conscious interaction between people and the environment. This allows Kazakhstan not only to attract tourists, but also to preserve the country's natural and cultural heritage, stimulating responsible tourism and investment in environmental protection.

LITERATURE REVIEW

1. Branding theory and stakeholder participation in branding

In modern conditions, the theory of branding is a rather complex and multifaceted concept and includes a number of approaches based on various tools and methods. Naydenov (2019) notes the important role of branding in creating a positive image of the object, as well as in increasing income. The emergence of a brand results from the concept of identifying a specific product. Its origins are associated with the skill and desire of each master to make his work recognizable and memorable. Pedersen (2004) considers place branding as a tool to provide a competitive advantage for the Øresund region, located between Denmark and Sweden. The author emphasizes that in the context of increasing competition between regions to attract investment, tourists and qualified specialists, place branding is becoming a key development strategy. Using the example of the Øresund region, Pedersen analyses how purposeful brand building can contribute to strengthening regional identity and increasing the attractiveness of the territory. The author notes that successful branding of a place requires joint efforts of various stakeholders - authorities, businesses, local communities. Marketing communications aimed at promoting the unique image and values of the region also play an important role.

Territory branding can be carried out at the national, regional and local levels, taking into account the competitive advantages of the country, region or individual territory. Browning & Oliveira, 2017 analyze the role of nation branding in the face of global competition for investment, talent, and access to foreign markets. The authors note that countries actively use branding technologies to form a unique competitive image. Effective nation branding allows to increase the global visibility and influence of states, as well as promote their political and economic interests in the international arena. The article discusses the key conceptual approaches to the study of nation branding, as well as its practical application by various countries in modern geopolitical conditions. A number of authors consider branding from the point of view of the main marketing tool. Thus (Buhalis, 2000) notes that traditional destination marketing focuses on the formation and maintenance of an appropriate image of the region to ensure the growth of tourist arrivals. However, while the object of marketing is protected natural areas - ecotourism destinations, the task of marketing is to balance between attracting visitors and encouraging their certain behaviors that are optimal for the preservation of ecosystems. Managing the marketing of protected natural areas based on the principles of sustainability can significantly improve the conservation, protection, promotion and appreciation of both natural and cultural heritage, which is a prerequisite for the successful positioning of a tourist destination in the global market.

Kim et al., 2015, studying the differences in attitudes and behavior of tourists from mainland China and Taiwan, analyzed their motivation, preferences and travel behaviors. The results show that tourists from mainland China are more focused on entertainment, shopping and meeting status needs, while tourists from Taiwan are more likely to value opportunities for education, self-development and immersion in the local culture. In addition, tourists from mainland China are more inclined to conspicuous consumption and seek prestigious brands, while Taiwanese tourists are more rational in their purchases. The authors emphasize that understanding these differences is important for travel companies to develop segmented marketing strategies and offerings to attract and serve these two consumer groups.

Santos-Vijande et al., 2013 note in their study that in today's competitive business environment, the brand is becoming an important source of competitive advantage for service providers. They offer a conceptual model that demonstrates the impact of four key elements of brand management on the competitiveness of service firms. These elements include: 1) internal branding focused on employees; 2) interaction with customers; 3) brand management; 4) Brand-oriented innovation. The authors emphasize that the effective management of these aspects allows service firms to achieve a high level of brand awareness, customer loyalty and, ultimately, increased competitiveness. The article contributes to the understanding of the importance of a systematic approach to brand management for achieving competitive advantages by service companies. Hanna et al. (2020) systematized and summarized the main elements of place and destination branding, such as identity, image, target audiences, brand management. A comprehensive analysis of existing models and concepts makes it possible to propose an integrated framework that can serve as a basis for future research in this area.

Branding has become a key tool for destinations to visualize the complexity of the experiences that tourists expect when visiting a destination (Almeyda-Ibáñez & George, 2017). Rather, 2020 delves into the psychological aspects of destination branding, exploring the impact of brand experience, value alignment, and destination trust on tourist behavior. These studies collectively highlight the importance of branding in tourism and the need for an integrated approach. The study by (Pike & Ryan, 2004) is devoted to the analysis of the positioning of tourist destinations based on the comparison of cognitive, affective and conative perceptions. The authors note that traditional destination marketing often focuses only on the cognitive component, that is, on consumers' knowledge and perceptions of the destination. However, for more effective positioning, it is also necessary to take into account the affective (feelings and emotions) and conative (intentions and behavior) aspects. The study examined the perceptions of three New Zealand destinations by visitors from Australia. The results showed that cognitive, affective, and conative components can vary significantly, highlighting the importance of a comprehensive approach to positioning analysis. The authors conclude that the integration of these three aspects allows travel organizations to better understand the image of the destination in the minds of consumers and develop more effective marketing strategies.

Thus, today branding acts as the main tool for increasing the attractiveness of the tourist territory, creating a positive image, and forming an associative picture of the area in the imagination of the tourist. The branding process is based on a detailed analysis of the geographical, economic, social, environmental and other characteristics of the area, as a result of which the main competitive advantages are determined (Zharkenova et al., 2023). The unique qualities of a destination are at the heart of the branding strategy. In other words, the branding process is based on the unique qualities of the element of space and a well-developed strategy. In addition, stakeholder partnerships, brand leadership, departmental coordination, brand communications, and brand culture are critical prerequisites for successful destination branding (Hankinson, 2009).

Stakeholder participation in territory branding has a positive effect on the clarity of the brand concept and the effectiveness of urban brands in attracting target groups (Klijn, 2012). Quality stakeholder relationships have a positive impact on brand equity, which in turn provides a link between stakeholder relationships and company performance (Wang, 2016). In addition, stakeholder participation in territory branding is critical to creating, developing, and owning a successful brand, as they play a central role in legitimizing and influencing its meaning (Kavaratzis, 2012). Four "levels" of stakeholders are involved in the branding of a city or locality, with key stakeholders playing a crucial role in selecting other stakeholders to participate in. Each of these stakeholder groups is involved in the city's branding process to some extent. The degree of participation is highly dependent on the main stakeholders, who are considered key decision-makers in the branding process. These primary stakeholders select other stakeholders who "may" participate in the branding process. While this can be beneficial, it is vital to provide more opportunities and engage stakeholders who are willing to participate in the branding process. The alienation of stakeholders can also lead to the loss of part of the heritage-based identity (Henninger et al., 2016).

It is worth noting that the participation of stakeholders, including local communities, is one of the crucial factors in the success of territory branding, as it enhances the civic behavior of the brand (Ripoll, 2023) and can lead to a clearer brand concept and more effective attraction of target groups (Klijn, 2012). This participation can take many forms, including joint activities, co-creation, and control (Bivainienė, 2019). However, there is a need to move towards a more participatory practice of place branding, as stakeholders are often not fully involved in the branding of their place (Kavaratzis, 2012; Hartman, 2023). Colavitti & Usai (2015) note that the involvement of various stakeholders, including local communities, authorities and businesses, is a key element of effective branding of places. This allows for diverse interests and objectives, as well as ensuring a more sustainable development of the region. The authors analyze the process of creating a brand for a mountain heritage area, including the development of a visual identity, the promotion of tourist routes and the organization of cultural events. Particular attention is paid to the role of partnerships in raising local awareness, engaging the private sector and improving infrastructure. Within the framework of this work, the branding process is considered from the point of view of the behavior of the local community, their interest in participating in the branding of the territory. As one of the main stakeholders, local communities are able to determine the main directions for the implementation of the branding strategy. In some cases, the socio-cultural environment of the local community can become one of the central elements of the brand and can be included in the associative vocabulary of the brand book of the destination.

2. Branding of National Parks as a Tourist Unit

Specially protected natural areas around the world are real gems for travelers, wildlife connoisseurs and lovers of outdoor activities in the bosom of nature. These unique protected sites not only preserve important ecosystems of the Earth, but also provide opportunities for educational, ecological and adventure tourism. For example, one of the most iconic protected areas is Yellowstone National Park, located in the United States. This park covers an area of more than 8900 sq. km and is known for its unique geothermal phenomena - hot springs, geysers and boiling mud pots. It is also home to a rich wildlife that includes grizzly bears, wolves, bison, and other North American fauna. Yellowstone is one of the most popular national parks in the United States, attracting millions of tourists every year.

Equally renowned is the Great Barrier Reef in Australia - the largest marine ecosystem on the planet. It stretches for more than 2,300 km along the east coast of Australia and includes more than 2,900 individual reef systems and islands. This unique natural UNESCO World Heritage Site is famous for its incredible biodiversity, home to more than 1,500 species of tropical fish, hundreds of species of coral, and other marine organisms. The Great Barrier Reef is one of the most popular diving and snorkeling sites worldwide. Other continents also have their own iconic protected areas. For example, the Serengeti National Park in Tanzania is known as one of the last places on Earth where large populations of wild animals such as lions, elephants, rhinos, buffaloes, etc. have been preserved. Another famous protected area in Africa is the Kilimanjaro National Park in Tanzania, home to the highest peak in Africa, Mount Kilimanjaro. In South America, one of the most famous protected areas is the Iguazu National Park, located on the border of Argentina, Brazil and Paraguay. It is home to the majestic Iguazu Falls, some of the most spectacular water cascades in the world. In addition to natural attractions, the park is known for its diverse flora and fauna, including populations of jaguars, giant otters, and other rare species.

The role of national parks in the creation and promotion of territorial brands, as well as the analysis of the practices of implementing joint branding initiatives with their participation, is shown in the article "National Parks, Territorial Brands and Co-Branding Initiatives". The author Ferrari (2020) aims to show how the unique natural and cultural features of national parks can be effectively used to form recognizable regional and national brands. Ferrari also examines various cases of successful and unsuccessful cooperation between the public and private sectors within the framework of territorial branding strategies involving national parks. The key objective of the article is to identify the key factors that determine the effectiveness of such collaborative branding projects. Santamarina (2019) notes that the country's various autonomous communities have shown different approaches to promoting and branding their natural attractions. Thus, Catalonia focuses on ecotourism and sustainable development, emphasizing the uniqueness of its national parks. Andalusia, in turn, focuses on a "sunny" image and a variety of landscapes. The Basque Country focuses on authenticity and a traditional way of life in harmony with nature. Despite the differences, the general trend is to create strong regional brands that can attract both locals and international tourists. The author emphasizes that the competent positioning of natural assets is crucial for the preservation of Spain's fragile environmental heritage and ensuring its sustainable development. Regional differences in the marketing of natural areas reflect the broader cultural and political characteristics of the country. Understanding these differences is key to developing effective conservation strategies that take into account the local context.

National parks are unique natural objects that are the pride and heritage of each country. The branding of such places plays a key role in attracting tourists and promoting local culture and traditions. Pizzichini et al., 2020 focus on the ethical attributes of national park brands and their impact on tourists' choice of local souvenirs, primarily food and drinks. The authors emphasize the importance of positioning national parks as environmentally responsible, sustainable destinations. This perception directly affects the attractiveness of buying authentic, authentic local products as souvenirs. Tourists who value respect for nature are more likely to choose eco-friendly products produced in compliance with ethical principles. Ozretic-Dosen et al., 2019, studying the issue of branding of national and natural parks in Croatia, note that managers of such parks often consider marketing as a secondary function, while it plays a key role in promoting unique natural and cultural resources, attracting visitors and increasing the competitiveness of territories. The study revealed a gap between park managers' understanding of the importance of marketing and real-world marketing practices (Gadamus et al., 2015). Building an indigenous evidence-base for tribally-led habitat conservation policies. Marine Policy. Many managers limit themselves to traditional tools, experiencing a lack of competencies in the field of strategic branding, digital technologies and interaction with visitors. The authors of the article emphasize the need to improve the marketing skills of management personnel for the effective use of the potential of national and natural parks.

To date, there are a number of studies (Seo & Lee, 2021), (Kavaratzis & Florek, 2021), (Hollebeek & Macky, 2019), that reveal the importance of developing effective marketing strategies for national and natural parks in order to increase their competitiveness. For example, (Vučemilović & Vištica, 2017) note that in order to achieve a sustainable competitive advantage, parks should focus on differentiation based on the promotion of unique natural and cultural resources, improving interaction with visitors and the use of modern digital tools. The study emphasizes the need to develop marketing competencies of management and the introduction of an integrated strategic approach to the management of the National park's brand. (Goodwin, 2002) explores the possibilities and limitations of community involvement in tourism around national parks. The author notes that the involvement of the local population is a key component of sustainable tourism, as it allows to take into account the interests and needs of local residents, as well as contributes to the preservation of cultural heritage and natural resources. However, Goodwin also points to a number of challenges that national parks face when engaging local communities. This can include a lack of financial and managerial resources, conflicts of interest, as well as a lack of understanding among the local population of the benefits of tourism. The author proposes various strategies to overcome these limitations, such as developing partnerships, providing training and support to local entrepreneurs, and involving communities in the planning and decision-making process.

An invaluable contribution to the development of ecotourism was made by Kazakh authors, who in their articles explore various aspects of brand development in national parks of the country. The focus is set on the problems and prospects of sustainable development, analysis of the potential and resources to attract tourists, as well as the need to preserve the unique nature and cultural heritage (Abdramanova et al., 2017). Researchers assess the sustainability of ecotourism in specific national parks ("Altınemel") by identifying problems with infrastructure, funding, and the lack of sufficient guides (Koshim et al., 2023). They also analyze the potential of different regions (Katon-Karagay) and identify the most attractive tourist sites in order to develop recommendations for the rational use of resources (Turyspekova et al., 2022).

In the field of territory branding, a number of authors (Niyazbekova et al., 2019; Sergeyeva et al., 2021), (Akbar et al., 2020) emphasize the importance of creating a recognizable image and unique positioning to attract tourists. They study the issues of territorial branding and identify factors that can make the national park more competitive in the tourism market.

In general, the works of Kazakh authors make an important contribution to the development of ecotourism in Kazakhstan and contribute to the understanding of how sustainable development can be combined with attracting tourists.

In other words, it can be noted that today the issue of branding national and natural parks is one of the topical issues. Tourist sites of national parks are of great interest to tourists. More and more vacationers today want to spend their holidays in a unique natural environment. However, to date, most parks do not have developed brand books, and practically do not implement branding strategies, hoping that the unique properties of natural objects will attract tourists to the territory of the parks. In addition, there is a rather weak involvement of members of the local community in branding processes. This compels us take a reexamine the problems of forming a brand of tourist areas, particularly parks and specially protected areas.

3. Main gaps in the study of branding of the territory of national parks

To date, quite a lot of works have been published that address the problems of branding tourist areas. Many studies emphasize the importance of sustainable tourism in national parks (Maheshwari et al., 2011; Cristòfol et al., 2021), (Sharma et al., 2019), describe examples of park branding in various countries and regions (Afshardoost et al., 2020; Jiménez-Barreto et al., 2020; Zhao et al., 2022; (Sarabia-Molina et al., 2022). However, the analysis of the publication reveals several gaps in the formation of the brand of the territory, especially national parks. Thus, the mechanisms and strategies of branding that contribute to sustainable development have not been sufficiently studied. It is necessary to thoroughly study the impact of branding on the socio-economic and environmental aspects of the development of parks.

The next issue that has not been solved to date is the lack of an in-depth analysis of the influence of the brand on the behavior of tourists. It is necessary to study how the brand affects the choice of tourists, their behavior in the park and their readiness for responsible tourism. It is important to understand how a brand can encourage tourists to comply with the rules of conduct and preserve the natural environment. There is a lack of research in the context of international cooperation. In a globalized world, it is important to explore the role of branding in attracting international tourists and in establishing international partnerships for the conservation of national parks (Hopcraft et al., 2015; Kaltenborn et al., 2011; Ferrari, 2020; Wang & Yuan, 2020). The issues of involving the local community in the process of branding national and other specially protected areas have not been fully studied. It is important to examine the role and contribution of local residents in the creation and promotion of the park's brand. It is necessary to develop mechanisms for including local communities in the branding process and ensuring their participation in decision-making.

Research in these areas will help develop more effective branding strategies for national natural parks, contributing to their sustainable development and the preservation of natural and cultural heritage.

MATERIALS AND METHODS

1. Object of research

The main object of the study was the Ulytau State National Nature Park, located in the central part of Kazakhstan. This area has unique natural, historical and cultural characteristics, occupying an area of about 2200 square kilometers. The landscape is dominated by picturesque mountain ranges, rivers and lakes, as well as a variety of flora and fauna. The favorable geographical location of the park is one of the key factors contributing to the development of tourism activities in the region. Administratively, the Ulytau State National Nature Park is located in the Ulytau district of the Ulytau region, in the northwestern part of the Ulytau and Arganaty mountains. The Ulytau State National Nature Park is characterized by the following geographical features. The maximum height of the Ulytau Mountains is 1131 meters above sea level, including Mount Aulietau and Akmeshit Peak. In turn, the highest point of the Arganaty Mountains is Mount Dandygul, which reaches 757 meters above sea level. The length of the park from north to south is about 225 kilometers, and from west to east - 150 kilometers. The administrative center of the park, the village of Ulytau, is located 135 kilometers from the city of Zhezkazgan. The administrative building of the park, built in 1976, is located directly in the village of Ulytau, 250 meters from the borders of a specially protected natural area. The total area of the Ulytau State National Nature Park is estimated at 58,912 hectares, including Arganatskaya (33,419 hectares), Ulytau (20,847 hectares) and splitting forests (4,646 hectares). A two-kilometer buffer zone with an area of 28,420 hectares has been allocated around the forest dachas.

The park’s road infrastructure is primarily consists of dirt roads, while the most developed network of country roads is concentrated on the territory of the Arganat forest cottage, leading to recreation areas and farms. On the territory of the Ulytau forest dacha, the road network is poorly developed due to the mountainous terrain. Natural resources and unique landscapes of Ulytau, including picturesque mountain ranges, valleys, lakes and rivers, create favorable conditions for the development of ecological, educational and adventure tourism. In addition, the rich historical and cultural heritage of the region, with the burials of Kazakh khans, archaeological monuments, holds a solid tourist potential. The presence of certain tourist infrastructure, such as hotels, campsites and tourist centers, also contributes to the development of tourism in Ulytau.

The Ulytau Nature Park has a complex of favorable geographical, natural, historical, cultural and infrastructural prerequisites that create a solid basis for the development of various types of tourism in this region (Table 1).

Table 1. Development of ecotourism in the protected areas of the Ulytau Nature Park (Source: compiled by authors)

#	Aspects of ecotourism	Opportunities and prospects
1	Potential for ecotourism	Unique nature and history
2	Infrastructure development	Organization of a network of ecological trails and tourist routes, as well as the equipment of observation decks, information stands, visitor centers and digital tourism applications
3	Accommodation and meals for tourists	Development of accommodation sector and local cuisine
4	Environmental education	Organization of environmental centers and training
5	Socio-economic benefits	New jobs and preservation of natural and cultural values of the region

This table clearly reflects the key conclusions regarding the potential of Ulytau for ecotourism, the necessary measures for the development of infrastructure, tourist accommodation, environmental education, as well as the socio-economic benefits of this direction.

The main unique qualities of the Ulytau territory include:

1. Historical and cultural heritage of the Golden Horde:

- Ulytau was an important political and spiritual center of the Golden Horde, the residences of the last khans of the Genghisids were located here;
- the legendary commander Tamerlane visited the Ulytau mountains in 1232;
- the unique culture, traditions and life of the nomadic people have been preserved.

2. Ancient traditions of mining:

- Centuries-old history of ore deposits development rooted in antiquity;
- Ulytau was one of the key centers for the extraction of copper and other metals in the region;
- Ulytau is the heir to the technology of development and smelting of ores of ancient miners, which continues to live in the modern production of a large non-ferrous metallurgy company "Kazakhmys".

3. Natural and cultural diversity:

- unique natural landscapes, flora and fauna of Ulytau;
- preservation of the traditional nomadic way of life in harmony with nature;
- A variety of archaeological, historical and cultural sites waiting to be discovered by tourists.

The main elements of the area that attract tourists are such cultural and historical monuments as: mausoleums of Zhoshy Khan, Alasha Khan, Dombaula, Kulan ana, Bolgan ana, Edyge Peak, sacred sites Terekti Aulie, Aulie Tau, medieval sites and settlements (Khan Ordasy, Baskamyr), etc. (Seidualin et al., 2024). These objects are a reflection not only of the medieval history of the Kazakh people, but also of a more ancient period.

In general, Ulytau today is presented as an ancient land of great nomads, which symbolizes the uniqueness of this region, combines the rich historical and cultural heritage of the Golden Horde, mining and smelting of ores and natural attractions. The natural resources of Ulytau and its picturesque landscapes complement its historical significance, creating a comprehensive tourist offer that can attract a wide range of visitors. These unique characteristics of the area can fully act as the main elements of branding the territory as a destination.

2. Research methods and data collection

Research work was based on a number of methods of scientific cognition. Thus, the study employs the methods of theoretical analysis, which made it possible to determine the main trends in the development of specially protected areas and generalize their modern specific features. To search for evidence of the assumptions put forward, methods of empirical analysis were used, within the framework of which the data obtained during field studies on the territory of the Ulytau National Park were processed. The main part of the work is based on the methods of qualitative analysis. To determine the specifics of tourism development and the features of branding national parks, the primary research method employed was qualitative analysis. This included conducting interviews with key stakeholders interested in the development of tourism within national natural parks and other protected areas. Qualitative research has been extensively applied in previous studies on stakeholder perceptions in the context of destination management (Yrza & Filimonau, 2022).

The interview questions were selected based on the results of a literature review of the main sources published in the open-access and touching on the problems of branding the territory of national parks. Thus, when determining the main topics for interviews, the results of various studies (Ferrari, 2020; Ozretic-Dosen et al., 2019; Melnychenko et al., 2021) were used since the works of these authors also considered the problems of branding the territory of national parks, but in the context of a different geographical space. The interview program consisted of 14 main questions, addressing the challenges in the development of national parks in modern conditions, especially in Kazakhstan, branding of the area and objects of specially protected territories, the participation of the local community in the process of branding the territory. In general, the questions were divided into three main blocks. The first set of questions was aimed at identifying the degree of understanding by the participants of the branding processes, especially those implemented within the boundaries of specially protected areas and national parks. The thematic focus of the second block of questions touched upon such aspects as the main recommended approaches to branding the territory of national parks, marketing promotion tools, ensuring environmental sustainability as part of brand formation, etc. In order to determine the reliability of the thematic content of the questions, the interview program was tested among representatives of the local community involved in the process of tourism development in the national parks.

As a result of the approbation, interviews were conducted among representatives of small and medium-sized tourism businesses, the academic environment, visitors to national parks, organizations involved in the promotion and branding of tourist areas, including national parks, government agencies, etc. The interview was conducted in Russian and Kazakh languages. The fundamental principles of interviewing were the principles of voluntary participation and respect for the opinion of the respondents. The total number of interviewees was 21 (n=21, Table 2).

Table 2. Interview participants (n=21)

Code	Gender	Affiliation of the respondents	Professional experience (beginner – 2 years or less, specialist – 2-5 years, expert – over 5 years)
Persons with the authority to make decisions and implement policies in the field of branding and tourism development at the republican and local levels (n=4)			
P1	F	Head of the Directorate of the Administrative Department of the President of the Republic of Kazakhstan	expert
P2	M	Head of the Department of Physical Culture and Sports of the city of Zhezkazgan	expert
P3	M	Head of the Department of Agriculture of the Ulytau District	specialist
P4	F	Head of the Department of Strategic Planning and Project Management, Ministry of Culture and Sports	expert
Stakeholders involved in DMO (n=5)			
DMO1	M	Manager of JSC NC "KazakhTourism"	expert
DMO2	F	Senior Manager of JSC NC "KazakhTourism"	expert
DMO3	F	Association of Tour Operators of Kazakhstan	expert
DMO4	F	Zhetisu Tourist Information Center	expert
DMO5	F	Republican Public Association "QazaqGeography"	specialist
Representatives of the tourism business (n=5)			
TB1	F	Director of the travel agency "Amigo Tours"	beginner
TB2	F	Employee of the travel company "Fantasy Tours"	specialist
TB3	M	Head of Sales Department, Talisman Travel Agency	specialist
TB4	F	Director of the travel agency "DS Travel"	expert
TB5	M	Travel Agent	beginner
Researchers and academics (n=4)			
R1	F	Dean of the Faculty of Geography and Environmental Management of Al Farabi Kazakh National University	expert
R2	F	Professor of the Kazakh Academy of Sports and Tourism	expert
R3	F	Professor, Almaty Management University	expert
R4	M	Professor of Turan University»	expert
Посетители и туристы			
T1	F	Tourist	expert
T2	F	Tourist	expert
T3	F	Tourist	specialist

Almost all interviewees were selected using the snowball method using the professional contacts of the research team. The interview was conducted by phone, offline and online in the format of a video meeting (Zoom). Although the snowball technique has a lack of bias, the research team chose this method due to the fact that it provided access to the respondents who are involved in the implementation of tourism policy both at the level of the republic and at the regional level.

RESULT AND DISCUSSIONS

The article proposes to create a unique and attractive brand "Ulytau", which will reflect the rich historical and cultural heritage of the region and its untouched nature. The brand should be authentic, recognizable and attractive to tourists. It is planned to involve local residents in the branding process and create an ethnic village that will become a center of attraction. The purpose of Ulytau branding is to contribute to the sustainable development of the region and the preservation of its unique characteristics. As an example, we can consider the United States, where quite effective models of interaction between the local community, government agencies and tour operators in the development of national parks and tourism are being built. In the U.S., national parks are managed by the National Park Service, a federal agency under the Department of the Interior. This service is responsible for the development and implementation of policies in the field of nature conservation, organization of eco-tourism and interaction with local communities.

For effective cooperation between various stakeholders, special coordinating councils have been created in the United States. They include representatives of federal, state, and municipal governments, as well as the business community and local residents. Such councils are responsible for coordinating interests, developing common approaches and rules of interaction. In addition, public-private partnerships between national parks and tourism companies are actively developing in the United States. They make it possible to optimally combine the commercial interests of business and the tasks of preserving natural heritage. Tour operators obtain licenses and undertake to follow the established requirements for the organization of environmentally responsible tourism. U.S. national parks represent diverse local communities involved in the sustainable development of these areas. Native American tribes such as the Navajo, Hopi and Zuni preserve traditional crafts, cultural practices and develop ecotourism in the Grand Canyon and Canyonlands. Farming and ranching communities of ranchers and organic producers in Yellowstone, Grand Teton, and Sequoia provide services for parks and market local produce. Fishermen in Alaska and in the Olympic National Park are engaged in fishing and environmental monitoring. Creative communities of artists, craftsmen and musicians in Canyonlands and Arches create art, crafts and cultural programs. Engaging with these diverse local communities is an important element of the sustainable development of U.S. national parks.

Thus, the United States has established a systematic approach to the management of national parks, based on a balance of interests of various groups and a clear distribution of rights, responsibilities and mechanisms of cooperation.

Perceptions of regions around the world are often formed on the basis of stereotypes or dominant images, which can be both positive and negative (Hanna et al., 2020; Zharkenova et al., 2023). As a positive reputational indicator, Kazakhstan has made a significant contribution to world civilization. For centuries, Kazakhstan has been an important crossroad for trade and cultural exchange between East and West (Omarov et al., 2020). The Great Silk Road passed through the territory of Kazakhstan, contributing to the spread of ideas, technologies and goods (Issakov et al., 2023). Nomadic tribes inhabiting Kazakhstan made their unique contribution to the development of military affairs, horse breeding and jewelry art. The Scythians, Sarmatians and other tribes living on the territory of Kazakhstan were known for their skilled archers and horsemen. They also developed a rich culture and literature, including epics such as "Kyz Zhibek" and "Kozy Korpesh - Bayan Sulu". To enhance the positive perception of Kazakhstan on the global stage, it is essential to transform existing negative stereotypes and showcase the country's versatility and uniqueness through the development of a strong national brand (Sergeyeva et al., 2021). Kazakhstan has traditionally been viewed as a land of nomads, renowned for the hospitality of its people, the beauty of its natural landscapes, and its rich cultural heritage. The historical and cultural complex "Ulytau" provides a range of tourist services, including information about sights, excursions along tourist routes and museums, capable of receiving a total of about 10,000 tourists a year. Ulytau Park has unique historical and cultural resources that can be integrated into tourist products that are attractive to tourists (Seidualin et al., 2024).

It is important to consider branding not only as the development of logos and a recognizable brand, but also as the creation of a comprehensive strategy for the development of ecotourism in the Ulytau Nature Park. Despite the existence of a program for the development of protected areas and master plans, at present there is a significant drawback - the lack of a unified management system that unites all entities involved in the development of the Ulytau Nature Park, including akimats and the coordinating council under the State National Park of Ulytau. The Coordinating Councils play an important role in coordinating the efforts of various actors and ensuring an integrated approach to tourism development in the region. However, actors may sometimes ignore the work of such councils, undermining their effectiveness. First, the subjects may ignore the work of the coordinating council due to insufficient awareness. They may not be aware of the council's existence, its aims and objectives, or how their involvement can benefit them. Second, actors may not see clear benefits from participating in the work of the council or from implementing its recommendations. They may feel that the council does not represent their interests or that its work will not bring them any tangible benefit. Third, subjects may not trust the coordinating council or its members. They may perceive the council as corrupt, incompetent, or ineffective. This mistrust can lead to their reluctance to participate in or cooperate with the council. Fourth, subjects may have conflicting interests with members of the coordinating council or other subjects. These conflicts can make cooperation difficult and lead to actors ignoring the work of the council.

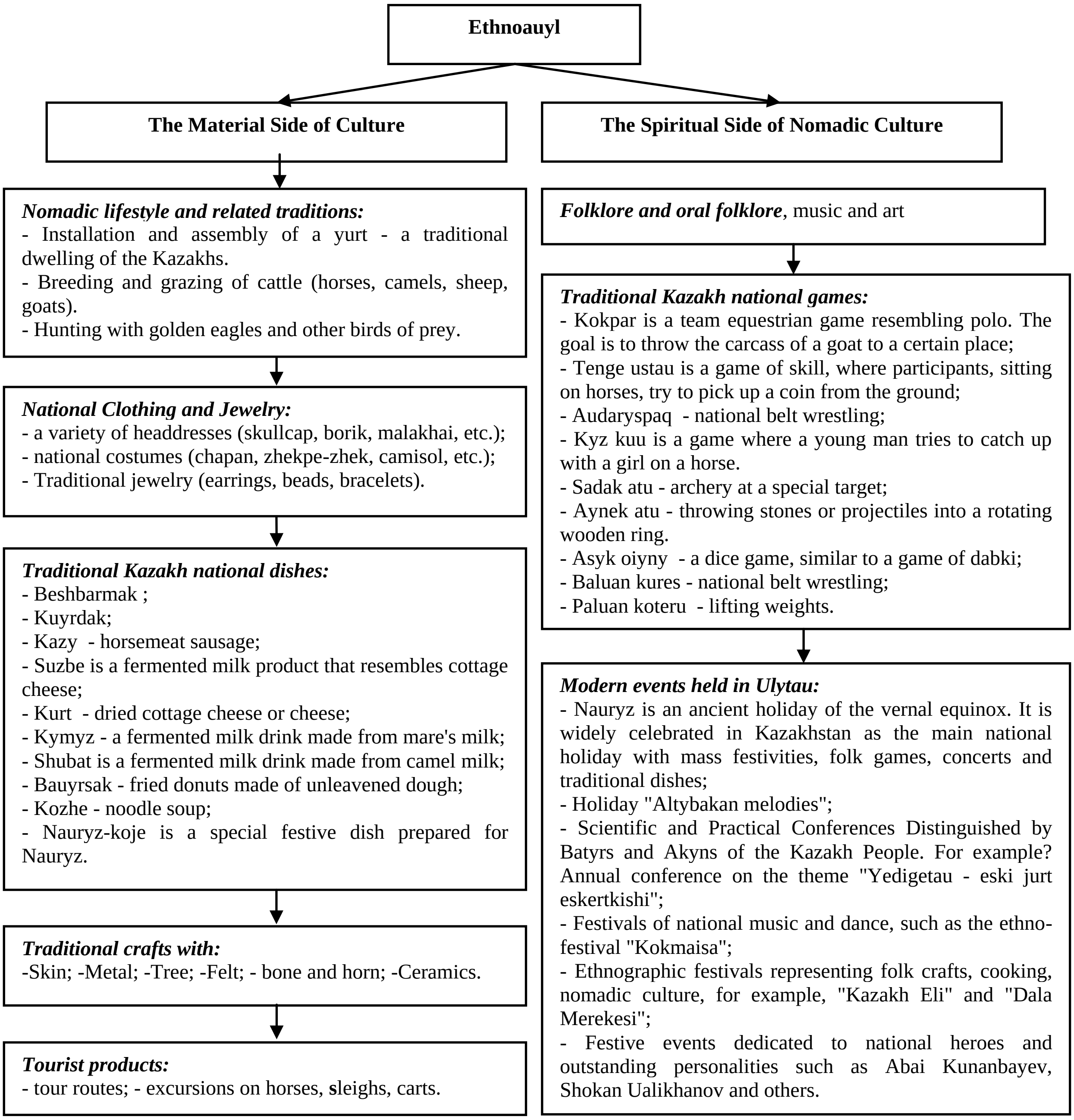
Finally, actors may lack resources, such as time or staff, which may limit their ability to participate in the work of the board. They may be focused on their day-to-day operations and not be able to devote time to participating in the work of the council. The Coordination Council should raise awareness of its work, clearly demonstrate the benefits of stakeholder participation, establish trust, address conflicts of interest, and provide actors with the support and resources necessary for their effective participation. By addressing these problems, the Coordination Council can increase the level of interaction with the subjects and ensure their active participation in the development of tourism in Ulytau.

The study of this problem necessitates the development of an effective system of interaction among ecotourism entities in the region, which will ensure that each participant receives dividends from the promotion of a single branding product of the Ulytau Nature Park. With its rich natural heritage and unique landscapes, Ulytau Nature Park can successfully implement a partnership strategy model to develop its brand. The study highlights that a comprehensive strategic approach based on local resources and identity is needed to create an attractive image of the park. The active involvement of local residents, the business community and government bodies in the branding process will help create a sustainable image of the park, contributing to its development and attracting more tourists, strengthening Ulytau's position as an important tourist destination. This study examines the potential of the ethno-village in the Ulytau Nature Park to stimulate the development of branding and proposes strategies for its implementation (Figure 1).

The development of a branded product for Ulytau Park should be carried out taking into account the following principles:

- Authenticity: The brand must be based on the real characteristics of the park and reflect its unique character.
- Recognition: A brand should be easily recognizable and memorable to stand out from other travel destinations.
- Attractiveness: The brand should make tourists want to visit the park and experience its unique features.

The inclusion of the ethnic village in the Ulytau brand is a strategic decision that enhances the authenticity and recognition of the park. The ethno-village, which immerses tourists in traditional Kazakh culture, makes Ulytau more attractive to the target audience interested in ethnic tourism. It also fosters interaction between the local community and tourists, showcasing their crafts and traditions, boosting the local economy and creating new jobs. Thus, the ethno-village becomes an important element of the brand, contributing to the successful achievement of branding goals: creating a unique image, attracting tourists and sustainable development of the region.



Ethnoauyl

The Material Side of Culture

The Spiritual Side of Nomadic Culture

Nomadic lifestyle and related traditions:
- Installation and assembly of a yurt - a traditional dwelling of the Kazakhs.
- Breeding and grazing of cattle (horses, camels, sheep, goats).
- Hunting with golden eagles and other birds of prey.

National Clothing and Jewelry:
- a variety of headdresses (skullcap, borik, malakhai, etc.);
- national costumes (chapan, zhekpe-zhek, camisol, etc.);
- Traditional jewelry (earrings, beads, bracelets).

Traditional Kazakh national dishes:
- Beshbarmak ;
- Kuyrdak;
- Kazy - horsemeat sausage;
- Suzbe is a fermented milk product that resembles cottage cheese;
- Kurt - dried cottage cheese or cheese;
- Kymyz - a fermented milk drink made from mare's milk;
- Shubat is a fermented milk drink made from camel milk;
- Bauyrsak - fried donuts made of unleavened dough;
- Kozhe - noodle soup;
- Nauryz-koje is a special festive dish prepared for Nauryz.

Traditional crafts with:
-Skin; -Metal; -Tree; -Felt; - bone and horn; -Ceramics.

Tourist products:
- tour routes; - excursions on horses, **s**leighs, carts.

Folklore and oral folklore, music and art

Traditional Kazakh national games:
- Kokpar is a team equestrian game resembling polo. The goal is to throw the carcass of a goat to a certain place;
- Tenge ustau is a game of skill, where participants, sitting on horses, try to pick up a coin from the ground;
- Audaryspaq - national belt wrestling;
- Kyz kuu is a game where a young man tries to catch up with a girl on a horse.
- Sadak atu - archery at a special target;
- Aynek atu - throwing stones or projectiles into a rotating wooden ring.
- Asyk oiyny - a dice game, similar to a game of dabki;
- Baluan kures - national belt wrestling;
- Paluan koteru - lifting weights.

Modern events held in Ulytau:
- Nauryz is an ancient holiday of the vernal equinox. It is widely celebrated in Kazakhstan as the main national holiday with mass festivities, folk games, concerts and traditional dishes;
- Holiday "Altybakan melodies";
- Scientific and Practical Conferences Distinguished by Batyrs and Akyns of the Kazakh People. For example? Annual conference on the theme "Yedigetau - eski jurt eskertkishi";
- Festivals of national music and dance, such as the ethno-festival "Kokmaisa";
- Ethnographic festivals representing folk crafts, cooking, nomadic culture, for example, "Kazakh Eli" and "Dala Merekesi";
- Festive events dedicated to national heroes and outstanding personalities such as Abai Kunanbayev, Shokan Ualikhanov and others.

Figure 1. The main characteristics of the ethno-auyl (ethno-village)

An effective branding strategy for the Ulytau Nature Park should be based on its unique characteristics and take into account the needs of the target audience. The key elements of the recommended branding strategy should include:

- Unique Selling Proposition (USP): "Ulytau Nature Park: Where History, Mining and Nature Meet in a Unique Tourist Experience".
- Logo: The logo should be simple, memorable, and reflect the key characteristics of the park. It is recommended to use the image of Mount Ulytau in combination with elements representing the historical and natural heritage of the park.
- slogan: "Discover Ulytau: a treasury of history, nature and culture".

Currently, the logo of the Ulytau Nature Park is vaguely defined and inconsistent. There are many different logos and slogans used by different stakeholders, which creates confusion for potential tourists, as some logos feature mountains, the natural heritage of the park, the image of animals, a musical instrument. In addition, the current brand does not fully reflect the unique characteristics of the Natural part. Most importantly, if the subjects of the natural park want to represent a single brand, the coordinating council must ensure the uniform use of the logo, slogan and other elements of the Ulytau brand in all communications. An ethno-village can serve as a place of attraction for all market participants, acting as a center of synergy and cooperation. However, the lack of clear relationships between actors, duplication of functions and inefficient use of resources, conflicts and misunderstandings between stakeholders contributed to a decrease in effective work. The ethno-village in Ulytau can serve as a physical embodiment of this interaction, providing a platform for the exchange of knowledge, ideas and resources.

The model of interaction of subjects proposed by the authors of the article is a dynamic tool that should be regularly updated as the project develops. It provides project teams with a comprehensive view of stakeholders and their relationships, enabling them to effectively manage interactions and achieve project goals. The ethno-village in Ulytau has significant potential for the development of branding in the region. The interaction of market entities, the anchor role of the ethnic village and the creation of a coordinating council will contribute to the creation of a favorable environment for the development of a destination brand. Working together, stakeholders can create a unique and attractive tourism product that will contribute to the economic growth and sustainable development of Ulytau.

To date, effective methods in branding national parks can be the use of social media to draw attention to parks, the creation of interactive virtual tours to attract visitors, the development of a unique and memorable logo and design for the park, and the holding of events and festivals to attract more visitors (Garg et al., 2019).

A comprehensive approach to branding the Ulytau Nature Park is needed, going beyond just creating a logo. The lack of effective management and coordination between government agencies, the coordinating council and tourism companies hinders the development of the park. It is necessary to develop clear branding steps, including the definition of the park's positioning, brand development (logo, slogan), marketing strategies and close interaction with local residents. Particular attention should be paid to sustainable development and environmental responsibility.

It is important to pay attention to the preservation of the nature and ecosystem of the park, to ensure the safety of visitors, and to create information materials about the richness of nature and the history of the park to draw attention to its unique features. It is worth noting that in modern conditions, the issues of preserving the unique qualities of national park objects have become relevant for business representatives, who until then were mainly interested only in maximizing the benefits of the tourism projects being implemented:

«… Today, when developing and selling tourist products, we pay great attention to the preservation of the unique characteristics of objects located within the boundaries of protected areas. Our tours, which are carried out within the boundaries of national parks, are primarily based on visiting objects that attract tourists with their special properties. The attractiveness of the territory of national parks depends on the preservation of the qualities of these objects, and the longer they are preserved, the longer our products will be in demand" (TB1).

The process of branding the territory of national parks is a rather complex and multifaceted process and requires the involvement of all entities interested in promoting the territory for tourist purposes. To date, within the framework of branding, it is worth paying attention to the following:

1. Positioning and differentiation: The development of the brand of the Ulytau Nature Park should begin with the identification of the key characteristics that distinguish this park from many others. The basis of the brand should be the uniqueness and richness of the natural and cultural heritage of Ulytau. The first step will be the positioning of the park. The following positioning is proposed: "Ulytau: the heart of history, the soul of the steppe". It focuses on the deep connection of Ulytau with the history of Kazakhstan, its role as a place of concentration of the material and spiritual heritage of nomadic peoples. Also, this wording emphasizes the consonance of Ulytau with the steppe nature itself, its organic inscribement in this landscape. The target audience of the Ulytau brand should be lovers of history and archeology, tourists interested in nature and ecotourism, as well as travelers looking for an authentic and untouched by civilization kind of experience. For these groups, Ulytau should be associated with a place where history comes to life against the backdrop of majestic steppe expanses, where you can feel the heritage of nomads and enjoy untouched nature.

«… The key elements of the Ulytau brand differentiation should be a unique combination of natural and historical attractions: ancient burial mounds, petroglyphs, medieval settlements, diverse flora and fauna, rare bird species, picturesque geological formations and the sacred mountain of Ulytau. It is important to offer tourists an authentic experience through tours with local guides, horseback riding, jeep excursions, accommodation in yurts. Emphasis should also be placed on eco-tourism and the opportunities for spiritual unity with nature that Ulytau can provide" (DMO1).

The visual image of the Ulytau brand should be designed in such a way as to reflect its natural and historical richness as much as possible. The identity, logo and slogan are intended to become expressive symbols that will be recognizable and associated with the park. Close interaction with the local population should play an important role in the development of the Ulytau brand. Involving residents in the branding process, providing them with opportunities to earn money on tourism will allow them to become "ambassadors" of the park, which in the long term will strengthen its sustainability and prosperity, and all these should be appealing first of all, for the tourist.

«… I visit Ulytau once a year. So far, I associate Ulytau with only one object, Aulie tau. During my last trip, I managed to visit several historical sites, of which the place has a lot to offer, each of them was unique. I think all this should be taken into account when forming the Ulytau brand. In general, the Ulytau brand should create an association with the tourist about the main resources of the park" (T2).

1. Brand development. The visual image of the Ulytau brand should be designed in such a way as to reflect its natural and historical richness as much as possible. The corporate identity, logo and slogan are intended to become expressive symbols that will be recognizable and associated with the park. Brand promotion should be carried out through various communication channels, including the website, social networks and printed materials. Close interaction with the local population should play an important role in the development of the Ulytau brand. Involvement of residents in the branding process, providing them with opportunities to earn money from tourism will allow them to become "ambassadors" of the park, which in the long term will strengthen its sustainability and turn them into competitive advantages to attract the attention of tourists and create a sustainable and prosperous tourist destination.

«… In my opinion, the key aspects in this process should be the ancient history of the region, the demonstration of archaeological sites and the reconstruction of the life of nomadic civilizations. Creation of interactive museum exhibitions. It is important to pay attention to the popularization of the cultural heritage of modern ethnic groups. Organizing workshops on traditional crafts such as felt and carpet weaving will not only enrich the tourist experience but also contribute to the preservation of these practices. I think that holding thematic festivals and events will become an effective tool for integrating history and culture into the brand of Ulytau.

In addition, in my opinion, it is important to pay attention to the visual embodiment of cultural heritage in the branding of the National Park. The use of national symbols, ornaments and architectural elements will help to create a recognizable and holistic image. An integrated approach that combines cognitive, interactive and event formats will reveal the unique history and culture of Ulytau, which will undoubtedly attract wide interest to tourists. (R4)

3. Marketing strategies. The development of effective marketing strategies is a key aspect in the development of a successful brand of the Ulytau Nature Park. An integrated approach to marketing will attract the target audience, strengthen competitive advantages and ensure the sustainable development of the park applications, etc.) will allow Ulytau to effectively interact with the target audience in the online space. The content should vividly and emotionally represent the unique nature, rich history and cultural heritage of the park.

Traditional marketing channels also play an important role. The development of advertising materials (booklets, posters, videos), participation in tourist exhibitions and forums, cooperation with travel agencies and the media will allow to convey information about Ulytau to a wide audience of potential visitors.

«… Here I would say that there is no one tool that would immediately shoot. Within the framework of branding, it is necessary to determine the points of contact with the consumer (tourist), i.e. to identify touch points.

You need to understand the so-called path of a tourist who visits the National Park, and each stage, for example, the stage of inspiration. How do we inspire people to come to this national park more, and this must be understood, and if there is a weakness there, then it must be strengthened (DMO2)

Particular attention should be paid to the creation of a strong brand in Ulytau. The development of a recognizable logo, corporate identity and slogan reflecting the uniqueness of the park will become the basis for the formation of its positive image. Competent branding will create an emotional connection with the audience and contribute to the growth of the popularity of Ulytau.

«… Building a strong brand for a national park requires a holistic approach that includes research and analysis, developing a message and concept, running marketing campaigns, engaging with local communities, and creating unique experiences. My guess is that research and analysis help to understand the competitive landscape, the target audience, and the unique features of the park. This can serve as the basis for the development of a relevant and attractive brand" (P2)

An important element of the marketing strategy should be cooperation with local communities and the involvement of local residents. This will not only provide valuable insights into the culture and traditions of the region, but will also provide support for the local population, who will be able to act as "ambassadors" of the Ulytau brand.

The comprehensive use of online and offline marketing tools, a strong branding platform, as well as close interaction with local communities - all this will become the basis for the effective promotion of the Ulytau Nature Park and attracting the attention of the target audience.

1. Interaction with local communities. A key success factor in the development of the Ulytau Nature Park brand will be close interaction with local communities.

«… I believe that first of all, before offering a certain job, it is necessary to coordinate actions with the main stakeholders, businesses and, especially, residents. Local communities provide us with services. These are places of accommodation, catering, etc., so it is necessary to coordinate any steps in the field of branding the area with local residents " (DMO4)

First, it is necessary to include local people in the branding process - ask for their opinions, use their talents and knowledge when creating a brand and marketing campaigns. This will not only provide valuable insights into the culture and traditions of the region, but will also provide support for the local population, who will be able to act as "ambassadors" of the Ulytau brand.

Secondly, it is important to offer local residents opportunities to earn money from the development of tourism - to create programs for local guides, artisans, entrepreneurs so that they can benefit and become interested partners in promoting the park. Finally, it is necessary to encourage responsible behaviour of tourists by educating them about the culture and traditions of the locals and encouraging them to respect their values. Only such close interaction with local communities will ensure the sustainable development of Ulytau Park and create an authentic tourist experience.

5. Sustainable development. Sustainability should be a key priority in the development of the Ulytau Nature Park brand. First of all, it is necessary to create an environmentally responsible brand that demonstrates commitment to the preservation of the natural environment and responsible tourism. This will emphasize the uniqueness of the park and its value as a place where nature is preserved in its original form. It is possible to introduce efficient waste recycling systems, implement

energy-saving solutions, and develop rules of environmentally responsible behavior for visitors. Such initiatives will not only reduce the burden on the ecosystem but will also become part of the responsible positioning of the Ulytau brand. Cooperation with international organizations for nature protection should be an important area. Attracting their expertise, financial and organizational support will make it possible to implement large-scale projects to preserve biodiversity, restore natural landscapes and develop sustainable tourism in Ulytau. The status of partnerships with recognized environmental organizations will also strengthen the reputation and competitiveness of the brand.

«… In the context of preserving environmental sustainability and natural heritage, balanced branding and development of tourism with nature protection requires an integrated approach and the incorporation of various strategies and activities. It is necessary to conduct a thorough analysis of the impact of tourism on the natural environment and its vulnerable components, to identify critical points and risks. Attendance management strategies should then be developed and implemented, including controlling pressures on ecosystems, optimizing routes and developing rules of conduct for tourists" (R1).

Thus, sustainable development should become the key foundation of the Ulytau brand. Environmental responsibility, programs to reduce the impact of tourism and cooperation with environmental organizations will create a brand that will not only attract tourists, but also ensure the long-term preservation of the unique nature of the park

The study of the opinions of the main stakeholders interested in the development of tourism in the territory of national parks made it possible to determine the main terms on the basis of which it is possible to form an associative molecule of the object under consideration (Table 2, Figure 2).

Table 2. Codes and sub-codes of the main interview questions regarding the branding of the State National Nature Park

Theme	Codes	Subcodes	Support of Respondents (n=21)
Tourist potential of the national park	Natural resources	Peak Auliye Mountain	**16 (76,2%)**
		Yedige Peak	12 (57,1%)
	Historical sites	Mausoleum of the Golden Horde Period	17 (81,0%)
		Tamerlane's legacy	11 (52,4%)
		Mining facilities	8 (38,1%)
		Terekty Auliye	14 (66,7%)
	Culture	Traditions	**15 (71,4%)**
		Socio-cultural environment	7 (33,3%)
	Ecology	Clean air	5 (23,8%)
		Environment	4 (19,0%)
Possible types of tourism that can be developed within the boundaries of the park	Educational types of tourism	Historical and cultural tourism	**19 (90,5%)**
		Ethnotourism	7 (33,3%)
		Dark tourism	**11 (52,4%)**
	Recreational Types of Tourism	Ecotourism	9 (42,9%)
		Rural tourism	5 (23,8%)
		Health tourism	8 (85,7%)
Branding objects	Natural objects and reserves	Ulytau Mountains	**17 (81,0%)**
		The steppes of Ulytau	3 (14,3%)
	Historical and cultural sites	Mausoleum of Josha Khan	20 (95,2%)
		Mausoleum of Alash Alash Khan	14 (66,7%)
		Khan ordasy	**15 (71,4%)**
		Terekty Necropolis	**18 (85,7%)**
Visual image of the park	History, culture, traditions	The History of the Golden Horde	**19 (90,5%)**
		Culture and traditions of the nomadic people	11 (52,4%)
	Nature and Heritage	Mountains, steppes and rivers	5 (23,8%)
		Sacred heritage	7 (33,3%)
The main participant of branding	Public Authorities Business and DMO	Local authorities	**15 (71,4%)**
		Regional and republican bodies	9 (42,9%)
		Tourism business	**18 (85,7%)**
		Associations and national companies	14 (66,7%)
		Local communities	12 (57,1%)
Local Community Engagement	Local business	Tourism enterprises	**19 (90,5%)**
		Service organizations	11 (52,4%)
	Local Parks Authority	National Park Management	16 (76,2%)
	Local population	Residents	**1781,0%)**

Table 2 shows that the participants of the interview (n=21) see great tourism potential in the Ulytau SNNP, based on natural resources, historical sites and traditions, for example:

- Natural resources: Aulie Tau Peak (76.2%) and Yedige Peak (57.1%) are key nature tourism destinations.
- Historical sites: The mausoleum of the Golden Horde period (81.0%) is the main object of historical and cultural tourism.
- Culture: Traditions (71.4%) play an important role in the tourist potential of the park.

The results of the interviews regarding the branding of the Ulytau State National Nature Park emphasize the rich tourism potential of the park, based on its natural, historical and cultural values. The study revealed strong support from local stakeholders for the development of educational and recreational tourism, as well as for positioning the park as a unique cultural and historical destination. The results show the need to improve infrastructure and services for tourists, as well as the importance of collaborating with local partners to ensure the sustainable development of the park.

These conclusions can serve as a basis for the development of an effective development strategy that will allow the Ulytau State National Natural Park to maximize its potential and become an attractive tourist destination. Practice shows that often in the formation of the brand of the territory, terms expressing the name of the area or individual characteristics of the territory, which form associative images or ideas among tourists about the area, play a special role (Zharkenova et al., 2023). The associative dictionary of the Ulytau National Natural Park includes such high-frequency words as: Zhoshy Khan, Alasha Khan, Dombauyl, Khan Ordasy, Terekti Aulie, Peak Yedige, Tanbaly Tas, Aulie Tau, etc.

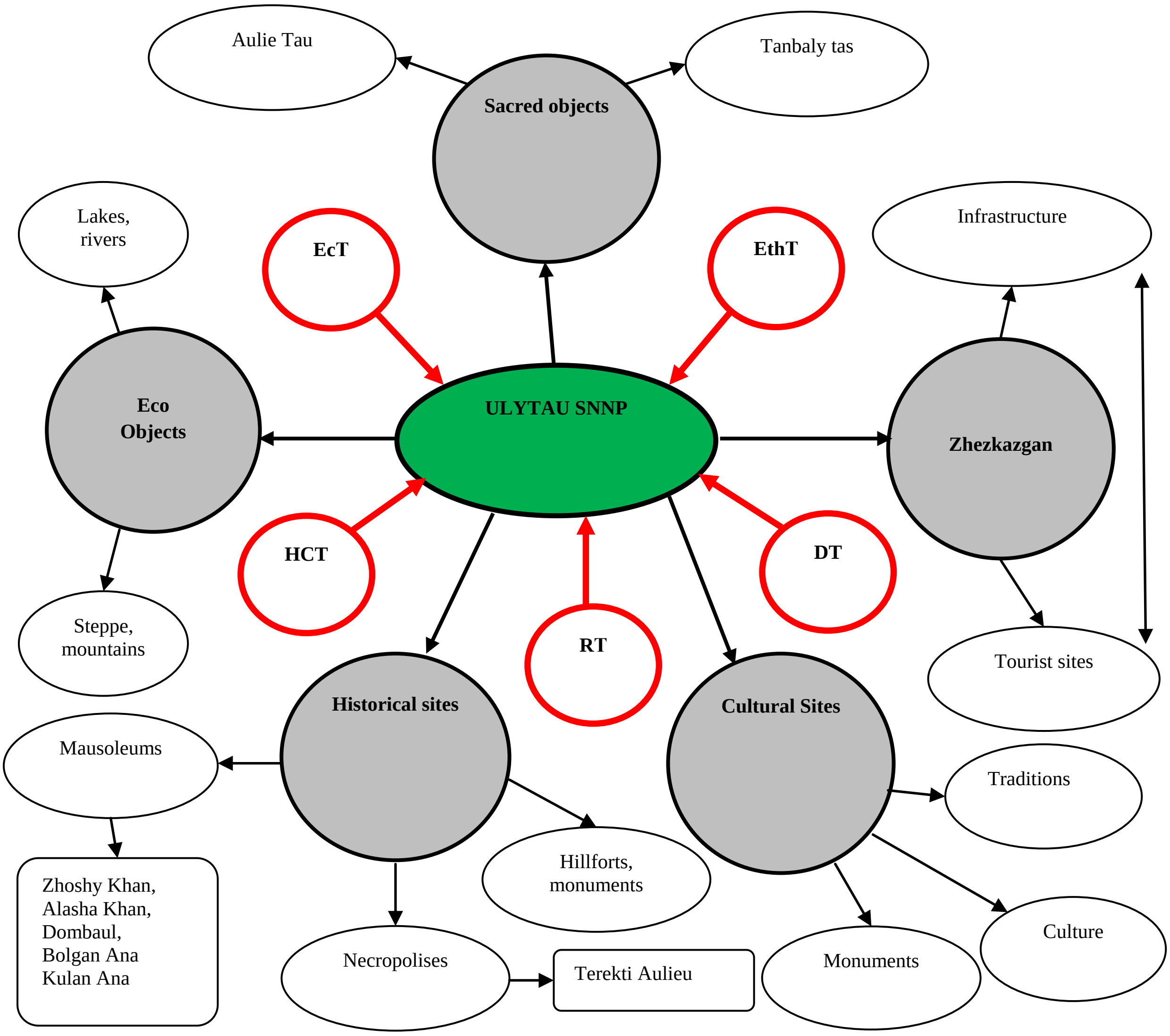


Figure 2. Associative Molecule of the Ulytau State National Nature Park (EcT – Ecological Tourism, EthT – Ethnotourism, HCT – Historical and Cultural Tourism, CT – Rural Tourism, DT – Dark Tourism) (Source: Compiled by the authors)

The associative molecule shown in Fig.2 indicates the most important directions in the formation of the symbolic image of the Ulytau State National Nature Park. It is the high-frequency terms of the associative vocabulary that reflect the images of tourists about the area and what attracts them most in this territory (Zharkenova et al., 2023). In addition, the associative molecule can underlie the concept of brand formation at the local level and determine the main strategies for promoting the area (Bolkunov, 2016). The associative molecule of the Ulytau SNNP is a valuable tool for developing a branding strategy and promoting the territory. It allows to identify the key associations of tourists with the region and use them to create a unique and attractive image of Ulytau.

The development and promotion of a local tourist brand is not limited to the creation of a graphic (logo) and verbal (slogan) designation and the search for communication channels for its promotion in various segments of the information space (Tiberghien, 2020). Branding of tourist territories is, first of all, a set of measures that are aimed at promoting certain characteristics of the region to potential consumers (tourists, travel agents, investors in the hospitality sector) with the help of a properly created image, a key idea. The formation of a brand of a tourist territory is a long process and provides for the implementation of a set of interrelated and combined measures.

CONCLUSION

Different regions of the world are associated with certain characteristics or aspects of their culture and society. For example, Paris is known for its style and fashion, Japan for its cutting-edge technology, Switzerland for wealth and precision, Rio de Janeiro for carnival and football, and Tuscany for its high quality of life. Kazakhstan strives to position itself as a modern, dynamically developing country with a rich history and culture.

The Ulytau Nature Park, which has a rich cultural and historical heritage, has significant potential for the development of ecotourism. The article examines the use of this potential to create a strong brand of the park, which will contribute not only to attracting tourists, but also to preserving the natural and cultural values of the region. Ulytau Park is famous for its unique natural landscapes and many archaeological sites, such as the mausoleum of Alasha Khan and other historical sites. These resources provide unique opportunities to create travel products that cater to environmentally conscious travelers. It is important to note that tourists are increasingly appreciating not just outdoor recreation, but a deep immersion in the history and culture of the local population. For the successful development of the brand of the park and ethno-village, the participation of various stakeholders is necessary. The article examines in detail the roles and responsibilities of such participants as large corporations, banks, investment funds, akimats, farmers, the local community and tour operators. Each of these groups plays an important role in the development and maintenance of tourism infrastructure, as well as in the promotion of tourism. Large corporations and banks provide the necessary financial resources for the development of the park's infrastructure. This includes the construction of tourist routes, the creation of visitor centers and other facilities that make the park more attractive to tourists. Corporations can also sponsor various events and festivals held in the park.

Investment funds invest in the long-term development of the region, supporting projects aimed at preserving natural resources and cultural heritage. These investments help create a sustainable tourism infrastructure that attracts tourists all year round. Akimats (Local authorities) play an important role in administrative support and coordination of projects. They ensure compliance with legal regulations and standards, as well as assist in the promotion of the park at the regional and national levels. The involvement of farmers and the local community is key to creating an authentic tourism experience. Locals can offer tourists unique products and services, such as traditional crafts, national cuisine and participation in cultural events. This not only enriches the tourist experience but also contributes to the economic development of the region. Tour operators play an important role in organizing tours and promoting the park. They develop itineraries, conduct excursions and provide marketing support, which attracts tourists from different parts of the world.

The proposed model of management of the ethno-village in Ulytau is a promising model for the sustainable development of the region and the creation of a unique tourist experience. It ensures harmonious interaction between the local population, tourism business, government agencies and scientists. The ethno-village is becoming a center of attraction, where traditions are preserved and promoted, ecotourism is developing and the Ulytau brand is being strengthened. A key role in governance is played by the Coordination Council, which ensures effective interaction between all stakeholders. The associative model developed in the article plays a key role in the development of ecotourism in the Ulytau State National Nature Park, highlighting the main natural resources, such as steppes, mountains, lakes and rivers, which attract tourists. It supports sustainable development by emphasizing the importance of protecting ecosystems and minimizing environmental impacts. The model creates a positive image of ecotourism, drawing attention to unique natural and cultural experiences. It also contributes to the development of educational programs, the involvement of the local population and the improvement of infrastructure. As a result, the associative model becomes an important tool for harmonious interaction between tourism activities and nature protection in Ulytau.

The main tool for promoting the park's products is marketing, and especially branding. Creating a strong brand for Ulytau Park will help draw attention to its unique cultural and natural attractions. Branding should emphasize the uniqueness of the park, its historical significance and natural beauty, which will allow you to stand out from other tours.

A comparative analysis of one-day and multi-day tours has shown that multi-day tours bring significantly greater economic returns. Not only do they provide higher yields, but they also contribute to an even distribution of tourist flows, reducing the burden on the most popular sites and allowing tourists to dive deeper into the cultural and natural heritage of the region. The development of the Ulytau Nature Park brand through ecotourism and ethno-aul has great potential. Interaction between different stakeholders, the use of marketing strategies and a focus on multi-day tours can ensure the sustainable development of the region. This, in turn, will help preserve Ulytau's unique natural and cultural resources for future generations, while contributing to economic development and improving the quality of life of local residents.

Appendix 1. Interview Form

Introduce yourself.

Confirm your desire to participate in the interview and do you agree to sign the consent to participate in the interview?

Explain in which organization you work or whether you are related to tourism

1. Introduction:

Q1. Branding of territories is an important tool for attracting tourists and developing tourism. How do you understand the concept of a "territory brand" and what key elements do you consider important in its formation?

1. What resources and features do you consider the most important for branding national parks?
2. What approaches and strategies, in your opinion, are the most effective for creating a strong national park brand?
3. What importance do you attach to interaction with local residents and businesses when developing and promoting the brand of the national park?
4. How do you think it is possible to balance branding and tourism development with the need for nature conservation?

5. Marketing campaigns and events can significantly increase the brand awareness of a national park. What types of marketing promotions and events do you consider the most effective for brand promotion?
6. Branding of the territory of national parks

Q2. National parks today are beginning to play an increasingly active role in the development of tourism in various countries and regions. How do you assess the development of national parks and their participation in the development of tourism, including in Kazakhstan?

7. What economic and social effects do you expect from the successful branding of the national park?
8. How much do national parks need branding today?
9. Could you explain which entities should be involved in the branding of national parks?
10. What tools are currently the most effective in branding the territory or objects of national parks?
11. Branding of the territory of the Ulytau National Park

Q3. Ulytau National Park has unique natural and cultural resources. What key elements do you consider important for the branding of the Ulytau territory?

12. What strategies and approaches do you consider the most effective for promoting Ulytau in the international arena?
13. What forms of interaction with local residents and businesses do you consider the most productive for successful branding?
14. What associations do you form when you mention the Ulytau National Park?
15. What are the most famous objects of the Ulytau National Park for you?
16. Ulytau has a rich history and cultural heritage. How do you think these aspects can be integrated into the brand of the territory and attract tourists?
17. Successful territory branding requires an interdisciplinary approach and collaboration. What steps and actions, in your opinion, are necessary to create a strong and sustainable brand of the Ulytau National Park?

Do you have any additions to the questions asked?

Thank you for your participation.

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MANAGING SUSTAINABLE TOURISM OF PERAWAN BEACH, EAST JAVA, INDONESIA BASED ON THE COASTAL ECOSYSTEM SERVICE (CES) APPROACH

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Abstract: Coastal tourism at Perawan Beach in Malang Regency, East Java, presents both opportunities and sustainability challenge. The main challenge is that sustainable ecotourism often struggles with economic viability. Intense competition from more accessible destinations, which may disregard ecosystems, presents a major challenge. This research aims to (1) describe current activities at Perawan Beach, (2) identify tourism and other human activity threats to coastal ecosystems, and (3) explore coastal opportunities through a coastal ecosystem service approach for societal benefit. This study using the Coastal Ecosystem Service (CES) approach, involved interviews and observations to assess stakeholder perceptions, tourism threats, and opportunities. Following CES indicators, this study is based on grounded theory. The data collection technique was based on semi-structured interviews involving 10 stakeholders. Findings indicate that CES can enhance beach tourism sustainability by involving communities, protecting natural resources, and promoting fair economic growth. CES supports long-term environmental management and local well-being by integrating provision, regulation, support, and cultural services. The key focus is managing events and regulating the climate in coastal tourism areas. In order to educate visitors on coastal vegetation and sustainable fisheries. CES opportunities span diverse coastal ecosystems, including beaches, estuaries, forests, wetlands, and floodplains. The main initiatives were building Ocean Farms and following virtual reality promotions, promising steps for sustainable beach tourism. Ocean Farms offers hospitality services for tourism, such as floating hotels, and provides education on sustainable fisheries management. The development of Ocean Farms also represents support from academics, researchers, stakeholder collaborations, and the local government, all of whom are committed to the sustainability of this tourism initiative. The main challenges in developing Perawan Beach as a sustainable tourism destination include infrastructure problems, ineffective promotion, and geographic conditions that limit certain water tourism activities. However, there are great opportunities through a coastal ecosystem services (CES) approach, which emphasises the importance of environmental maintenance and education on coastal vegetation management. This beach has potential for further development in sustainable marine tourism while preserving its ecological services. Its natural wealth, including the Gondang Wetan Estuary and Pedotan Lagoon, supports water-based tourism activities. Based on CES indicators, the area is strong in providing food resources, biological assets, regulatory functions, and opportunities for coastal conservation and education.

Keywords: sustainable tourism, tourism beach, coastal ecosystem service (CES), local stakeholder, Indonesia

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INTRODUCTION

Coastal areas have become the main tourist destinations with various potential natural resources (Fang & Dakui, 2014; Romero-Padilla et al., 2016). Coastal tourism stands at the intersection of natural beauty, cultural richness, and economic potential, offering a myriad of opportunities for tourists and local communities. It also promises not only beautiful views and recreational activities but also significant economic benefits through job creation, infrastructure development, and income generation (Mejjad et al., 2022). Throughout the scientific literature, beaches have been considered a very valuable ecosystem for the tourism industry because of their economic, recreational, aesthetic, and cultural values (Williams et al., 2016) o that their existence and use need to be sustainable. Sustainable coastal and marine tourism focuses on optimizing tourism opportunities (Chen & Teng, 2016). This optimization also minimizes negative impacts feared to affect environmental, economic, and social stability (Gössling et al., 2016). Implementing this paradigm requires careful planning, collaboration between stakeholders, and commitment to long-term environmental management (Drius et al., 2019). This involves not only protecting natural resources and biodiversity but also encouraging community involvement, preserving cultural values, and generating equitable economic opportunities for local populations.

The debate regarding the sustainability of coastal tourism covers many different points of view related to carrying capacity. The wisest definition of tourism carrying capacity offered may be “The maximum number of people who can visit a tourist destination at the same time without causing damage to the physical, economic, or socio-cultural environment, and an unacceptable reduction in the quality of tourist satisfaction” (Coccossis & Mexa, 2017). When too many tourists visit a site, what to consider the most is the site’s carrying capacity, because overtourism is a potential threat to the site’s sustainability (Cheung & Li, 2019). It is also based on the relationship between human well-being and ecosystem functioning being continuously affected by environmental degradation (Mendoza-González et al., 2021). The next dilemma is when tourism has

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good natural resource potential and works with an ecotourism system but tends to have few visitors. Previous research also explains that socially and environmentally sustainable ecotourism initiatives often struggle to achieve economic viability (Neger, 2022). Previous research confirms that there are challenges to economic sustainability in tourist areas beyond the influence of massive environmental protection. The fact is that for tourism to develop, its economic sustainability must be taken into account, especially in terms of economic viability (Neger, 2022). Previous research also states that when an economic activity does not produce a net profit, it will be difficult to be sustainable in the long term (Picard, 2015).

The low economic income due to the minimal number of tourists is also influenced by the lack of effective promotion, conflicts over land ownership, lack of cooperation between stakeholders, minimal infrastructure to support tourism, the economic crisis in local communities, public security, lack of financial support, lack of clean water supply, the influence of seasonal tourism, and the possibility of immature skills or training (Neger, 2022). In this study, we highlight the challenges of sustainable beach tourism at Perawan Beach, Malang Regency, East Java Province, Indonesia. This beach has a large biodiversity capacity and at the same time has challenges for economic sustainability, especially in generating ideal profits for local communities (Sumarmi et al., 2023). Even though this area has large natural resources with a complex tourist typology, it is not included in a special protection scheme for conservation. As such, ecosystem service-based for sustainable coastal tourism can be adopted in managing this beach. In addition, ecosystem services can open integrated economic circulation and prevent stakeholders from switching to economic activities that may conflict with environmental conservation (Mendoza-González et al., 2021; Neger, 2022; Sumarmi et al., 2022). The Coastal Ecosystem Service (CES) approach is closely related to, among other things, coastal tourism (CT) and human activities (HA) (Drius et al., 2019). We concentrate on two types of relationships (benefits and threats) in sustainable coastal tourism development, linking CES, CT, and HA. Ecosystem service is known to use a comprehensive framework and can be adopted in managing sustainable beach tourism.

The indicators consist of (1) provision (all products of the ecosystem, including food, materials, genetic resources, and habitat), (2) regulation and maintenance (all ecosystem functions, that maintain maintenance and regulation, including, for example, air and water quality, climate regulation and natural hazards), (3) support (habitat and protection for species, and soil formation), and (4) culture (nonmaterial benefits that people obtain from ecosystems, including recreation, cognitive development and aesthetic experiences) (Drius et al., 2019; Mendoza-González et al., 2021). Previous research especially focused on Southeast Asia, highlighting that while provisioning and cultural services are often recognized and valued, regulating and supporting services such as mangrove conservation and education service (Rojas et al., 2019).

This research emphasizes the need for greater awareness and communication about the essential yet frequently overlooked ecosystem services that underpin sustainable tourism practices. Other study also advocated for participatory governance models, emphasizing the involvement of local communities and stakeholders to generate long-term benefits for both ecosystems and tourism economies (Dimitrovski et al., 2021; Phelan et al., 2020). However, they noted significant barriers, including fragmented governance structures and a lack of financial incentives. Additionally, CES emphasized the importance of adaptive management in addressing climate change impacts (Furlan et al., 2022), suggesting that CES, such as coastal resilience and natural buffers like mangroves (Sunkur et al., 2023), and can protect tourism from several challenges such as pollution, overexploitation of resources, and poor water quality (Booi et al., 2022). Recently, researcher also found that CES approach give positive feedback with focus on intangible benefit including recreational sense, aesthetic, spiritual, and cognitive ones (Sima et al., 2024). The researcher was concluded that visitors who have integrated nature into their lifestyle, develop a strong attachment to the location and are willing to engage in pro-environmental actions and adhere to visitation rules. Through initial identification regarding economic sustainability challenges and large ecosystem opportunities, we analyzed stakeholders' perceptions based on CES. We interviewed stakeholders, local communities, and tourists at Perawan Beach, because of their close relationship with this coastal ecosystem.. The aim of this research is to assess the sustainability of coastal tourism at Perawan Beach by analyzing stakeholders' perceptions through the lens of Coastal Ecosystem Services (CES). Specifically, the study seeks to (1) describe current community activities related to the coastal ecosystem, (2) identify key threats posed by tourism and other human activities to both the ecosystem and tourism sustainability, and (3) explore opportunities for sustainable coastal management by focusing on the ecosystem services most valued by society.

MATERIALS AND METHODS

The research method using grounded theory method. Unlike other research methods that start with a hypothesis, grounded theory begins with the collection of data, and the theory emerges from this data (Corbin & Strauss, 2014). This study had several qualitative fieldwork steps carried out between May 2023 and December 2023. The first step was in-depth interviews with three selected experts to get a general picture of tourism development in Pantai Perawan (members of Powilis), Sidoasri Village. Based on interviews and literature, the next step was to identify potential ecotourism centers by visiting and observing tourist attractions. The map of the research location is presented in Figure 1. Semi-structured interviews were conducted based on a format that combined open and closed questions, allowing for guided and systematic conversations in discovering in-depth tourism-related information (Beedie, 2017; Pung & Chiappa, 2020). Those involved were organized into three groups to gain information about how they understand, use, and manage the beach. The next step was to conduct in-depth interviews involving 10 stakeholders. We adopted a CES approach so that the interview and field observation guidelines focused on collecting data related to CES. The transcription of interview responses was written in Microsoft Word.

Observation notes were analyzed directly from the original notes, considering the same comparison criteria as interviews. Then the texts compared were interview transcriptions and notes from observations. The comparative sample text classification considered stakeholders based on their authorities, local communities, and tourists to establish the unit of analysis. The methodological design model used in the data analysis was a concurrent triangulation strategy (Creswell &

Creswell, 2017). We used qualitative information in fieldwork collected during the same period, using semi-structured interviews, qualitative observations, and surveys. From this model, qualitative data analysis began with the transcription of interviews and adjustments to the research domain/keywords. A database was produced with data from the survey to enable comparison of results between the community, management, and also visitors as research respondents.

The first research objective was about the present situation and finding the main obstacle to economic viability; we focused on 1) knowledge of the ecosystem, 2) attachment of individual activities to the ecosystem, and 3) organizations related to use and management. Then, to answer the third objective regarding opportunities and CES, we focused on exploring 1) provisioning services, 2) regulating services, 3) cultural services, and 4) supporting services (Drius et al., 2019; MEA, 2005).

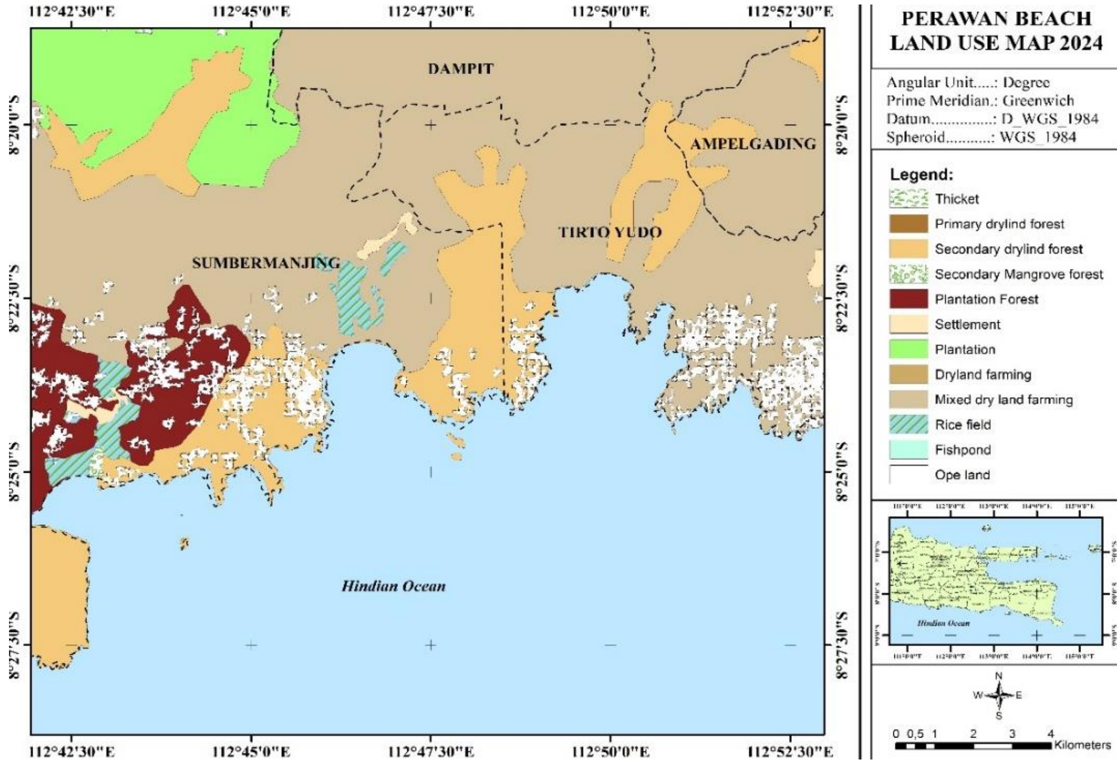


Figure 1. Land Use of Pantai Perawan (Source: The authors, 2024)

RESULTS AND DISCUSSION

1. Present situation of Perawan Beach, coastal tourism, and human activities

Perawan Beach in Sidoasri Village has beautiful brownish-white sand that stretches for almost two kilometers. Having the feel of a private beach, the atmosphere at the beach is calm, far from the noise of the city, and the beach is also clean. This area does not appear to have experienced many changes because the residents mainly work as fishermen. Its visual landscape is just breathtaking. The area hides the potential of a tourist site. A Coastal Ecosystem Service (CES) approach will be suitable since it preserves the environmental and social conditions of the community while boosting economic sustainability in the future. Visuals of the Perawan Beach landscape are presented in Figure 2.

Figure 2. (a) The sand along the coastline of Perawan Beach and (b) the cliff along the coastline of Perawan Beach (Source: The authors, 2023)

Perawan Beach is a beautiful area that can be developed as a tourist destination. This beach has complex geomorphological elements for tourist activities. First, at the eastern end of this beach, there is an estuary known as

“Gundang Wetan”. The Gundang Wetan Estuary (Sidoasri River) is shallow and clean and has a light current. The estuary is a great place for water activities, which are rare to be found on the South Coast of East Java. Gundang Wetan can be accessed by following the path around the bushes or following the coastline to the eastern end of the beach (Figure 3). Currently, local managers have provided river tracing and canoeing services to support tourism activities. This water tourism activity has a quite good economic impact and supports community activities that previously focused on fish capture.

Figure 3. (a) Distance between Gundang Wetan Estuary and coastline
(b) View of Gondang Wetan Estuary at high tide Perawan Beach (Source: The authors, 2023)

Figure 4. (a) Middle view of Pedotan Lagoon and (b) southern view of Pedotan LagoonPerawan Beach (Source: The authors, 2023)

Figure 5. (a) The “Ocean Farmits” floating house and (b) boat renting at Perawan Beach (Source: The authors, 2023)

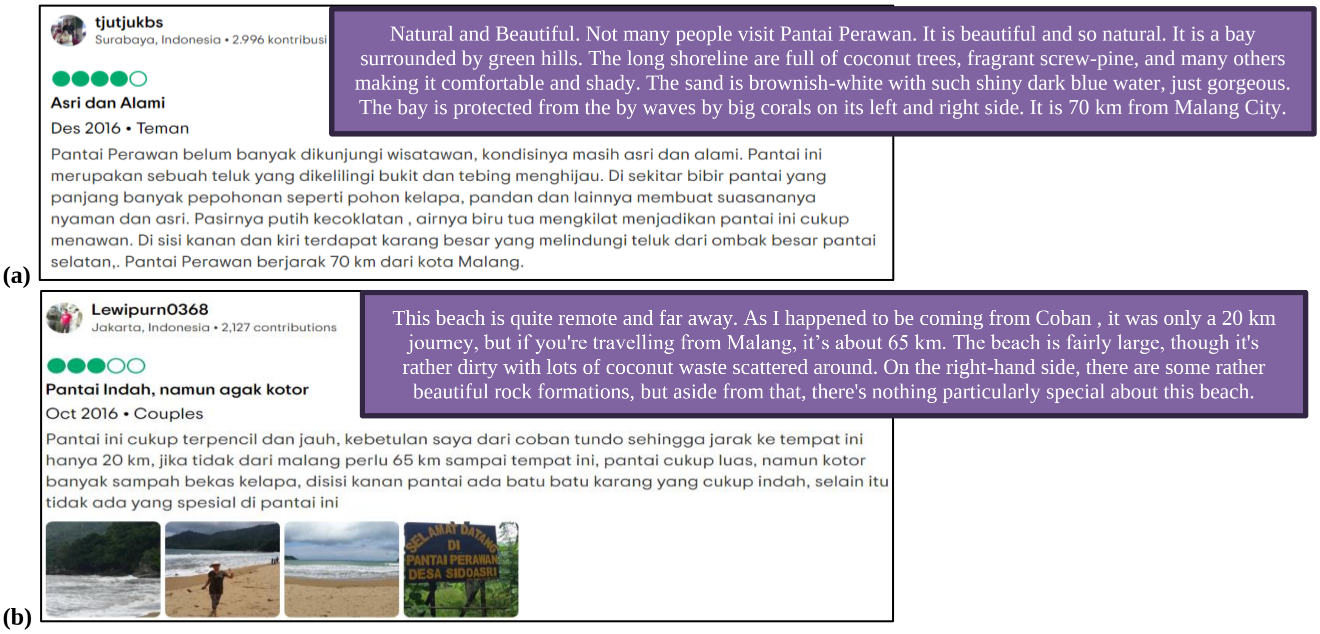
Second, there is a lagoon landscape. The local people call it “*Pedotan*”, which means “the flow is cut off or trapped” as the lagoon stands as if it greets visitors before reaching the Gundang Wetan Estuary. This spot was formed by hydrometeorological influences where high rainfall caused the Sidoasri River to overflow and fill the large basin. The water is calm and gives a healing impression to tourists and adds to the value of Perawan Beach as a tourist destination (Figure 4). This spot offers beautiful views from various angles. However, unlike the Gundang Wetan Estuary, which has undergone changes and improved management, this spot is starting to be abandoned. The interview results confirmed some problems related to the spot, starting from minimal infrastructure, security systems, and low interest. Recently, Perawan Beach has experienced an increase in activities related to coastal tourism with the construction of floating houses just off the coastline. This floating house’s name is “OCEAN FARMITS”, which is supported by Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Pertamina, PPP PONDOKDADAP, IKA ITS, PT. SAM Global Engineering, BKI, and PERPRO (Anti Corrosion Company). Ocean Farmits allows visitors to rent a boat and see the view of Perawan Beach from much more interesting angles (Figure 5).

The beach manager confirm that Ocean Farmits was first developed to combine a fish farming system (fisheries) and a floating hotel for tourists. The design of Ocean Farmits consists of an upper deck, a lower deck, and a fish net. The upper deck is used as a spot for tourism with one of the facilities being a floating hotel. The lower deck is used as a place to manage and educate people about fish farming. Meanwhile, at the bottom, there is a net as a place for cultivating fish. The Ocean Farmits was chosen as an alternative for water tourism on the beach because it can withstand wave heights of up to 6 meters, stands at a sea depth of at least 10 meters, and can last for 15 years (DIKST, 2023). In 2023, Perawan Beach using virtual reality-based website to improve promotional performance. This website is developed with the title "Adventure-Based Virtual Web Tour" following current promotional developments that are starting to utilize virtual reality. The visualized virtual content is in the form of landscape photos and videos along Perawan Beach developed with Theasys (Sumarmi et al., 2023). Respondents mentioned that to date the management team of the beach was still using virtual reality for promotion purposes. The other good thing about the beach is the cleanliness and beauty. The beach is home to many plant species, including *Pes-caprae*, *Barringtonia Asiatica*, *Pandanus Odorifer*, *Cocos nucifera*, *Ipomoea aquatica*, *Casuarina Equisetifolia*, *Rhizophora*, and shrub grassy vegetation (Sumarmi et al., 2023). The existence of these various plant species indicates that the beach has good ecological quality, and this must be maintained to attract visitors.

Figure 6. (a) The condition of the road's asphalt is not entirely in good shape and
(b) The main route to Perawan Beach is quite small (Source: The authors, 2023)

2. Main obstacles for economic viability within the ecosystem and social practice for coastal tourism sustainability

Previous research and publications mentioned several major difficulties from the economic perspective for sustainable coastal tourism (Brščić et al., 2020). Inadequate marketing and promotional efforts can hinder economic viability, thereby limiting the ability of coastal tourism to attract visitors and generate fair income for local communities (Sumarmi et al., 2023). Then there is the problem of infrastructure maintenance, such as roads and equipment, to support tourism activities (Drius et al., 2019). Current conditions related to roads and maintaining equipment need to be made a priority for improvement.



tjutjukbs
Surabaya, Indonesia • 2.996 kontribusi
●●●●○
Asri dan Alami
Des 2016 • Teman

Pantai Perawan belum banyak dikunjungi wisatawan, kondisinya masih asri dan alami. Pantai ini merupakan sebuah teluk yang dikelilingi bukit dan tebing menghijau. Di sekitar bibir pantai yang panjang banyak pepohonan seperti pohon kelapa, pandan dan lainnya membuat suasananya nyaman dan asri. Pasirnya putih kecoklatan , airnya biru tua mengkilat menjadikan pantai ini cukup menawan. Di sisi kanan dan kiri terdapat karang besar yang melindungi teluk dari ombak besar pantai selatan,. Pantai Perawan berjarak 70 km dari kota Malang.

Natural and Beautiful. Not many people visit Pantai Perawan. It is beautiful and so natural. It is a bay surrounded by green hills. The long shoreline are full of coconut trees, fragrant screw-pine, and many others making it comfortable and shady. The sand is brownish-white with such shiny dark blue water, just gorgeous. The bay is protected from the by waves by big corals on its left and right side. It is 70 km from Malang City.

Lewipurn0368
Jakarta, Indonesia • 2,127 contributions
●●●○○
Pantai Indah, namun agak kotor
Oct 2016 • Couples

Pantai ini cukup terpencil dan jauh, kebetulan saya dari coban tundo sehingga jarak ke tempat ini hanya 20 km, jika tidak dari malang perlu 65 km sampai tempat ini, pantai cukup luas, namun kotor banyak sampah bekas kelapa, disisi kanan pantai ada batu batu karang yang cukup indah, selain itu tidak ada yang spesial di pantai ini

This beach is quite remote and far away. As I happened to be coming from Coban , it was only a 20 km journey, but if you're travelling from Malang, it's about 65 km. The beach is fairly large, though it's rather dirty with lots of coconut waste scattered around. On the right-hand side, there are some rather beautiful rock formations, but aside from that, there's nothing particularly special about this beach.

Figure 7. (a) A positive review from a previous visitor of Perawan including the yellow highlight was the translation and (b) A negative review about organic waste from visitor including the yellow highlight was the translation(Source: Tripadvisor.com latest review comment from visitors at 2016)

The next difficulties are the geographical conditions of Perawan Beach, which is located on the South Coast of Java. This place tends to have quite high waves, and the perception of visitors. Base on the geographical condition, for water-related activities such as snorkeling, diving, banana boats, surfing, and jet skiing, to be prohibited for safety reasons. This is a common obstacle in various tourist attractions on the southern coast of Java, yet alternative activities and water-related activities around the estuary or lagoon are still very possible. Then the variable inhibiting visitors from visiting is the lack of reviews from previous visitors - the reviews are not so helpful with positive and negative sides appearing to be balanced, thus confusing potential tourists. One example of the results of visitor reviews on Trip-Advisor.com is presented in Figure 7.

Based on the visitor's review, it is known that Perawan Beach has a good quality environment as the review mentions "natural and beauty", "comfortable", and "gorgeous". Thus, efforts to maintain, manage, and use the potential must be seriously made. One of the efforts we do along with the local community is the cleaning initiative (Figure 8). Apart from the influence of reviews from visitors, branding is also influenced by coastal tourism competitiveness. The competitiveness of coastal tourism in South Malang was very high considering that many other beaches more popular offering various water activities, easy access, highly organized conservation or educational tourism, and a more adequate hospitality system. The research results also show that visitors who intend to come back often complain about accessibility, stating that Perawan Beach is too far and minimum local transportation service. Therefore, the great natural resources, biodiversity, and natural beauty at Perawan Beach will attract visitors if complaints from visitors are points of evaluation and improvement.

Figure 8. (a) Cleaning organic waste at Parking area, Perawan Beach and (b) Cleaning organic waste at camping ground, Perawan Beach (Source: The authors, 2023)

3. Opportunity for sustainable tourism based on the Coastal Ecosystem Service (CES) approach

Firstly, this study highlights the importance of regulating the services provided by coastal ecosystems, such as controlling events and regulating climate, as human activities in coastal tourism areas can be very intensive. This can consist of the intensity of agriculture, aquaculture and fisheries, transportation and tourist activity, industrialization, and urbanization (tourist or community mobility) (Drius et al., 2019). The service became the main supporter of tourism resilience on the south coast of Malang Regency, which tends to have high waves and the threat of annual flooding (Mendoza-González et al., 2021), so maintenance must remain a priority in long-term sustainable tourism development. Several opportunities for improvement in managing ecosystem services are available, one of which is educating visitors regarding coastal vegetation management. Through our in-depth interviews, stakeholders also acknowledged the importance of organizing services, emphasizing their role in maintaining the resilience of coastal areas.

This effort can be seen in several ecological components of the area starting from planting and maintaining coastal vegetation. The management of Perawan Beach also emphasizes that the service function related to provisioning aims to provide habitat land, refugia, raw materials, food ingredients (live seafood), water sources or supply to support tourism activities and genetic resources. One of the things we highlighted is the large water resources in Pedotan Lagoon, which are also used by the community for fishing (Figure 9).

Figure 9. (a) Water resources in Pedotan Lagoon and (b) Pedotan Lagoon often used for fishing activity (Source: The authors, 2023)

Furthermore, the stakeholders highly valued the coastal ecosystem service indicator, namely cultural services, especially those related to recreational use and the aesthetic of the landscape. This study emphasizes the importance of cultural services for human well-being and highlights the role of tourism and recreational activities in appreciating the natural beauty of coastal areas. Understanding and preserving cultural services is considered essential for the sustainable management of beaches and coastal dunes. The cultural service indicators applied at Perawan Beach on the natural resources of long beach ridge (*gisik*), estuary, Australian pine forest, bushes, permanent wetland, grasslands, and floodplain swamps as part of 1) recreation and tourism, 2) symbolic and aesthetic values, and 3) cognitive effect (Drius et al., 2019). Recreation and tourism are grouped and included in cultural ES (MEA, 2005).

Humans (society / managers / visitors) benefit from interactions with nature because they supply important values, such as physical exercise / knowledge, aesthetic experiences, intellectual stimulation, inspiration, and other contributions to the physical and psychological well-being of each individual (Cheng et al., 2019; Daniel et al., 2012). Following the benefits obtained by individuals, the ecosystem, and the economy at Perawan Beach, Ocean Farmits has been developed. As previously explained, apart from facilitating visitors to see better coastal views, it provides accommodation (floating hotels) and education about sustainable fisheries management (Figure 10).

(a) **(b)**

Figure 10. (a) Grouper fish cultivation (*Epinephelus sp*) and
(b) educational activity on environmental protection service of Perawan Beach (Source: The authors, 2023)

The study focuses on how CES is aimed at providing benefits to society. Researcher have been detailed the ecosystem service opportunities provided by various types of coastal ecosystems, such as sandy beaches, estuaries, Australian pine forests, shrubs, permanent wetlands, grasslands, crops, and floodplain swamps (Figure 11). This study identifies and categorizes these ecosystem services into various types, including regulation, provision, strengthening tourism culture, and optimizing supporting services with reference to previous research (Drius et al., 2019; Mendoza-González et al., 2021).

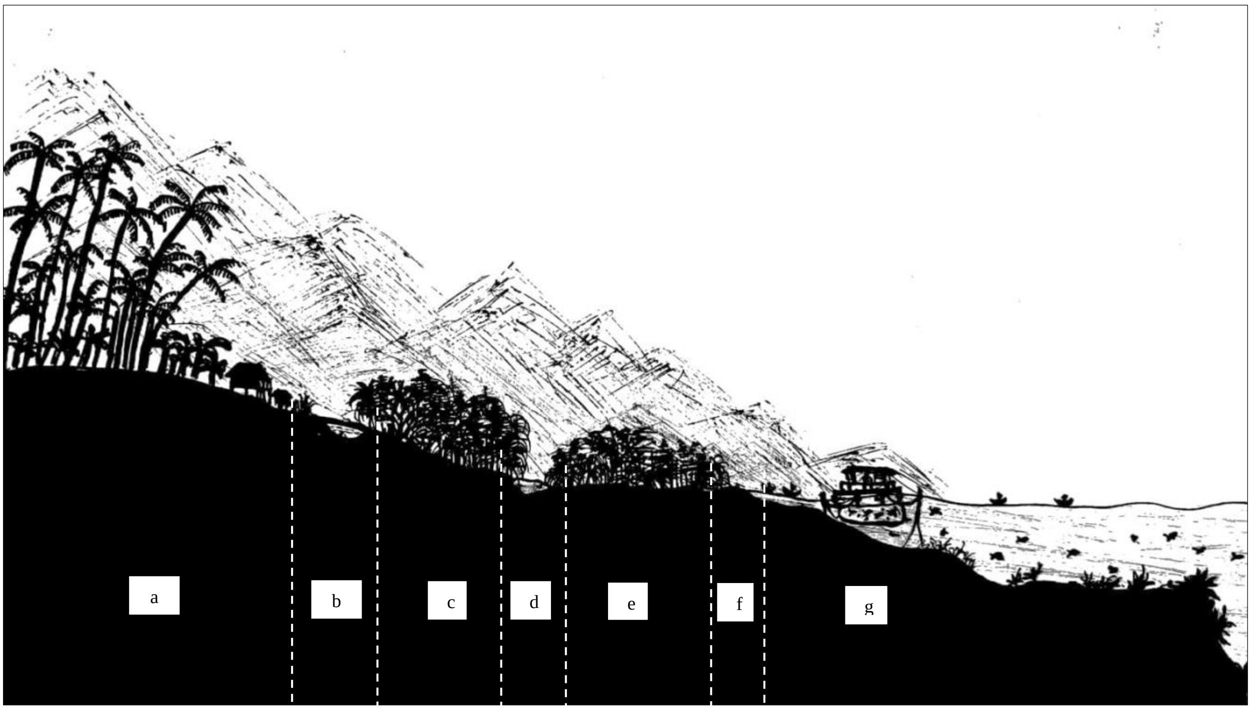


Figure 11. Code of Coastal Ecosystem (Note: explanation of the coastal ecosystem service in Table 1
The classification of coastal ecosystem service based on interviews with local managers and field observation) (Source: The author (2024)

Table 1. Details of Coastal Ecosystem Service in Perawan Beach (Source: Author analysis, 2024)

Code	Coastal ecosystem	Ecosystem Service	Description
a	Forest material, crops, farming, and pod	Provisioning Services: 1. Food provider from crop production 2. Provider of building materials 3. Provider of basic food ingredients for resale 4. Provider of firewood	**Provisioning Services:** Provider of agricultural food products (corn and sugar cane), provider of pond products in the form of shrimp, old wood can be replaced with other crops and can be used as firewood, producer of commercial wood and coconuts, provider of food (bananas)
b	River and aquifers (permanent wetland)	Provisioning Services: 1. Freshwater to support community activities 2. Provider of food (aquatic biota) 3. Reducing the potential for flooding Regulating Services: 1. Supporting freshwater retention areas 2. Mangrove cultivation area 3. Natural filtering Supporting Services: 1. Ecosystem maintenance 2. Nutrient cycle Cultural Services: 1. Amazing views 2. Recreation and water tourism 3. Potential for Coastal Conservation Education	**Provisioning Services:** Freshwater providers that support community activities, places for cultivating freshwater biota such as fish and crabs, and river water flowing toward estuaries can reduce the potential for annual flooding **Regulating Services:** This area can support the water needs of the surrounding plants, rivers in coastal areas can be developed to cultivate various types of mangrove plants, and the presence of river flows and other plants reduces the potential for pollution from waste carried by river water through natural filtering. **Supporting Services:** This area of the Sidoasri River flows into the eastern part of Perawan Beach. This stream is an area for cultivating crabs (freshwater crabs) and several freshwater fish. Apart from that, this area provides a good nutritional cycle for cultivating mangrove plants. **Cultural Services:** As the river is surrounded by karst hills, this area offers beautiful and amazing views. This potential is developed as a tourist spot along the river and a mangrove education point for visitors.
c	Shrubs and trees	Provisioning Services: 1. Providing firewood 2. Genetic resources Regulating Services: 1. Biological regulation Supporting Services: 1. Maintaining ecosystems and supporting nutrient cycles	**Provisioning Services:** Residents often use old/rotted plants to make firewood for personal use or to be sold (in the form of charcoal); the old plants are then replaced with new plants. **Regulating Services:** As a wild plant, shrubs are deliberately allowed to grow to maintain the beauty of the environment. **Supporting Services:** There is some biota around the beach which are sometimes hidden behind bushes. Apart from that, this point is also used to support food availability for several existing biota.
d	Lagoona and floodplain swamps	Provisioning Services: 1. Reducing the potential for flooding 2. Water resources for food security Regulating Services: 1. Aquifer recharge and hydric balance Supporting Services: 1. Ecosystem maintainer Cultural Services: 1. Recreation and water tourism 2. Amazing views 3. Potential for Coastal Conservation Education	**Provisioning Services:** Large basins function to store water having the potential to become an annual flood. Apart from that, the water in this lagoon can be used as a water source for cultivating water spinach, *Keben* plants, and other plants that are cultivated by the management team. **Regulating Services:** This area can support the water needs of surrounding plants while maintaining balance in the area that tends to be dry due to the influence of weather and the karst hill landscape. **Supporting Services:** As an area that is always wet, this area is a point for aquatic plants and freshwater biota to grow, thus supporting the sustainability of the ecosystem. **Cultural Services:** As a river flow surrounded by karst hills, this area offers beautiful and amazing views. This area is being developed as a selfie area, paddle boat area, and coastal environmental education area.
e	Australian pine forests, bushes, *Keben* trees, and fragrant screw-pine	Provisioning Services: 1. Genetic resources 2. Firewood potential Regulating Services: 1. Bioremediation 2. Regulating the atmosphere and microclimate 3. Protecting from floods and high waves Supporting Services:	**Provisioning Services:** It guards the genetic resources as it becomes a protected area and food source for several biota that live in coastal environments. The genetic resources also come as biodiversity that is complex enough to be used as material for sustainable coastal environmental studies. Apart from that, some rotten (old) trees can also be used as firewood by the management team or even sold (in the form of charcoal). **Regulating Services:** It can become a bioremediation point so that the ecological quality of the coast is sustainable and it also provides a much better microclimate impact compared to other beaches with less plant density. As is known, the southern coastal area of East Java has high tides, therefore the plant is deliberately cultivated and functions as a natural wave breaker so that the coastal environment is not easily eroded by waves.

		1. Ecosystem maintainer 2. Nutrient cycle Cultural Services: 1. Staycation friendly 2. Amazing views 3. Potential for Coastal Conservation Education	**Supporting Services:** This area has an important role in providing good nutrition because certain plants can be used as food. Then, the existing plant density also supports ecosystem maintenance because the plants have good long-term resistance. **Cultural Services:** The density of the Australian pine plants can be an advantage of this area as a place to take photos, and rest, and also provides comfort for tourists to do their activities around the coastline because of the cool air. Apart from that, the complete existing vegetation can also be used as educational material for visitors on how to maintain the ecosystem, especially plants around the coastline.
f	Estuary, mangrove vegetation, beach ridge, tides	Provisioning Services: 1. Provider of food resource 2. Aesthetic resources Regulating Services: 1. Controlling erosion and protecting from high waves 2. Biological regulation 3. Natural waste management Supporting Services: 1. Ecosystem maintainer 2. Nutrient cycle Cultural Services: 1. Recreation and tourism 2. Amazing views 3. Potential for Coastal Conservation Education	**Provisioning Services:** River estuaries often transport a lot of materials from along the water flow so this area is also a point where mangrove cultivation can be carried out as well as providing food for fish or freshwater biota. Apart from that, its location is on the border between land and seawater, so this point has amazing natural beauty and aesthetic resources. **Regulating Services:** The tidal area is planted with several coastal vegetation such as mangroves and fragrant screw-pine as natural wave breakers and to control coastal erosion. Apart from that, this area limits interaction between land and coastal waters so that one of its functions is to catch all the pollution before it enters seawaters (natural drainage). **Supporting Services:** Cultivation of mangroves and fragrant screw-pine around coastal areas and river estuaries is an indication of a good nutrient cycle for the surrounding biota. It has the potential to provide food for residents and also functions as a sustainable maintenance of coastal ecosystems. **Cultural services:** The beach ridges that stretch along the coastline function as a place for all tourist recreational activities (camping grounds, beach volleyball, silent tourism, sand tourism for children, and potential ATVs for visitors). The beautiful beach which directly borders the coastline surrounded by karst mountains or hills also provides high scenic quality. This point can also function as educational material for visitors to work together in maintaining the sustainability of the coastal environment.
g	Sandy beach, fisheries, seagrass, and reef material	Provisioning Services: 1. Provider of food resource 2. Aesthetic resources Regulating Services: 1. Regulating the atmosphere and sea environment Supporting services: 1. Ecosystem maintainer 2. Nutrient cycle Cultural Services: 1. Recreation and tourism 2. Amazing views 3. Potential for Coastal Conservation Education	**Provisioning Services:** This is an area where local fishermen earn income and source food from fishery products, seaweed products, and other protein ingredients from fishery products. This area also has a high aesthetic resource value because of its clear blue waters and is bordered by karst mountains as a special view. **Regulating Services:** Underwater biomes such as seagrass and reef material provide a good sign that the waters of Perawan Beach are in good condition so the ecosystem needs to be maintained sustainably. **Supporting Services:** As explained in regulating services, biome density, clean seawater, and good physical condition of sea water indicate nutrient richness and maintenance of sustainable ecosystem cycles. Apart from that, the establishment of Ocean Farmits also seems to provide great support for the maintenance of the grouper fish ecosystem cultivated by the management. **Cultural Services:** The calming sea view is also the main attraction at Perawan Beach. This is also supported by the construction of Ocean Farmits which also provides accommodation in floating houses and even education on marine resource management. Apart from that, boat rental services can also be used as economic income for local fishermen in addition to their income from fishing.

CONCLUSION

Perawan Beach has great potential to be developed as a sustainable beach tourism destination. With clean white sand and a calm atmosphere, this beach offers beautiful views and a beautiful atmosphere. Other attractions, such as the Gundang Wetan Estuary and the Pedotan Lagoon, add to the attractiveness of this beach, although more attention is needed to infrastructure and management systems to increase tourist visits. Initiatives such as the construction of Ocean Farmits, which combines a fish farming system and a floating hotel, as well as promotions through virtual reality show positive steps in utilizing the potential of this beach optimally and sustainably.

The main challenges in developing Perawan Beach as a sustainable tourism destination include infrastructure problems, ineffective promotion, and geographic conditions that limit certain water tourism activities. However, there are great opportunities through a coastal ecosystem services (CES) approach, which emphasizes the importance of environmental maintenance and education on coastal vegetation management. Researcher found that provisioning service and cultural service became major opportunity in Perawan beach. But in case of supporting service have minimum attention which mean that the indicator should be developing in the future.

Initiatives such as river tracing activities and conservation education in the Gundang Wetan Estuary, as well as the use of water resources in Pedotan Lagoon, show that ecosystem-based development can increase tourist attraction and provide sustainable economic benefits for local communities. Limitation on this research is that research only focuses on qualitative approach and the number of key informants was only based on the purposive technique Since the primary data was based on key informants as stakeholder, this research was lack of information about CES beneficial directly to visitor. Thus for further research it can be explored by using quantitative research or mixed methods, especially related to the level of tourist or visitor satisfaction with the CES strategy.

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THE INFLUENCE OF CUSTOMER INCIVILITY ON HOTEL FRONTLINE EMPLOYEES' RESPONSES AND SERVICE SABOTAGE: DOES CO-WORKER SUPPORT MATTER?

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Abstract: Customer incivility poses a difficulty for service industries since employees' negative responses to such customers may threaten the organization's success. Service industries implement stringent display guidelines and keep an eye on how Frontline Employees' Responses (FLEs) engage with customers. This study aims to investigate the impact of customer incivility on FLEs' negative responses and service sabotage, and to evaluate the moderating effect of co-worker support. The data is collected from 386 Sharm El-Sheikh hotel employees. The PLS-SEM results revealed that customer incivility positively affects service sabotage, FLEs rumination, and retaliation intention. Similarly, the study findings proved that FLEs' rumination and retaliation intention positively affect service sabotage behavior. Accordingly, both FLEs' rumination and retaliation intention, based on the results, succeeded in mediating the linkage between customer incivility and service sabotage behavior. In addition, the current study strived to use co-worker support as a strategy to mitigate customer incivility consequences by investigating its influence as a moderator on the relationships of customer incivility towards both FLEs' rumination and retaliation intention, and the result demonstrated that co-worker support succeeded in mitigating the customer incivility negative impacts. The study's results broaden our understanding of the effect of customer incivility on two different types of employee responses (psychological and behavioral). The practical contributions recommend the need to train FLEs to give them sufficient experience and skills to deal with customer incivility behaviors, and mutual support behaviors must be developed among workers.

Keywords: customer incivility, employees' responses, co-worker support, service sabotage, hotel frontline employees

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INTRODUCTION

People tend to respond more positively to individuals who exhibit polite and courteous behavior compared to those who demonstrate uncivilized and impolite conduct. This inclination originates from the innate self-defense mechanism inherent in human nature (Mason, 1994; van Quaquebeke et al., 2009). Conversely, incivility can be described as low-intensity deviant behavior with ambiguous intent to harm the target, in violation of workplace norms of mutual respect. Uncivil behaviors are typically rude and discourteous, indicating a lack of consideration for others (Andersson & Pearson, 1999; Shoukat et al., 2024). Customer incivility can trigger a desire for retaliation or revenge against the offender, particularly in service industries where the offender is the customer and the victim is the employee (Hu et al., 2017). Such retaliation adversely impacts the quality of service and thereby customer satisfaction. Customer satisfaction serves as the guidelines

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imposed by the hospitality sector to uphold service quality. The nature of the hospitality industry creates a barrier that inhibits frontline employees (FLEs) from expressing dissatisfaction with a particular behavior. Consequently, various reactions are provoked from the employee and manifested in different forms, adversely impacting the quality of service, customer satisfaction, and the psychological well-being of FLEs (Koopmann et al., 2015).

Customer incivility (CI) can be defined as “the low-quality interpersonal treatment that employees receive from their customers during service interactions” (Koopmann et al., 2015: 213). Such incivility deteriorates the psychological wellbeing of FLEs, resulting in a downgrade in service quality and consequently a decrease in customer loyalty due to their dissatisfaction with the provided services (Koopmann et al., 2015). These responses greatly harm the performance and eventually the profitability of the service enterprise. Several hospitality research focused on the antecedents and the triggering conditions of the CI towards FLEs, as well as their effects and consequences (Cortina et al., 2017; Gong et al., 2014; Kadić-Maglajlić et al., 2024). Nevertheless, there is a lack of studies and empirical evidence on the nature and various responses that the FLEs can manifest as a result of being subjected to CI. Also, limited research investigated how negative responses of FLEs can affect the business, work environment, guest experience, and the FLEs’ well-being (Myrden & Kelloway, 2015). Perceived co-worker support refers to the employees' realization of their co-workers’ practical and emotional support (Ng & Sorensen, 2008). Previous studies indicated that co-worker support can have a significant influence on employees' working actions such as knowledge sharing (Lee et al., 2015). Moreover, strong professional relationships in the work environment can be used as strategy to lessen stress and work-related problems (Park et al., 2016; Tews et al., 2013). So, further research is required to understand how employees can benefit from the support of their co-worker to alleviate the consequences of customer incivility (Ng & Sorensen, 2008; Irawan et al., 2024; Srivastava et al., 2024).

The theory of social exchange, one of the key theories of social behavior, conceptualizes societal interaction as a process of exchange (Honeycutt, 1981). According to this theory, the exchange of benefits between two parties fosters social relations in organizations and serves as transactional platforms (Blau, 2017; Cropanzano et al., 1997; Moorman & Byrne, 2005). When service staff witnesses disrespectful behavior from customers, they feel mistreated and become driven to seek revenge. A fundamental reciprocal response, often characterized as "tit for tat" involves retaliating against the individual who caused harm (Skarlicki et al., 2008). This constitutes a significant breach of the service guidelines which mandate that clients should receive professional and courteous treatment. Instead, it typically results in compromised service as a means of seeking equality (Solomon et al., 2015). Likewise, this perspective aligns with the theory of organizational (in) justice, which asserts that individuals often react to perceived unfairness directly (Malatesta & Byrne, 1997; Masterson et al., 2000). When employees perceive unfair treatment from the organization, they may respond by exhibiting negative behaviors towards the organization, such as diminishing their job performance or disengaging in corporate citizenship activities (Moorman et al., 1998; Rupp & Cropanzano, 2002; Hussein et al., 2024; Skarlicki & Folger, 1997; Zellars et al., 2002). Accordingly, employees who encounter unfair treatment from a colleague, manager, representative, or customer may respond with retaliatory actions toward them (Bies et al., 1997; Jawahar, 2002; Jones, 2009; van Jaarsveld et al., 2010).

Previous studies on customer incivility (CI) have predominantly focused on the hotel industry in specific regions and ignored diverse geographical regions and culture contexts (Bani-Melhem et al., 2020; Cheng et al., 2020). Cultural disparities may contribute to employees' engagement in retaliatory behavior toward customers (Bedi, 2012; Boukis et al., 2020; Sliter et al., 2012; Elnasr et al., 2021; Obradović, 2024). Likewise, most studies have primarily addressed the direct and indirect effects of CI on employees' job satisfaction, work effort, and turnover intentions, and neglected the reactions or responses of FLEs toward uncivil customers (Sloan, 2012; Walker et al., 2017), including the acts of service disruption in retaliation against these customers (Abubakar & Arasli, 2016; Cheng et al., 2020; Skarlicki et al., 2016). Moreover, Boukis et al. (2020) suggested that support from co-workers could significantly alleviate the adverse effects of CI on the psychological and behavioral responses of frontline employees (FLEs). Thus, employees' desires for revenge and retaliatory actions may be influenced by co-workers' support of encounters with rude customers (Bedi, 2012; Khanam & Tarab, 2024).

Hence, this study aims to investigate how and when employees' perceptions of supportive co-worker behavior reduce their tendencies to ruminate and retaliate against uncivil customers. This research addresses a central issue, that is the direct impact of customer misbehavior on service staff in the hospitality industry and the potential outcomes of co-worker support in this context. We hypothesize that co-worker support alleviates rumination and retaliation intentions, as supported individuals experience reduced job stress (Mazzetti et al., 2016). Surveys spanning 14 years and encompassing thousands of participants revealed that 98% had encountered repeated instances of uncivil behavior (Porath & Pearson, 2012), Such an alarming statistic underscores the need to examine the impact of customer incivility (CI) on employee service performance in the hospitality sector. It's crucial to understand how CI influences and motivates frontline employees' (FLEs) responses, given the established correlation between employee satisfaction and the delivery of high-quality service to guests which in turn sustains customer satisfaction and loyalty and ensures sustained profitability for the organization (Solnet et al., 2018). Thus, further investigation of this issue is necessary, particularly regarding the effects of CI on service sabotage and the extent to which it influences the responses of restaurant FLEs. To address these gaps, this study aims to employ the social exchange theory and organizational (in) justice theory to explore the interaction between CI and service sabotage in hotels in Egypt. Additionally, it seeks to examine the mediating effects of FLEs' responses and the moderating role of co-worker support in mitigating these responses Accordingly, we propose the following research questions:

RQ1: How does customer incivility (CI) impact the responses and service sabotage of frontline employees (FLEs) in restaurants?

RQ2: What responses are prompted from FLEs due to CI? What is the anticipated range of these responses? How do these responses influence service sabotage?

RQ3: To what extent does co-worker support alleviate the adverse effects of CI on FLEs?

RQ4: What strategies can help hospitality leaders to mitigate and address CI issues with their FLEs?

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1. Customer Incivility and Service Sabotage

In service-oriented fields, impolite customers represent a substantial and recurrent cause of job-related stress (Sliter et al., 2010; Grandey et al., 2007; Srivastava et al.,2024). This is particularly evident among employees engaged in roles requiring emotional labor, i.e. displaying positive emotions to customers. Prior studies indicated reported several employee attributes and negative outcomes have been positively associated with customer incivility, including emotional exhaustion (Kern & Grandey, 2009; Sliter et al., 2010), underperformance (Sliter et al., 2010), tension (Adams & Webster, 2013), surface acting (Hur et al., 2015), and absenteeism (Adams & Webster, 2013; Sliter et al., 2012).

Hence, uncivil customers are a major source of stress for service frontline service employees (Kern & Grandey, 2009), causing diminished performance and ultimately leading to decreased service quality or even a complete sabotage of service (Sliter et al., 2010; Kadić-Maglajlić et al., 2024;van Jaarsveld et al., 2010). Prior research suggested that inadequate customer demeanor may predict service sabotage behaviors among FLEs (Cheng et al., 2020).

In the service sector, service sabotage extends from workplace sabotage (Skarlicki et al., 2008), that is the deliberate actions by frontline service staff to disrupt customer service and compromise client interests (Chi et al., 2015; Harris & Ogbonna, 2002; Lee & Ok, 2014; Wang et al., 2011; Yiamjanya et al.,2024). The tension created by customer incivility can invoke employees to engage in acts of service sabotage (Skarlicki et al., 2016). Viewed through the lens of the equity theory, customer incivility reflects a diminished social exchange between employees and customers (Walker et al., 2014) fostering a sense of unfairness among employees (Nguyen-Viet & Nguyen, 2024; Andersson & Pearson, 1999; Wang et al., 2011) and leading to acts of service sabotage as a form of retaliation e (Bedi & Schat, 2017; Skarlicki et al., 2008). Consequently, we can hypothesize the following:

H1: Customer incivility has a positive effect on Service Sabotage.

2. Customer Incivility and Frontline Employees' Responses

The thermodynamic theory of retaliation (Bies et al., 1997) proposes that responding aggressively to an offense is not an automatic reaction but rather involves a series of cognitive processes to evaluate the specific incident. Retaliation may provide the victim with a symbolic and emotional release for constrained negative emotions such as anger, disgust, or resentment to satisfy their desire for revenge (Aquino et al., 2001; Srivastava et al.,2024; Robinson & Bennett, 1997). Furthermore, the emotional contagion theory (Hochschild et al., 1983) argues that individuals tend to unconsciously imitate the body language of others and can even experience the same emotions as those they are watching.

Research indicates that negative customer service interactions are prevalent in numerous service firms (Harris & Reynolds, 2003; Reynolds & Harris, 2006). Essentially, customer satisfaction plays a crucial role in determining the performance of a service organization. However, frequent emphasis on this concept may result in a power imbalance between customers and FLEs, potentially leading to instances where customers mistreat and abuse service personnel (Akkawanitcha et al., 2015; Hur et al., 2015). The drain on emotional and psychological resources caused by uncivil consumers renders FLEs unable to self-regulate, eventually causing them to mimic such behaviors (Vancouver, 2000; Shoukat et al., 2024; Skarlicki et al., 2008). Understanding the dynamics of how FLEs deal with customers' rude behavior is capturing more scholarly interest (Alola et al., 2019). The psychological (emotional and cognitive) and behavioral responses of FLEs to customers’ uncivil behaviors are the two main categories that were established in the relevant literature (Boukis et al., 2020; Cortina et al., 2017). This study focuses on both rumination as a psychological reaction and retaliation as a behavioral response of FLEs to examine how customer incivility impacts them.

Rumination is the state of constantly obsessing and thinking about something (Martin & Tesser, 2013). It refers to the continuous concentration on ideas and emotions related to a particular experience (Garnefski et al., 2001), draining attentional resources that would otherwise have been used for task performance (Porath & Erez, 2007). Customer impoliteness deters FLEs' ability to retain customer-related knowledge and diminishes their capacity for innovative problem-solving and complex thinking (Miron-Spektor et al., 2011; Rafaeli et al., 2012; Ayele & Singh, 2024). Despite the lack of studies on the cognitive effects of uncivil customer behaviors on frontline employees (FLEs), related research examined employee rumination, focusing on distress symptoms and their potential causes and consequences rather than on solutions (Nolen-Hoeksema et al., 2008). Frontline employees (FLEs) may perceive incidents of customer incivility as a failure to fulfill their primary duty of serving the customer. Consequently, such occurrences can be viewed as personal failures by FLEs, causing them to re-experience the failure and associated bad emotions over time (Koopmann et al., 2015; Srivastava et al., 2024). Specifically, in the context of the hospitality industry, encounters with uncivil or rude customers prompt customer service representatives to engage in more rumination the night after such incidents, with longer-lasting consequences (Baranik et al., 2017; Wang et al., 2013; Yakupova et al., 2024). Consequently, the following hypothesis is postulated:

H2: Customer Incivility has a positive effect on Rumination.

Employees who frequently encounter inappropriate customer behavior (such as rudeness, demeaning, or aggression) exhibit unfavorable job performance, including revenge, weariness, and withdrawal intention (Han et al., 2016). One way of coping is forming intentions of retaliation against a rude customer (Bedi & Schat, 2017; Wang et al., 2011). A behavior that has been provoked by others in revenge for actual or perceived injustice is known as retaliation (Aquino et al., 2001). In a similar context, (Sliter et al., 2010) outlined that employees become unkind and more prone to make deliberate mistakes when they get exposed to customers' impolite behavior. To restore their sense of integrity and self-esteem, employees may deviate from expected norms of service behavior by seeking retaliation (Elshout et al., 2015). The responses of employees are likely to vary due to their feelings and thoughts of retaliation. While some employees might use covert strategies to balance the odds, such as withholding benefits and assistance; others might take an overt vengeance approach and act aggressively towards rude customers and other patrons (Hur et al., 2015; Vancouver, 2000; Kadić-Maglajlić et al., 2024). Consequently, we expect that employees who perceive the actions of customers as unfair and contrary to principles of fairness and respect will be more inclined to hold intentions of retaliation. This anticipation is supported by existing theoretical and empirical evidence provided by precedent studies (Bani-Melhem et al., 2020; Boukis et al., 2020). Therefore, we developed the following hypotheses:

H3: Customer Incivility has a positive effect on Retaliation Intentions.

3. Frontline Employees' Responses and Service Sabotage

As noted in the previous paragraphs, service sabotage constitutes damaging actions directed towards customers, stemming from perceived unfair treatment of both the company and its clients (Harris & Ogbonna, 2009; Lyu et al., 2024). In other words, service sabotage encompasses any deliberate, planned overt, or covert deviant behavior by service employees aimed to negatively impact efficient service interactions with customers (Harris & Ogbonna, 2009; Lin et al., 2022). The saboteur in certain situations has a specific target in mind (Ambrose et al., 2002). Jokes made by FLEs about customers for their amusement or to amuse co-workers are common examples of employee service sabotage (Lee & Ok, 2014). Other examples include failing to follow company policies and regulations; expressing employee hostility, indignation, or rumination towards customers; intentionally delaying service based on employee mood and emotion; and taking revenge on a customer. Employees may also interfere with regular operations by being uncooperative, concealing pertinent information, disseminating false information, or damaging service tools (Ambrose et al., 2002; Skarlicki et al., 2008; Nguyen-Viet & Nguyen, 2024).

Within the service settings, inappropriate customer behavior adversely affects the mental well-being of customer-facing service personnel, potentially eliciting negative emotional reactions (Hwang et al., 2021). FLEs perceive a customer's incivility as a personal insult because it constitutes psychological perceptions that negatively affect their responses, or even lead to service sabotage (Cheng et al., 2020; Alhemimah et al., 2024). According to frustration-aggression theory, frustration can prompt aggressive behavior (Berkowitz, 1983; Kadić-Maglajlić et al., 2024). Within this framework, rumination, considered a form of frustration, arises from a negative emotional state (Breuer & Elson, 2017). According to Wang et al. (2011), a significant proportion of the stress experienced by employees in the service sector stems from inappropriate interactions with customers. Consequently, it is plausible that a substantial portion of their rumination arises from the tension and unfavorable feelings caused by these customer encounters. Given the clear origin of this rumination, there is a decent chance that employees may express their negative emotions, stemming from rumination, towards customers during subsequent interactions, potentially resulting in service sabotage behaviors (Luo & Bao, 2013; Skarlicki et al., 2016; Singtuen & Gałka,2024). Grounding on these arguments, we propose the following hypothesis:

H4: Rumination has a positive effect on Service Sabotage.

Prior research revealed that when an employee experiences unfair treatment or encounters an uncivil customer, they may resort to retaliatory actions (Walker et al., 2014; Shoukat et al., 2024). By the time employees reach the stage of retaliation, they may have already begun the process of emotional and physical disengagement from their jobs (Yeh, 2015). This retaliation behavior towards uncivil customers can lead to customer dissatisfaction and escalated negative interactions (Groth & Grandey, 2012) leading to damaging work behaviors such as service sabotage (Bedi & Schat, 2017; Hutagalung et al., 2024). Hence, the following hypothesis can be proposed:

H5: Retaliation Intention has a positive effect on Service Sabotage.

4. The mediating role of Rumination and Retaliation

Based on previous literature and the arguments given above that illustrate the direct connections between, the first hand, customer incivility, rumination, and service sabotage and, on the other hand, between customer incivility, retaliation intentions, and service sabotage, the following two hypotheses are proposed:

H6: Rumination mediates the relationship between Customer Incivility and Service Sabotage.

H7: Retaliation Intention mediates the relationship between Customer Incivility and Service Sabotage.

5. Co-worker Support as a Moderator in the Relationship between Customer Incivility and Frontline Employees' Responses

Exploring the factors that can mitigate the impact of customer incivility on frontline employees' (FLEs) responses is a focal point of this study. From this perspective, our research views customer incivility as a failure in the social relationship between FLEs and customers, leading to unfavorable service outcomes such as sabotage. To address and potentially mitigate these outcomes, we investigate the role of co-worker support as a moderator, aiming to offset employees' negative reactions to customer incivility. In this context, co-worker support refers to the level of confidence an employee feels in their colleagues' willingness to offer assistance and support, both emotionally and practically, in carrying out job responsibilities and tasks (Ibrahim, 2014; Ng & Sorensen, 2008; Mulyadi et al., 2024; Khanam & Tarab, 2024).

This support can take many forms, such as friendliness, sympathy, cooperation, and respect in performing daily tasks and handling upsetting workplace situations (Susskind et al., 2003; Agina & Abuelnasr, 2021). Previous studies have shown that co-worker support significantly affects employees' workplace behaviors, including knowledge-sharing and problem-solving (Karatepe & Olugbade, 2017; Lee et al., 2015). According to the theory of conservation of resources (COR), supportive relationships with co-workers are crucial in alleviating employees' negative perceptions of organizational functioning when faced with resource-depleting circumstances. This is because such circumstances reinforce the perceived value of these relationships (De Clercq et al., 2020; Shin et al., 2024). This theory posits that the benefits of resource-generating work environments in reducing employees' stress levels are remarkably significant in the presence of unfavorable circumstances that pose a risk of further resource losses (Hobfoll & Shirom, 2000). For instance, during a role conflict, the personal resource of tenacity boosts positive work behaviors (De Clercq & Belausteguigoitia, 2017). Similarly, relying on supportive co-worker relations may become principally critical for coping with the stress associated with daily work tasks, as incidents of customer incivility or mistreatment can create ambiguity in employees' responses.

We anticipate a moderating effect of employees' perceptions of co-worker support on the relationship between customer incivility and their negative responses. Supportive co-workers' competence enhances employees' confidence in their ability to overcome work problems and effectively fulfill their job responsibilities (Amarneh et al., 2010 ; Kadić-Maglajlić et al., 2024) such as well-being and willingness to help (Sliter et al., 2012). Therefore, employees feel more motivated and self-assured due to this support for their objectives, which enables them to better handle work challenges such as uncivil customers (Karatepe & Olugbade, 2017).

Additionally, co-worker support may result in positive behavior (Salanova et al., 2006; Wang, 2024), alleviating colleagues' psychological stress (Ma & Qu, 2011), fostering a sense of being valued (Lee et al., 2015), and enhancing overall coping strategies for work stress (Quinn et al., 2012; Wang & Chen, 2014). Similarly, co-worker assistance can enhance employees' energy levels and reduce their fixation on the negative aspects of their work situations, as they can rely on each other to accomplish their tasks effectively (Hofstetter & Cohen, 2014). The proposed model (Figure 1) reflects our prediction that co-worker support diminishes the positive effect of customer incivility on FLEs negative responses, which in turn reduces service sabotage. Based on the previous arguments, this study suggests the subsequent hypotheses:

H8: Co-worker Support moderates the influence of Customer Incivility on Rumination, such that the relationship will be weaker when Co-worker Support is high.

H9: Co-worker Support moderates the influence of Customer Incivility on Retaliation Intention, such that the relationship will be weaker when Co-worker Support is high.

In light of the above literature, this study developed an integrated model to investigate the impact of customer incivility on frontline employees' responses and service sabotage. It also examines the moderating influence of co-worker support on these relationships. Figure 1 illustrates the conceptual framework of the study.

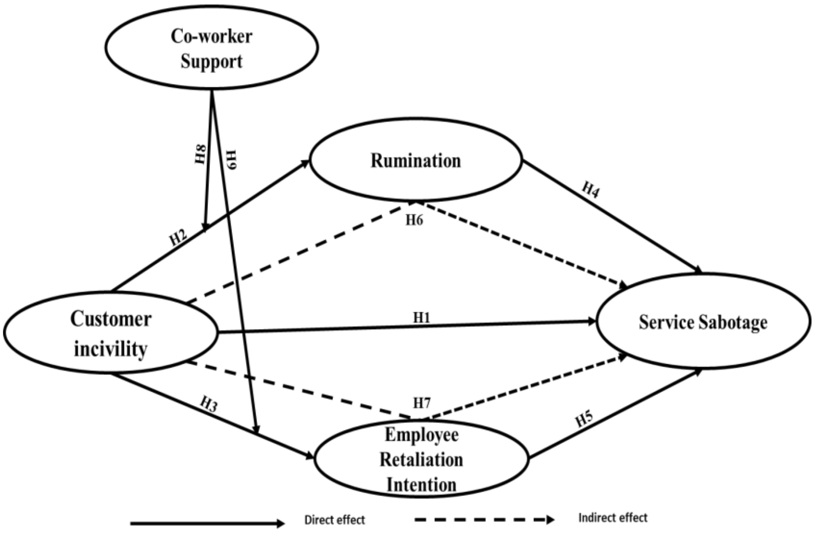

Figure 1. Conceptual framework

METHODOLOGY

1. Participants and procedures

The city of Sharm El-Sheikh, a major tourism destination in Egypt, was chosen to be the focus of the field study due to its abundance of highly rated hotels. From a pool of the city's top 43 hotels, 25 five-star properties were randomly selected for this study. To mitigate common method bias, we employed questionnaires for "multi-wave and multi-source surveys" as outlined by (Podsakoff et al., 2012). Adopting a time-lagged study approach, data were collected in two waves at two-month intervals from guest-contact employees in Sharm El-Sheikh hotels, spanning from December 2022 to April 2023. In the initial survey wave, employees assessed customer incivility, rumination, employee retaliation intentions, co-worker support, and provided demographic information.

The second wave, conducted a month later, gathered data on service sabotage. A total of 500 questionnaire responses were obtained across both survey rounds. After filtering out ineligible responses, 386 were deemed suitable, resulting in a response rate of 77.2%. The study sample comprised predominantly male participants (314 participants, 81.4%) and 72 female participants (18.6%), with ages ranging from 23 to 56 years.

2. Measures

After conducting a thorough review of the existing literature, a questionnaire form with measurement scales was developed. The initial form underwent further refinement through personal interviews with a total of nine academics and eight professionals who have extensive experience in interacting with hotel customers. The substance of the survey remained unchanged throughout this process. Customer incivility (CI) was operationalized using a five-item scale taken from the study of Martin and Hine (2005) (Martin & Hine, 2005). Examples of the items used include, "*Customers use body language to show me their impatience*" and "*Customers complain that my service is too slow at the peak of the hotel reception*." The rumination (RUM) construct was measured using a three-item scale recommended by Yperen (1996). Sample items included "*I have difficulty relaxing after work"* and *"Even at home, I often think of my problems at work*". For employee retaliation intentions (ERI), items were adopted from Balaji et al. (Balaji et al., 2020). Sample items involved: "*I feel that I should do something to get even"* and *"I intend to get revenge"*.

The measurement items for the service sabotage (SS) were adopted from Harris (Harris, 2006). The scale items included "*I take revenge on rude customers"* and *"I hurry customers when I want to*." Finally, the co-worker support (CS) variable was operationalized using the five-item scale proposed by Hammer et al., 2004. CS's items included, for example, "*I slow down service when I want to"* and *"I receive help and support from my co-workers*." All scale measurements items were empirically measured on a 5-point Likert scale (where 1 = strongly disagree and 5 = strongly agree).

3. Data Analysis

To evaluate the proposed model, the researchers employed Structural Equation Modeling (SEM) using Partial Least Squares (PLS) approach enabled by Smart PLS 4.0 software. When the primary aim of a study is to predict one or more dependent variables instead of validating an established theoretical model, the use of PLS is suitable and viable (Hair et al., 2017). Hence, the utilization of PLS-SEM is deemed suitable for our research as it enables the examination of the relationships between customer incivility (CI) and service sabotage (SS), considering the mediating influence of rumination (RUM) and employee retaliation intentions (ERI), and examining the moderating effect of co-worker support (CS). Moreover, PLS method demonstrates efficacy across a broader spectrum of sample sizes, represents a more sophisticated model with less constraints on data, and serves as a valuable analytical approach (Hair et al., 2011). In contrast to alternative statistical methodologies, PLS-SEM allows for the inclusion of a greater number of reflective components inside each construct. To that end, the current study applies SEM-PLS and adheres to the data analysis procedures outlined by Leguina (2015) encompassing two primary phases, i.e. assessing the measurement model and examining the structural model.

4. Common method bias

Scholars widely agree that social desirability poses a significant risk of bias in behavioral studies, particularly when utilizing single-informant surveys to collect data across multiple companies (Podsakoff et al., 2003).

This paper utilized various methodologies to objectively assess the potential impact of common technique bias on the interpretation of the findings. The study employed two main approaches: a) the Harman one-factor test; and b) a confirmatory factor-analytic approach to the common latent factor approach. Initially, the researchers employed factor analysis, a widely suggested method for assessing bias existence. All constructs were subjected to analysis to ascertain the presence of a singular significant component. The results revealed five components with eigenvalues surpassing 1.0, justifying a total variance of 69.21%. Subsequently, a confirmatory factor-analytic method was employed to support the evaluation of the Harman one-factor test, following the suggestion of Chang et al. (2010).

If the one-factor model is inadequate, it implies that common method variance doesn't pose a significant risk. The one-factor model yielded a Satorra-Bentler χ^2 (218) = 510.41; χ^2 /d.f = 2.34 (compared with the Satorra-Bentler χ^2 (201) = 311.79; χ^2 /d.f = 1.56). The one-dimensional model demonstrates a notably inferior fit compared to the measurement model, indicating the absence of significant common method bias.

Table 1. Psychometric metrics

	Loadings	***a* Value**	**C.R**	**AVE**		**Loadings**	***a* Value**	**C.R**	**AVE**
Customer Incivility (CI)		0.847	0.891	0.621	**Service Sabotage (SS)**		0.914	0.929	0.595
CI_1	0.816				**SS_1**	0.792			
CI_2	0.856				**SS_2**	0.811			
CI_3	0.819				**SS_3**	0.818			
CI_4	0.720				**SS_4**	0.809			
CI_5	0.720				**SS_5**	0.824			
Rumination (RUM)		0.882	0.927	0.809	**SS_6**	0.698			
RUM_1	0.900				**SS_7**	0.747			
RUM_2	0.926				**SS_8**	0.720			
RUM_3	0.872				**SS_9**	0.708			
Employee Retaliation Intention (ERI)		0.931	0.951	0.829	**Co-worker Support (CS)**		0.883	0.914	0.679
ERI_1	0.922				**CS_1**	0.787			
ERI_2	0.923				**CS_2**	0.828			
ERI_3	0.918				**CS_3**	0.832			
ERI_4	0.878				**CS_4**	0.848			
					CS_5	0.825			

RESULTS

1. The evaluation of the outer model

The measuring (outer) model evaluates both the convergent validity (CV) and discriminant validity (DV) to ensure the quality of the data. Convergent validity utilizes multiple assessment criteria such as factor loading (λ), Cronbach's alpha (a), composite reliability (CR), and Average Variance Extracted (AVE) to assess the association between indicators. These criteria require values higher than 0.50 for (a) (Leontitsis & Pagge, 2007), higher than 0.60 for CR (Fornell & Larcker, 1981), higher than 0.50 for AVE (Hair et al., 2011), and higher than 0.50 for λ (Afthanorhan, 2013). Furthermore, discriminant validity (DV) posits that observed values should be distinguishable when different methodologies are used to evaluate alternative concepts. According to (Fornell & Larcker, 1981), a construct is deemed to have fulfilled the statistical requirement for discriminant validity if the square root of its Average Variance Extracted (AVE) exceeds the correlation between that construct and other constructs within the model (Tables 2, 3). Bold items: "for discriminant validity, the outer factor loading of the reflective items should have a higher value than the cross-loading related scale measures".

Table 2. Fac. Cross-loadings

	CI	RUM	ERI	SS	CS		CI	RUM	ERI	SS	CS
CI_1	**0.816**	0.243	0.325	0.550	0.494	**SS_2**	0.503	0.498	0.522	**0.811**	0.458
CI_2	**0.856**	0.281	0.354	0.556	0.474	**SS_3**	0.554	0.458	0.516	**0.818**	0.457
CI_3	**0.819**	0.267	0.342	0.485	0.357	**SS_4**	0.493	0.448	0.506	**0.809**	0.475
CI_4	**0.720**	0.244	0.299	0.386	0.233	**SS_5**	0.552	0.519	0.558	**0.824**	0.512
CI_5	**0.720**	0.267	0.313	0.428	0.327	**SS_6**	0.465	0.555	0.576	**0.698**	0.342
RUM_1	0.315	**0.900**	0.728	0.642	0.150	**SS_7**	0.464	0.552	0.527	**0.747**	0.336
RUM_2	0.310	**0.926**	0.738	0.626	0.135	**SS_8**	0.360	0.605	0.577	**0.720**	0.241
RUM_3	0.262	**0.872**	0.717	0.577	0.135	**SS_9**	0.359	0.648	0.640	**0.708**	0.261
ERI_1	0.387	0.732	**0.922**	0.640	0.157	**CS_1**	0.439	0.074	0.133	0.413	**0.787**
ERI_2	0.385	0.731	**0.923**	0.642	0.133	**CS_2**	0.413	0.106	0.134	0.406	**0.828**
ERI_3	0.367	0.743	**0.918**	0.643	0.156	**CS_3**	0.380	0.122	0.129	0.401	**0.832**
ERI_4	0.370	0.737	**0.878**	0.676	0.168	**CS_4**	0.412	0.165	0.163	0.453	**0.848**
SS_1	0.512	0.449	0.518	**0.792**	0.475	**CS_5**	0.379	0.152	0.131	0.434	**0.825**

Table 3. Fornell–Larcker criterion matrix

	CS	CI	ERI	RUM	SS
Co-worker Support	**0.824**				
Customer Incivility	0.488	**0.788**			
Employee Retaliation Intention	0.169	0.415	**0.910**		
Rumination	0.156	0.330	0.809	**0.899**	
Service Sabotage	0.513	0.616	0.715	0.685	**0.771**

Table 4. HTMT Matrix

	CS	CI	ERI	RUM	SS
Co-worker Support					
Customer Incivility	0.557				
Employee Retaliation Intention	0.184	0.467			
Rumination	0.170	0.381	0.893		
Service Sabotage	0.569	0.694	0.773	0.760	

Bold scores: "for a proper discriminant validity, AVE values (bold) have to show values that are higher than the inter-variable correlation coefficient". Additionally, in response to the considerable criticisms directed towards Fornell and Lacker's criterion, a number of scholars recommended an assessment of the Heterotrait-Monotrait ratio of correlation (HTMT) as a means to ascertain the discriminant validity (Sarstedt & Cheah, 2019). According to (Gold et al., 2001), the established threshold value for HTMT is 0.9. The CV values presented in Table 4 demonstrate that all of the recommended minimum and/or maximum levels were met, suggesting that the proposed outer model is suitable. Regarding the dimensions of the DV, both the √AVE and heterotrait-monotrait ratio of correlations (HTMT) values, as presented in Table 4, met the specified criteria. This indicates that the scale exhibits adequate discriminant validity. HTMT: To ensure enough discriminant validity, all HTMT values must be less than 0.90.

Table 5. VIF, R2, and Q2 results

Items	VIF	Items	VIF	Items	VIF	Items	VIF	Items	VIF
CI_1	2.665	RUM_1	2.494	ERI_1	3.943	SS_1	2.759	CS_1	2.412
CI_2	3.385	RUM_2	3.106	ERI_2	3.955	SS_2	2.956	CS_2	2.939
CI_3	2.210	RUM_3	2.236	ERI_3	3.758	SS_3	3.408	CS_3	2.338
CI_4	2.319			ERI_4	2.563	SS_4	3.284	CS_4	2.312
CI_5	2.239					SS_5	3.104	CS_5	2.101
						SS_6	1.998		
						SS_7	2.537		
						SS_8	3.378		
						SS_9	3.034		
Service Sabotage				R^2	0.668	Q^2	0.389		
Rumination				R^2	0.265	Q^2	0.193		
Employee Retaliation Intention				R^2	0.296	Q^2	0.227		

2. Hypotheses Testing (inner model assessment)

To mitigate the potential impact of variables on the model's predictive capacity, this study examines collinearity by utilizing the Variance Inflation Factor (VIF) as a diagnostic tool to evaluate the presence of collinearity among the examined variables. According to the recommendations outlined by Hair et al. (2011), addressing multicollinearity is unnecessary when the VIF values remain below 5. The evaluative metrics used to assess the explanatory quality of the regression model include the R^2 and Stone-Geisser's (Q^2). In the field of behavioral studies, an R^2 value of 0.20 is commonly considered to be a significant threshold (Hair et al., 2011). In a similar vein, the Q^2 results exceeded the recommended threshold value of 0.0 (Hair et al., 2014). The results for VIF, R^2, and Q^2 are presented in Table 5.

PLS-SEM, in contrast to CBSEM, does not provide a diverse range of statistical measures for model validation. These measures include X^2, and other metrics used to assess model fit (Henseler & Sarstedt, 2013). The goodness-of-fit (GoF) gives an operational answer to this difficulty as it can be interpreted as an index for validation purposes (Tenenhaus et al., 2005). The GoF calculation approach, as described Tenenhaus et al. (2005) and by Mital et al. (2018) is calculated using the following formula:

$$\text{Gof}= \sqrt{AVE_{avy} \times R^2{}_{avy}}$$

Note: Gof→ The goodness-of-fit; AVE→ Average Variance Extracted; R2→ coefficient of determination; avy→ Average

In accordance with Tenenhaus et al. (2005), the values for the goodness-of-fit (GOF) measures are as follows: GoF small = 0.1, GoF medium = 0.25, and GoF high = 0.36. The results showed that the proposed model has a GoF value of 0.535, suggesting a substantial GoF index for our model. In addition, the study evaluates the adequacy of the model by examining the discrepancies in observed correlations through the utilization of the Standardized Root Mean Square Residual (SRMR). An SRMR value below 0.08 indicates an acceptable level of model fit (Hu & Bentler, 1998). The SRMR value of the proposed framework, which is 0.078, suggests that the model exhibits a favorable level of fit.

Table 6. Hypotheses testing (inner model results)

Hypotheses	**β**	**T-Value**	***p*-Values**	**Results**
Direct Paths				
H1- Customer Incivility → Service Sabotage	0.387	9.045	0.000	Confirmed
H2- Customer Incivility → Rumination	0.290	5.079	0.000	Confirmed
H3- Customer Incivility → Employee Retaliation Intention	0.398	7.194	0.000	Confirmed
H4- Rumination → Service Sabotage	0.315	4.016	0.000	Confirmed
H5- Employee Retaliation Intention → Service Sabotage	0.299	4.148	0.000	Confirmed
Indirect mediating Paths				
H6- Customer Incivility → Rumination → Service Sabotage	0.091	3.286	0.001	Confirmed
H7- Customer Incivility → Employee Retaliation Intention → Service Sabotage	0.119	3.800	0.000	Confirmed
Moderating Effects				
H8- Customer Incivility x Co-worker Support -> Rumination	-0.346	6.895	0.000	Confirmed
H9- Customer Incivility x Co-worker Support -> Employee Retaliation Intention	-0.306	7.129	0.000	Confirmed

After confirming the accuracy of both the outer and inner models, the proposed hypotheses of the study were thoroughly examined. The researchers utilized Smart PLS4 software to conduct a bootstrapping procedure with 5000 repetitions. This procedure was used to estimate the regression weights (*β*), *t*-statistics, and significance levels (*P*) of the direct, indirect, and moderating effects. The results of this analysis are presented in Table 6. Based on the findings offered in Figure 2 and Table 6, customer incivility (CI) exerted a significant and positive influence on service sabotage (SS) ($\beta = 0.387$, $t = 9.045$, $p < 0.000$), rumination (RUM) ($\beta = 0.290$, $t = 5.079$, $p < 0.000$), and employee retaliation intention (ERI) ($\beta = 0.398$, $t = 7.194$, $p < 0.000$) Such results provide support for H1, H2, and H3.

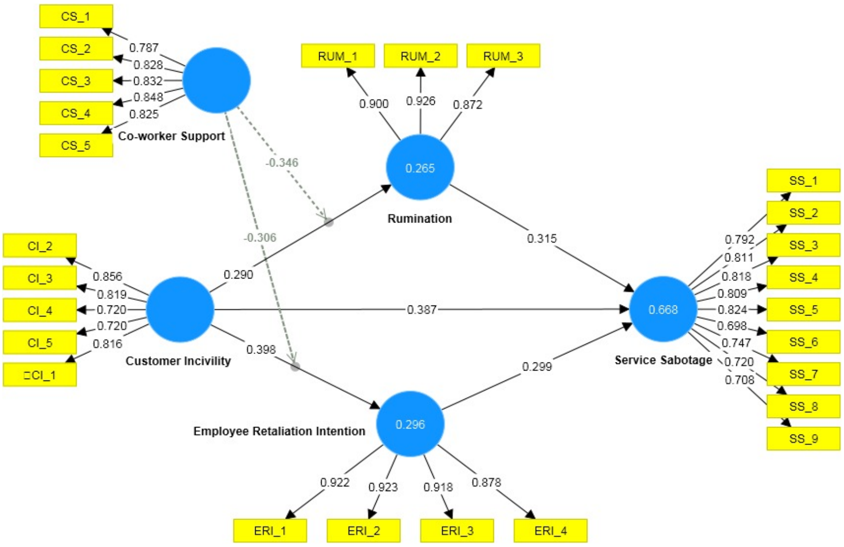

Figure 2. Research model

The results furthermore demonstrated that rumination (RUM) and employee retaliation intention (ERI) significantly and positively affected service sabotage (SS) ($\beta = 0.315$, $t = 4.016$, $p < 0.000$; at $\beta = 0.299$, $t = 4.148$, $p < 0.000$; respectively).

These findings support both H4 and H5. Moreover, the construct of rumination (RUM) and employee retaliation intention (ERI) were found to mediate the link between customer incivility (CI) and service sabotage (SS), with coefficients of $\beta = 0.091$, $t = 3.286$, $p < 0.001$, and $\beta = 0.119$, $t = 3.800$, $p < 0.000$, respectively. These results provide support for hypotheses H6 and H7. Based on the analysis of moderating effects, as depicted in Figures 3 and 4, co-worker support (CS) has a notable impact on the intended linkages. Specifically, the findings indicate that co-worker support (CS) mitigates the significant influence of customer incivility (CI) on rumination (RUM) ($\beta = -0.346$, $t = 6.895$, $p = 0.000$), thereby confirming support for H8. Furthermore, co-worker support (CS) alleviates the significant effect of customer incivility (CI) on employee retaliation intention (ERI) ($\beta = -0.306$, $t = 7.129$, $p = 0.000$), providing further evidence for H9.

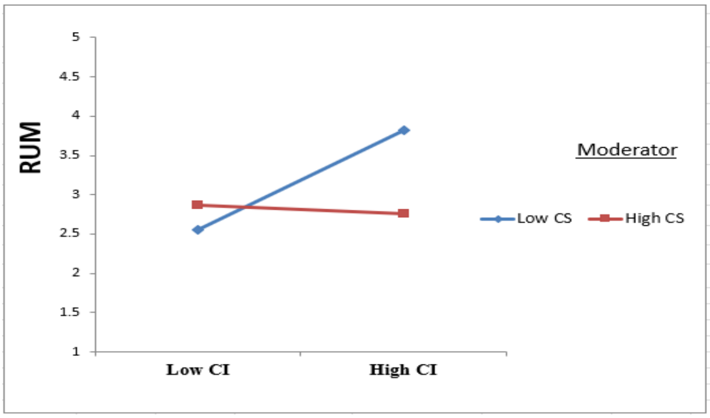

Figure 3. Interaction plot for the co-worker support (CS)

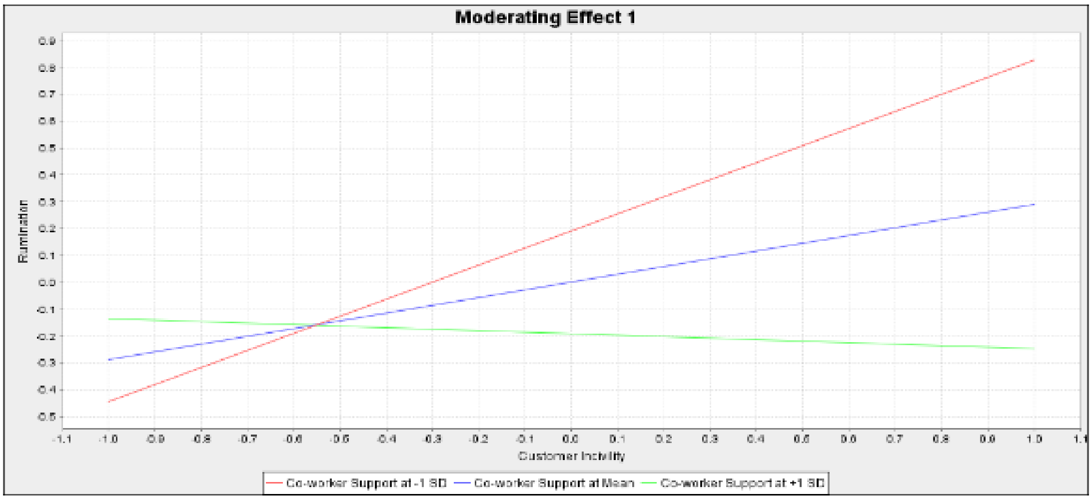

Figure 4. Moderation influence on customer incivility (CI) towards employee retaliation intention (ERI)

3. Robustness tests

Several robustness checks were conducted to validate and ensure the replicability of our study findings. First, we tested the effect of rumination and employee retaliation intention on service sabotage without including customer incivility in our model. The analysis revealed the same or stronger significance levels of significance. Moreover, a longitudinal analysis was performed to address the reverse causality of the service sabotage on rumination and employee retaliation intention. That is, data was collected at two distinct points in time in 2023. In the first wave, we received 308 valid responses. Subsequently, in the second wave, six months later, we re-administered the questionnaire to the same respondents from the first wave, resulting in 259 valid responses for further analysis. In line with our theoretical model, the findings underscored the substantial influence of customer incivility on both rumination and employee retaliation intention.

CONCLUSION

The current study aims to investigate the impact of customer incivility on FLEs' negative responses and service sabotage, and to evaluate the moderating effect of co-worker support. The study findings proved that FLEs' rumination and retaliation intention positively affect service sabotage behavior. Accordingly, both FLEs' rumination and retaliation intention, based on the results, succeeded in mediating the linkage between customer incivility and service sabotage behavior. The results revealed that customer incivility positively affects service sabotage, which supports the findings of earlier research (Cheng et al., 2020; Chi et al., 2015; Hwang et al., 2021; Pu et al., 2024).

Customer incivility has a positive impact on FLEs retaliation intention. This agrees with the theories mentioned previously, such as equity theory, the results state that customer incivility offers a situation where respect norms are unfairly violated, triggering negative emotions customer incivility has a positive effect on FLEs retaliation intention. In line with the theories mentioned earlier, such as organizational (in)justice theory and equity theory, our results suggest that customer incivility represents a situation where respect norms are unfairly violated, triggering negative emotions. The findings of this study also showed that frontline employees may view their motivation, time, and energy as inputs to be compared to the returns they receive from customers (Cheng et al., 2020; Akram et al., 2024).

Therefore, our study contributes to equity theory by empirically confirming that when employees' expectations of fair treatment from customers are violated due to encountering rudeness, they perceive this as unfair treatment. Consequently, there is an increased likelihood that they may retaliate or undermine customer interactions (Bedi & Schat, 2017; Luo & Bao, 2013; Skarlicki et al., 2008). In this case, hotel managers might offer psychological assistance to employees who encounter uncivil customers to boost their self-assurance in facing such situations (Kim & Qu, 2019). In the same vein, the findings of this study indicated that co-worker support moderates the positive impact of customer incivility on rumination and customer incivility on employee retaliation intention.

DISCUSSION AND IMPLICATION

Frontline employees (FLEs) serve as the face of service organizations through their commitment to delivering satisfactory service and expressing their friendly and positive conduct to foster customer loyalty (Maria Stock et al., 2017). Customer incivility presents a challenge for service industries because employees' hostile reactions to experiencing such behaviors from customers can jeopardize the organization's prosperity (Bani-Melhem et al., 2020). As a result, service industries implement stringent display guidelines and control how FLEs engage with customers. Even with these rigorous guidelines and oversight mechanisms, some attitudes such as rumination and retaliation intention can remain hidden, which in turn result in deviant behaviors such as service sabotage (Alola et al., 2019; Cho et al., 2016). Previous studies reported various negative impacts of uncivil customers on service employees’ responses and subjective wellbeing, which are supported by FLEs' elevated levels of occupational stress and psychological withdrawal (Lim & Cortina, 2005; Schilpzand et al., 2016), work effort (Boukis et al., 2020), Job satisfaction, and participative climate (Pap et al., 2021; Penney & Spector, 2005), and turnover intentions (Bani-Melhem et al., 2020; Wilson & Holmvall, 2013).

These observations serve as the driving force behind our research, contributing to the existing literature by initially exploring the impact of customer incivility on frontline employees' (FLEs) negative reactions and service sabotage. Subsequently, we assess the moderating influence of co-worker support on these effects. The outcomes of our empirical investigation effectively fulfilled their intended aims and met their objectives, particularly within the context of Egyptian hotel industry, which offers insights into cultural distinctions not extensively studied in prior research. Additionally, our study makes a theoretical contribution through the application of the equity theory framework. The results of the study enhance our understanding of the effect of customer incivility on two different types of responses, psychological and behavioral, across different levels. This underscores that customer responses are not uniform and vary depending on factors such as cultural background, psychological well-being, and past experiences of employees. Furthermore, other factors, such as the involvement of co-workers in challenging situations, may also influence the intensity of these reactions.

Precedent studies indicated that service sabotage is linked to rude customers behaviors. This is because service providers often perceive ill treatment from customers in a negative way, resulting in elevated levels of service sabotage (Alola et al., 2019). Within the service sector, more than 85% of employees have engaged in acts of service sabotage, creating various ways and actions for sabotaging services (Harris & Ogbonna, 2009). Consequently, it falls upon hoteliers to monitor these occurrences among their staff and take proactive measures to protect them rather than leaving them to address such issues independently. Additionally, managers must come up with plans to lessen the reason behind a customer's abnormal behavior. For instance, customers can earn a price reduction or a free drink if they welcome customer-contact personnel politely and treat them with respect, strengthening the relationship between the two parties (Hwang et al., 2021). Drawing from psychological theories such as the frustration-aggression theory, unfair treatment tends to provoke negative responses characterized by frustration (Berkowitz, 1993).

In this context (Boukis et al., 2020) argued that the customer's uncivil behavior negatively affects the psychological state of the FLEs, causing a state of rumination. With this knowledge in hand, hotel managers may consider whether their enterprises are prone to any kind of customer incivility and provide FLEs training opportunities on how to handle such incidents without receiving unfavorable responses. Moreover, managers should use mindful activities to help employees avoid personally absorbing the stress related to their roles and instead repurpose this energy in a more positive way. In line with this, our study proved that customer incivility positively affected FLEs rumination.

On the same note, customer incivility has a positive effect on FLEs retaliation intention. In line with the theories mentioned earlier, such as organizational (in)justice theory and equity theory, our results suggest that customer incivility represents a situation where respect norms are unfairly violated, triggering negative emotions, and fostering unfavorable attitudes towards the source of the unfairness (Ahmed et al., 2023; Huang et al., 2019). DeCelles et al. (2019) further argued that customer abuse is a significant contributor to workplace injustice, and it appears that many service industries frequently experience both hostile customers and uncooperative employees as well. These findings hold great significance not only for service organizations in general but also for the hospitality industry specifically, as both sectors commonly encounter a high volume of uncivil customers (Torres et al., 2017; Zhou et al., 2018). Hence, hotels need to take a more pro-active stance when handling incidents of rude consumer behavior. In this context, service managers can support frontline employees in handling such circumstances constructively rather than harboring retaliation intents that grow over time and lead to retaliatory behavior. Hotel managers can create a supportive environment for staff to voice their concerns and actively involve them in devising solutions to effectively manage interactions with uncivil customers.

Additionally, managers can help victimized employees understand why incivility occurred and determine if it was a result of customers' ignorance, to alleviate the negative responses (Cheng et al., 2020). Moreover, hotel managers can think about providing their service employees more freedom to handle impolite circumstances. Doing so will strengthen the staff members' sense of control over ongoing customer interactions and lessen the stress they experience while dealing with such scenarios (Kim & Qu, 2019).

In line with the significance of the direct relationship between customer incivility and rumination and between rumination and service sabotage, the results also confirmed that rumination succeeded in mediating the link between customer incivility and service sabotage. This confirms that negative rumination about customer incivility generates a skeptical perspective for putting forth more effort and dedication at work. Therefore, employees are inclined to adopt withdrawal behaviors, reducing their work effort and commitment (Shin et al., 2023) or aggravate their response to instances of service sabotage behaviors (Alola et al., 2019). Similarly, employee retaliation intentions mediate the connection between customer incivility and service sabotage because of the significance of the direct relationships between customer incivility and employee retaliation intentions and between employee retaliation intentions and service sabotage. This result can be explained by adopting the frustration-aggression theory (Breuer & Elson, 2017) which suggests that encounters with uncivil customers hinder the attainment of hospitality service objectives. This triggers frustration among employees, potentially leading to the conversion of this frustration into aggressive energy. Consequently, employees may seek outlets for their frustration, manifesting in intentions to retaliate against misbehaving customers (Balaji et al., 2020) and ultimately in service sabotage behaviors (Chan et al., 2022).

The direct and indirect link between customer incivility, rumination, employee retaliation intentions, and service sabotage challenges the common adage, particularly within the hospitality industry in developing countries, that "the customer is always right." Findings indicate that if hotel managers and supervisors fail to address customer incivility fairly—without bias against employees—it can lead to employees exhibiting negative behaviors, both intentional and unintentional, as a form of service sabotage. This retaliation stems from the mistreatment they endure, highlighting the critical need for equitable handling of customer interactions.

The concept of resource replacement posits that the depletion of one resource can be offset by the acquisition of another resource (Hobfoll, 1989). In the same vein, the findings of this study indicated that co-worker support moderates the positive impact of customer incivility on rumination and customer incivility on employee retaliation intention. That is, employees offset losing resources due to customer incivility behaviors by gaining alternative resources stem from co-workers' emotional and instrumental support (Shin et al., 2022). Specifically, frontline employees in the hospitality and tourism sector rely on co-worker support when dealing with customer incivility, a concept that also has not received enough academic attention (Baker & Kim, 2021). In this context, hotels should provide support to employees and foster mutual co-worker support to effectively manage situations involving misbehaving customers. The mitigating role played by co-worker support in the relationships between customer incivility and rumination and between customer incivility and employee retaliation intentions encourages supervisory levels to abandon the principle of "divide and conquer" and create a cooperative climate among workers to support each other in facing the pressures that may arise from interacting with undesirable customer behaviors.

Limitations and future research directions

The current study has some limitations. First, our analysis of Egyptian hotels did not incorporate diverse grouping algorithms, such as size or value distinctions. This suggests a potential opportunity for future research to investigate these variables based on a more comprehensive and inclusive dataset. Second, our study focused on hotels industry in Egypt. Future study could conduct a comparative study encompassing multiple countries with different cultures, Eastern and Western for instance, to consider the potential impacts of cross-culture issues.

Additionally, organizational culture could play a significant role in shaping employee responses to incivility and service sabotage, and variations in culture across different hotels may limit the applicability of the findings. Third, our study utilized cross-sectional examination to explore the relationships between the study variables and to test its hypotheses. Future studies could utilize secondary research data to measure the study variables. Further studies in this area can adopt a qualitative approach to investigate employees' perception of customer incivility behaviors to provide rich information that enables a profound understanding of the employees' potential reaction behaviors. Lastly, future studies can consider examining other moderators that can potentially alleviate negative FLEs' response provoked by uncivil customers such as organizational support, employee promotion focus, and employee prevention focus.

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OPPORTUNITIES AND PERSPECTIVES OF FORMATION OF THE MOUNTAIN TOURISM CLUSTER IN ALMATY AGGLOMERATION

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Abstract: In the current conditions of sustainable development, the main reason for the importance of creating tourism clusters in mountainous areas is determined by competitiveness, the availability of attractive tourist facilities, and the possibility of achieving economic development by increasing the number of tourists. This is due to the fact that recreational resources and landscape features of mountainous areas significantly increase the tourist potential of the territory and contribute to the development of tourism. In connection with this, Almaty agglomeration is one of the most favourable regions for the creation and development of the first mountain tourism cluster in the Republic of Kazakhstan. Therefore, the purpose of this study was to explore the opportunities and prospects of mountain tourism cluster development in Almaty agglomeration. The study began with a literature review of the theoretical and practical foundations of mountain tourism cluster formation. The main problems of the enterprises-participants of the mountain tourism cluster and ways to solve them became known in the course of a specially conducted interview. The interview was based on 4 questions pre-designed for tourism industry entrepreneurs participating in the cluster located in the agglomeration and 63 business managers voluntarily participated. As a result of the research the main problems of enterprises-participants of mountain tourism cluster in Almaty agglomeration are revealed and the structural model of mountain tourism cluster development is developed. The model was aimed at mobilising tourism and recreational facilities and service organisations into a unified environment that would form the basis for the formation and development of a mountain tourism cluster. As a competitive advantage of Almaty agglomeration the presence of unique picturesque wildlife, as well as the occupation of such types of active recreation as sports tourism and extreme tourism is defined. Thus, having studied the development potential of mountain tourism cluster in Almaty agglomeration, natural resources and attractions, as well as the current state of the tourism industry, the need to develop a state strategic plan for the development of tourism cluster in Almaty agglomeration was determined. The said plan should fully

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incorporate marketing strategies, infrastructure development, socio-economic development, environmental cleanliness and safety, and protection of stakeholder rights. The results of this study will be effective in creating a mountain tourism cluster in the Almaty agglomeration, attracting visitors from around the world and stimulating the local economy.

Keywords: mountain tourism, cluster development, opportunities and prospects, Almaty agglomeration, Kazakhstan

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INTRODUCTION

In the modern conditions of sustainable development, the mountains are of particular interest to tourists as one of the most attractive tourist sites of natural and cultural significance and a unique landscape with a variety of amazing aesthetic views (Dax & Tamme, 2023). The recreational value of mountainous areas significantly increases the potential of the local area and favours the development of tourism (Tampakis et al., 2019). Mountain tourism is a specific type of tourism activity characterised by a particular landscape, topography, climate, biodiversity and local communities (Agbebi et al., 2021). Therefore, a large number of educational, sporting and therapeutic treks are organised in mountainous areas according to geographical features (Ito, 2021). Due to the difficult terrain of the mountains, the intensity of mountain tourism is not as high as in urban centres or beach resorts on a regional scale. However, mountains are in very high demand as one of the outdoor holiday destinations after beaches and ocean islands. After all, due to the increase in health problems after the global pandemic of COVID-19, mountain tourism is developing all over the world (Linca and Toma, 2021).

The main reason was that during the COVID-19 pandemic, many tourists maintained a social distance by renting private villas, apartments or holiday homes in mountainous areas (Zeng et al., 2022). Thus, mountain tourism involves visiting certain mountainous areas by special tourist groups, enjoying the landscape features of these places and obtaining tourist services in mountainous areas of great tourist and recreational importance. Nowadays, in terms of mountain tourism, many mountainous regions are famous for their sights and peaks, in particular, Peru is world famous for Machu Picchu and Nepal for the Himalayas. In addition, the Grand Canyon National Park in the USA; some tourist areas of the Alps in Italy and Austria (Mont Blanc, Monte Rosa, Matterhorn); Picos de Europa in Spain; Kilimanjaro in Kenya and Tanzania; the Carpathians in Slovakia, Czech Republic, Poland, Hungary, Romania and Ukraine; the Ural and Caucasus Mountains; and the Tien Shan Mountains characteristic of China and Central Asian countries are particularly sought-after tourist regions (Larson & Poudyal, 2012; Výrostová et al., 2021; Bennike & Nielsen, 2023; Sharma et al., 2023). The said mountainous areas offer hiking, mountaineering, cultural monuments preserved for centuries and unique routes that will give you an adrenaline rush. Therefore, it is necessary to diversify the functional activities for mountain tourism in these regions. That is, it is necessary to organise services on a cluster basis. Tourism clusters-tourist products and services should be realised as a network of supply chains of tourism services, covering various components of activity (Zhang et al., 2009). So, since the development of mountain tourism on a cluster basis is most often reflected at the regional level, the creation of clusters based on the tourist and recreational features of the same mountain region becomes extremely important.

The primary reason for the importance of creating tourism clusters is determined by their competitiveness, the presence of attractive tourist facilities, as well as an increase in the number of tourists, the ability to promote the development of transport, culture, trade, hospitality and other sectors of the economy (Jackson & Murphy, 2002; Alimova et al., 2020). In this regard, Kazakhstan has all prerequisites for the development of tourism business on the basis of clustering, i.e. historical and architectural monuments, medical and health resorts, nature reserves, cities that have developed as financial, educational and cultural centres are distinguished by their attractiveness for tourists (Saduov et al., 2019). The development of the cluster will contribute to the development of the construction, transport, entertainment industry and increase the volume of capital as investments in the republic. At the same time, the cluster will create an opportunity for the systematic development of Kazakhstan's regions, which currently have significant tourism resources that are not taken into account (Kenzhebekov et al., 2021). Support for the development of the tourism cluster is based on integrated actions of the public and private sectors, in particular, on the understanding of the priority of creating a competitive tourism industry to achieve a normal and dynamic socio-economic level of development of the region. However, at present, the most important aspects of the problems of improving the competitiveness of tourism services in Kazakhstan and the creation of a cluster in the sphere of mountain tourism have not been solved. Also, the theoretical and practical foundations of mountain tourism cluster development are not fully defined, there are practically no fundamental works devoted to the ways of solving the main problems of tourism cluster development.

In this connection, the purpose of this study was to explore the opportunities and promising directions for the development of mountain tourism cluster in the agglomeration of Almaty, the southern capital of the Republic of Kazakhstan. This is due to the fact that Almaty is a multi-route centre, where tours of active and passive types of tourism can be carried out at the national and regional levels (Zharkenova et al., 2023). Moreover, the location of Almaty will be particularly favourable for the development of mountain tourism, and it will be very advantageous to form a mountain tourism cluster within the Almaty agglomeration. Also, the ski resort in Almaty has every chance to develop in line with the times and become one of the world centres of mountain tourism (Dorokhov et al., 2020). The tourist potential of such resorts as Shymbulak, Oi-Qaragai, Akbulak, Tabagan, Pioneer Family Mountain Resort and Medeu Ice Rink is especially high. The fact is that snow falls in abundance in these places all year round and the ski season lasts for a very long time. Besides, there are Butakovskiy pass (route №106), Lesnoy pass - Bukreev peak (route №108), Gorelnikskiy gorge - trapezoidal pass - Kumbel peak - Kokzhailau - Ak-Bulak (route №120), Gorelnik - alplager "Dead-end water" - Mynzhylky - Titova pass - Gorelnik gorge (route №122), Shymbulak ski resort - Talgar pass - Shymbulak peak (route №123), Shymbulak ski resort - Talgar Pass - Bogdanovich Glacier (route №124), dead-end Water Mountaineering Camp - Mynzhylky - Lake Manshuk Mametova (route №134) and dead-end Water Mountaineering Camp - Mynzhylky - Titova Pass - Availability of tourist routes, such as Gorelnik Gorge (route №136), gives tourists an opportunity to choose. Thus, it is necessary to fully utilise the potential of the Almaty Industrial Zone and the Alatau Innovation Technology Park. Almaty accounts for 5/1 of all visitors to the Republic, including 40% of domestic and foreign visitors. According to the results of a survey of Kazakh and foreign tourists, 60% of foreign tourists choose Almaty for ecotourism, and 55% of Kazakh tourists come for various activities and entertainment (Koshim et al., 2023).

Popularisation of the recreational value of tourist service objects in these mountainous regions creates the potential for increasing tourist flow. Therefore, the assessment of opportunities for the creation and development of mountain tourism cluster in Almaty and the identification of its promising directions will allow us to set a course for the future. This study, making conclusions about the creation and development of mountain tourism cluster in Almaty, is aimed at identifying the possibilities of cluster development and promising directions of development.

LITERATURE REVIEW

Tourism cluster basics

In the scientific literature, clusters are peculiar ways of self-organisation of society, adapted to withstand the rigours of global competition and maintain their existence. Cluster development is defined as a geographical concentration of interrelated companies and specialised suppliers and a group of consumer industries (Porter, 2000). The application of cluster development measures in tourism activities is often reflected at the regional level. Provides for the consolidation of tourism elements into a single centre to attract, serve and satisfy tourists within a city or county at the prefectural level as a geographical area (Yang & Fik, 2014; Peiró-Signes et al., 2015). In essence, the concept of tourism clusters is based on the theory of industrial clusters first introduced by Marshall (2009). Tourism clusters are composed of several industries and are shaped by the dynamics of relationships between different industries within the cluster (Cole, 2009).

Tourism clusters, as a result of the concentration of tourism industries and firms of the same destination in the same environment, allow small enterprises to introduce new innovations (Chan et al., 2012). More specifically, clustered products of interconnected firms and productivity gains in hotels (Chung & Kalnins, 2001).

As a result of the search for strategic methods of cluster development of the tourism industry, effective cluster models for the tourism industry have become known. In particular, the majority of tourism cluster researchers use the Porter's Diamond model. An example is the conceptual model (CR) of Crouch & Ritchie (1999). They suggested that the competitiveness of tourism destinations is determined by four main components, namely: qualifying determinants; destination management; key resources and attractors; and supporting factors and resources. However, Jackson & Murphy (2006) believe that Porter's model facilitates the shift from comparative advantage to competitive advantage in the process of cluster development. Hong (2008) uses Porter's model as the relationship between companies and suppliers as well as other relevant institutions. In addition, Dwyer & Kim (2003) proposed an "Integrated model" (DK) that represents the determinants and indicators of target competitiveness. Over time, Mazanec, Wöber and Zins (2007) extended the integrated model in terms of the competitiveness coefficient. Meanwhile, Kim & Wicks (2010) reconstructed a tourism cluster development model of global competitiveness based on Porter's diamond model, bringing together tourism researchers to study competitiveness and multinational activities in the global economy. To date, the strategy of tourism cluster development is developed through the efforts of all cluster participants, and the strategy defines the basic principles of tourism cluster development (Doçaj et al., 2018). Since the creation and development of a tourism cluster is a rather complex process, it requires constant work to adapt to changes in market and innovation conditions (Lascu et al., 2018).

Therefore, when establishing a tourism cluster, great efforts are made to improve transport and financial infrastructure, increase investment to improve management and attract companies that provide certain services and have experience in cluster development (Ivanovic et al., 2010). In this context, the main objective of tourism cluster policy is determined by the need to increase the share of clusters in the national economy, and increase cluster productivity and competition. Accordingly, clusters in the non-oil sector of the economy will be based on the division of enterprises into several industries using new methods.

Development of mountain tourism cluster

In line with the research topic, however, the development of a mountain tourism cluster is considered a major issue when considering a development plan for tourism-related activities in many regions (Page & Connell, 2020). Unique landscapes, wildlife, clean air, local culture, history and cultural heritage, winter and summer sports, and the possibility of nature-related activities were named as the main factors of high attractiveness of mountainous areas (Jeelani et al., 2023). Mountain areas are more fragile than other landforms and tend to be more susceptible to changes caused by tourism (Shah & AhmadWani, 2014). Conceptually, therefore, there are different strategies for mountain tourism clusters, which include: rural tourism, agritourism, ecotourism, community tourism and cultural tourism. In particular, rural tourism is developed as an alternative source of employment in mountain regions in the context of the cluster (Khartishvili et al., 2019). Indeed, with the accelerating urbanisation process, mountainous areas outside the suburbs are becoming increasingly popular due to the fact that most tourists prefer mountain tourism in rural areas to rural tourism (Podovac et al., 2019). Consequently, the mountain tourism cluster becomes prioritised as a regulator of environmental and community impacts in mountainous areas (UNEP, 2007; UNWTO, 2018). The formation and development of mountain tourism clusters by region is thus a very complex process, and many studies have therefore been conducted on a geographical basis. Moric (2013), for example, is concerned that most of the routes in Montenegro are in the first stage of cluster development and that the rural tourism sector is still underutilised. Cao and Sarker (2022) in assessing the competitiveness of mountain tourism in China, developed the following key recommendations. They believe that county authorities should improve the balance between competition and cooperation with proper conservation and strengthen the balance by establishing a coordinated mechanism. In addition, local authorities believe that it is necessary to improve tourism infrastructure and develop the mountain tourism market by removing barriers to tourism co-operation. Additionally, Ng (2022) conducted a Scopus literature review on mountain tourism and concluded that mountainous countries are often more productive in terms of publications than countries poor in mountain resources and that geographical proximity facilitates academic exchange and cooperation in mountain tourism research.

Despite valuable world studies, there is no clear single formula for the formation and development of mountain tourist cluster. Therefore, a mountain tourist cluster should be based on the peculiarities of the location of mountain territories, convenience, aesthetic appeal and value of landscapes and much more. Unfortunately, there are practically no tourism clusters in Kazakhstan that meet the Kazakhstani recommendations for assessing the competitiveness of existing and prospective sectors of the economy and their development. American consulting J.E. Austin Associates Inc. according to the analysis conducted by the company, there are seven cluster areas in Kazakhstan: tourism, production of building materials, food industry, cargo transportation, textile industry, production of tools for mining, metallurgical industry (Samambayeva, 2013; Gallardo Vázquez, 2023). However, Kazakhstan has limited opportunities for global competitiveness as a result of the lack of proper management of tourism entrepreneurship (Aktymbayeva et al., 2023).

The implementation and successful functioning of targeted programmes for the development of high potential in the tourism business of Kazakhstan will create favourable conditions for the existing clusters in the country and will contribute to the emergence of new clusters. In this regard, the potential for the development of mountain tourism cluster in Almaty is very high, as noted in their studies by Kazakhstani scientists Niyazbayeva and Yessengeldina (2016), Askeyev and Baizholova (2021), Issakov et al. (2023a) and Tokbergenova et al. (2023). The authors believe that the development of mountain tourism cluster in Almaty will contribute to the achievement of high quality of recreation, consumption of environmentally friendly products, increasing the level of service using modern technologies, automation of management and digitalisation of marketing activities. In conclusion, the development of the mountain cluster in Almaty promotes this region as a centre of ecotourism and presents it as a multi-destination centre where active and passive tourism tours can be carried out at the national level.

MATERIALS AND METHODS

Study Area

Nowadays, mountain tourism is a special branch of tourism, which is dynamically developing in developed and developing countries of the world. Mountain tourism involves visiting certain mountainous areas in order to familiarise oneself with the landscape features of these places and to obtain tourism services in mountainous areas of great tourist and recreational importance. The development of mountain tourism is seen as an opportunity to combat the threat of marginalisation and to enable mountain residents and businesses to earn higher incomes.

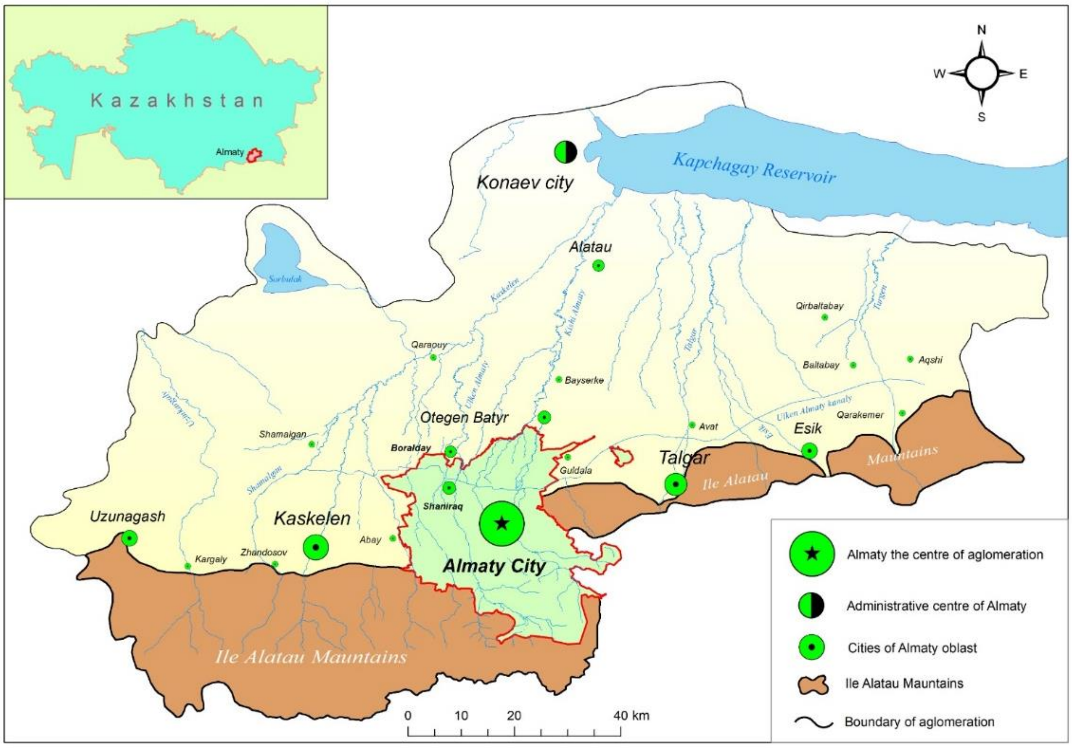

Figure 1. Territory of Almaty agglomeration (Source: compiled by the authors)

Therefore, tourism clusters in the mountain region are considered as a systemic mechanism for generating regional income through tourism activities. Also, the development of mountain tourism on a cluster basis is based on the tourist and recreational features of a particular mountain region, as it is carried out at the regional level. In this context, this study is aimed at exploring the opportunities and promising directions of mountain tourism cluster development in Almaty agglomeration, the southern capital of the Republic of Kazakhstan. This is due to the fact that the territory of Almaty agglomeration has a unique recreational potential and tourist resources of world significance. The rationality of the geographical location, wide opportunities for the development of virtually all types of tourism and the availability of regional tourist products allow the development of tourism and recreational infrastructure of this region. Almaty agglomeration includes five administrative districts of Almaty oblast (Yenbekshikazakh, Zhambyl, Iliysk, Karasai, Talgar districts and the territory of Kapshagay city administration) and the territory of Almaty city (Figure 1). The centre (core) of the agglomeration is the city of Almaty. In order to form optimal directions of agglomeration development, a rational plan of the territory has been developed, taking into account the interests of administrative-territorial units within the boundaries of the territory. The plan states that Almaty agglomeration has full potential for the development of extreme types of tourism - ski tourism, mountain biking, rafting and hang-gliding (Resolution on approval of the interregional scheme of territorial development of Almaty agglomeration, 2016). The President also spoke about the need to develop a mountain tourism cluster in the Almaty agglomeration (Official website of the President of the Republic of Kazakhstan, 2021). This is because the Almaty agglomeration has a large number of national parks and scenic spots, which allows for a large tourist flow. In addition, as part of the task to bring the number of external tourists to 3 million people in the agglomeration by 2025, ecotourism, skiing, health, sports, ethnic and urban tourism are offered to tourists as special destinations (Concept of cultural policy of the Republic of Kazakhstan for 2023-2027).

The survey

In the course of the research a special interview was obtained to identify potential enterprises-participants of the mountain tourism cluster, their grouping by industry characteristics and identification of key problems. After all, for the system solution of problems of development of mountain cluster of Almaty it was important to listen first of all to the opinion of business representatives working in this sphere. Therefore, the interview was based on 4 questions developed in advance for tourism industry entrepreneurs participating in the cluster located in the agglomeration. Simple random sampling was used to conduct structured face-to-face interviews (Hoyos, 2010). Executives or managers from 63 companies who agreed to be interviewed answered questions, giving interviews for 20 minutes each. Data were collected from September to November 2023. Interviews were conducted on weekdays at 17:00-20:00 by a well-trained senior lecturer in interview style. The interview questions (Q) were as follows:

Q1. In your opinion, what is the current state of mountain tourism in Almaty?

Q2. What are the main problems that exist in your enterprise?

Q3. What do you think are the solutions to these major problems?

Q4. In your opinion, in what direction should mountain tourism in Almaty develop in the future and what tourist attractions would you highlight?

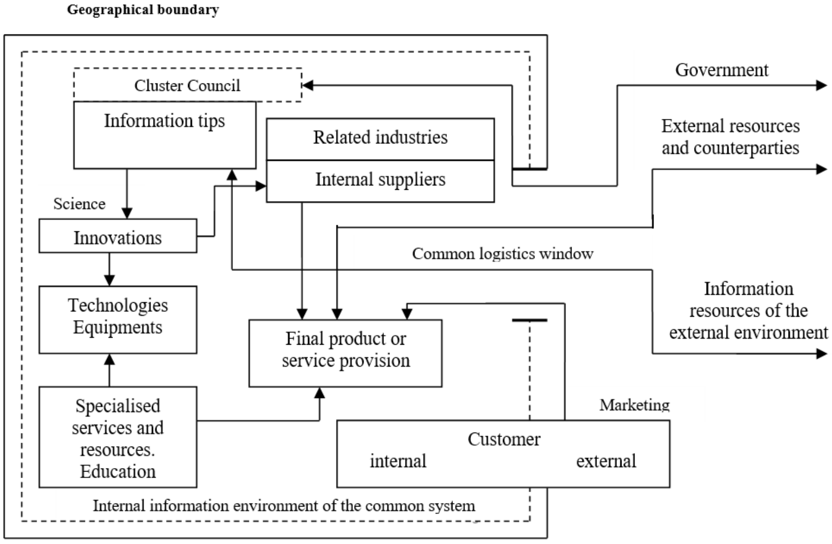

Figure 2. Common structure characteristic of clusters (Source: compiled by the authors)

Cluster Framework

The structure of tourism clusters today has become more complex, the cluster council includes regional leadership and is linked to the Government Entrepreneurship Council. The most important thing in the cluster structure is to spread innovation in value creation to the whole industry and to have a common logistic window in interaction with the external environment (Figure 2). This structure allows minimising transaction costs. Therefore, the creation and development of a tourism cluster within the Almaty agglomeration is very important. The possibility of cluster development of mountain tourism is especially high. In this regard, having identified opportunities and promising directions for cluster development of mountain tourism in Almaty agglomeration, we have developed a structural model (in the results section of the model). The structural model was based on Porter's Diamond model (Fang et al., 2023). In other words, the model is aimed at mobilising tourist and recreational facilities and service organisations into a unified environment, which is the basis for the formation and development of a mountain tourism cluster in the Almaty agglomeration.

Research Flowchart

This study involves the development of a cluster model with the identification of opportunities and promising directions of mountain tourism cluster development in the agglomeration of Almaty, the southern capital of the Republic of Kazakhstan. The study began with a literature review and study of theoretical and practical foundations of mountain tourism cluster formation. To identify the main problems of entrepreneurs in the sphere of tourism in the studied territory, an interview was conducted, opportunities and promising directions of mountain tourism cluster development were identified. As a result, a cluster model for the development of promising areas was proposed. The full scheme of this study can be seen in Figure 3.

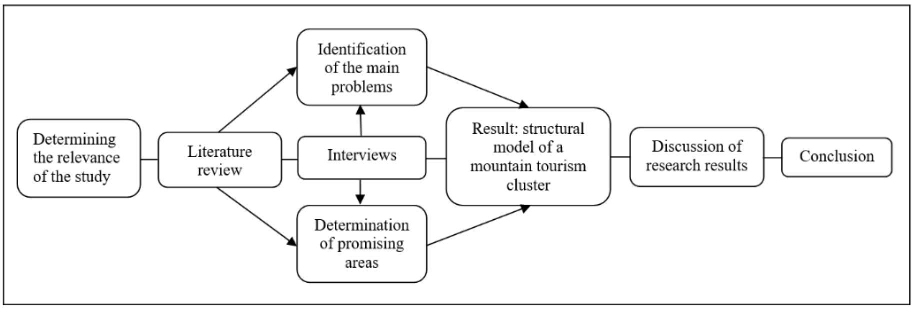

Figure 3. Research Flowchart (Source: compiled by the authors)

RESULTS AND DISCUSSION

Identification of enterprises participating in the mountain cluster

As a result of the study, the enterprises participating in the development of mountain tourism cluster in Almaty agglomeration were identified and grouped by industry (Table 1). Among the enterprises participating in the Almaty mountain tourism cluster were hotels, restaurants, resorts and sanatoria located on the mountain, national parks and reserves, ski complexes, clubs engaged in skiing, agricultural enterprises (representatives of agritourism) and hiking and trekking circles. Among them, ski complexes are of great importance in the development of mountain tourist clusters. This is due to the fact that tourists primarily come to the mountains for skiing, snowboarding, conkey or trekking, so in the process of organising or developing a mountain cluster it is necessary to give priority and support to enterprises working in this direction.

Table 1. Enterprises participating in the mountain tourism cluster, N=63

Type of ownership	Hotels located in the mountains	Restaurants located in the mountains	Mountaineering clubs	Hiking and trekking circles	Sanatoriums	Ski (snowboarding) complexes	National parks and reserves	Agricultural enterprises
1	2	3	4	5	6	7	8	9
State	-	-	1	-	1	2	3	-
Private ownership	16	13	6	10	3	4	-	5
Total 63	16	13	7	10	4	6	3	5

Due to the territorial specificity of Almaty, skiing complexes are scattered. Nevertheless, ski resorts on the slopes of the Alatau have a high tourist potential (Table 2). Such resorts as Shymbulak, Oy-Karagai and Akbulak have especially high chances of receiving tourists. In addition, there are plans to build a ski resort Kokzhailau and develop mountain tourism in the future.

Table 2. Ski complexes located in the vicinity of Almaty (Source: compiled by the authors)

№	Name of ski resorts	Location feature	Type	Price
1	Shymbulak	Ski resort located at an altitude of 2510 metres above the Zailiyskiy Alatau gorge near Almaty.	Ski resort	5-15 euros
2	Oi-Qaragai	The resort is located at an altitude of 1,650 metres above sea level in a zone of coniferous forests	Mountain resort	7 euros
3	Ak-Bulak	Located in the foothills of Ili Alatau at an altitude of 1600 metres above sea level, outside the city of Talgar	Ski resort	6-32 euros
4	Tabagan	The complex covers an area of 91 hectares. The highest point of the slope is 1,652 metres above sea level.	Ski resort	6-12 euros
5	Pioneer	The resort is located at an altitude of 2000 m above sea level in the picturesque Kotyrbulak Gorge on the territory of Ile-Alatau National Park.	Ski Park	6-12 euros
6	Medeu	High-altitude sports complex located near the city of Almaty, at an altitude of 1691 metres above sea level.	High mountain skating rink	3-6 euros

Currently, alpenism, a special type of mountain tourism in the vicinity of Almaty, is rapidly developing day by day, influenced by the clubs operating in the area. Several well-known alpenism clubs are active today (Table 3). Among them we can single out the Almaty Mountain Club and the Almaty School of Mountaineering. This is due to the fact that these clubs specialise in organising mountaineering trips and training in extreme outdoor sports. They are also actively involved in training climbers and organising competitions. These teams run many routes near Almaty, the most popular of which are as follows: 1) Butakovskiy pass (route №106), 2) Lesnoy pass - Bukreeva peak (route №108), 3) Gorelnik gorge - Trapeziya pass - Kumbel peak - Kokzhailau - Ak-Bulak (route №120), 4) Gorelnik - Tuyuku alplager - Mynzhilki - Titova pass - Gorelnik gorge (route №122), 5) Chimbulak ski resort - Talgar pass - Chimbulak peak (route №123), 6) Chimbulak ski resort - Talgar pass - Bogdanovich glacier (route №124), 7) closed water mountaineering camp - Mynzhilki - Manshuk Mametova lake (route №134) and 8) closed water mountaineering camp - Mynzhilki - Titova pass - Gorelnik gorge (route №136).

Table 3. Mountaineering clubs (Source: compiled by the authors)

№	Club name	Direction
1	Almaty Mountain Club	Actively participates in organising climbing trips, training and competitions
2	Almaty Adventure Club	A club specialising in extreme sports, including mountaineering
3	Almaty Rock Climbing Club	Engaged in mountaineering and mountain tourism
4	Extreme Tourism and mountaineering Club "Vertical"	Specialises in mountain trekking, mountaineering and mountain tourism and is dedicated to training beginners
5	Almaty Mountaineering School	Mountaineering and mountaineering courses for amateurs and professionals
6	Cozy Rock	Rock climbing for children and adults
7	Alpine Asia Team	Mountaineering section

At present, there are 7 sanatoriums in Almaty, which are engaged in health improvement of residents and tourists (Table 4). This is due to the fact that the slope of the Ile Alatau is an ideal place for climatotherapy. Most sanatoriums provide an opportunity for hiking and eco-tourism due to the location on the territory of Ile-Alatau National Park and Almaty reserve in the picturesque nature. The air of the valley facilitates blood circulation and restores metabolism. Therefore, most foreign and domestic tourists come for this purpose. In these sanatoriums, programmes of therapeutic and recreational procedures for each holidaymaker are prescribed by doctors individually, taking into account the state of health, chronic diseases and compatibility of procedures.

Table 4. Sanatoriums (Source: compiled by the authors)

№	Name of ski resorts	Sanatorium-resort treatment for the following types of diseases	Price
1	Altyn Kargaly	Cardiovascular system; musculoskeletal system; gastrointestinal tract; upper respiratory system	20-80 euros
2	Ak-Kain	Inflammation of the palatine tonsils; inflammatory process of the pharyngeal mucosa; chronic inflammation of the trachea and bronchi; respiratory diseases; heart and vascular diseases; high or low blood pressure; spinal diseases; joint diseases; colitis, haemorrhoids; diseases of the female genital organs; infertility; inflammation of the prostate gland; gum diseases and cavities of the mouth	20-30 euros
3	Ak-Bulak	Cardiovascular diseases; musculoskeletal system diseases; gastrointestinal tract diseases; chronic liver and biliary tract diseases; respiratory diseases	20-55 euros
4	Kazakhstan	Rehabilitation of musculoskeletal apparatus; respiratory organs; cardiovascular and nervous systems; urological and gynaecological diseases	25-75 euros
5	Koktem	Digestive organs; gastric and duodenal ulcer; biliary tract; chronic colitis; treatment of metabolic and endocrine system diseases; treatment of nervous system diseases (out of exacerbation phase); treatment of respiratory and ENT diseases; treatment of chronic and occupational intoxication, including heavy metals and phosphorus.	22-70 euros
6	Samal	Specialises in rehabilitation of the musculoskeletal system; respiratory organs; cardiovascular and nervous systems	32 euros
7	Almaty Resort	Sanatorium profile - general therapeutic	70-420 euros

However, there is a high demand for hiking and trekking on the part of tourists visiting Almaty. After all, the good work of enterprises working in this direction and the ability to arouse interest in this direction among tourists increase the demand. In particular, such teams as: Demal, Tourist and Sports Club "Monte", Lake Alma Hiking Trail, Gorny Club Almaty, Tamyr and Morena are well developed in this direction. These teams intend to develop this direction of ecological tourism. In addition, it contributes to improving the level of physical culture of any tourist and promotes a healthy, active lifestyle. These teams provide services on many hiking and trekking routes in the vicinity of Almaty, the most popular of which are Kokzhailau, Butakov waterfalls, Furmanov Peak and others.

As for the hotels belonging to the mountain tourism cluster located in the mountainous region near Almaty, there are many hotels with special service among them (Table 5). It can be said, however, that the location and prices of the hotels differ. It is very important to have unified agreements, as hotels participating in the cluster operate within the cluster. Therefore, we believe that state regulation of this direction is necessary. In addition, restaurants are of great importance in mountain tourism (Abdirazakov et al., 2023). There are many good restaurants located on the mountain that are part of the Almaty mountain tourism cluster, among which we can highlight the following: Akauyl, Chashnagiri, Auyl, Hisan, Inzhu, Abay, Restaurant & club Bellagio, Chalet Shymbulak meat restaurant, Rifugio del Monte, Big Chefs Shymbulak and Dadli.

Table 5. Hotels (Source: compiled by the authors)

№	Hotel name	Guest feedback		Minimum price, euro	Hotel category
		TripAdvisor (5)	Booking.com (10)		
1	Shymbulak Resort Hotel	3.5	8.4	80	-
2	Oi-Qaragai Mountain Resort	4.0	8.6	120	4*
3	Be Fine	4.5	9.0	165	4*
4	S.N.e.G Hotel	4.5	9.3	120	-
5	Qazaq Auyl Eco Hotel	5.0	9.1	250	5*
6	Tenir Eco Hotels	4.0	9.1	290	-
7	Alpine Rose Resort	3.0	-	50	-
8	Hostel Shymbulak	-	8.8	30	-
9	Edelweiss	-	7.7	40	3*
10	Sunkar Hotel	3.0	8.2	30	-
11	Samal Resort & SPA	4.5	9.1	100	4*
12	Medeu Hotel Almaty	2,5	-	30	2*

Agricultural entrepreneurs and farmers have a great influence on the formation and development of the mountain tourism cluster in Almaty. In the past, this region is the birthplace of apples, and the local brand "Aport apple" is known all over the world (Robbins, 2010). Given that Apple aport grows in mountainous areas, it can be seen that agritourism representatives located in the region also participate in the mountain tourism cluster. Thus, agritourism is a relatively new trend of ecotourism that is becoming increasingly popular in Almaty. Several farms participating in the mountain tourism cluster can be noted in Almaty: Arba Wine Vineyards, GreenEco Greenhouse Complex, Flower farm Little Garden, Ostrich Farm, Taurus, Agroimpex, Talgar Trout Farm, Turgen Trout Farm Altyn Tau and Dragan Farm.

It is worth highlighting the Dragan Farm, which is of particular interest for the Almaty Mountain tourist cluster. This farm is gaining the respect of tourists by organising many types of agritourism. Thus, Almaty agglomeration has sufficient tourism and recreational potential for the development of mountain tourism cluster. However, due to the lack of systematic organisation and mutual agreements, mountain tourism is not developed at the appropriate high level. There are a number of urgent problems that need to be solved, which we have shown in the next section.

Actual problems of development of the mountain tourism cluster of Almaty

In order to identify the main problems of development of the Almaty cluster of mountain tourism, the heads and managers of 63 enterprises located in the mountain zone of Almaty agglomeration and carrying out tourism activities were interviewed. According to the results of interviewing the following problems of the current state of mountain tourism and services in Almaty agglomeration were identified:

1) Lack of qualified specialists. In general, there are no special institutes engaged in tourism research in Kazakhstan (currently, only state institutions conduct research). Kazakhstani companies conduct market research on their own. However, there are practically no experienced specialists to develop the construction of tourist facilities and amusement parks (Shevyakova et al., 2019). Also, not all educational institutions in the tourism sector provide the industry with full-fledged experienced specialists (Németh et al., 2019). Therefore, it is necessary to stimulate support for the training of necessary specialists for clusters where the education system will be established. To ensure quality training of tourism personnel it is necessary to:

- introduction of the tourism education quality certificate "UN Tourism.TedQual" in the universities that train personnel for the tourism industry;
- ensuring Kazakhstan's participation in international tourism events;
- ensuring the participation of foreign specialists in the development of educational programmes, teaching aids, textbooks and visual materials of higher education institutions that train tourism personnel (Zhoya et al., 2023);
- conducting training seminars and refresher courses for tourism industry specialists, including guides, tour guides, tourism instructors, including for specially protected natural areas and state national parks. In addition, according to the results of international experts, one of the most important measures for the development of the tourism industry is its scientific and methodological support. In Almaty there is practically no scientific and methodological base for the development of mountain tourism, while in developed countries, such as Germany and the UK, there are Centres for research and forecasting the prospects for the development of national tourism, funded from the state budget (Aliyeva et al., 2020).

2) Vulnerable infrastructure and recreation industry development. The main problem is the lack of developed infrastructure and services corresponding to international standards. In fact, one of the problems is the difficulty to reach the facilities due to roads in poor condition. According to experts, the most significant impact on the development of tourism comes from the hotel business, transport, travel agencies, and global computerised booking and reservation systems. Therefore, it is necessary to pay special attention to them, improve the quality of their service and expand the scope of services. Taking into account the insufficient development of tourism infrastructure and limited financial resources, it is necessary, first of all, to undertake the construction of a network of hotels and motels located in mountainous areas, as well as campsites. This is due to the fact that today accommodation prices in this region are relatively expensive for locals. In order for affordable hotels to appear in the mountains of Almaty, it is necessary to strengthen competition, and then prices will fall. In addition, of particular importance for the development of mountain

tourism in Almaty is the development of health resort activities. This requires the implementation of the following measures: certification and classification of health resort facilities, ensuring coordination of their activities.

3) The presence of administrative barriers. In particular, it is important to improve the legal and regulatory framework and resolve visa issues. This issue, in turn, requires the participation of all stakeholders in the implementation of the state programme, public-private partnership. Therefore, the involvement of all interested ministries and local executive bodies in the development of tourist industry facilities is becoming more and more urgent. It is necessary to expand the list of countries whose citizens are entitled to simplified visa and registration regimes. At the same time, tax incentives should be granted to participants operating within the mountain tourism cluster. Such common problems cannot be solved by individual companies. Therefore, they should be controlled by a targeted government policy.

4) Lack of proper marketing. Although there are many picturesque places near Almaty agglomeration, they are not popular with foreign tourists. Developing an image strategy of Almaty as a tourist centre with unique tourism potential, open to the whole world, safe for tourists, is an important factor in attracting them to the country. As a marketing strategy, it should be implemented in the following directions:

- organisation of demonstration of video materials on mountain tourism on the world media channels BBC, CNN, Euronews, Discovery, Tourism and Adventures, etc;
- frequent briefings, presentations on the potential of mountain tourism in Almaty;
- development of customised videos tailored to specific target markets;
- organisation of information and press tours for representatives of major leading tour operators.

5) The problem of financial resources. For the development of mountain tourism it is very important to attract large investments into the industry and increase the investment attractiveness of Almaty. For sustainable development of mountain tourism in Almaty, it is necessary to make many changes to the law "on investments". In particular, it is necessary to reduce taxes and customs duties. Special attention should be paid to crediting and investing domestic tourism enterprises by providing discounts.

6) The issue of tourist safety. The safety of tourists directly depends on the state policy, measures taken by tour operators and travel agents when organising tours. In the conditions of increasing frequency of terrorist acts, epidemics and unfavourable technogenic consequences, the issue of safety becomes urgent. In this regard, the issue of development of Almaty mountain tourist cluster is to inform tourists on the issues of protection and defence of tourist environment and safety.

In general, for the cluster development of mountain tourism in Almaty agglomeration there are many issues to be solved. These issues should be solved by co-operation between government and business as well as local communities through proper solution planning.

State regulation of the mountain tourism cluster

The issues of development of the mountain tourist cluster of Almaty should be solved first of all by the state and private entrepreneurs. This is due to the fact that in the development of tourism, as one of the spheres of the economy, it is possible to distinguish the tasks of the state and individual entrepreneurs. For the development of mountain tourist cluster at the level of agglomeration, active intervention of the state is necessary to solve the main problems (Li & Liu, 2022). That is, it is necessary to stimulate promising areas for the development of domestic tourism and arrivals to the agglomeration with constant monitoring of alternative markets for tourist services. At the same time, the tourism cluster should support the construction of new and reconstruction of old facilities, ensuring the effective functioning of the Coordinating Council. It is also necessary to legally regulate the improvement of service quality and price reduction (Moldagaliyeva et al., 2023).

National channels should be obliged to promote mountain routes and routes with tourism potential and systematise the organisation of winter and summer sports events. The development and publication of agglomeration guides, thematic maps in several foreign languages should be supported (Issakov et al., 2024). In addition, it is necessary to prepare special itineraries for foreign tour operators and media in the territory of Almaty agglomeration and organise information tours. It is necessary to promote mountain tourism as the best form of healthy lifestyle and create appropriate infrastructural conditions for it (Issakov et al., 2023b). In this connection, the participation of entrepreneurs of private tourism business in the development of mountain tourism cluster in Almaty agglomeration promotes the development of this sphere of activity. Due to the growing demand for mountain tourism, the number of tourism enterprises in the agglomeration will increase. This will also expand the geography of tour operators developing new tourist routes and mountain tourism requirements in the vicinity of Almaty. Promotes the development of mountain tourism on a cluster basis by investing in the construction of small and medium-sized private hotels. Based on the results that are currently being carried out, it can be seen that the development of the tourism industry is fully dependent on the support of the state. As a result of the state measures described above, in our opinion, the mechanisms of state regulation of the industry can be structured as follows:

- credit and financial: creation of a special economic zone, transport and other infrastructure, targeted programme of mountain tourism development, development of a form of property state partnership in the sphere of mountain tourism (system of state guarantees, soft loans, direct financial support of important projects), financial assistance for advertising services;
- investments: attraction of foreign financial sources for the development of regional tourism opportunities, establishment of co-operation relations with the Sustainable Development Fund "Samruk-Kazyna" for the implementation of promising projects;
- tax-budgetary: discussion of measures to provide tax incentives for the development of the industry, provision of tax benefits by reducing administrative barriers;

- price regulation: increasing demand for tourism products by indirectly influencing pricing;
- information support: targeted orientation of advertising activities in the media to promote and position the tourist product and opportunities of the region;
- formation of the national tourist brand "Almaty Mountain Tourism".

Structural model of mountain tourism cluster development in Almaty

The development of a competitive cluster in the tourism industry directly depends on the measures taken by the state. This is due to the fact that as a result of mutual agreements between market institutions, government agencies and entrepreneurs, based on the proposals of each party, a single transaction and joint work, a competitive product in the tourism industry is formed (Nyanga et al., 2023; Berdiyarov, 2021). The importance of the presence of state structures in the cluster is due to the solution of issues related to the formation of the legal environment, tax policy, financing, infrastructure development. Similarly, given the great influence of socio-political factors on the legislative and executive activities of the state in various spheres of domestic and foreign policy, their relevance is indicated by the regulatory and legal environment of the tourism cluster (Chen et al., 2021; Cheng et al., 2023). In this regard, the development of mountain tourism cluster in Almaty will depend on the following circumstances: the creation of an optimal institutional environment aimed at balancing the interests of society, enterprises and local communities. Therefore, when developing the cluster model of mountain tourism in Almaty (Figure 4), we ensured the participation of various stakeholders, including government agencies, travel agencies, local businesses and members of the public.

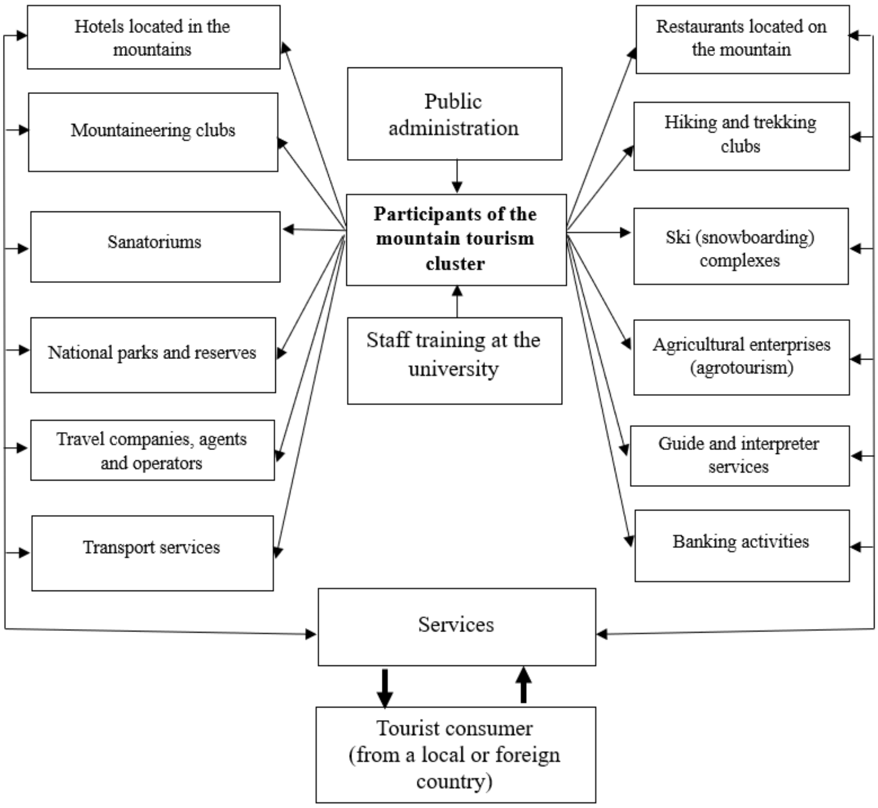

Figure 4. Structural model of the Almaty mountain tourism cluster (Source: compiled by the authors)

Mountain tourism cluster participants are an important part of the cluster model, as they form the main demands of tourists. The following enterprises will participate in the implementation of the cluster model of mountain tourism in Almaty:

1) Hotels located in the mountains: Shymbulak Resort Hotel, Oi-Qaragai Mountain Resort, Be Fine, S.N.e.G Hotel, Qazaq Auyl Eco Hotel, Tenir Eco Hotels, Alpine Rose Resort, Hostel Shymbulak, Edelweiss, Sunkar Hotel, Samal Resort & SPA және Medeu Hotel Almaty.

2) Restaurants located on the mountain: «Akauyl», «Chashnagiri», Auyl, Hisan, Inzhu, Abay, Restaurant & club Bellagio, Chalet Shymbulak meat restaurant, Rifugio del Monte, Big Chefs Shymbulak and Dadli.

3) Mountaineering clubs: Almaty Mountain Club, Almaty Adventure Club, Almaty Rock Climbing Club, Extreme Tourism and mountaineering Club "Vertical", Almaty Mountaineering School, Cozy Rock and Alpine Asia Team.

4) Hiking and trekking clubs: Demal, Tourist and Sports Club "Monte", Lake Alma Hiking Trail, Gorny Club Almaty, Tamyr and Morena.

5) Sanatoriums: Altyn Kargaly, Ak – Kain, Ak-Bulak, Kazakhstan, Koktem, Samal and Almaty Resort.

6) Ski (snowboarding) complexes: Shymbulak, Oi-Qaragai, Ak-Bulak, Tabagan, Pioneer and Medeu.

7) National parks and reserves: Ile-Alatau National Park and Almaty Reserve.

8) Agricultural enterprises (agrotourism): Arba Wine Vineyards, GreenEco greenhouse complex, Flower farm "Little Garden", Ostrich Farm, Taurus, Agroimpex, Talgar trout farm, Turgen trout farm "Altyn Tau" and "Dragan" farm.

9) Travel companies, agents and operators: Tumar Trans, Sky Way, Asia Connection, Discover Almaty, Grande Voyage, Meloman travel, Alatau in travel, All Service Tourism, Almaty Horse and Polo Club, AmAr Travel, Asia Discovery, Australia & Oceania Travel, Azimut Travel, Eco Park Tour, Fantasy Way, Gid Travel, GornoTravel, Green Trip, Holiday Globus etc.

10) Guide and interpreter services: KGB Language Services, Welcome.kz, Wegotrip etc.

11) Transport services: Grande Voyage, CarPlusDriver, Rosalie Trans, Minivanservis, AllTransQazaqstan, ExpressBus etc.

12) Banking activities: Altyn Bank, Bank RBK, Bereke Bank, First Heartland Jusan Bank, Fortebank, Home Credit Bank, Kaspi Bank, CenterCredit Bank, Eurasian Bank, Narodny Bank of Kazakhstan, Freedom Finance Kazakhstan, Nurbank and VTB (Kazakhstan).

Thus, the competitive advantage of Almaty is the presence of unique culture (historical tourism), beautiful wildlife (ecological tourism), as well as the opportunity to engage in such types of recreation as sports tourism, extreme tourism (Figure 5). That is why it is possible to develop the mountain tourism industry by carrying out work to increase the potential of mountain tourism in Almaty, including existing natural resources and tourist attractions, infrastructure (Issakov et al., 2023c). Unfortunately, mountain tourism is not developed at the proper level due to the fact that modern tour operators do not have a clear idea of what types of tourism should be developed.

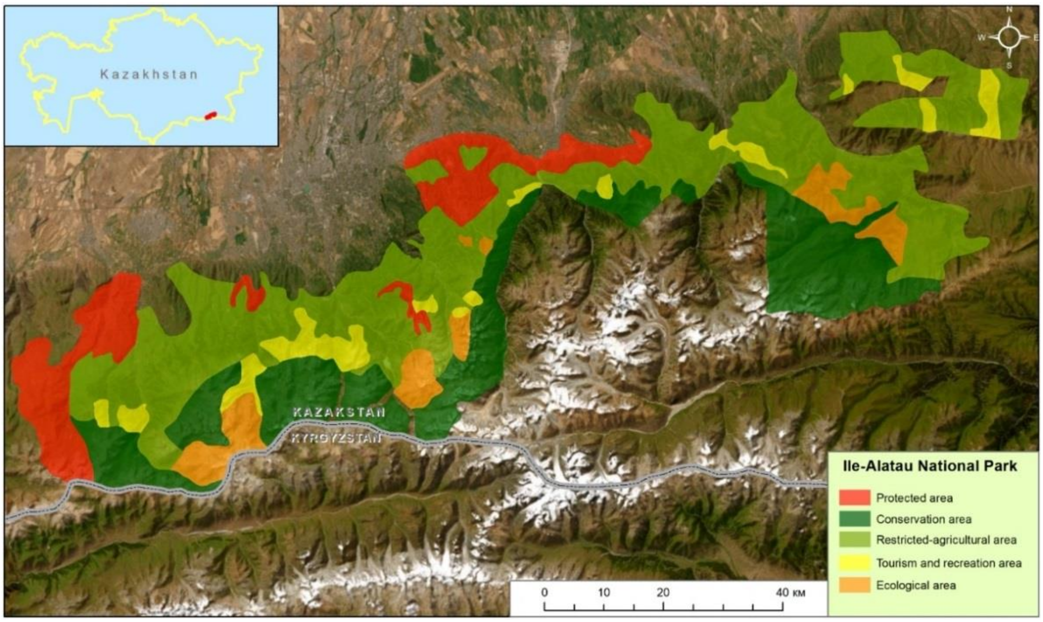

Figure 5. Tourist potential of Ile-Alatau Mountain (Note: compiled by the authors)

CONCLUSIONS

So, having studied the potential of mountain tourism cluster development in Almaty agglomeration, natural resources and attractions, as well as the current state of the tourism industry, we came to the conclusion that it is necessary to develop a strategic plan defining the goals. The strategic plan should include marketing strategies, infrastructure development and stakeholder engagement. In this regard, it will be useful to organise more frequent social media marketing, tourism fairs and events to raise awareness of the mountain tourism offerings in Almaty. Infrastructure development should start with improving roads, building footpaths and creating visitor centres. Therefore, government agencies, tourism agencies, local businesses and community representatives should work together to achieve the goal of developing mountain tourism infrastructure through mutual partnership or knowledge sharing. It is also important to provide training and development opportunities for the local labour force involved in the mountain tourism cluster with the skills and knowledge to meet the needs of tourists. This will improve the quality of hospitality, tourism management and customer service. However, the most important point is to ensure that the mountain tourism cluster is sustainable and not damaging to the environment and local communities. This can be achieved by adopting sustainable practices such as waste management, eco-friendly accommodation facilities and responsible tourism initiatives. In this way, by engaging and satisfying all stakeholders, a thriving mountain tourism cluster can be created in the Almaty agglomeration, attracting tourists from around the world and contributing to the local economy.

In conclusion, we note that it is obvious that the effectiveness of formation and development of the Almaty mountain-tourist cluster is impossible without state support and regulation. Therefore, we conclude that the objectives of the state cluster policy should be as follows:

- promotion of integration of participants in the mountain tourism cluster;
- implementation of programmes to support the entry of domestic travel agencies into the foreign tourist market;

- carrying out joint marketing research and promotional activities;
- coordination with representatives of the participants of the tourism cluster, implementation of educational policy and provision of opportunities for communication with educational institutions;
- development of information and communication infrastructure;
- formation of the institutional environment for the development of the mountain tourist cluster;
- construction of special routes for winter and summer sports and organisation of competitions on them (e.g.: biathlon, bicycle tour, jeep tour);
- promoting the development of active tourism and local history in secondary educational organisations.

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EVALUATION OF ACCESSIBILITY TO HEALTH CENTERS IN THE URBAN AREA OF THE CITY OF VILLAVICENCIO, COLOMBIA

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Abstract: The objective of this research is to evaluate the accessibility to health centers located in the urban area of the city of Villavicencio, taking as reference the indicators of accessibility to health services established by the Organization for Economic Cooperation and Development (OECD). To do this, the necessary basic information is collected, which consists of the population census, the geolocation of the medical care points along with the number of beds - stretchers and doctors available in each of them, and the travel speeds of the health care network. traffic, the information is subsequently analyzed from a geostatistical point of view, to finally apply the improved floating catchment area methodology in two steps (E2SFCA). Regarding the information on health centers, we work with the classification of these activity nodes divided into two groups, on the one hand, public health centers that deal with those categorized within the State Social Enterprise (ESE), and, on the other hand, private health centers which provide a particular service; regarding the latter, it was identified during the development of the research, that the department of Meta presents a high level of affectations generated by affectivity and anxiety disorders, which is why a large part of the private health centers correspond to specialized centers focused on mental health care and rehabilitation services, which was identified as a particular panorama, which is why these health centers were excluded from the accessibility analysis, in order not to obtain inaccurate results. With the above, accessibility indicators were identified for all health centers located in the urban area of the city of Villavicencio, excluding those focused on mental health care and rehabilitation services, finding that the results of the indicators obtained show that there is acceptable behavior in terms of accessibility to beds - available stretchers, however, in relation to doctors, it is evident that there is currently no adequate coverage as established in the aforementioned document. By carrying out a comparative exercise of the results with other intermediate cities in Colombia such as Armenia, the Central Western Metropolitan Area (Pereira) and the Manizales – Villamaría Conurbation Area, it is possible to conclude that this behavior is maintained in all cases, which is why the recommendation is to strengthen the medical staff in intermediate cities of Colombia.

Keywords: Accessibility, health centers, E2SFCA, urban analysis, OECD, geostatistics

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INTRODUCTION

Health, itself, represents a vital aspect through which the quality of life of people is measured, therefore, it is appropriate to establish that good care in health services represents a factor of wide importance for different societies; given that, by guaranteeing optimal levels of health for populations, there is higher personal and collective development. An important aspect to review from this perspective is related to the correct distribution of the medical goods that a society has access to, becoming a challenge for any social structure to establish equitable access to health care services, understanding access as a broad term to determine the degree to which the population obtains the services it requires from the available health care system (Institute of Medicine (US) Committee on Monitoring Access to Personal Health Care Services & Millman, 1993). From this overview it is possible to establish that one of the ways to evaluate the level of medical care existing in a society, among other things, is from the degree of accessibility between the population and the health centers located in a certain area, finding with this that health planners and those responsible for public policies are more frequently concerned with the evaluation of access (Aday & Andersen, 1974). By carrying out these types of evaluations, possible deficiencies can be identified as a result of differential access to social determinants of health, such as access to medical care (Whitehead et al., 2020). Given this, accessibility indicators could constitute an important ingredient in a social report and could also help to reorient transport policy formulation in directions more consistent with national and regional objectives for the provision of equal opportunities (Levine, 2020).

Historically, conducting a study with the stated objectives has had several difficulties because the evaluation of general access to health care has proven to be difficult due to the multifaceted nature of the concept and the complex set of

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interactions that occur between populations and services (Pan et al., 2015). However, the advancement of technologies in terms of automatic location systems has allowed the development of geographic information systems (hereinafter referred to as GIS) through which it was increasingly feasible to observe, measure and monitor real-time access, in addition to mathematical calculations that became increasingly more precise, through the use of digitally represented travel models (Levinson & Wu, 2020). The above facilitated the tools through which it was possible to carry out accessibility studies that included those variables required for this type of analysis, taking into account that access to healthcare depends on the characteristics of both the system and the population that receives them needs (Pan et al., 2015).

In response to the above, location-assignment models have been used for this type of analysis, which vary from non-spatially restricted models, where supply and demand interact in straight lines, representing trips that remain constant, to more discrete that are integrated within a network of lines, where each segment and intersection contributes individual constraint parameters to the model (Radke & Mu, 2000). In this context, the term accessibility is related, in terms of proximity measures, to the potential of opportunities for interaction between a point and other points (Hansen, 1959).

Among the types of accessibility measurement, the potential accessibility method, based on a gravity model, is the most popular method to measure the ease with which residents of a given area can reach medical services and facilities (Ni et al., 2019). Floating catchment area methods (called FCA) were presented in a more sophisticated way, being a family of measures used to quantify accessibility based on a gravity model (Bryant & Delamater, 2019) defining a certain service area, an established travel time threshold, and taking into account the availability of doctors by health centers (Luo & Wang, 2003). The enhanced two-step floating catchment area (E2SFCA) methodology is initially supported by the two-step floating catchment area (2SFCA) method , which corresponds to a model of severity that offers its intrinsic advantages, but which, additionally, is presented as an intuitive solution in its interpretation based on a direct doctor-population relationship (Luo & Qi, 2009), determining in a first step the population that It is within the scope of each provider and in a second step assigning the available services to the populations determining which services fall within the scope of each population (McGrail & Humphreys, 2009). An analysis such as the one described above has not been carried out in the city of Villavicencio, the main city of the Colombian eastern plains and capital of the department of Meta, in which there is a total population of 552,010 pop (National Administrative Department of Statistics [DANE], 2018).

The object of this study is then focused on applying the E2SFCA methodology to study the current accessibility conditions of the Villavicense population to the health centers located in the urban area of the city, a location that can be seen in Figure 1, requiring as fundamental information three factors that must be taken into account. Taking into account which are the supply of medical services, the demand for services by the population and the travel costs between the demanding populations and the medical sites (Wan et al., 2012), processing the data through the use of the GIS tool called ArcGIS. With this, the accessibility indicators are obtained both to the beds - stretchers, and to the available doctors, which, when compared with what is determined in the document "Health Panorama: Latin America and the Caribbean 2020" (OECD & The World Bank, 2020), define whether there is adequate or inadequate accessibility to the city's medical centers.

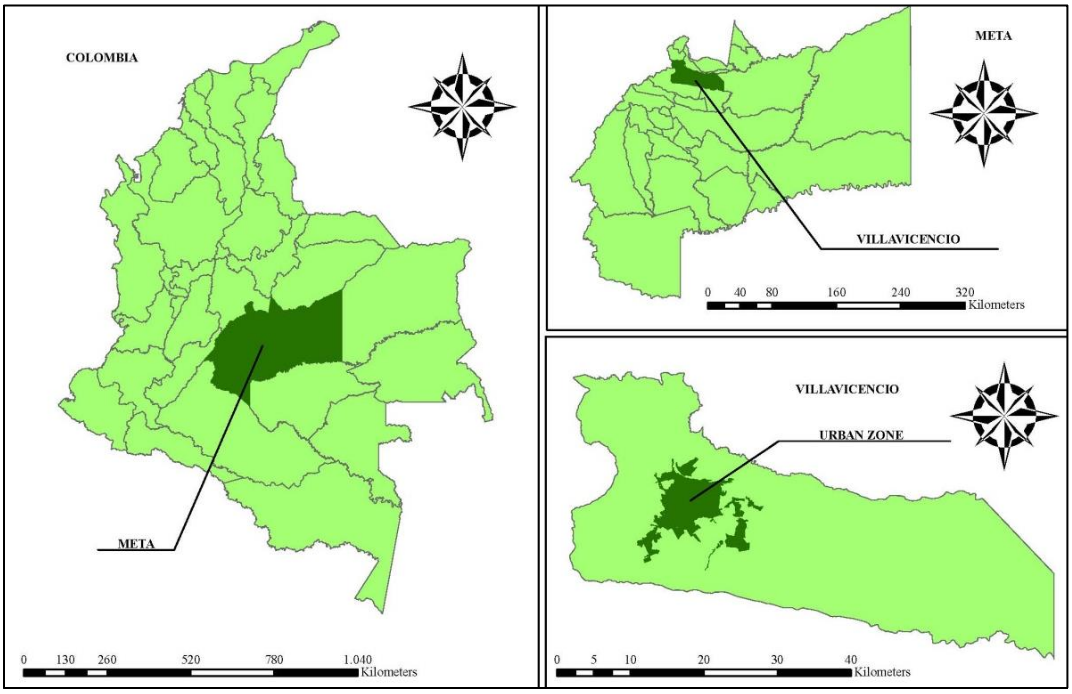

Figure 1. Location Urban Area Villavicencio – Dept. Meta – Colombia

METHODOLOGY

The research methodology of this study can be observed in Figure 2, and focuses on four phases which are based on a. Information collection, b. Geostatistical analysis of information, c. Application of the E2SFCA method, and d. Results and discussion.

Information Collection

The information required for the accessibility evaluation focuses on i) Population of Villavicencio, ii) Health Centers, and iii) Transportation Infrastructure Network.

i) Population of Villavicencio: Identified as the demand, it refers to the number of people living in the urban area of Villavicencio, this information is obtained from the data of the population census carried out in the territory (DANE, 2018) downloaded by through your Geoportal the shapefile files with the amount of population distributed by blocks.

ii) Health Centers: Identified as supply, it refers to the availability of health services in the urban area of the city of Villavicencio. The data related to their geolocation, as well as their installed capacity (beds – stretchers), are obtained from government and official information (Ministry of Health and Social Protection, sf) through the web portal Special Registry of Health Providers, identified by its acronym as REPS. Given the absence of official data regarding the number of doctors available in each health center, the results obtained for the work carried out in the city of Manizales - Caldas called " *Evaluation of geographical accessibility to health care services of the capital of the department of Caldas: focus on geospatial equity according to the level of care"* (Leal, 2022). Taking into account the similarities with the city of Villavicencio regarding its population, extension and population density, it is determined that it is possible to apply the results obtained in the aforementioned work to the present study. From the above, there is a coefficient of relationship between doctors and beds of 0.225 for low complexity levels that correspond to levels of care 1 and 2. The information from the health centers was obtained in two groups, one on the public health centers which are within the categorization of State Social Enterprise (ESE), and another on private health centers which are recognized as clinics that provide a particular service.

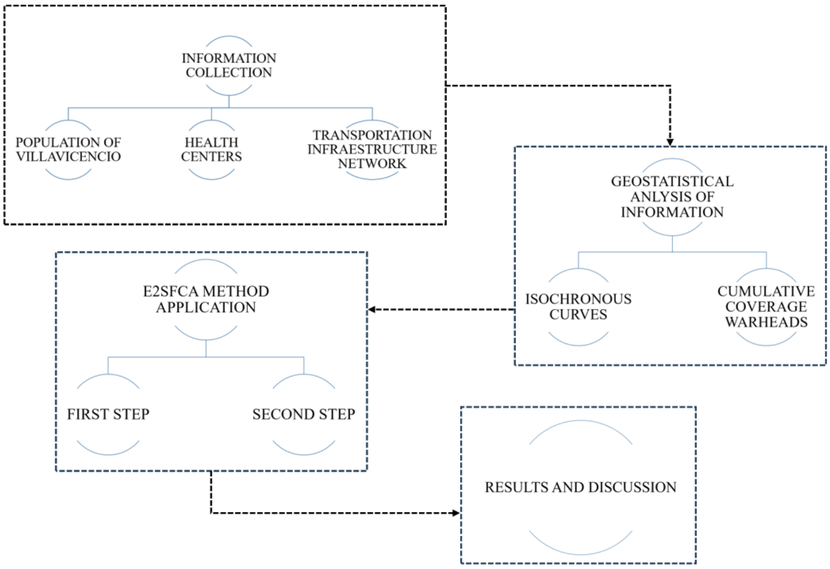

Figure 2. Investigation methodology

iii) Transportation Infrastructure Network: Refers to the city's road network, which includes information related to travel speed, this is obtained from its construction in a shapefile through the use of the ArcGIS tool, in which generates a network composed of interconnected lines with a direction defined by the direction in which vehicles move in the city according to the city's mobility regulations. The constructed network includes the network travel speeds, from which it is possible to calculate travel times; These are estimated as those shortest times through road networks, between a place of residence and a doctor's office (Wang & Luo, 2005), which are required for the analysis of accessibility to health centers. health, taking into account that travel time and distance are generally treated as impedance in access measures (Wu & Levinson, 2020). It is important to emphasize that both travel speeds and travel times are associated with the private transport mode, under which an analysis of accessibility over the entire territory is allowed.

Geostatistical Analysis of Information

Once the information is obtained, it is processed by calculating the integral average accessibility, from which the isochronous curves and the accumulated coverage ogives are obtained.

i) Isochronous curves: With them, the aim is to identify the travel time to each of the health centers analyzed taking into account equation (1), with which the cost of travelling in each case is identified, based on the length between one point and another; and the network travel speed (Escobar et al., 2020).

$$d_{ij} = \frac{L_{ij}}{V_{ij}} \tag{1}$$

Where d_{ij}: travel time to each health center; L_{ij}: length between points i and j; V_{ij}: network travel speed.

Using the ArcGIS Network Analyst tool, which has a function called New Closest Facility, it is possible to process the information and obtain travel times from the transportation infrastructure network to each of the identified health centers, based on the aforementioned equation. By obtaining the matrix with the travel times between all points of the network and taking as a starting point the concept of the least path algorithm, it is possible to identify the shortest path between each point of origin and the health centers to be analyzed, thereby which proceeds to calculate using the average or arithmetic mean equation (2) (Escobar et al., 2020).

$$\overline{d_{ij}} = \frac{\sum d_{ij}}{(n-1)} \tag{2}$$

Where $\overline{d_{ij}}$: average travel time to each health center; n: number of points analyzed.

Subsequently, the Kriging model is used, which executes geostatistical analyzes based on data correlated between space and time (Simpson et al., 2001) through an interpolation process on the information on average travel times, what is obtained is a matrix with all the consolidated information, allowing the generation of a map of isochronous curves, which identifies travel times in ranges of 5 minutes for each health center.

ii) Cumulative coverage warheads: Subsequently, it is possible to calculate the cumulative population and area coverage ogives for each health center through a process of intersection between the travel times obtained and the population of Villavicencio, in order to identify the population located in zones of ranges of trip every 5 minutes. This information is processed through the use of a Microsoft Excel dynamic table.

E2SFCA Method Application

This method is based on the 2SFCA methodology; however, it represents an improvement by applying weights to differentiate travel time zones, both in the first and second steps, thus taking into account the decrease in distance (Luo & Qi, 2009). The value of these weights obtained from equation (3) is defined as the weight of the distance of each time zone defined in the study; This was calculated from the Gaussian function that captures the drop in the access distance to each health facility (Luo & Qi, 2009).

$$\mathrm{W_r} = \mathrm{f}(d_{ij}) = \exp(-\frac{{d_{ij}}^2}{\beta}) \tag{3}$$

Where $\mathrm{W_r}$: weight of the distance of each time zone; β: distance weight coefficient.

i) First step: With the data obtained from the accumulated population ogives, it is possible to find that population located in areas with travel time periods of 5 – 10 – 15 minutes. With this information, the calculation of the supply - demand relationship of each health center is carried out (both for beds - stretchers, and for doctors), using equation (4), which takes into account the distance weights. calculated in equation (1) for each defined time zone. At this point it is important to emphasize that the calculated impedance values are decisive in the evaluation of accessibility, due to the level of detail of the spatial data required for the analysis and because perceived distances differ from physical distances (Vale & Pereira, 2017).

$$\mathrm{R_j} = \frac{\mathrm{Sj}}{\sum_{\mathrm{k}\in(\mathrm{d_{kj}}\in\mathrm{D_r})}\mathrm{P_k W_r}} = \frac{\mathrm{Sj}}{\sum_{\mathrm{k}\in\{\mathrm{d_{kj}}\in\mathrm{D_1}\}}\mathrm{P_k W_1}+\sum_{\mathrm{k}\in\{\mathrm{d_{kj}}\in\mathrm{D_2}\}}\mathrm{P_k W_2}+\sum_{\mathrm{k}\in\{\mathrm{d_{kj}}\in\mathrm{D_3}\}}\mathrm{P_k W_3}} \tag{4}$$

Where $\mathrm{R_j}$: supply – demand relationship; Sj: number of beds – stretchers and doctors for each health center; $\mathrm{P_k}$: population located in each area with a travel time period of 5 – 10 – 15 minutes.

ii) Second step: Subsequently, an origin - destination matrix is generated that contains the travel times to each health center from each block of the urban area of the city of Villavicencio, which is carried out using the "New" function. OD Cost Matrix" from the Network Analyst tool available in ArcGIS. This matrix is used in order to identify "block" areas with travel time periods of 5 – 10 – 15 minutes. Again, each one is assigned a weight which is given by equation (1). Finally, to identify the accessibility to the beds - stretchers and to the doctors of each health center, the calculated weights are multiplied by the supply - demand relationship determined for each case in the first step, then making a sum with the information of each apple, taking into account what is established in equation (5) (Luo & Wang, 2003).

$$\mathrm{A_i}^{F} = \sum_{\mathrm{j}\in\{\mathrm{d_{ij}}\in\mathrm{D_r}\}}\mathrm{R_j W_r} = \sum_{\mathrm{j}\in\{\mathrm{d_{ij}}\in\mathrm{D_1}\}}\mathrm{R_1 W_1} + \sum_{\mathrm{j}\in\{\mathrm{d_{ij}}\in\mathrm{D_2}\}}\mathrm{R_2 W_2} + \sum_{\mathrm{j}\in\{\mathrm{d_{ij}}\in\mathrm{D_3}\}}\mathrm{R_3 W_3} \tag{5}$$

Where $\mathrm{A_i}^{F}$: accessibility to beds – stretchers and doctors in each health center. By processing the information as indicated above, the results of the average number of beds – stretchers and doctors per 1,000 pop are obtained.

The results obtained in relation to the indicators of accessibility to beds - stretchers and doctors are compared with what was determined in the document "Health Panorama: Latin America and the Caribbean 2020" (OECD & The World Bank, 2020), in order to identify possible deficiencies in accessibility in the current scenario, and from there formulate proposals for improvement in a future scenario. Subsequently, equation (6) is used in order to calculate the variation gradient obtained between the current scenario and the future scenario (Escobar et al., 2020).

$$Gv = \frac{{\mathrm{A_i}^{F}}_{f} - {\mathrm{A_i}^{F}}_{a}}{{\mathrm{A_i}^{F}}_{f}} * 100 \tag{6}$$

Where Gv: variation gradient; ${\mathrm{A_i}^{F}}_{f}$: accessibility to beds – stretchers and doctors in each health center – future scenario; ${\mathrm{A_i}^{F}}_{a}$: accessibility to beds – stretchers and doctors in each health center – current scenario.

RESULTS AND DISCUSSION

Accessibility measures generally use the impedance effect of distance, time or generalized transportation costs, and the spatial distribution of urban opportunities to produce numerical indices of accessibility for each location in a study area (Kwan, 1998), therefore, once the process mentioned in the research methodology is carried out, the accessibility indicators are obtained in quantitative terms of the number of beds – stretchers and doctors per 1,000 pop. These indicators are compared with what is determined in the document "Health at a Glance: Latin America and the Caribbean 2020" (OECD & The World Bank, 2020). This document establishes health coverage and services indicators for Latin American countries, with references for Colombia shown in Table 1.

Current Scenario

An analysis of the results of the current accessibility scenario is carried out in both public and private health centers. Once these two panoramas have been analyzed, the analysis of the set of health centers located in Villavicencio is carried out.

i) Public health centers: In relation to the indicators of accessibility to public health centers, there are indicators of 1.39 beds - stretchers * 1000 pop and 0.33 doctors * 1000 pop, which allows identifying a deficiency with respect to the number of doctors available. It is available in every public health center in the city. On the other hand, if the indicator recommended by the OECD for the number of beds – stretchers is observed, it is evident that public health centers do not meet this indicator; If you want to comply with the parameter, it is proposed to include 4 additional beds - stretchers for each health center, and in the case of the Departmental Hospital increase the amount to a total of 445 beds - stretchers.

ii) Private health centers: Regarding the results of private health centers, there is a notable difference in coverage compared to public health centers, which is due to a particularity identified in the city of Villavicencio, which corresponds to the care of mental health diseases and rehabilitation services, finding that of the 12 private health centers analyzed, 7 specialize in mental health and rehabilitation. In this regard, it was found that, based on reports made by the Ministry of Health since 1993, during the following 20 years the department of Meta was always among the five in the country with the most affectivity and anxiety disorders, discovering that the Depression in Meta reached 57.4%, being the highest in the country and in terms of anxiety, Meta was the first with 34.1% (Llano Siete Días Editorial Office) (October 21, 2013). The worrying mental health of the people of *Metense*. The above represented an alert for the management of diseases related to mental health in the region of the country, which is why, among other things, in 2021 the “Renovar” Nervous System Clinic was inaugurated with the mental health center most modern in the country, constituting Villavicencio as a leader in mental health in the region.Based on the above, the second step procedure of the E2SFCA method is carried out, excluding the 7 identified private health centers, in order to obtain the results of the private health centers that do not specialize in mental health and rehabilitation, obtaining some indicators of 2.49 beds – stretchers * 1000 pop and 0.57 doctors * 1000 pop. These results show that the availability of doctors remains lower than the availability of beds – stretchers in the city's private health centers (as was found for public health centers).

Table 1. OECD accessibility indicators

Description	Beds and Stretchers *1000pop	Doctors *1000pop
Health at a Glance: Latin America and the Caribbean 2020	**1,70**	**2,20**

Table 2. Accessibility indicators to all health centers excluding those specialized in mental health

Description	Beds and Stretchers *1000pop	Doctors *1000pop
Health Centers excluding those specialized in Mental Health	**3,89**	**0,90**

iii) All Health Centers: In order to evaluate the behavior of accessibility to the health centers available in the city of Villavicencio, the analysis of the system as a whole is carried out, excluding health centers specialized in mental health. and rehabilitation, finding the results in Table 2. The processing of the information generates the following maps in which the accessibility to the beds is displayed – stretchers (Figure 3) and doctors (Figure 4) available in the health centers located in the urban area of the city of Villavicencio.

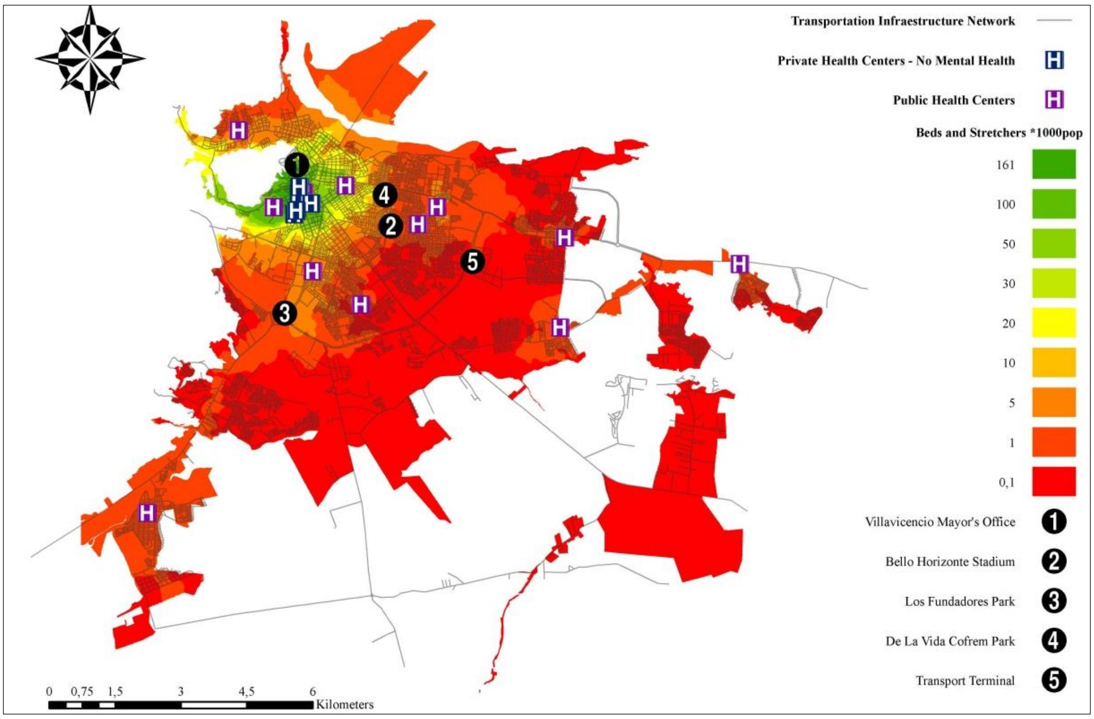

Figure 3. Accessibility to beds and stretchers in all health centers, excluding those specialized in mental health

As can be seen, the indicator shown in Table 2 for the availability of beds - stretchers complies with what is established in the OECD document, however, the availability of medical personnel is below the indicator, which is consistent with what found in the accessibility evaluation that was carried out independently for public health centers and for private health centers, which is why the proposal that is formulated to improve accessibility in the city in a future scenario focuses on strengthen the medical staff available throughout the city.

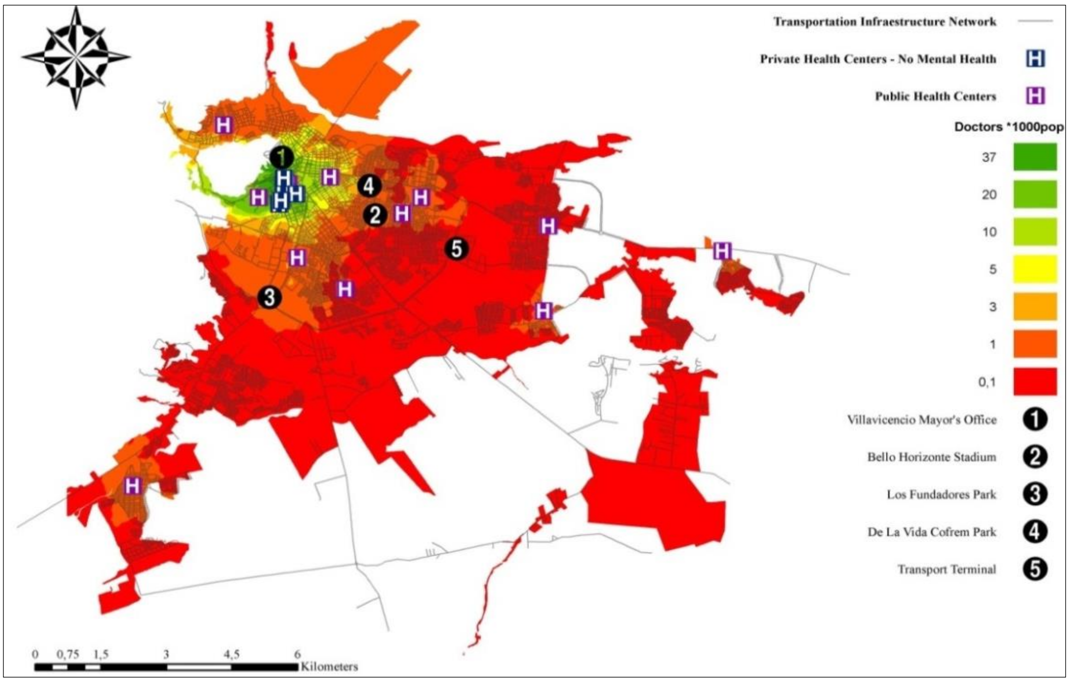

Figure 4. Accessibility to doctors in all health centers, excluding those specialized in mental health

Comparative Analysis with other intermediate cities

In order to determine the behavior in intermediate cities of Colombia, the results obtained in the studies "Evaluation of the geographical accessibility to medical care services of the capital of the department of Quindío and compare them with the conditions of the metropolitan areas of Colombia" are extracted. Manizales - Villamaría and the AMCO: focus on geospatial equity according to the level of care" (Barrios, 2022), "Evaluation of geographic accessibility to health care services in the Central Western Metropolitan Area" (Márquez, 2022) and "Evaluation of "geographic accessibility to health care services in the capital of the department of Caldas: focus on geospatial equity according to the level of care" (Leal, 2022), obtaining the information recorded in the following Table 3.

Table 3. Accessibility indicators Health Centers in Armenia, Pereira, Manizales and Villavicencio

Description	Beds and Stretchers *1000pop	Doctors *1000pop
Armenia Health Centers	**2,32**	**0,56**
Health Centers of the Central West Metropolitan Area	**1,86**	**0,59**
Health Centers of the Urban Area of Manizales and Villamaría	**3,17**	**0,96**
Villavicencio Health Centers	**3,89**	**0,90**

Performing a comparative analysis, it is observed that in all cities the indicator related to beds is met, as shown in Figure 5, however, the indicator of the availability of doctors is not met, as shown in Figure 6.

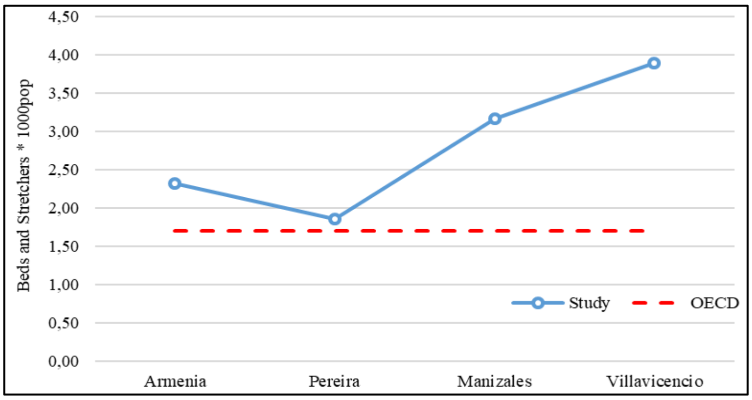

Figure 5. Comparison of bed accessibility in intermediate cities vs OECD 2020

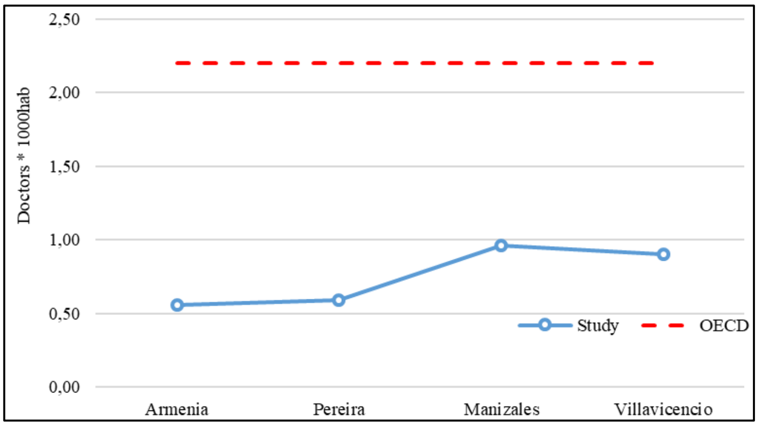

Figure 6. Comparison of accessibility to doctors in intermediate cities vs OECD 2020

Due to the above, it is possible to determine that the city of Villavicencio has a higher value for compliance with the indicator for beds and stretchers, and the second best value for the indicator for available doctors. In order to determine the reasons why this scenario is generated, the factors of available health centers, number of available beds, number of available doctors, population and length of the available road network of each city are analyzed.

Armenia: It has a smaller population compared to the city of Villavicencio by an approximate proportion of 48%, which is also reflected in having a shorter road network and a smaller number of health centers available. A figure of 1.66Km*1000 pop is calculated for Armenia and 1.69Km*1000 pop for Villavicencio, indicating that in both cases there are approximately the same lengths of road network per inhabitant; Likewise, a figure of 0.026 health centers *1000 pop is calculated for Armenia and for Villavicencio 0.033 health centers *1000 pop, from which it is possible to establish that for each inhabitant there is less availability of health centers in Armenia than in Villavicencio. The above results in a comparative improvement in the conditions of availability of health equipment for the city of Villavicencio.

Central Western Metropolitan Area: It has a larger population in relation to the city of Villavicencio in a proportion of 114%, also having a greater length of road network. A figure of 1.90Km*1000 pop is calculated for the Metropolitan Area of Central West, which, compared to the figure for Villavicencio (1.69Km*1000 pop), indicates that there are greater lengths of road network per inhabitant in the Metropolitan Area of Central West. On the other hand, it is observed that in both cases there are the same number of health centers available, and, making the respective calculation, a figure of 0.028 health centers *1000 pop is established in the Central Western Metropolitan Area, which means that for each inhabitant there is less availability of health centers than in the city of Villavicencio (0.033 health centers *1000 pop). The above results in a comparative improvement in the conditions of availability of health equipment for Villavicencio, despite the fact that the Central Western Metropolitan Area has a greater number of beds and doctors.

Manizales and Villamaría Conurbation Area: It has a population smaller than Villavicencio by a proportion of 82%, which is why it also has a shorter length of road network available and a smaller number of health centers. In this case, a figure of 1.35Km*1000 pop is calculated, which leads to shorter road network lengths per inhabitant compared to Villavicencio (1.69Km*1000 pop); and a data of 0.036 health centers *1000 pop, which indicates that for each inhabitant there is approximately the same availability of health centers in both cases (0.033 health centers *1000 pop for Villavicencio), with a slightly better performance for the Conurbation Area from Manizales and Villamaría. The above leads to an improvement in the conditions of availability of health equipment in relation to the previous scenarios analyzed, which is reflected in the accessibility indicators in comparison with the Central Western Metropolitan Area and the city of Armenia. However, in relation to the city of Villavicencio, a different behavior is evident in terms of beds - stretchers and doctors, which occurs when it is found that in both cases there are approximately the same number of beds (so it is allowed establish that the indicator of accessibility to beds in Villavicencio has a better behavior than in Manizales), contrary to the case of doctors having a much lower amount available for Villavicencio, which results in better conditions of accessibility to doctors in the Area Conurbation of Manizales and Villamaría.

Future Scenario

Once the results are compared, the proposal(s) that lead to improving accessibility conditions to the city's health centers are identified. Subsequently, the corresponding calculations are carried out in order to determine the accessibility indicators in the future scenario based on the defined proposals. Finally, the variation gradient between the current scenario and the future scenario is defined. As evidenced in the current scenario, the indicator of accessibility to beds – stretchers do not require improvement since it complies with the indicator proposed by the OECD; however, it is necessary to improve the indicator of accessibility to doctors in all healthcare centers. health of the city, for which the proposal is presented to strengthen the medical staff of all the health centers located in the city of Villavicencio. In accordance with the above, it is proposed to implement a ratio coefficient between doctors and beds of 0.56 (the current one corresponds to 0.25), thereby obtaining an increase in the number of doctors for each health center in the city, both public as well as private. With the new data, the E2SFCA methodology is applied again, obtaining as results for the future scenario those recorded in Table 4.

Table 4. Accessibility indicators of private health centers – Future scenario

Description	Beds and Stretchers *1000pop	Doctors *1000pop
Health Centers excluding those specialized in Mental Health	**3,89**	**2,20**

The variation gradient between the current scenario and the future scenario is now calculated, which can be seen in Figure 7 and which reflects the improvement in percentage terms from one scenario to another.

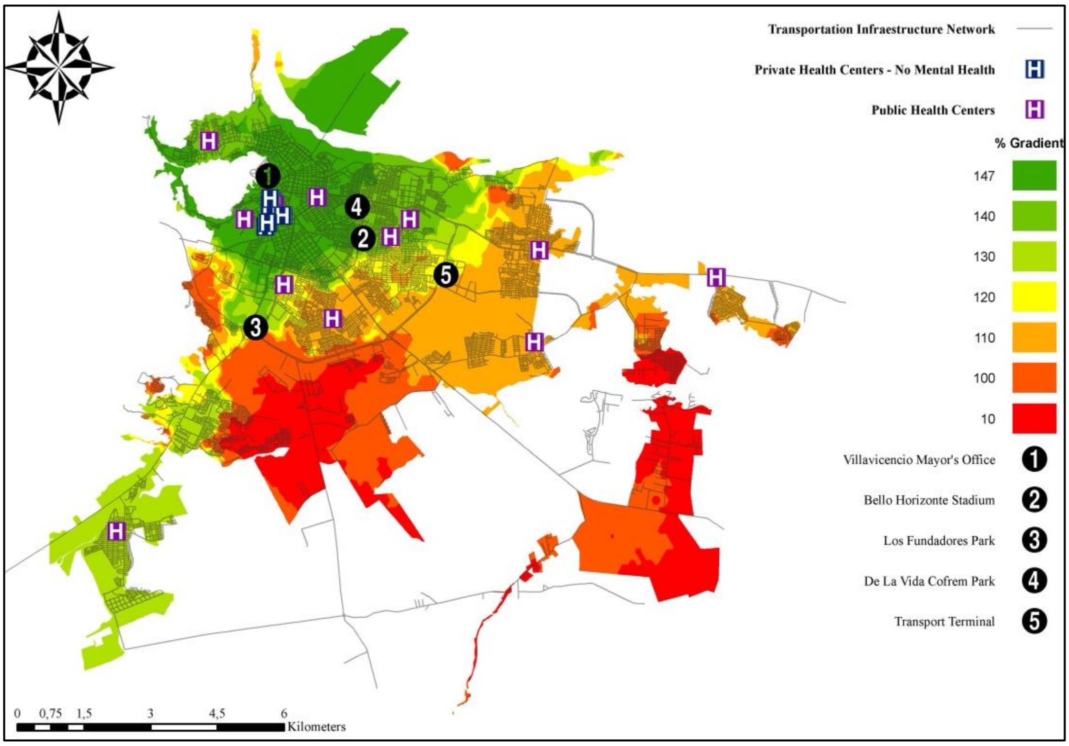

Figure 7. Variation gradient between the current scenario and the future scenario

CONCLUSION

With the development of this work, it is observed that the application of the E2SFCA method allows defining behaviors of accessibility to health services throughout the analyzed territory, taking into account aspects beyond the simple number of available health centers, analyzing factors such as capacity of transportation networks and capacity of each health center. Likewise, from the work carried out it is possible to conclude that in the city of Villavicencio there is acceptable behavior in terms of accessibility to beds - stretchers available in the city's health centers, however, it is evident that they do not exist in the city. current scenario, adequate coverage in relation to the supply of medical personnel, however, it is found that it is possible to improve the conditions of accessibility to doctors, by strengthening the supply of personnel in the health area, increasing the number of medical personnel available in each health center in the city. On the other hand, the development of the work allows us to identify that, when carrying out a comparative analysis, it is possible to establish that the behavior found in the city of Villavicencio corresponds to what is evidenced in other intermediate cities in the country, therefore, the proposal to strengthen the medical staff in health centers, represents an improvement in the conditions of accessibility to medical services in the intermediate cities of Colombia.

The limited access to information related to the real-time availability of doctors in each health center in the city, as well as the intrinsic dynamics of the practice of this profession, implies a limitation for the work carried out, represented in a possible inaccuracy in the results obtained. However, this represents a starting point for future research, in which it is possible to deepen the analysis carried out, confirming or rectifying the findings found here.

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GEOGRAPHICAL INFLUENCES ON ESPORTS CONSUMPTION WITH SPECIAL FOCUS ON URBAN AND RURAL AUDIENCES

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Abstract: As a dynamically evolving new form of media, esports has attracted considerable interest in recent years. This research aims to investigate the emerging patterns in esports consumption, with a specific emphasis on geographic location and its effect on consumption habits. Using a survey methodology, a dataset comprising 285 respondents interested in esports was analyzed to examine their consumption habits, behaviors, motivations, and attitudes. Special attention was given to preferences for esports events and the effect of geographical location. The results reveal that esports players predominantly come from urbanized areas, whereas club members and fans are more often found in rural regions. In rural areas, the consumption of esports content is driven by social aspects, community engagement, and entertainment value. In contrast, urbanized areas place a greater emphasis on the competitive aspects of esports, reflecting a focus on the professional and high-skill elements of the games. This divergence highlights how geographical location influences both the type of esports engagement and the priorities of the audience. Specifically, it underscores that rural areas are more focused on the social and entertainment aspects of esports, while urbanized areas emphasize the competitive and professional elements. This contrast in priorities suggests that the appeal of esports is shaped by regional differences, affecting how content is consumed and valued.

Keywords: esports, esports consumption, sports consumption, socio-demographics, geography

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INTRODUCTION

The examination of factors influencing sports consumption has long been a focal point for researchers in the field of sports sciences. This is unsurprising, as understanding what drives individuals to consume various sports products can, through optimization, enhance and increase consumption in the long term. This increase in consumption is a crucial condition for the sustainability of organizations operating within the sports sector (Kim et al., 2019).

The investigation of this issue is far from straightforward due to the highly complex nature of the phenomenon. This complexity includes the strong emotional aspect of sports (Mullin et al., 2007), the roles of consumers (active, passive) (Funk et al., 2008; 2009; Preuß, 2012), the characteristic co-creation of value in sports consumption (Woratschek et al., 2014), the unique characteristics of various sports leagues and geographically diverse sports models (America, Europe) (Andreff, 2011), the sports subculture of a given country (Ha et al., 2018), the objectives of the examining discipline (marketing, management etc.), and the specific characteristics of the given sport (Kim et al., 2019).

While it can be said that research focusing on consumption within traditional sports presents a highly diverse and extensive picture, the examination of factors influencing esports consumption is still in its infancy. In recent years, driven by web-based games and broadcasting technologies, esports has become one of the fastest-growing types of "new media" (Hamari & Sjöblom, 2017). This growth has been further accelerated by the pandemic and the resulting strong trend towards digitalization. Europe remained a prominent hotspot for esports during the health crisis, with many countries reporting an increase of over 50% in interest in European esports by the end of 2020 (Deloitte, 2020). In recent years, an increasing number of countries have begun to recognize the potential within the industry and have prioritized its development on their agendas (Deloitte, 2020; Witkowski, 2023; Siutila, 2024).

Such substantial growth and interest in the field necessitate academic research. Existing literature tends to focus more on technological advancements, economic impacts, and educational applications, with findings demonstrating that the consumption of both esports and traditional sports is motivated by comparable factors, including social engagement, the desire for skill enhancement, escapism, competitive excitement, and entertainment (Hamari & Sjöblom, 2017; Pizzo et al., 2018; Qian et al., 2019a; 2019b; Tang et al., 2022). And although the examination of socio-cultural aspects and consumer characteristics is receiving increasing attention, it remains a relatively underexplored area within this emerging industry.

Understanding the characteristics of esports consumer behavior proves to be pivotal from several perspectives. Firstly, gaining insight into consumer needs enables the creation of personalized and highly engaging content and events, which

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can lead to increased consumption, engagement, and loyalty. Secondly, tailoring content to these needs significantly contributes to both the expansion and retention of the fan base by attracting potential enthusiasts. Moreover, this level of interest plays a crucial role in market expansion, offering prospective companies valuable opportunities to develop tangible offerings. Additionally, understanding consumer behavior is instrumental in generating higher revenues. It is also worth noting that comprehending needs, interests, and behaviors is a defining factor in content development and innovation, laying the foundation for the long-term sustainability of the industry through the optimization of supply and demand.

The highly digitalized nature of esports introduces premises that can significantly influence the nature of consumption. Firstly, based on the Psychological Continuum Model (PCM)'s Involvement thesis of sports connection (Funk & James, 2001), it can be assumed that individuals interested in consuming esports content possess - through various levels of involvement - varying degrees of digital literacy, with at least a basic level of proficiency (Macey et al., 2022). Additionally, accessibility is critically dependent on the presence of both primary and secondary infrastructural conditions, such as adequate bandwidth, availability of consoles, peripherals, etc.

Another crucial factor is the prevalence of the esports subculture within a given area. The greater the popularity and mainstream adoption of esports, the higher the penetration rate, which in turn leads to increased consumption intensity and growth. The aforementioned factors all have spatial implications, as digitally advanced regions possess the necessary developed digital infrastructure, digital literacy, and an extensive digital subculture forming the base criterion for the widespread adoption of esport (Molnár & Müller, 2023). In present study, beyond a broader understanding of esports consumption, our main focus is the examination of patterns emerging in esports consumption regarding these spatial effects, specifically analyzing the impact of the place of residence and its characteristics on consumption.

LITERATURE REVIEW

The place of residence plays a significant role in shaping both traditional sports consumption and esports consumption, with notable differences observed between large cities and rural areas (Kiss et al., 2016; Szalai et al., 2023). In large cities, traditional sports consumption is typically higher due to the proximity to major sports arenas, stadiums, and teams, allowing for easier access to live sporting events and services (Lee et al., 2016; Bácsné Bába et al., 2019; Zasimova, 2022; Legeby, 2024). This proximity fosters a culture of in-person spectatorship, where fans can regularly attend games and events, creating a vibrant sports community and a shared sense of identity among city dwellers. The infrastructure in large cities, such as public transportation and well-developed roads, further supports this trend by making it convenient for spectators to travel to and from venues (Bácsné Bába et al., 2019).

Additionally, cities often host a diverse range of sports teams and events, catering to various tastes and preferences, thereby enhancing overall sports engagement. In contrast, rural areas often lack such infrastructure and proximity to major sports venues, resulting in a different mode of consumption for traditional sports. The geographical isolation of rural areas means that live sports events are less frequent and harder to access, leading to a greater reliance on televised broadcasts or online streaming for sports consumption. As a result, rural spectators may have a different engagement experience, more dependent on media than on live, communal experiences that foster local sports culture. This distance from live events can also diminish the communal and social aspects of sports fandom that are prevalent in urban settings, where attending games is often a social activity that strengthens community bonds (Misener & Mason, 2006; Rosso & McGrath, 2017; Jepson et al., 2019; Parra-Camacho et al., 2021).

In the realm of esports, the disparities between urban and rural areas are similarly pronounced but are driven more by technological infrastructure and digital access (Molnár & Müller, 2023). Larger, digitally advanced cities offer superior infrastructure, including high-speed internet and access to gaming cafes or dedicated esports arenas, which facilitates a higher level of engagement with esports through live streaming, online communities, and even local tournaments. Urban residents benefit from these resources, which provide not only the technical capability to participate in esports but also a social environment that fosters interest and engagement. The availability of high-speed internet in cities enables smooth streaming of live events, which is critical for an immersive esports experience (Rourke & Pastore, 2024).

In contrast, rural areas often lack the digital infrastructure necessary for high-quality, real-time esports consumption, which can limit residents' ability to participate in or spectate esports events. Poor internet connectivity in these areas can result in reduced access to streaming services and online gaming platforms, hindering the ability of rural residents to fully engage with esports. Furthermore, urban environments tend to have a younger, more tech-savvy population that is more inclined toward digital entertainment, including esports, while rural populations may be less exposed to this form of media due to a lack of awareness, resources, or community support for gaming culture.

The social dynamics in large cities also support the growth of esports, as the density of the population and cultural diversity promote a variety of gaming communities and fan bases. This diversity not only drives demand for different types of esports content but also fosters innovation and growth within the industry, as companies and organizations are encouraged to cater to a wide range of preferences and demographics. Meanwhile, rural areas may face challenges in fostering such communities due to fewer people with shared interests in esports, as well as a lack of venues where enthusiasts can gather and share their passion. Moreover, the economic advantages of living in a large city, such as higher disposable income and greater access to technology, also contribute to the higher consumption of esports, as residents can afford the necessary equipment and internet services required for participation (Molnár & Müller, 2023). In contrast, economic constraints in rural areas may further restrict the ability of residents to engage with esports, both as participants and as spectators (Garcia Villar & Murillo, 2018; 2020). However, it is important to note that despite these challenges, there is a growing interest in esports in rural areas, driven by the increasing availability of affordable technology and the spread of internet access.

Ultimately, while both traditional sports and esports are popular across different types of regions, the mode and intensity of consumption are heavily influenced by the infrastructural and social differences between large cities and rural areas. As technology continues to evolve and internet access becomes more widespread, these gaps may narrow, allowing for more equitable access to both traditional sports and esports across diverse geographic locations. Nonetheless, the current landscape shows that place of residence remains a critical factor in determining the level and type of engagement individuals have with sports, whether traditional or digital. The future of sports consumption will likely continue to be shaped by the interplay of technological advancements, social dynamics, and geographic factors, highlighting the complex ways in which place and space influence our leisure activities and cultural practices.

MATERIALS AND METHODS

In alignment with our research objectives (Figure 1), we selected a questionnaire survey as the method for examining the characteristics of consumers, as it is among the most widely accepted approaches for such assessments. The survey was strategically distributed within social media groups specifically focused on esports consumers, ensuring that the dataset was comprised of individuals with a clear interest in the topic. Respondents were required to be over 18 years of age, and the survey was administered online to maintain the anonymity of participants. The questionnaire was designed to collect extensive data on respondents' demographic characteristics, socioeconomic backgrounds, esports habits, and attitudes.

This approach enabled a thorough exploration of correlations between various factors and the identification of emerging patterns within the research. The questionnaire was organized into three primary sections: basic personal information, esports-related activities and preferences, and attitudes towards esports. After data cleansing, 285 valid responses were available for further analysis. The analyses primarily focused on descriptive statistics (such as mean, standard deviation, and frequencies) to provide insights into the general characteristics of the respondents and establish a foundation for subsequent analyses. Various correlation analyses, including contingency table analyses and independent samples t-tests, were conducted to examine demographic differences, particularly the impact of place of residence on esports consumption.

Descriptive statistics were utilized to document information such as the distribution of respondents by place of residence, age group, and their most interested and frequently consumed esports games, events, and content characteristics. These statistics also served a validation purpose, confirming that the respondents were genuinely interested in esports.

In addition to descriptive statistics, correlation analyses were systematically employed to identify differences and similarities between data groups. The primary research objective was to investigate the effect of place of residence on esports consumption. Consequently, the analysis extended to potential variations in esports habits and preferences between small towns and larger cities. Cross-tabulation analysis, including Pearson's chi-square test, was utilized as part of the structural examination and validation methods. Additionally, independent samples t-tests were conducted to compare the two groups.

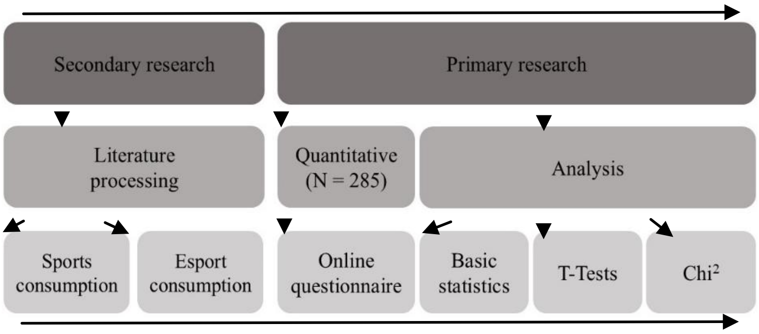

Figure 1. Research methodology

RESULTS AND DISCUSSION

The key demographic characteristics of the sample (N=285) are summarized in Table 1. Regarding gender distribution, the sample demonstrates a fairly balanced representation, consisting of 46.00% male and 54.00% females. Although esports are considered as a male dominated field, with various researches highlighting that males are more interested than females (García & Murillo, 2020; Yusoff & Yunus, 2021; Tang et al., 2021; Rogstad, 2022), the slight tilt toward the female side can be attributed to women’s increased willingness to participate in surveys (Curtin et al., 2000; Singer et al., 2000; Moore & Tarnai, 2002; Smith, 2008). Regarding age distribution, it can be stated that the younger age group (18-24 years) was the most prominently represented (66.50%).

This aligns with international trends, which highlight that esports consumption is most prevalent among younger demographics (Hanz, 2020; Kim et al., 2021; Greer et al., 2021). Given the young age of the sample, it is predictable that the highest level of education is primarily linked to high school or higher education studies. Additionally, more than half of the population is still pursuing their studies based on their labor market status (Studying: 58.20%; Studying and working: 2.50%). While the nature of employment is predominantly associated with intellectual or white-collar work (76.50%).

For our research, the most important aspect was the geographical location of the respondents. Since the objective was to examine the effect of digital development in larger cities on esports consumption, as opposed to smaller cities, two major groups were distinguished: 'Urban Areas,' which include larger cities with more developed digital infrastructure, such as the capital city, bigger cities, and county seats, and 'Rural- and Smaller Urban Areas,' which include smaller places of residence, such as farms, villages, small towns, and smaller cities. From this perspective, we obtained a relatively balanced distribution (Urban Areas: 57.9%; Rural and Smaller Urban Areas: 42.1%), which is advantageous for conducting subsequent analyses of correlations and differences.

Table 1. The demographic characteristics of the sample (N=285)

Demographics	Category	Distribution
Gender	Male	46.00%
	Female	54.00%
Age	18-24 yrs	66.50%
	25-29 yrs	14.90%
	30-34 yrs	4.50%
	35 yrs or above	14.10%
Place of Residence	Urban Areas	57.90%
	Rural- and Smaller Urban Areas	42.10%
Highest level of Education	University	21.10%
	High School	71.50%
	Primary School	7.40%
Labor market Status	Studying	58.20%
	Studying and working	2.50%
	Working	37.90%
	Other	1.40%
Nature of work	Physical work	22.80%
	Intellectual work	76.50%
	Mixed	0.70%

Table 2. The esport characteristics of the sample (N=285)

Characteristics	Category	Distribution
Content consumer type	Casual watcher	40.40%
	Active watcher	26.70%
	Club member, Fan	2.10%
	Expert, critique	1.80%
	Esport player	29.10%
Frequency of esport content consumption	Occasionally	41.8%
	Monthly	29.5%
	Weekly	12.3%
	Every other day	11.20%
	Daily	5.30%
Type of games (multiple choice)	MOBA	45.30%
	FPS	41.10%
	RTS	11.20%
	Battle Royal	45.30%
	Fight	22.80%
	Sport	7.00%
	Other	3.50%

Due to the highly specialized and complex nature of the subject, it was essential to examine the specific characteristics of esports within our population (Table 2). Given the ongoing ambiguity regarding who is officially considered an esports athlete, a hobbyist, or a home gamer, and because our research aimed merely to map a general overview of esports consumption characteristics, we segmented the population based on the traditional sports thesis that differentiates consumers according to the frequency of consumption. In addition, respondents were asked to classify themselves into the most appropriate consumer type based on their own consumption habits. The resulting distribution of the five major groups is depicted in the second table, where the three main segments are 'Casual Watcher' (40.4%), 'Esports Player' (29.1%), and 'Active Watcher' (26.7%). In addition to frequency and consumer type, we were also interested in the genres of games that participants were interested in. The most popular genres were MOBA (Multiplayer Online Battle Arena), Battle Royale, and FPS (First-Person Shooter) games. In Table 2, we examined the identified consumer types and the co-occurrence of consumption frequency to ensure the validity of self-reported data.

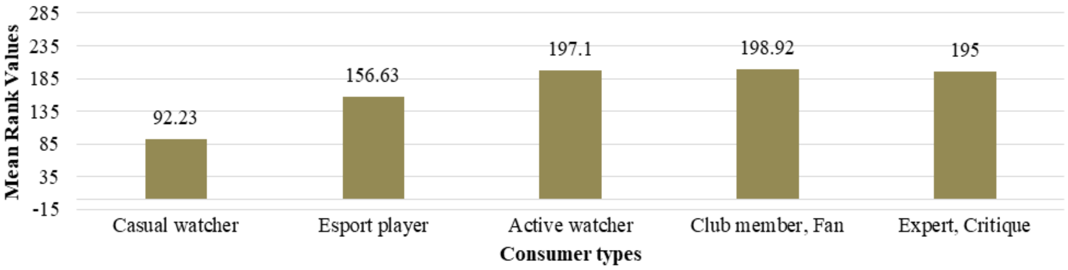

Figure 2. Frequency of consumption and type of consumers (N=285) (Kruskal-Wallis H: 92.86; df: 4; Sig. 0.000)

The results obtained are illustrated in Figure 2. It appears that the "Casual watcher" category demonstrates the lowest consumption frequency. In contrast, the most dedicated fans and club members, active viewers, and experts are positioned at the higher end of the spectrum. The relatively lower content consumption among esports players can be explained by the likelihood that they spend more time actively playing games rather than passively consuming related content. However, the frequency of their content consumption is still closer to that of active viewers, which can be attributed to their interest in following content from a professional perspective and enhancing their performance (considering competitors, strategies, etc).

Following the mapping of general esports player profiles, we proceeded to examine the impact of geographical location. Among other aspects, we assessed whether any patterns could be identified between consumer types and geographical location. As illustrated in Figure 3, the vast majority of “Esports players” are from larger urbanized areas, additionally more than half of the respondents who are either active viewers or experts also residing in major cities. This result indicates that the growth and accessibility of necessary infrastructure in large, digitally advanced cities provide a strong foundation for esports players to emerge, fostering competitive success and the development of new talent in the field. The finding somewhat aligns with patterns observed in traditional sports, where more developed criteria, such as advanced infrastructure, lead to more effective preparation and better performance outcomes (Hoffmann et al., 2002; Bernard & Busse, 2004; Yamamura, 2009; Emrich et al., 2012). A similar trend is seen in esports, as highlighted by Parshakov and Zavertiaeva (2018), who emphasize the role of well-developed technological and digital infrastructure in urban areas (Molnár & Müller, 2023). In contrast, "Casual watchers" and “Club members and Fans” are more likely to come from smaller rural areas. This result indicates two markedly different directions of consumption within the examined groups. In larger, urbanized areas, which are more digitally advanced (in terms of infrastructure, skills, subculture, and penetration), active participation is predominantly focused on competition, performance, and professional aspects. In contrast, in smaller, more rural areas, the emphasis is more on the social aspects, prioritizing community consumption and entertainment.

We also examined the types of content consumed and the locations of consumption within the two larger groups. The results (Figure 4) align with the previous pattern. In terms of content type, consumers from smaller areas tend to prefer community and entertainment content (such as interviews, podcasts, news, and highlights), whereas consumers from larger cities show a greater interest in gameplay videos and betting content. Given that most players come from these urban areas, game review videos, as well as strategic and technical content, represent a more significant segment for them.

In terms of consumption locations, streaming platforms and social media platforms are overwhelmingly dominant. This dominance can be attributed to the inherently digital nature of esports and the corresponding participation predominantly occurring in digital spaces. In larger cities, these two forms of consumption remain the most prominent, while in smaller towns, traditional media forms such as television, and the locations of competitions and meetings, are more prevalent. This discrepancy arises because esports events are relatively few even within domestic contexts, and they are primarily hosted in larger cities. Consequently, individuals in smaller rural areas need to travel to these larger locations to attend such events.

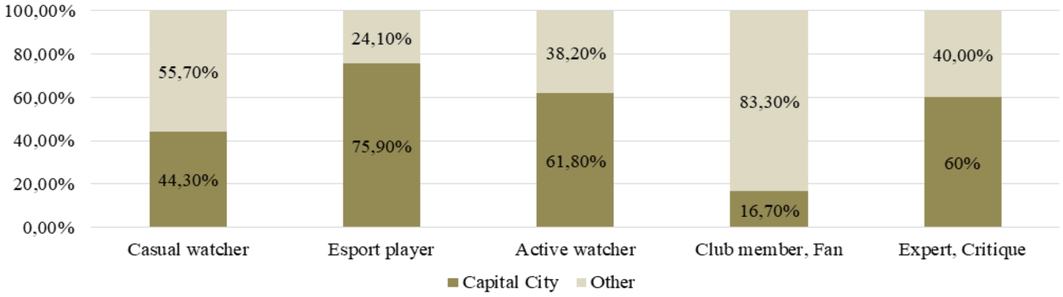

Figure 3. The esport profiles based on place of residence (N=285)

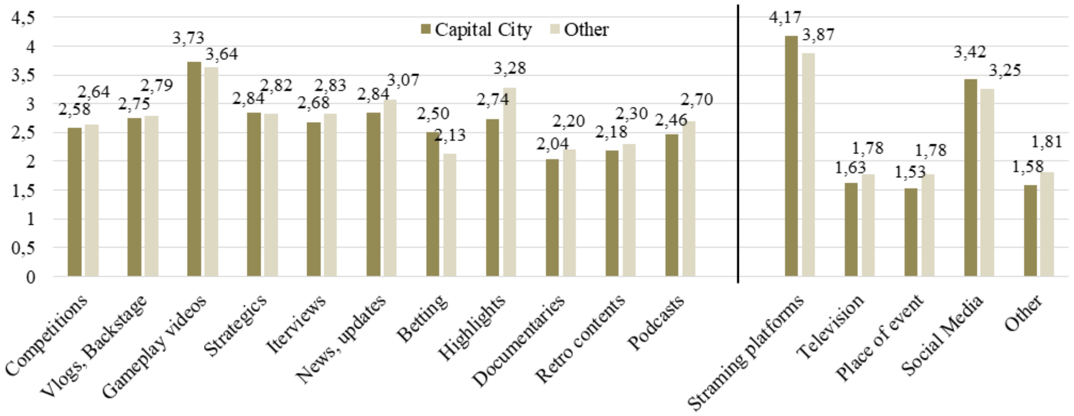

Figure 4. The type of content and the place of consumption based on place of residence (N=285)

To assess potential differences in consumption motivation, we evaluated five statements regarding why individuals watch esports content (Table 3.). Respondents rated each statement on a 5-point Likert scale, where 1 indicated "not at all characteristic" and 5 indicated "very characteristic" of the respondent. Overall, the most highly rated motivation was the entertaining value of the content. Additionally, learning and skill development, as well as competitive spirit, also received high ratings. Social aspects, such as social relationships and community, and support for favorite teams or players, were rated lower. Significant differences were observed between the two geographically distinct groups for four of the statements, which were analyzed using a t-test. In more urbanized areas, the competitive spirit and skill (p=0.004), as well as learning and skill development (p=0.027), were rated significantly higher. This result aligns with previous findings, indicating that in more digitally advanced areas where esports consumption emphasizes competition and professionalism, improving player performance through development and learning is a key motivation, and competition is generally viewed as more important. Conversely, the entertaining value (p=0.029) of content and social aspects, including relationships and community (p=0.004), were found to be more significant in smaller rural areas. This also reflects the community-oriented nature of the local subculture and the entertainment value derived from consumption in these areas.

Table 3. Esports consumption motivations based on geographical location (N=285)

	Statement	t - value	p - value	Mean	Urban Areas	Rural Areas
Q1	Support (favorite team(s) or player(s)).	-0.47	0.963	2.71	2.71	2.72
Q2	Entertainment value.	-2.20	**0.029**	3.52	3.38	**3.72**
Q3	Competitive spirit and skill.	2.94	**0.004**	3.32	**3.52**	3.06
Q4	Social relationships and community.	-0.285	**0.004**	2.73	2.53	**2.99**
Q5	Learning and developing own skills.	2.30	**0.027**	3.47	**3.62**	3.27

Table 4. Event characteristics and their importance based on geographical location (N=285)

	Statement	t - value	p - value	Mean	Urban Areas	Rural Areas
E1	Commentating, statistics, analyzation.	0.15	0.876	3.01	3.02	3.00
E2	Prize pool.	1.94	0.053	2.35	2.47	2.18
E3	The competing player(s) and team(s).	-2.01	**0.045**	3.24	3.10	**3.43**
E4	The game itself.	1.04	0.298	3.59	3.49	3.66
E5	Prestige and organization of the event.	0.987	0.324	2.92	2.98	2.83
E6	Quality of the content.	2.11	**0.036**	3.68	**3.81**	3.49

Beyond general motivations, we specifically addressed the characteristics of esports events and their importance to consumers (Table 4.). To measure this, participants were asked to rate six statements using a 5-point Likert scale, where 1 indicated "strongly disagree," and 5 indicated "strongly agree." For the entire sample, the most important factors were the quality of the content and the game itself. This suggests that esports audiences prioritize a well-produced, high-quality viewing experience. The focus on gameplay quality indicates that the skill level and performance of the players are crucial elements driving viewership. Additionally, the game itself being a top factor implies that viewers are drawn to games they are passionate about and that resonate with them. The availability of supplementary content—such as commentary, statistics, and analyses—was rated as moderately important. This finding suggests that while these additional elements enhance the viewing experience, they are not the primary reason people tune in. The presence of diverse teams and players also received a mid-range importance rating, indicating that variety and representation in competition are valued, but not as critical as core gameplay elements. Interestingly, the event's prestige and prize pool were considered the least important factors by respondents. This result indicates that viewers are less concerned with the reputation of the event or the monetary rewards at stake. Instead, they are more focused on the quality and engagement of the esports content itself.

This is also due to the fact that although esports players were significantly represented in the sample, the vast majority of the overall population still does not participate in such events with the intention of competing. The emphasis on content quality over prize money could reflect a community-driven mentality within the esports audience, where the enjoyment of the game and the skill on display take precedence. Additionally, these findings suggest that organizers might focus on improving content quality and in-game experiences rather than solely increasing prize pools to attract viewership.

We further analyzed the statements by geographic segments, revealing significant differences in two areas within the sample. In rural areas, the participating teams and players proved to be a more important aspect (p=0.045). This result may indicate the underlying entertainment value of the events for these respondents. This could indicate that in rural areas, spectators are more interested in the social and community aspects of esports, possibly viewing it as a form of entertainment similar to traditional sports. In contrast, respondents from urbanized areas significantly prioritized the quality of the content (p=0.036), indicating a preference for a more polished and professional viewing experience.

This difference suggests that urban viewers may be more focused on the competitive and technical aspects of esports rather than the social or entertainment elements. A connection between traditional sports consumption and the consumption of esports content can be drawn from the shared emphasis on the quality of content. In both fields, consumers prioritize high-quality presentations, as they enhance the viewing experience and provide a deeper engagement with the sport (Foroughi et al., 2014; Balogh & Bácsné Bába, 2023). Esports consumers value content that is well-produced, visually appealing, and informative, reflecting a broader trend where the quality of content is a critical factor in attracting and retaining viewers in both traditional and digital sports. This suggests that regardless of the medium, viewers are drawn to experiences that offer both clarity and depth, thereby enhancing their overall engagement.

CONCLUSION

The research provides a comprehensive analysis of how geographical location influences esports consumption, revealing significant differences between urban and rural audiences. Esports players are predominantly from urbanized areas, highlighting the concentrated nature of competitive gaming within these regions. Conversely, club members and fans are more commonly found in rural areas, indicating a different engagement dynamic in less populated regions. This distinction points to a fundamental divergence in how esports content is consumed and valued based on geographical location.

In rural areas, the consumption of esports content is deeply rooted in social aspects, community connections, and the entertainment value it provides. Viewers in these regions prioritize the communal and recreational aspects of esports, shaping their engagement habits around these factors. This preference reflects a broader cultural trend where rural audiences seek to enhance their social interactions and entertainment experiences through esports.

On the other hand, urbanized areas exhibit a pronounced focus on the competitive elements of esports. The emphasis here is on the skill development, learning opportunities, and high-level competition that esports can offer. This focus suggests that urban audiences are drawn to the professional and technical aspects of the games, valuing content that showcases top-tier gameplay and strategic depth. When it comes to event characteristics, urbanized audiences prioritize the quality of the content, reflecting their interest in well-produced and professionally presented esports experiences. In contrast, rural audiences place greater importance on the participating teams and players, which aligns with their focus on social engagement and community. Overall, the research highlights that geographical location significantly affects esports consumption patterns, with urban and rural audiences having distinct preferences and priorities. Urban areas lean towards a competitive and developmental focus, valuing high-quality content and learning opportunities. Rural areas, meanwhile, emphasize social interaction, community involvement, and the entertainment value of esports.

These findings underscore the need for tailored approaches in the esports industry to cater to the diverse preferences of different audiences. Event organizers, content creators, and marketers should consider these regional differences to effectively engage with their target audiences. By aligning content and event characteristics with the specific interests of urban and rural viewers, stakeholders can enhance the overall appeal and reach of esports.

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THE IMPACT OF MOBILE AUGMENTED REALITY ON GREEN EXPERIENCE AND DESTINATION CHOICE INTENTION IN GREEN TOURISM IN VIETNAM

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Abstract: As environmental awareness grows, sustainable tourism has emerged as a significant focus for both researchers and practitioners. Tourists are increasingly seeking experiences that align with their values of conservation and ethical responsibility. Simultaneously, advancements in technology, particularly mobile augmented reality (AR), have introduced innovative ways to enhance green tourism experiences. Despite its potential, research exploring the specific influence of AR on sustainable tourism remains scarce. This study addresses this gap by examining how mobile AR impacts green tourism experiences and destination choice intentions, using an extended Technology Acceptance Model (TAM). Data was collected from 276 tourists who interacted with a mobile AR tourism application during their visit to a nature-based attraction. Findings revealed that three key attributes of mobile AR—interactivity, vividness, and information content—positively influenced tourists' perceptions of usefulness and ease of use. These factors, in turn, contributed to heightened quality of green experiences and stronger intentions to revisit sustainable destinations. The results suggest that mobile AR can serve as an immersive and educational tool, fostering deeper appreciation for ecological and ethical tourism practices. The study provides significant theoretical contributions by extending TAM to demonstrate AR's role in shaping both experiential quality and behavioral intentions within the context of sustainable tourism. It positions AR as a powerful platform for promoting environmental conservation and ethical behaviors among tourists. For practitioners, the findings offer actionable insights into designing AR applications that captivate visitors while aligning with sustainability goals. By leveraging AR's capabilities, tourism stakeholders can create meaningful, interactive experiences that inspire responsible travel behaviors and reinforce the value of preserving natural resources. This research underscores the transformative potential of mobile AR in green tourism. It highlights the importance of integrating cutting-edge technologies to enhance tourist engagement, promote conservation, and advance the broader agenda of sustainable tourism development.

Keywords: augmented reality, green tourism, technology acceptance, green experience, destination choice

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INTRODUCTION

The tourism industry has been rapidly transforming with the emergence of new technologies such as augmented reality (AR) and virtual reality (VR) that are reshaping the way tourists research, plan, and experience travel (Wei, 2019). In particular, mobile AR applications are gaining popularity as they overlay digital information and visualizations onto the physical world in real-time through smartphones and tablets (Yagol et al., 2018). By integrating contextual data with the physical environment, mobile AR allows tourists to access location-based information and interactive visualizations that bring travel destinations to life (Lacka, 2018). This enhances trip planning, navigation, decision-making, and overall satisfaction.

Several studies have examined the factors influencing adoption of AR in tourism, including perceived ease of use, enjoyment, usefulness (Shen et al., 2022), novelty and personalization (Kourouthanassis et al., 2015). However, there remains limited research on the specific impact of AR on the green tourism experience. Green tourism refers to sustainable travel that minimizes environmental impact and promotes conservation (Raha & Gayen, 2022). It is driven by tourists' environmental awareness and desire for authentic nature-based experiences (Chen et al., 2023).

As consumers become more environmentally conscious, interest in eco-friendly and educational tourism activities has grown. AR offers opportunities to enrich green tourism by providing interactive information on ecosystems, conservation efforts, indigenous culture and sustainability practices (Samaddar & Mondal, 2023). This can potentially enhance learning, connection with nature and pro-environmental behavior (Sutiksno et al., 2024).

Understanding the influence of AR on the green tourism experience is vital, given the technology's ability to shape perceptions, increase awareness and potentially change beliefs and actions. While research has examined AR adoption in tourism, few studies have specifically analyzed its impact on sustainability outcomes. AR-based application increased visitors' geotourism knowledge and pro-environmental intentions at a nature preserve. Though highlighting AR's educational capacity, further research on its influence across green tourism contexts is needed. Investigating the relationship between AR, green experience and sustainability can inform responsible technology development and usage in this sector. Through studies have analyzed adoption of AR in tourism, there remain critical gaps pertaining to AR's impact on green tourism specifically. Firstly, there is limited research on AR's influence on tourists' cognitive, affective

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and behavioral dimensions of the green experience. While AR's ability to provide environmental information is established, its broader effects on environmental awareness, connection with nature and pro-conservation behavior warrants investigation. Understanding AR's holistic impact can shape responsible design and usage. Secondly, the relationship between AR, green experience quality and revisit intentions lacks exploration. As AR enriches the tourism experience, it may enhance perceived quality and loyalty, yet this linkage is underexamined in green tourism where quality perceptions play a key role in destination competitiveness (Hung & Khoa, 2022; Zakharchenko et al., 2021; Ahn et al., 2013).

Finally, the contextual factors shaping AR's effectiveness require analysis. Destination- and tourist-specific characteristics may moderate outcomes, hence investigating contextual influences will inform targeted AR deployment. While studies have adopted models like TAM to assess AR adoption, research applying experience economy concepts is limited. Radder & Han (2015) pointed out Pine & Gilmore's model highlights experience realms of education, entertainment, escape and aesthetics. Analyzing AR's impact on these realms could offer insights into enhancing green tourism engagement. Additionally, several theories relating to technology acceptance, information processing, experiential learning and environmental behavior provide useful foundations. However, an integrated approach examining AR's holistic influence on green tourism is lacking. Overall, the literature underscores AR's potential but lacks empirical research on its effectiveness in enhancing sustainable practices within tourism. This research aims to address these gaps. This study has three main objectives:

1. To analyze the impact of mobile AR on tourists' cognitive, affective and behavior dimensions of green tourism experience.
2. To examine the relationship between mobile AR, green experience quality and revisit intentions in the context of nature-based tourism.
3. To identify the contextual factors that moderate the impact of mobile AR on green experience and destination revisit intentions.

This paper is structured as follows. First, a literature review establishes the theoretical foundations by synthesizing prior research on mobile AR, green tourism, experience economy and relevant theories. Next, the conceptual framework and hypotheses are presented based on the identified research gaps. This is followed by an outline of the quantitative methodology adopted to test the hypotheses using a survey of nature-based tourists. Finally, the data analysis approach, expected findings, conclusions and future research directions are discussed.

LITERATURE REVIEW

Green Tourism and Green Experience in the Digital Transformation Age with Mobile Augmented Reality

Green tourism refers to sustainable travel practices that minimize environmental impact and promote conservation (Raha & Gayen, 2022). It is underpinned by tourists' environmental awareness and desire for authentic nature-based experiences (Mittal & Dhar, 2016). As consumers become more environmentally conscious, interest in eco-friendly and educational tourism activities has grown substantially. Green tourism encompasses responsible practices across transportation, accommodation, activities, and destination stewardship. Key drivers of green tourism include climate change impacts, depletion of natural resources, loss of biodiversity and increased environmental regulation.

The green tourism experience refers to the cognitive, affective, sensory and behavioral aspects that shape tourists' engagement with natural attractions in a sustainable manner (Nowacki et al., 2023). It involves elements of environmental learning, nature appreciation, green practices adoption and pro-conservation behavior. For instance, learning about indigenous flora/fauna, marveling at nature's beauty, recycling, avoiding wildlife disturbance and donating to conservation causes enhance the green experience. Recent studies have analyzed determinants of the green experience like perceived value, place attachment and satisfaction (Pai et al., 2023; Sthapit et al., 2022). As green tourism gains prominence, tourism stakeholders strive to deliver quality green experiences through immersive, personalized and contextualized engagement. This is catalyzed by emerging technologies like mobile augmented reality (AR) that create interactive and customized experiences. Mobile AR integrates digital visualizations and information with the physical landscape in real-time through smartphones and tablets (Hussein, 2022). By overlaying context-sensitive data on users' visual perception, AR allows access to location-based annotations, wayfinding guidance, historical insights, indigenous narratives and sustainability practices (Youngblood & Gartner, 2023). This enhances green learning and connection with nature.

Theoretical Model

This study employs an extended Technology Acceptance Model (TAM) to examine mobile AR's impact on the green tourism experience and destination choice intention. Introduced by Davis (1989), TAM posits that perceived usefulness and perceived ease of use determine users' acceptance and usage behavior towards a technology. Perceived usefulness denotes the belief that the technology enhances task performance and productivity. Perceived ease of use reflects the degree to which the user perceives the technology as effortless to understand and operate (Davis, 1989). TAM theorizes that perceived usefulness and ease of use shape attitudes towards usage, leading to actual system usage.

TAM has been widely utilized to predict user acceptance of various technologies including mobile AR (Song et al., 2024; Papakostas et al., 2022). While useful for analyzing adoption, TAM's limitation is its lack of explanatory external variables. To address this, researchers have incorporated factors like individual differences, social influences, technology characteristics, task aspects as antecedents to TAM's perceptions (Venkatesh & Davis, 2000).

The impact of mobile augmented reality on green experience and destination choice in green tourism is a topic of growing interest in the field of sustainable tourism. Technology, particularly mobile applications equipped with advanced features such as augmented reality, has been identified as a key tool in promoting environmentally responsible travel choices (Zhang & Deng, 2024). Augmented reality has the potential to enhance visitor experiences at sustainable destinations by providing educational overlays that inform tourists about local conservation efforts (Chon & Hao, 2024). Additionally, the use of augmented reality in mobile app development for travel and tourism has been highlighted as a way to support sustainable initiatives and encourage conscious travel choices (Soonsan & Jumani, 2024). Service design has been identified as a facilitator for designing augmented reality experiences for tourism consumption, hospitality services, and sustainable services (Giraldo et al., 2024). By incorporating augmented reality into destination marketing strategies, travel planners are able to provide immersive experiences that support sustainable initiatives and encourage responsible choices. Furthermore, the integration of augmented reality into mobile applications has been shown to have a positive impact on encouraging conscious travel choices and promoting sustainable tourism practices (Hussein, 2022).

In the context of sustainable tourism, the use of virtual and augmented reality technologies is transforming how travelers experience destinations while minimizing environmental footprints (Madi et al., 2024). By harnessing technology, destinations can offer immersive experiences that educate tourists about local conservation efforts and encourage responsible travel decisions (Gonzáles-Santiago et al., 2024). Overall, the integration of mobile augmented reality into green tourism initiatives has the potential to enhance the green experience and influence destination choices in favor of sustainable practices.

This study incorporates three key mobile AR attributes - interactivity, vividness and information content (Song et al., 2024) - as external factors influencing perceived usefulness and ease of use. Furthermore, it analyzes the interrelationships between TAM variables and green experience/destination choice constructs to investigate mobile AR's impact in green tourism context (Karim et al., 2023). The theoretical research model is displayed in Figure 1.

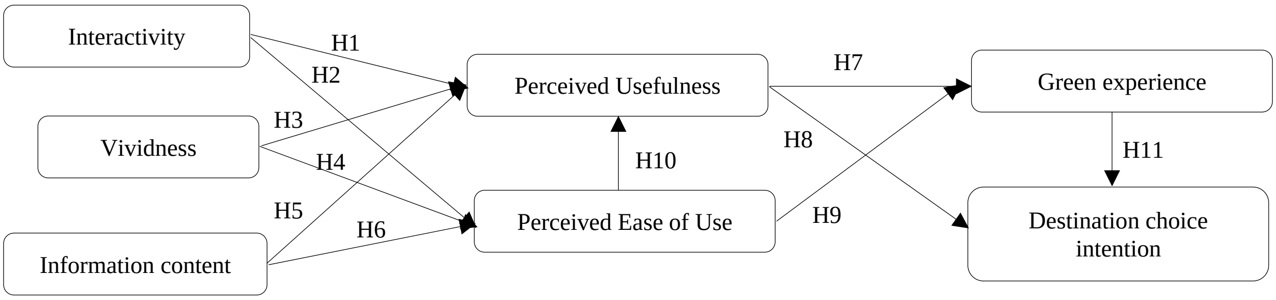

Figure 1. Theoretical model

Hypotheses development

Interactivity reflects the extent to which users participate, get involved and control the communication process (Joo & Yang, 2023). In mobile AR, interactive features enable the manipulation of content, navigation and responses in real-time (Cao et al., 2023). Interactivity encompasses dimensions of active control, two-way communication, synchronicity and connectedness with the medium. Enhanced control over content access and navigation can augment perceptions of AR's usefulness for trip planning by allowing customization to specific user needs (Shakeri et al., 2023). Studies indicated that greater interactivity positively influences perceived usefulness in mobile AR shopping (Yoo, 2023), AR gaming (Wong et al., 2023) and AR tourism apps (Madi et al., 2024). Besides usefulness, interactivity also shapes ease of use perceptions. AR systems that respond faster and more efficiently to user input are perceived as more user-friendly (Zare Ebrahimabad et al., 2024). The ability to tailor AR experiences and easily manipulate interactive features improves ease of use perceptions. Therefore, the following hypotheses are proposed:

H1: Interactivity has a positive effect on the perceived usefulness of mobile AR

H2: Interactivity has a positive effect on the perceived ease of use of mobile AR

Vividness denotes AR's ability to produce rich mediated environments through aesthetically appealing visuals and quality display resolution (Kim et al., 2023). Vividness enhances sensory breadth, depth and realness of virtual objects integrated in physical surrounding. Visual vividness positively influences usefulness perceptions by improving understanding, evaluation and decision-making regarding destinations and activities (Gil-López et al., 2023). AR's vivid and realistic 3D reconstructions of attractions allow users to make better informed trip planning decisions by virtually experiencing each location in-depth (Yung et al., 2021). The visual attractiveness and display quality of vivid AR environments also make the technology easier to use by enhancing comprehension of complex information (Riar et al., 2021). Based on this reasoning, the following hypotheses are formulated:

H3: Vividness has a positive effect on perceived usefulness of mobile AR

H4: Vividness has a positive effect on perceived ease of use of mobile AR

Information content denotes the depth, accuracy and relevance of details presented in AR (Reipschlager et al., 2021). AR can deliver personalized and contextualized information aligned with users' specific interests, profiles and geographic location. By integrating a rich diversity of engaging location-based multimedia and narratives, AR provides an informative tourism experience (Evagelou et al., 2024). Informative content positively affects usefulness perceptions by assisting trip planning and on-site decision making (Guo et al., 2024). Presenting timely, accurate, and relevant AR content tailored to tourists' needs enhances perceived usefulness. Additionally, the completeness and consistency of AR content improves ease of use by enabling clearer understanding and seamless usage (Qin et al., 2021). Thus, the following hypotheses are proposed:

H5: Information content has a positive effect on perceived usefulness of mobile AR

H6: Information content has a positive effect on perceived ease of use of mobile AR

Perceived usefulness directly influences usage intentions across technologies, including mobile AR (Arghashi & Yuksel, 2022). AR applications that enhance trip productivity, planning and on-site decision making are likely to be favoured by tourists. Besides intentions, perceived usefulness also drives attitudes like satisfaction (Pang, 2021) and engagement (Arghashi & Yuksel, 2022). In green tourism contexts, AR usefulness perceptions regarding eco-navigation, sustainability insights and conservation practices can potentially boost green experience quality and destination revisit intentions. Thus, it is hypothesized that:

H7: Perceived usefulness has a positive effect on green experience

H8: Perceived usefulness has a positive effect on destination choice intention

Regarding perceived ease of use, studies demonstrate its significant effect on enjoyment, satisfaction and recommendation intentions for AR shopping apps (Anifa & Sanaji, 2022). Ease of use also enhances cognitive, emotional and behavioural engagement with technologies (Tang & Hew, 2022) like mobile social gaming and smartwatches. In tourism, AR applications that are free of effort likely stimulate greater user engagement and green experience quality derived from enhanced interaction with nature-based content. Thus, the following hypotheses are proposed:

H9: Perceived ease of use has a positive effect on green experience

H10: Perceived ease of use has a positive effect on perceived usefulness

The green experience constitutes tourists' cognitive, affective, and behavioural perceptions derived from their engagement with nature attractions and sustainable practices (Ibnou-Laaroussi et al., 2020). It encompasses dimensions of environmental learning, emotional affinity, nature orientation and green practices adoption (Ito et al., 2020). Positive green experiences signal quality sustainable tourism capable of fostering responsible behaviour. Research indicates that green experience quality enhances satisfaction, perceived value, place attachment and revisit intentions across nature-based contexts (Sthapit et al., 2022). Destinations that craft memorable green experiences rich in learning, meaning and conservation practices are likely favoured by tourists. Thus, it is hypothesized:

H11: Green experience has a positive effect on destination choice intention

RESEARCH METHOD

This study employs a quantitative approach, utilizing an online survey to gather data from tourists in Vietnam who have used a mobile augmented reality (AR) tourism application during their visit to a nature-based destination. This method is deemed appropriate as it allows for the systematic collection of quantifiable data, enabling statistical analysis to test the proposed hypotheses and examine the relationships between variables. The research process begins with developing a theory and specifying a model. Next, the population needs to be defined, which leads to testing hypotheses.

Defining the population and testing hypotheses is an iterative process, requiring going back and forth between the two steps. Once the hypotheses are sufficiently tested, a sample can be selected from the population. Data is then collected from the sample and prepared for analysis. The prepared data is archived before proceeding to descriptive statistics analysis. After descriptive statistics, inferential statistics are used to test the hypotheses. The final step is developing the conclusion based on the analysis. The research process was followed the Figure 2.

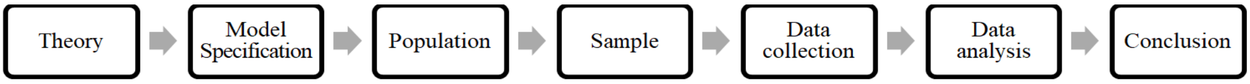

Figure 2. The flow chart of methodology steps

Measurement Scales

Established multi-item scales adapted from prior studies were used to measure the constructs in the research model. All scale items employed a seven-point Likert agreement scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). This scale offers a wide range of response options, allowing for greater nuance in capturing respondents' levels of agreement.

Mobile AR Characteristics

- **Interactivity:** Measured using three items adapted from McLean and Wilson (2019), assessing the level of control, responsiveness, connectedness, and personalization offered by the mobile AR app. This captures the extent to which users can actively engage with and manipulate the AR environment.
- **Vividness:** Assessed using five items adapted from McLean and Wilson (2019), focusing on the aesthetics, animations, colors, resolution, and realism of the AR environment. This evaluates the sensory richness and visual appeal of the AR experience.
- **Information Content:** Measured using four items adapted from Yoo (2020), evaluating the depth, accuracy, currency, and relevance of the information presented in the mobile AR app. This examines the quality and usefulness of the information provided through AR.

Technology Acceptance Model (TAM) Constructs

- **Perceived Usefulness:** Measured using four items adapted from Davis (1989), assessing the perceived benefits of using the mobile AR app for trip planning, time savings, effectiveness, and productivity. This captures the belief that the app enhances the overall tourism experience.
- **Perceived Ease of Use:** Operationalized through four items adapted from Davis (1989), evaluating the ease of understanding, flexibility, clarity, and learning curve associated with using the app. This reflects the perceived effortlessness of using the AR technology.

Green Tourism Outcomes

- **Green Experience:** Measured using four items adapted from Yu et al. (2017), encompassing learning enrichment, emotional affinity, nature orientation, and sustainable practices adoption fostered by the mobile AR app. This captures the cognitive, affective, and behavioral dimensions of tourists' engagement with green tourism elements.
- **Destination Choice Intention:** Assessed using three items adapted from Gómez et al. (2018) measuring tourists' likelihood, intention, and want to revisit the destination for a future trip. This reflects the impact of the overall experience, including the use of AR, on their future travel decisions.

Sample and Data Collection

The target population for this study consisted of tourists who had visited a nature-based destination and utilized a mobile AR tourism application during their trip within the past year. This included both domestic and international tourists who had traveled to natural attractions such as national parks, wildlife sanctuaries, and conservation reserves. Respondents were recruited through a reputable online panel provider, ensuring a diverse and representative sample. Screening questions were used to identify eligible participants who met the specific criteria. The survey administration adhered to the provider's protocols, guaranteeing respondent authentication, voluntary participation, informed consent, and data privacy.

Respondent Statistics

A total of 550 online survey invitations were distributed, resulting in 276 valid and complete responses after data screening, representing more than 50% response rate. This sample size is deemed sufficient for robust statistical analysis, particularly for structural equation modeling (Hair Jr et al., 2016). The respondent profile exhibited a balanced gender distribution, with 52.17% female and 47.83% male. The majority of respondents fell within the age groups of 21-30 years (40.94%) and 31-40 years (28.26%), indicating a younger demographic more likely to be familiar with and receptive to mobile AR technology. The sample also demonstrated a high level of education, with 67.03% holding undergraduate degrees and 32.97% possessing postgraduate qualifications. The diverse demographic characteristics of the respondents, including nationality (77.9% domestic, 22.1% international) and occupation, contribute to the generalizability of the findings to a wider green tourism audience. This comprehensive approach to sampling and data collection ensures the reliability and validity of the study's results. Table 1 presented the respondent characteristic.

Table 1. Sample information statistic

Characteristic		n	%
Gender	Male	144	52.17
	Female	132	47.83
Age	< 21	33	11.96
	21-30	113	40.94
	31-40	78	28.26
	> 41	52	18.84
Education level	Bechalor	185	67.03
	Master	72	26.09
	Doctor	19	6.88
Nationality	Domestic tourist	215	77.9
	International tourist	61	22.1

RESULTS

This section presents the results of the data analysis, examining the psychometric properties of the measurement model and the hypothesized relationships within the structural model. SmartPLS 4 software was employed for the partial least squares structural equation modelling (PLS-SEM) analysis, a variance-based SEM technique well-suited for exploring complex models with formative and reflective constructs.

Measurement Model Assessment

The measurement model was assessed for its reliability and validity, ensuring the accuracy and consistency of the constructs before examining the structural relationships.

Convergent validity evaluates the extent to which the indicators of a construct converge or share a high proportion of variance. This was assessed using factor loadings, composite reliability (CR), and average variance extracted (AVE). As shown in Table 2, all indicator loadings exceeded the recommended threshold of 0.70 (Hair Jr et al., 2016), indicating strong relationships between the indicators and their respective constructs. The CR values for all constructs ranged from 0.874 to 0.952, exceeding the recommended value of 0.70, suggesting high internal consistency among the indicators. Finally, the AVE values for all constructs ranged from 0.638 to 0.819, surpassing the minimum requirement of 0.50, indicating that the constructs explain more than 50% of the variance in their respective indicators (Fornell & Larcker, 1981).

Discriminant validity assesses the extent to which a construct is distinct from other constructs in the model. This was evaluated using the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio. The Fornell-Larcker criterion posits that the square root of the AVE for each construct should be higher than its correlations with other constructs (Fornell & Larcker, 1981). As shown in Table 3, the square root of the AVE values (shown in bold along the diagonal) for each construct exceeded its correlations with all other constructs, confirming discriminant validity. The HTMT ratio is a more stringent measure of discriminant validity, comparing the average of the correlations of indicators measuring different constructs with the average of the correlations of indicators measuring the same construct (Henseler et al., 2014). HTMT values below 0.85 are generally considered acceptable (Kline, 2015). Table 4 presents the HTMT ratios, demonstrating that all values were below 0.85, further confirming discriminant validity.

Table 2. Measurement Model Assessment

Construct	Indicators	Factor Loading	CR	AVE	Construct	Indicators	Factor Loading	CR	AVE
Interactivity (IT)	IT1	0.862	0.94	0.8	Destination Choice Intention (DCI)	DCI1	0.888	0.95	0.82
	IT2	0.895				DCI2	0.917		
	IT3	0.918				DCI3	0.91		
Information Content (IC)	IC1	0.863	0.87	0.64	Perceived Ease of Use (PE)	PE1	0.882	0.94	0.72
	IC2	0.868				PE2	0.895		
	IC3	0.729				PE3	0.924		
	IC4	0.681				PE4	0.848		
Perceived Usefulness (PU)	PU1	0.857	0.92	0.75	Green Experience (GE)	GE1	0.842	0.94	0.78
	PU2	0.88				GE2	0.894		
	PU3	0.882				GE3	0.9		
	PU4	0.846				GE4	0.904		
Vividness (VV)	VV1	0.839	0.93	0.73	Vividness (VV)	VV4	0.868		
	VV2	0.855				VV5	0.821		
	VV3	0.879							

Table 3. Fornell-Larcker Criterion

Construct	IT	VV	IC	PU	PE	GE	DCI
Interactivity	**0.893**						
Vividness	0.712	**0.853**					
Information Content	0.684	0.651	**0.799**				
Perceived Usefulness	0.695	0.729	0.762	**0.864**			
Perceived Ease of Use	0.785	0.791	0.738	0.812	**0.848**		
Green Experience	0.741	0.786	0.754	0.827	0.845	**0.883**	
Destination Choice Intention	0.778	0.812	0.783	0.853	0.872	0.869	**0.905**

Table 4. HTMT Ratios

Construct	IT	VV	IC	PU	PE	GE
Interactivity						
Vividness	0.724					
Information Content	0.696	0.662				
Perceived Usefulness	0.708	0.741	0.773			
Perceived Ease of Use	0.797	0.803	0.75	0.823		
Green Experience	0.753	0.798	0.765	0.838	0.856	
Destination Choice Intention	0.79	0.824	0.795	0.864	0.883	0.88

Structural Model Assessment

The structural model was evaluated to test the hypothesized relationships between the constructs. The assessment included examining path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and variance inflation factor (VIF) for multicollinearity. Table 5 presents the path coefficients, their significance levels, and the results of hypothesis testing. All hypothesized relationships were supported, with statistically significant path coefficients ($p < 0.001$).

Table 5. Structural Model Results (Note: *** p < 0.001)

H	Path	Beta	p-value	Result	R^2	Q^2	f^2	VIF
H1	IT -> PU	0.213	***	Supported	0.683	0.432	0.08	1.00
H3	VV -> PU	0.568	***	Supported			0.37	1.00
H5	IC -> PU	0.543	***	Supported			0.43	1.00
H10	PE -> PU	0.286	***	Supported			0.1	1.32
H2	IT -> PE	0.345	***	Supported	0.725	0.518	0.12	1.00
H4	VV -> PE	0.521	***	Supported			0.38	1.14
H6	IC -> PE	0.464	***	Supported			0.32	1.43
H7	PU -> GE	0.435	***	Supported	0.812	0.689	0.30	1.34
H9	PE -> GE	0.742	***	Supported			0.45	1.53
H8	PU -> DCI	0.387	***	Supported	0.776	0.623	0.32	1.42
H11	GE -> DCI	0.881	***	Supported			0.56	1.50

The results indicate that interactivity, vividness, and information content positively influence both perceived usefulness and perceived ease of use. Furthermore, perceived usefulness and perceived ease of use positively impact green experience, which, in turn, positively affects destination choice intention. Lastly, perceived ease of use also has a positive effect on perceived usefulness. The R^2 value reflects the proportion of variance in the dependent variable explained by the independent variables. The R^2 values for perceived usefulness, perceived ease of use, green experience, and destination choice intention were 0.683, 0.725, 0.812, and 0.776, respectively. These values indicate a substantial explanatory power of the model, suggesting that the independent variables effectively predict the variance in the dependent variables.

The f^2 value measures the effect size of each independent variable on the dependent variable. Values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 2013). The f^2 effect sizes ranged from small to large. Specifically, the paths from IT to PU (H1) and PE to PU (H10) showed small effects (f^2=0.08 and 0.10 respectively). The paths from IT to PE (H2), PU to DCI (H8), and PU to GE (H7) demonstrated medium effects (f^2=0.12, 0.32, and 0.30 respectively). Large effects were found for the paths from VV to PU (H3), IC to PU (H5), VV to PE (H4), IC to PE (H6), PE to GE (H9), and GE to DCI (H11) with f^2 values of 0.37, 0.43, 0.38, 0.32, 0.45, and 0.56 respectively.

The Q^2 value assesses the model's predictive relevance, indicating its ability to predict out-of-sample data. Values above zero suggest good predictive validity (Hair Jr et al., 2016). The Q^2 values for perceived usefulness, perceived ease of use, green experience, and destination choice intention were 0.432, 0.518, 0.689, and 0.623, respectively, indicating good predictive relevance of the model. Multicollinearity refers to high correlations between independent variables, potentially affecting the stability and interpretability of the model. The variance inflation factor (VIF) was used to assess multicollinearity. VIF values below 5 are generally considered acceptable. The VIF values for all independent variables were below 3, suggesting no significant multicollinearity issues. In conclusion, the measurement model demonstrated strong convergent and discriminant validity, ensuring the accuracy and reliability of the constructs. The structural model exhibited good explanatory power, substantial effect sizes, good predictive relevance, and no significant multicollinearity issues. The results provide strong support for all proposed hypotheses, highlighting the positive impact of mobile AR characteristics on perceived usefulness and ease of use, which, in turn, enhance green experience and destination choice intention. This emphasizes the potential of mobile AR to enrich green tourism experiences and promote sustainable destination choices.

DISCUSSIONS

This study's findings offer useful insights into the impact of mobile AR on green tourism experiences and destination choice intentions. The results demonstrate that key AR attributes of interactivity, vividness and information content enhance perceived usefulness and ease of use, which subsequently enrich green experience quality and foster greater intentions to revisit sustainable destinations. Overall, the findings align with and advance the current literature on technology adoption in tourism as well as research on green experience determinants. Firstly, the significant influence of interaction, vividness and content quality on perceived usefulness and ease of use supports prior tourism studies underscoring these attributes' role in AR acceptance (Holdack et al., 2022; Huang & Liao, 2014). By establishing their impact in a green tourism context, this research responds to calls for greater investigation into AR features shaping tourism experiences (Jung et al., 2016).

Secondly, the results support the hypothesized relationships between TAM constructs of perceived usefulness and ease of use with experiential quality and behavioral intentions (Faqih & Jaradat, 2015; tom Dieck & Jung, 2015; Huang & Liao, 2014). The findings demonstrate that tourists' beliefs regarding AR's benefits and effortlessness boost green experience quality and destination revisit intentions, consistent with TAM applications in sustainable tourism (Eslami et al., 2019).

This reinforces ease of use and usefulness perceptions as key determinants of technology acceptance outcomes within tourism. Additionally, the positive effect of green experience quality on destination choice highlights its salience as a predictor of loyalty intentions, further validating green tourism studies underscoring this link (Zhang et al., 2019; Ramkissoon & Mavondo, 2015). By establishing mobile AR as a conduit for enriched green experiences capable of driving revisit intentions, this research responds to calls to examine technologies fostering sustainable behaviors in tourism (Zakharchenko et al., 2021).The findings diverge somewhat from McLean and Wilson (2019) who found PU had no significant impact on AR shopping apps' experiential value. A potential explanation is that mobile AR's planning and navigational utilities are more directly perceived as enhancing the tourism activity experience itself compared to retail shopping where usefulness perceptions may be more transactional. This highlights how technology-experience relationships can vary across contexts. Overall, the alignment with TAM and green experience research reinforces the efficacy of integrating these streams to advance theoretical and practical understanding of AR for sustainable tourism.

The results carry several implications for AR application in green tourism contexts. Firstly, the significant impact of interactivity underscores the need for design features enabling active user control and manipulation to heighten perceived usefulness and ease of use. Creating customizable and responsive AR environments allowing tourists to self-direct their sustainability-oriented exploration of destinations can enrich green learning and engagement.

Secondly, vividness emerged as a salient determinant of usefulness and ease of use perceptions, highlighting the importance of visual appeal and sensory realism in crafting captivating AR eco-experiences. Tourism organizations should utilize rich multimedia content leveraging 3D reconstructions, 360 imagery, animations and ambient sounds to vividly reconstruct and contextualize green practices within destinations. Vividness not only makes interactions easier but enhances perceived utility. Finally, given information content's strong influences, providing accurate, relevant and continually updated sustainability insights via AR assumes critical importance. This suggests value in leveraging user-generated content and crowdsourced local expertise on green initiatives to build informative AR layers that meaningfully augment tourists' contextual understanding and inspire conservation behaviors.

CONCLUSION

Theoretical Contributions

This study makes three key theoretical contributions. Firstly, it integrates and extends technology adoption and green experience research by developing and empirically testing an AR-TAM model incorporating key external variables relevant to tourism contexts. The findings significantly advance theoretical understanding of mobile AR adoption outcomes, demonstrating AR attributes' impact on green experience quality and destination loyalty intentions via TAM perceptions.

Secondly, in contrast to most tourism AR studies focused predominantly on adoption drivers, this research expands theoretical perspectives by examining post-adoption experiential impacts. Analyzing relationships between AR, green experience dimensions and behavioral outcomes advances academic knowledge regarding mobile AR's evolving role in shaping sustainable tourism attitudes and behaviors. Finally, this study responds to calls for greater research into technologies fostering green tourism, contributing much-needed empirical insights into AR's influence in facilitating educational, emotional and conative sustainability gains. The findings provide a rigorous, quantitative basis for ongoing inquiry into AR and other emerging technologies' contributions to sustainable tourism.

Practical Implications

The study offers valuable practical insights into mobile AR's implementation by tourism practitioners to enrich green tourism practices. Firstly, the findings highlight key AR attributes that most strongly influence green experience quality and loyalty. This assists developers in prioritizing interactive features, vivid visualizations and engaging content that optimize tourism sustainability gains. The results provide guidance for tourism organizations to invest in AR capabilities that align with green initiatives and traveler values. Secondly, the research highlights the mediating role of perceived usefulness and ease of use between AR attributes and green experience/destination choice. Recognizing these relationships provides tourism managers actionable guidance for marketing communications aimed at fostering positive perceptions that motivate AR usage and reinforce its benefits for sustainable travel. Persuasively conveying AR's advantages while addressing usability concerns can accelerate adoption. Finally, the findings demonstrate AR’s potential as an educational and inspirational platform for fostering pro-environmental behavior among tourists. Tourism enterprises can leverage interactive and vivid AR content to raise awareness of conservation challenges, showcase sustainability best practices adopted at destinations, and promote eco-conscious decisions by travelers. As stakeholders increasingly embrace technologies augmenting green tourism, this research provides an empirical basis to shape AR applications targeting meaningful sustainability impacts.

Limitations and Future Research

Despite its contributions, this study has certain limitations that present avenues for future research. Firstly, the use of self-reported survey data from tourists poses subjective biases. Supplementing perceptual evaluations with observational data analyzing actual environmental behaviors could enrich insights. Secondly, the cross-sectional research design offers limited perspective into AR's effects over time. Longitudinal studies assessing repeat destination visits could further unravel AR's lasting impacts. Additionally, qualitative approaches exploring tourists’ in-depth experiences with AR eco-technologies could uncover nuanced insights to complement this study’s model testing.

Comparing AR against alternate interactive mediums like virtual reality for delivering sustainability content may also be worthy of investigation. Finally, examining moderating effects of tourist demographics and destination characteristics could reveal useful boundary conditions. Extending this research across contexts, mediums and traveler segments can further advance understanding of technologies promoting green tourism globally.

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DESTINATION SUSTAINABILITY OF IJEN GEOPARK AS PERCEIVED BY TOURISTS: HOW FAR ITS IMPACT ON VISIT INTENTION?

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Abstract: Collectively, geotourism has grown intensively in the last decades. Therefore, this study was done to determine the potential factors affecting the intention of tourists to visit Ijen Geopark, located in East Java, Indonesia, hence contributing to the broader discourse on geopark tourism, sustainable tourism, destination marketing, and consumer behaviour. In this research, a total of 424 tourists were surveyed, including both those who have visited the geopark and those who have not. The findings indicate a significant relationship between key variables found using exploratory factor analysis and structural equation modelling. Overall, destination sustainability directly affects both the tourist's visit intention and destination image and credibility, whereas destination credibility itself influences destination image and the tourists' environmental motivation. In addition, environmental motivation was seen as a relevant driver that had a positive impact on both destination image and visit intention. The results also confirmed that destination image would play a critical role in shaping tourists' visit intentions. The current findings bring to light the relevance of sustainability and credibility in driving attractiveness in both geoparks and other nature-based tourism destinations. This study provides valuable insights for tourism managers to promote sustainability and manage credibility, ultimately resulting in positive effects on tourist behaviour, such as higher environmental motivations. The direct contribution of this research is indeed to the United Nations SDGs, through encouraging sustainable tourism supportive of natural heritage conservation-SDG 12: Responsible Consumption and Production. It also aligns with SDG 13: Climate Action, in which the emphasis on environmental motivation reflects the necessary eco-conscious tourism. Finally, represented by SDG 8: Decent Work and Economic Growth is the potential of sustainable tourism to contribute to local economies. This study in its entirety demonstrates how the intersection of sustainability to destination management and tourist behaviour can further responsible tourism in line with global sustainability goals.

Keywords: consumer behaviour, destination marketing, geopark tourism, sustainable marketing, Ijen Geopark

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INTRODUCTION

Geotourism is on the rise globally, particularly due to the fast expansion of UNESCO's Global Geoparks network, leading to an increase in the number of geotourists (Dowling et al., 2021). More specifically, geopark tourism is among the fastest-growing categories of tourism that integrates management and development regarding geological heritage sites. Based on Tuckyta et al. (2024), geopark tourism provides for conservation and educational use of the protected area with considerable geological heritage. Furthermore, this type of tourism not only develop any interest of tourists but also promotes geotourism, geoconversion, and education based on geological and environmental heritage.

This makes geopark tourism different from the other forms of tourism, and it is for this reason that more emphasis is now placed on education and conservation. Kusnadi (2023) significantly focuses on the dual aspects of geopark tourism, namely, environmental conservation and geological heritage as major attractions.

However, conservation principles combined with tourism development result in tension because most of the conservation principles restrict human activities, including tourism and economic endeavours. All these challenges notwithstanding, geopark tourism is considered a path toward sustainable development that harmonizes geological, biological, and cultural diversity by its spatial conservation principle. Recognition of geoparks-for example, the UNESCO Global Geopark status accorded to Ciletuh, Indonesia-highlights their international importance, while simultaneously creating challenges for balancing global recognition and implementation of local environmental policy.

Still, Drápela et al. (2021) mentioned that geopark tourism should fully support methods and practices for sustainability, especially in relating the abiotic, biotic, and cultural aspects of any one landscape. Besides, the development of geopark tourism should be in concert with the needs and wants of the local communities and help safeguard the geoheritage. Though geopark tourism has been advocated for worldwide, especially in areas with striking natural features, the task lies in how to control the intensity of tourism so as not to destroy the geoheritage sites themselves.

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In these recent years, the promotion and protection of geoheritage is an important issue in tourism of a geopark. Suhud et al. (2023) explain that geopark tourism refers to a type of tourism that concerns the management and sustainable use of valuable geologic heritage. Most geoparks contain several other geological formations such as mountains, canyons, waterfalls, caves, and even fossils among other cultural and natural resources. These geoparks might join the Global Geoparks Network supported by UNESCO so that they could eventually become milestones in this geotourism industry. In their paper, Yuniarti et al. (2022) debate the development of geopark tourism within the Ciletuh-Pelabuhanratu Geopark in West Java Indonesia. This type of tourism is to be developed around the geopark's geological values and special natural heritage, which will be enlisted in the development of sustainable tourism of the area. Geopark tourism in Ciletuh-Pelabuhanratu is representative for the integration of geotourism with local economic development. Skibiński et al. (2021) have defined geopark tourism within geotourism as "knowledge-based tourism which integrates cross-disciplinary aspects of the tourism industry with the conservation and interpretation of abiotic natural features, while considering relevant associated cultural issues at geosites for the general public." When the educational and conservation features of geosites are utilized, geopark tourism has the highest potential to greatly benefit regional development.

Intention is driven by awareness in many contexts, such as tourism and technology adoption. This again reflects the case of geopark tourism among many other environmentally conscious behaviours mentioned under many studies. Recently, the development of tourism in geoparks has been significantly influenced by the recognition of the surrounding natural environment, as noted by Megerle (2020). Travel restrictions and the re-discovery of local surroundings have arguably contributed to a surge in the number of visitors in natural areas for activities such as walking, biking, and hiking. Unfortunately, this surge in visitor numbers has been accompanied by increased pressure on sensitive nature complexes, including the geotopes, with resultant problems such as disturbance by improper parking, litter, and/or violation of rules. These behaviours run the risk of significantly undermining the geopark conservation effort and suggest that while awareness may well drive visit intention, such awareness must be linked to responsible behaviour if the sustainability of those actions is to be ensured. Patwary et al. extend this argument to the hospitality industry, where environmental concern plays a significant role in the intention of international tourists to stay in green hotels. In Malaysia, as awareness of green hotels is still in the nascent stage, increasing environmental knowledge amongst tourists is instrumental in improving their attitude and intention toward choosing environmentally friendly accommodations. This therefore framed that awareness of environmental issues and green actions is vital in encouraging sustainable choices among consumers. According to Apuke (2018), awareness can be improved to drive intention through publicity. In this present study, he proved that with better and higher publicity, much more awareness can be created which could then lead to a significant raise of intention among people or consumers towards the use of a certain product or service. This demonstrates the impact that awareness campaigns can have on encouraging positive consumer behaviour and boosting brand or product involvement.

In their study focused on brand awareness, Ihzaturrahma & Kusumawati (2021) show that when a brand is highly endorsed, there is a resultant positive effect on the intention to buy. Consumers are more inclined to patronize, or intend to patronize, brands they know. This reiterates the clarity of findings in related studies which show that brand awareness plays an important role in influencing consumer choice, frequency of purchase, and brand trial. Flavián et al. (2022) investigate the role of awareness in new service adoption in the context of investment services based on AI. The obtained results prove that awareness increases the acceptance of new disruptive services for every different customer group, but for young consumers and women. Awareness makes a very important contribution to establishing users' intentions in relation to the deployment of AI-driven analytical services, underlining its importance in innovative technology adoption.

While there has been a significant rise in research studies investigating the factors influencing tourists' intention to visit geoparks, only a limited number have delved into crucial topics like sustainability, credibility, and environmental motivations. For this reason, it would be beneficial for the present study to explore such factors that may influence tourists to visit Geopark Mount Ijen, such as destination sustainability, destination image, destination credibility, and environmental motivation, with a view to determining which of these factors is the most influential. In this respect, because this research does incorporate these variables, it has given far more meaningful insight into how sustainable practices, perceived credibility, and tourists' environmental consciousness contribute to their decision-making process and, consequently, offers valuable insight into the dynamics of geopark tourism. The purposes for such urgency to examine destination sustainability, destination image, destination credibility, and environmental motivation in this study are reasoned by their important roles in shaping tourists' behaviour and decisions in the context of geopark tourism. Destination sustainability is vital in that it reflects the long-term viability of the site, hence influencing the perceptions of tourists for environmental responsibility, an issue which now has started to take centre-stage among modern eco-conscious travellers. It is important because the destination image hinges on overall perceptions or appeal that tourists develop of a destination and their willingness to visit a destination. Destination credibility also has to do with a tourist being likely to place more confidence in and visit those destinations perceived as reliable and capable of fulfilling their promises. Second, environmental motivation-that is, the growing trend for tourists to seek tourism experiences that are in line with their environmental values-makes it a very important driver of tourism demand to nature-based destinations, including geoparks. These form the basis for the development of an improved understanding of the appeal and viability of geoparks, especially at this present time when responsible and sustainable tourism has taken centre stage with a state of global urgency.

Ijen Geopark is a park located in East Java, Indonesia, on the border of two regencies, namely Banyuwangi and Bondowoso. As stated by Irmayanti et al. (Pribadi et al., 2024), this is a geopark with natural wonders, especially for having the rare "Blue Fire" and one of the most acidic craters, the Ijen Crater, which are the two major attractions for visitors coming from all over the world. Ijen Geopark is all about tourism, biodiversity conservation, and geological and cultural aspects around the ecosystem of Mount Ijen. It deals with the provision of empowerment to the local communities and increasing their awareness towards the conservation of nature. As stated by Irmayanti et al. (Pribadi et al., 2024) and Permanadewi et al. (2024), tourism within Ijen Geopark concerns promoting biodiversity, geology, and cultural heritage around Mount Ijen. Accessibility to most geosites is relatively easy, while the rest require efforts, for example, the Neogen Limestone Sembulangan can only be accessed by boat. This geopark offers hiking, bird watching, and biodiversity observation. It is developing "School goes to Geopark" educational programs for both tourists and students visiting the area. Planning for sustainable tourism in Ijen Geopark still faces many problems with its maintenance of infrastructure and environmental conservation. Ijen Geopark integrates geotourism with conservation and education to ensure that the experience during a visit is enriching yet sustainable and contributes to the community.

LITERATURE REVIEW

Destination sustainability

In other words, destination sustainability incorporates environmental and social concerns with economic ones to ensure that tourism destinations are viable in the long term and have a positive impact. Gong et al. (2019) explain that destination sustainability is the application of the triple bottom-line sustainability framework at regional or destination levels, and this has been considered vital for sustainable tourism. It demands a coordinated effort in planning, managing, and regulating a large degree of interacting elements and effects at the destination level-far beyond what individual organisations and private companies are prepared for. It therefore involves, first and foremost, a driving role of local or regional authorities for sustainable development. Jørgensen (2023) further explains that destination sustainability involves measuring and enhancing the sustainability levels at these destinations. This applies in using various indicators, certifications, and indices in observing and assessing the ability of tourism to act economically, socially, and environmentally. The idea is to enhance the ability of tourism destinations to act within the notion of sustainability, which encompasses environmental, social, and economic dimensions. Moliner-tena et al. (2021) further explain destination sustainability as an attempt to develop and/or promote harmony among the economic, socio-cultural, and environmental dimensions within tourism destinations. Fortunately, through these practices, this balance has come to be satisfied in securing the long-term sustainability of such a destination, from management of natural resources to sustainable local economic development and the social and cultural aspects regarding care for local communities. According to them, sustainability makes for the creation of memorable tourism experiences for future generations.

Along similar lines, Palacios et al. (2021) defined destination sustainability as the attempt to preserve and improve the balance between environmental, social, and economic dimensions concerning hospitality management in tourism destinations. This may encompass those practices that promote the conservation of natural resources, equity in the social sphere for residents and visitors, and the production of economic benefits in a sustainable manner within the local community. It's all about ensuring that tourism development pays dividends to the stakeholders while supporting the long-term health of the destination. Additionally, Jesus (2023) extends the concept to talk about destination sustainability as one grand initiative entailing maintaining and improving the sustainability of environmental, social, cultural, and economic elements of a tourist destination. This shall involve responsible management of natural resources, conservation of the cultural heritage, gaining control by the local community, and economically viable benefits accruable to all those involved. In this case, authentic tourism experiences are created with a view toward conserving social and cultural identities but at the same time contributing positively to the environment and the communities.

1. Destination sustainability and visit intention

A few studies have begun to explore this relationship in a variety of contexts, showing that sustainability and its impact on visit intention are becoming more prominent in the field of tourism research. As such, Talwar et al. (2023) note that sustainability affects visit intention by three mechanisms: through environmental impact, pro-environmental behaviours, and willingness to forego in-situ tourism experiences for sustainable alternatives. They further indicate that environmental awareness and pro-environmental practices at a destination level may increase the intentional behaviour of tourists to visit a place, especially among environmentally concerned tourists. Further, even the intention to sacrifice their experiences with direct tourism for the sake of ecological sustainability may also lead tourists toward an alternative form of sustainable tourism, such as virtual tourism. Moreover, Riva et al. (2022) extend this discussion into the impact of sustainability on visit intention within the context of green restaurants, and their findings revealed that sustainable environmental management and overall sustainability have positive effects on customers' intentions toward revisiting restaurants.

The concepts of green consumerism, green perceived value, and green perceived quality will, therefore, help in shaping repeat visit intentions that indicate sustainability practices in the hospitality industry are significant for customer loyalty and retention. In addition, Su et al. (2020) contribute to this discussion through a focus on the driving role of destination sustainable responsibility (DSR) in visit intention. They illustrate the significant influence of tourists' perceptions of destination social responsibility efforts on trusting the destination and the intention to visit. Therefore, evidence from the research indicates that when tourists perceive positive social motives for a destination, it builds their level of trust and reduces perceived risks, hence consolidating the intention to visit. The finding therefore suggests that the integration of social responsibility in the management of a destination is one sure way of increasing tourism.

Bieszk-Stolorz et al. (2021) introduce another perspective: the effect of museum sustainability, enabled by gamified e-guides, on visit intention. It might improve the cultural, environmental, social, and economic sustainability of the museums, since gamification attracts visitors and at the same time enhances the level of engagement in learning. It is also discovered that gamified e-guides have a positive influence on visit intention because such innovations allow museums to reach new audiences, increase the cultural awareness of visitors, and foster conservation of the environment. Zeng et al. (2021) narrow down to sustainability in mountain health and wellness tourism, indicating that such mountain destinations have sustainable practices which are related to taking positive tourist experiences that lead to higher satisfaction and, therefore enhanced visit intention. They indicated that incorporation of sustainability in the overall tourist experience would have a direct and indirect impact on visit intention, hence improving the competitiveness and longstanding success of the destination.

2. Destination sustainability and destination image

Various studies have reiterated that the concept of sustainability has gained increasing importance in shaping the perceptions of tourism destinations. According to Silva (2018), sustainability enhances destination image by incorporating its dimensions of environmental factors, social factors, and economic factors into the identity of tourism destinations. The findings show that consumers have embraced sustainability as part of a destination image where elements such as environmental preservation, resource conservation, and social protection become an integral part of the way in which destinations are perceived. Sustainability has often been used as a strategic argument by tourism marketers in appealing to consumers, further showing it constitutes a sound basis for contributing to an understanding of a destination's identity and image. Li et al. (2021) also discuss the aspect of sustainability in developing a sustainable image of a destination. Through the configuration-based approach, their study indicates that integrating sustainability in the promotion of the destination image would increase the holistic perception about the destination image and help develop sustainable tourism. This goes to mean that sustainability is not only essential for immediate appeal of destination competitiveness but also for the long-term image sustainability of a destination. In this respect, Hatzithomas et al. (2021) have pointed out that sustainability influences the sustainable image of a destination shaped by how tourists perceive messages conveyed through mass media, popular culture, personal sources, and direct experiences. The findings have suggested that environmental quality is a factor in creating a desirable destination for an international audience-a factor that again emphasizes sustainability in international destination perceptions.

Although in the paper of Leković et al. (2020) the source of sustainability factor is not approached as relevant to destination image directly, the authors recognize its importance in general context of tourism destinations management. According to the researchers, the sustainability factors that include environmental conservation, local economic development, and cultural preservation lie at the heart of the positive and sustainable destination image. This, by implication, would seem to suggest that even in those cases where sustainability is not discussed, it forms a silent underlying factor which can add positive appeal to the destination on a long-term basis. In Melé et al. (2020), the authors discuss how sustainability practices will affect the "green image" of cities, this being a desirable perception by tourists about a city's commitment to the environment. The research suggests that investment in a green image has become of paramount importance, while sustainability practices affect the overall destination image indirectly through the generation of a positive green image. This means that environmental sustainability has lately been taking relevance in the levels of perception towards destinations. Finally, Almeida-Santana & Moreno-Gil (2019) support that there is an important role of sustainability in the boost of competitiveness at tourism destinations. The findings of the research showed that the management of sustainability, besides the sociodemographic, cultural, and behavioural characteristics of a tourist, plays a very vital role in the perception of tourists about the destination's sustainable image. This therefore calls for the inclusion of sustainability in destination marketing strategies to achieve a positive competitive destination image.

3. Destination sustainability and destination credibility

The concept of sustainability and brand credibility is a very relevant topic in both academic research and practical application, particularly within the sectors of tourism and hospitality. According to Rosli et al. (2019), sustainability drives hotel brand credibility a long way and thus influences the tourists' choice of hotels. They mentioned that in the era of sustainability, full and accurate information raises consumer acceptance; their willingness to recommend the hotel to other consumers increases. Therefore, brand credibility and attachment are two aspects in which to invest in the case a hotel manager wants to reach long-term brand sustainability. This would imply that sustainability is an important mediator of consumer perception about the credibility of hotels and, therefore, their decision-making process. Cowan & Guzman (2020) further this discussion by considering how sustainability impacts corporate credibility. They note that consumers believe that companies investing in sustainability initiatives and corporate social responsibility are more credible and. Besides, these initiatives for sustainability and CSR can result in an overall brand evaluation and may affect brand equity in a positive way, though it is not necessary that they always guarantee its direct impact on brand equity. It means that sustainability would contribute much to enhancing credibility of a company and improvement regarding consumer's perception about the brand. Sydnes & Aarvold (2021) go ahead to explain how sustainability impacts credibility particularly when firms advertise their communication. They have pointed out possible negative consumer reactions to greenwashing because of perceived sustainability claims that are not honest or manipulative. According to the study, sources of the claim seem to be the main factor, but specificity and relevance of the claims to the brand and firm history in terms of sustainability are also important moderators. Companies able to credibly communicate their sustainability initiatives and to show a sincere approach are perceived as more credible, even if their past was not so 'green.'.

Uitslag's (2024) study carries on to confirm that brands perceived as more committed to sustainability had more credibility for customers. This enhanced credibility strengthens the brand image and increases consumer purchase intention. Conversely, brands that are perceived as being less committed to sustainability initiatives find it difficult to attract a retain ecologically concerned customer. Due to this, authentic integration of sustainability into a brand is irrepressible in meeting the consumer expectations and ethical work standards. Sander et al. (2021) extend the impact of sustainability on advertisement credibility. Accordingly, the study shows sustainability advertisements significantly improve the perceived advertisement credibility, especially when the advertising is related to environmental aspects. In negative cases manipulative perceived content of the advertisement leads to negative reactions and rejections. On the other hand, if the advertisement is deemed credible and free from manipulative motives, the emotive response becomes more positive. The results also reveal that environmental sustainability advertising yields a more positive attitude toward the ad than social sustainability advertising, once again suggesting that environmental advertising messages have stronger effects on consumer perceptions of ad credibility and their overall attitude toward the ad.

Destination credibility

It is a multi-dimensional construct that becomes imperative in the formation of the perception and behaviours developed by tourists towards destinations (Suhud et al., 2024). According to Japutra & Keni (2020), destination credibility consists of the extent to which one feels that the management of the destination is willing and able to perform promises made to the destination. The definition stresses the role of the management in relationship building through ensuring that the destination lives up to the expectations set by its promotional initiatives. Jiménez-Barreto et al. (2020) provide an explanation of the concept in the context of online destination credibility. Thus, it thus defined as that degree of trust a user has in the brand credibility of a destination in line with their good and poor user experiences on the destination platform.

Their online trust therefore influences users' behavioural intentions toward the destination. Moreover, the authors underscore that destination credibility is a relational concept that can be created and explored by assessing subjective personal experiences-a prerequisite for inferring that the perceived level of credibility of a destination brand has a lot of potential to affect customers' attachment and satisfaction. On the other hand, Majeed & Ramkissoon (2022) relate the credibility of the destination to tourists' trust or confidence in a destination derived from perceived risk, information derived from sources, and experiences. Besides, they indicated how crises such as the COVID-19 pandemic may affect the credibility and image of the destination, while further influencing the decision-making process of travellers.

Molinillo et al. (2022) contribute to this discussion by defining destination credibility as a perception of trust towards a destination brand after the visit has taken place. This post-visiting ability to trust, they say, is important because these increase the potential for future behaviours-like repeat visits or recommendations. The correspondence between pre-visiting information and the post-visiting experiences will be important either in maintaining or enhancing the credibility of the destination. Finally, Pelet & Ettis (2022) give another point of view by mentioning destination credibility, which refers to advertising. They define it as the confidence in consumption about where an advertisement would take them-to a brand's Facebook page or its main website. They indicate that the consumer can evaluate the credibility of an advertisement by confirming how well the ad corresponds to their experiences and by trusting the message and medium of the advertisement.

4. Destination credibility and destination image

One of the most critical areas in the study of destination credibility and destination image has just started to attract attention in recent years, though the research remains somewhat limited. According to Omeish et al. (2024), influencers' credibility significantly shapes the destination image. Their findings indicated that the perceived credibility of influencers, hence, made the recommendations more persuasive, leading to a more positive formation of destination image. This may imply that the trustworthiness of the influencers plays an important role in incrementing how a destination is perceived by prospective tourists. Similarly, Qiu et al. (2023) address the influence of information source credibility on destination image. Their findings showed that a positive destination image evaluation and emotional evocation take place when the tourists perceive information sources about the destination as credible and promises to put up by the destination are upheld.

This leads to a "signal fit" perception; that is, the credibility and honesty presented by the destination are matched appropriately with the expectations from the tourists. Therefore, the credibility of a destination significantly influences the image of the destination and further on, tourist behaviour towards the environment. Abad & Borbon (2021) also identify the interaction of credibility and destination image, placing emphasis on travel vlogs. In their study, they showed that the credibility of information expressed in travel vlogs predisposes perception to trust a certain destination and therefore increases the capability to project the image of the destination. This again gives meaning to how credible information can affect online content about destinations and show what potential visitors perceive. On the other hand, Huang et al. (2021) have focused on an overview of different factors that may affect destination image but have not put into perspective precisely how credibility has an impact on destination image. Mentioned studies such as Lee et al. (2019), where the influence of tourists' experiences concerning street food quality on destination image was studied, and Lee & Jeong (2018), who discusses pro-environmental destination images and recreational sport interest in pulling out visitor motivations for pro-environmental behaviours in Korean national parks. Although credibility is not mentioned, under such circumstances, it is envisaged to be quite a considerable factor which shapes destination image since normally a good image resulted because of trust and credibility a destination attraction commands among tourists. Finally, Ran et al. (2021) have conducted research on the effect of e-WOM credibility on destination image. The study established that destination image is influenced positively by e-WOM credibility, which goes to mean that tourists' confidence in the credibility of e-WOM information has the potential to influence their perception toward a destination and thus influences attitude and perceived behavioural control toward the destination.

5. Destination credibility and environmental motivation

Then again, regarding educators, a concept more customized to the above discussion is what is known as credibility docent. This instance of credibility associates rather well with motivation. Each of these studies pops out different facets of such an engaging relationship. According to Froment et al. (2022), how students perceive their university professors, as reflected in professional profiles, is significantly and positively related to academic motivation. Further, this addresses the fact that if a student believes his or her instructor is credible, then that student is motivated to engage more in academics.

The present study underlines the important role credibility may play in giving students' academic motivation and helping them improve their results. Froment et al. (2021) further reinforces this idea because they clearly illustrate that docent credibility not only encourages motivation in students but even positively affects the performance assessment given by them to educators. That is, it will serve as a self-sustaining cycle whereby a credible educator increases student motivation which affects students' view about the quality of instruction they receive. This therefore underlines the need for maintaining high credibility amongst educators to ensure a productive learning environment. In this direction, Martin et al. (1997) also establish a significant relationship between instructor credibility and situational motivation among students.

According to their findings, students who perceive their instructors as highly credible are most likely to show higher levels of situational motivation in the learning context. That goes to indicate that instructor credibility could result in a motivating factor for students right at the point of engaging them in learning activities. Zheng (2021) also explores the connection between teacher credibility and student motivation, citing that it positively influences both. Zheng (2021) argues that credibility refers to a perception of competence, care, and reliability in a teacher. Indeed, student motivation greatly improves along with many facets of the learning experience with this perception; thus, it shows just how broad the influence of teacher credibility can be in terms of the outcomes for students. Finally, Johnson & Kaye (2015) extend the notion of credibility outside the classroom into a discussion of motivating effects within the media use context. This study has shown that perceived credibility of both traditional and social media platforms affects motivational use for the purpose of political information. High perceived credibility in social media like Facebook, blogs, and Twitter influences the choice to use such media for political information, hence underpinning the role of credibility in shaping media consumption behaviours.

Environmental motivation

The concept of environmental motivation is different in every context, but intrinsic and extrinsic variables have been the main strives of pro-environmental behaviour. In an organizational setting, environmental motivation could be explained as the type of influence provided by a favourable work environment on the motivation and performance of the working population; a good work environment increases job satisfaction and, in turn, employee performance (Palino & Choldun Sina Setyadi, 2021). At the personal level, environmental motivation would stem intrinsic undergirding of personal beliefs and internalized norms when individuals are environmentally activated internally without extrinsic rewards or sanctions coming from other people (Sharpe et al., 2022). This intrinsic motivation is essential since such deep-seated values and moral convictions will help to maintain long-term pro-environmental behaviour (Thiermann & Sheate, 2020).

The environmental motivation in organizational management significantly impacts green technological innovation and eventually organizational performance through, for instance, the involvement of employees in environmentally responsible behaviour. According to Tipanya et al. (2022), in realizing business sustainability, there is a need to ensure that environmental objectives are combined with employee motivation. Otherwise, environmental motivation is taken as the key in technology adoption, where people's readiness to utilize green technologies would rely on their commitment to reducing their impact on the natural environment (Wathuge & Sedera, 2023).

6. Environmental motivation and destination image

Several studies have pointed to the relationship between motivation and destination image as very complicated and interwoven. According to Tang et al. (2022), tourist motivations, mostly about learning and having entertainment, play an important role in shaping the perceived image of a destination. It is these motivations that provide a clear framework through which tourists perceive the natural, cultural, and infrastructural conditions of a destination and finally determine whether to return or not. Carreira et al. (2022) identify that both cognitive and affective motivations operate positively to influence the destination image formed during a visit, which seems to bear evidence of the fact that already existing motivations and expectations can shape tourists' perceptions and experiences-a process bounded within influencing future behavioural intentions. In this way, motivation is not just a precursor to travel but also plays a critical role in the ongoing development and reinforcement of a destination's image. Moreover, the interaction of motivation and destination image extends into the domain of pro-environmental behaviours. For instance, Lee & Jeong (2018) note that a pro-environmental destination image can enhance both intrinsic and extrinsic motivations to engage in sustainable practices. This infers that perceived environmentally responsible destinations can enhance tourists' motivation to behave in an environmentally friendly way. Boomsma (2013) gives an added dimension by highlighting how motivation is affecting the mental imagery, especially within the context of visual messages encouraging pro-environmental behaviour. Mental imagery could be a powerful form of motivation, focusing on strengthening or even instilling new goals aligned with sustainable living. Although these have been revealed, it has not been clearly explained how Destination Image particularly influences environmental motivation; hence, there is a literature gap. On the other hand, Zheng et al. (2021) reiterate mutuality of this relationship when they show that a positive destination image can boost the travel motivation to point out that these two factors keep interacting with one another in shaping tourist behaviour and destination attractiveness.

7. Environmental motivation and visit intention

By far, a relatively underexplored area of inquiry is the effect of environmental motivation on visit intention- namely, outside the realm of volunteer tourism. The studies that have been conducted to date-for example, Suhud (2015) has indicated that environmental motivation indeed bears a positive relationship to visit intention within volunteer tourism in such a way that the higher the tourists' environmental motivation, the longer they will spend on activities targeting environmental conservation. This implies that environmental motivation can potentially play an important role in influencing behavioural intentions, particularly when the activities come into line with the environmental values of the individual and his concerns. Based on this, De Groot & Steg (2010) avowed those different forms of self-determined motivation, including those driven by environmental values, are the crucial component in predicting pro-environmental intentions. These findings reveal the potency of environmental motivation to predict visit intention, particularly in contexts where the destination/activity resonates with the pro-environmental goals.

However, outside the field of volunteer tourism, how environmental motivation creates visit intention is less documented, which presents a literature gap. For instance, He et al. (2021) and Pop et al. (2020) confirm the magnitude of environmental motivation in engendering intentions to perform pro-environmental actions, such as purchasing green products or adopting new energy vehicles. These findings evoke the belief that, in a similar way, visit intention to environmentally sustainable destinations can be influenced by environmental motivation, though empirical evidence thereof in just this context would be scant. Qu et al. (2019) add weight to the fact that motivation, especially desire, is very important in the development of tourists' pro-environmental behavioural intentions. With such insight, there would therefore be a strong rationale for further research into how environmental motivation may have an impact on visit intention in diverse contexts of tourism and could thus contribute toward more focused strategies in the promotion of sustainable tourism.

Destination image

The core of the destination image is constituent in the process of tourist perception and evaluation of places that are considered as possible travel destinations. Its cognitive and affective constituents play an important role in shaping how tourists perceive and feel about a specific destination. Qiu et al. (2023) identified destination image as the perception or impression of the destination that tourists held in their minds, wherein the contents included both cognitive and affective elements, namely thought and emotion. Their study showed that the credibility of sources of information about the destination maintains the destination image up front. At the same time, the destination image also mediates the relationship between credibility of destination and environmentally responsible tourist behaviour. This, on other words, implies that there is a probability that credible image can ensure more environmentally responsible actions from tourists. In this, Ran et al. (2021) elaborate by explaining that destination image is the summation of perceptions created by a series of impressions from various factors such as natural, cultural, social, and infrastructural attributes of the destination. The study has stated destination image to be a mental representation showing the body of knowledge and feelings possessed by an individual toward a given destination.

These factors consist of personal traits, past travel experiences, and nationality that collaborate or have a significant role in shaping this image. The multi-faceted conceptualization of destination image evaluation through cognitive, affective, and behavioural eyes underlines its complexity. Rodrigues et al. (2023) give a subtler view by presenting that the destination image is formed in three different stages: during the choice of the destination, during the real consumption of the trip when expectations are compared with reality, and after the visit has taken place, when word-of-mouth promotion and recommendations occur. They underlined that the destination image encompasses a relational set of cognitive, conative (behavioural), and emotional components which, in their integral whole, comprise the picture of the destination.

In fact, this tripartite approach would indicate that destination image is dynamic and does change across different phases of the tourist experience. Suban (2024) emphasises the effect of destination image on the level of tourists' satisfaction and re-visitation intention. It is indicated that destination image is a result of a few aspects that include tourism promotion, previous experiences of tourists, reviews from others, and an overall perception that is continually formed in the minds of tourists. This postulates that care needs to be taken in managing destination image for high tourist satisfaction and re-visitation rates. Suhud & Allan (2022) have characterised destination image as the sum of beliefs, ideas, and impressions that one has about a destination. These perceptions are affected by factors such as promotion, received information, and previous experiences. Their work emphasizes how important it is to understand how those factors interact together in combining to create a destination image that further affects tourists' decisions and behaviours.

8. Destination Image and Visit Intention

While destination image has, in fact, been found in the tourism literature to relate to visit intention, it shows how important perceptions of a destination element may turn out in influencing the tourists' decisions regarding their visit. Liang & Lai (2023) refer to the fact that destination image bears great significance about visit intention, while their research confirms such a mediating role of destination image between brand image and the intention to visit. The finding underlines the importance of a favourable image of a destination to enhance tourists' intentions to visit a location. Rodrigues et al. (2023) emphasize that destination image is going to have a great influence on visit intention.

As Rodrigues et al. (2023) point out, that tourist global perceptions about the destination are a critical aspect based on which tourists make their decisions regarding visiting or re-visiting the destination. The above-mentioned relationship is important in terms of rural destination sustainability because a positive image will attract not only first-time visitors but also repeat visitors, which account for the long-term tourism development. Similarly, Suban (2024) indicates that destination image plays an important role in the development of visit intention, where good overall destination image significantly contributes to increasing intentions to visit or revisit. This study also evidences that the influence of destination image on either behavioural intention comes about both directly and indirectly, suggesting proper management of the image can affect tourists at more than one stage in the process of decision-making. This is significantly agreed to by Suhud & Allan, who, on one side, show that destination image has a strong effect on visit intention, in this case, upon Anak

Krakatau Mount Indonesia. Their study is coherent with several other studies that note that perceptions from tourists about a place are major drivers of a tourist's intention to visit. This may mean that destination managers have the main role of improving destination imagery to draw more tourists. Lastly, Suhud et al. (2021) extend the discussion to revisit intentions mobilized by destination image. Their findings proved that a positive destination image impacts not just the initial decision to visit but also substantially improves tourists' satisfaction and intention to return.

This indicates the twofold importance of destination image in driving both first-time visits and fostering repeat tourism-both aspects being crucial in maintaining long-term visitor engagement. Figure 1 illustrates the relational structure of some influential factors that impact visit intentions towards a destination, focusing on the Geopark Mount Ijen. The proposed model suggests that destination sustainability, credibility of destination, and environmental motivation have a considerable influence on destination image: H2, H4, H6. Subsequently, the destination image influences visit intention directly: H1, H7, H8. Moreover, destination sustainability and destination credibility are interconnected-which means a destination perceived as credible is perceived as more sustainable, too. Also, environmental motivation mediates destination credibility, that is, the ecological motivation of the visitors, onboard for congruence of ecological values, leads to positive perceptions about credibility of the destination. This framework underlines the centrality of destination image as a moderator between these antecedent factors and the final intention to visit the site, hence underlining the importance of improving perceived sustainability and credibility of the destination for a positive image able to drive visitor intentions.

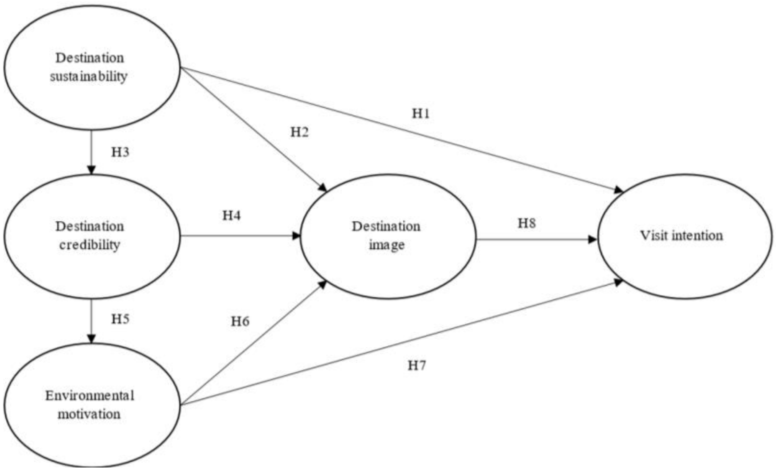

Figure 1. The theoretical framework

METHODS

Measures. Data Analysis Methods

The quantitative data in this study were analysed in four key steps to ensure the robustness and validity of the analysis. First, EFA used SPSS version 29, which tested the validity of the indicators according to Hair (2016), where an indicator is considered valid if its factor loading reaches 0.4 or greater. It was also an important step in identifying what underlying factor structure is present and that items within each construct were appropriately grouped and representative of the theoretical constructs. We then conducted reliability analysis, using Cronbach's alpha, with a threshold from 0.7 or greater being acceptable as a standard goal for reliability (2016). This will also ensure that the constructs being measured are consistent and reliable over time, thereby reinforcing the internal consistency of the scales used in the research.

Third was checking AVE, the acceptable score of which was considered to be 0.5 and above, implying variance that the constructs explain a sufficient amount in their indicators. Finally, the hypotheses in this research were tested by using SEM method with AMOS 29 version. According to Hair (2016), a hypothesis can be accepted when its critical ratio is greater than or equal to 1.96. The goodness-of-fit for the SEM was checked against the following cut-off criteria set by various scholars: probability level is between 0.05 and 1.00, chi-square to degrees of freedom ratio (X2/DF) falls between 0 and 2.00, Comparative Fit Index falls between 0.95 and 1.00, and Root Mean Square Error of Approximation falls between 0 and 0.05 (Table 1). Taken together, these steps ensure the validity of the results from a statistical point of view and their reliability, thus making for a sound basis on which valid conclusions should be rested for this study.

Table 1. Criteria of a fitted model

Criteria	Rule of Thumb	Resources
Probability	$0.05 < p < 1.00$	Schermelleh-Engel et al. (2003)
CMIN/DF	$0 \leq \text{CMIN/DF} \leq 2$	Tabachnick et al. (2007)
CFI	$0.95 \leq \text{CFI} \leq 1.00$	Hu and Bentler (1995)
RMSEA	$0 \leq \text{RMSEA} \leq 0.06$	Hu and Bentler (1999)

RESULTS

Participants

As demonstrated in Table 2, the demographic background of the 424 participants in this study is highly varied, with 66% being females and 34% males. Additionally, the age range of 21-25 years had the highest representation at 51.4% in the sample, followed by the age group 26-29 years with 20.5%, while the remaining age groups had lower representation. On educational attainment, 36.1% had completed their diploma, 31.4% had undergraduate degrees, and 29.2% had high school education. Only a few had post-graduate educational levels (2.1%), or less than high school education, 1.2%. Occupational status fell mostly into the employed category 53.8%, self-employed made up 23.3%, and unemployed status constituted 22.2%. The marital status showed that 58.5% were unmarried, 38% were married, and other lesser percentages separated/divorced (3.3%) or widowed (0.2%). Previous experiences in visiting Ijen Geopark showed that as many as 63.4% had visited the place, while 36.6% had not, which can also provide a balance to compare in understanding tourists' motivation and intention in this study.

Table 2. Profile of participants

Profile		Frequency	Percent	Profile		Frequency	Percent
Sex	Male	144	34.0	Occupational Status	Employed	228	53.8
	Female	280	66.0		Unemployed	94	22.2
	Total	424	100.0		Self-employed	99	23.3
Age Group	17-20	31	7.3		Retired	3	.7
	21-25	218	51.4	Marital Status	Unmarried	248	58.5
	26-29	87	20.5		Separated/divorced	14	3.3
	30-34	53	12.5		Married	161	38.0
	35-39	26	6.1		Widowed	1	.2
	40-45	9	2.1	Experience Visiting Ijen Geopark	No	155	36.6
Level of Education Has Been Completed	Less than high school	5	1.2		Yes	269	63.4
	Diploma	153	36.1				
	Postgraduate	9	2.1				
	Undergraduate	133	31.4				
	High school	124	29.2				

Data Validity, AVE, and Reliability Tests

The data validity, AVE, and reliability tests of the variables and indicators associated with environmental motivation are well within the limits of strong psychometric properties regarding destination publicity, destination sustainability, destination image, destination credibility, and visit intention in respect of Ijen Geopark. Thus, each of the constructs will have a very high factor loading, with all indicators exceeding 0.9, which implies a strong correlation between the items and their respective latent variables. The AVE values, which range from 0.891 to 0.919, mean that each construct shares a reasonable amount of variance with its indicators, thus guaranteeing convergent validity. Furthermore, Cronbach's Alpha values for all constructs were greater than 0.960, indicative of excellent internal consistency reliability; hence, the items are said to have performed consistently in their measurement of the intended constructs (Table 2). Put together, these findings establish the measurement model, thus confirming the reliability and validity of the constructs in measuring tourists' environmental motivations, destination publicity, sustainability, image, credibility, and visit intention to Ijen Geopark.

Table 3. Results of data validity, ave, and reliability tests

	Variables and Indicators	Factor Loadings	AVE	Cronbach's Alpha
	Environmental Motivation		0.892	0.960
Em4	Visiting Ijen Geopark will allow me to develop something sustainable in the area.	0.947		
Em1	Visiting Ijen Geopark will allow me to do something important for the environment in the area.	0.946		
Em2	Visiting Ijen Geopark will allow me to help the environment around the area.	0.944		
Em3	I care about the environment in the Ijen Geopark area.	0.941		
	Destination Publicity		0.891	0.976
Dp4	News about Ijen Geopark on social media is positive and beneficial for Ijen Geopark.	0.954		
Dp3	I often find news about Ijen Geopark on social media.	0.945		
Dp6	News about Ijen Geopark that people talk about is positive and beneficial for Ijen Geopark.	0.944		
Dp1	I often find news about Ijen Geopark on news portals.	0.943		
Dp2	News about Ijen Geopark on the news portal is positive and beneficial for Ijen Geopark.	0.940		
Dp5	I often hear news about Ijen Geopark being talked about by people.	0.938		
	Destination Sustainability		0.919	0.971
Ds4	Ijen Geopark managers will support the sustainability of Ijen Geopark tourism.	0.963		
Ds1	Ijen Geopark managers will provide good services to the community.	0.960		
Ds2	Ijen Geopark managers will support the preservation goals of Ijen Geopark.	0.958		
Ds3	Ijen Geopark managers will pay attention to the interests of visitors.	0.953		
	Destination Image		0.905	0.987
Di9	Ijen Geopark is interesting.	0.957		
Di4	Ijen Geopark is exciting.	0.954		
Di3	Ijen Geopark is charming.	0.953		
Di5	Ijen Geopark is calming.	0.953		
Di8	Ijen Geopark is easily accessible.	0.952		
Di7	Ijen Geopark is friendly.	0.952		
Di2	Ijen Geopark is relaxing	0.950		

Di6	Ijen Geopark is innocent.	0.949		
Di1	Ijen Geopark is fun.	0.941		
	Destination Credibility		0.907	0.974
Dc1	Ijen Geopark reminds me of someone who is competent and knows what he/she is doing.	0.959		
Dc5	Ijen Geopark reminds me of someone who has a name that I can trust.	0.952		
Dc4	Ijen Geopark reminds me of someone who delivers what he/she promises.	0.952		
Dc3	Ijen Geopark reminds me of someone who can provide clear, organized, and expert information.	0.951		
Dc2	Ijen Geopark reminds me of someone who has the ability to deliver what he/she promises.	0.950		
	Visit Intention		0.912	0.976
Vi1	I hope that I will visit Ijen Geopark in the future.	0.962		
Vi5	I really want to visit Ijen Geopark.	0.959		
Vi3	If everything is as I expect, I will plan to travel to Ijen Geopark.	0.959		
Vi4	In the next 12 months, I hope to be able to visit Ijen Geopark.	0.952		
Vi2	I prefer to visit Ijen Geopark compared to other destinations.	0.942		

The structural model presented below, Figure 2, considered from a path coefficient perspective (estimates of the relationships), destination sustainability has a direct influence on destination credibility, environmental motivation, destination image, and visit intention. When testing the model, probability 0.166, CMIN/DF 1.259, CFI 0.999, and RMSEA 0.025 suggest an increasingly good fit of the model.

These path coefficients indicate that destination sustainability is significantly and strongly positively influencing destination credibility with a coefficient of 0.84 and has, further, imparted a strong impact on destination image comprising 0.60. Moreover, destination credibility itself has a quite positive effect on destination image, while having a coefficient of 0.25, which further reassures the importance of credibility in shaping the perception. Environmental motivation influences both destination credibility at 0.72 and destination image at 0.12, though the latter one is relatively weak. Destination image is, finally, strongly predictive of visit intention, 0.34, with there also being a direct path from destination sustainability to visit intention 0.18, and one from environmental motivation with a direct influence on visit intention of 0.34.

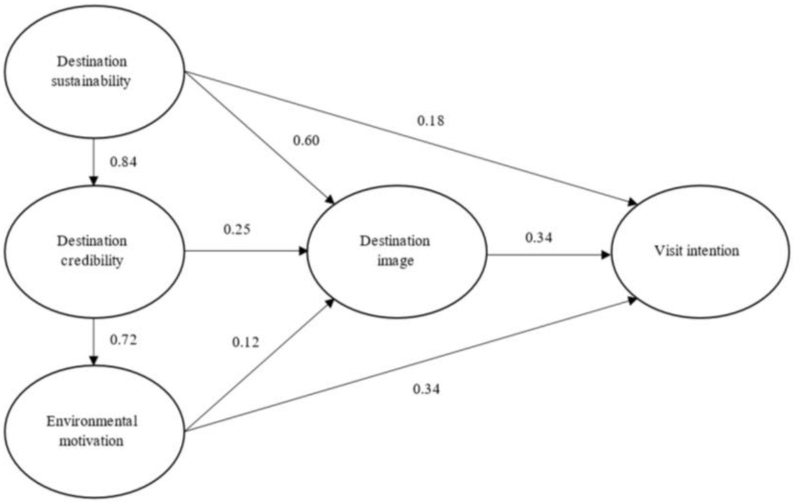

Figure 2. Structural model of the hypotheses tests

The table below shows the results of hypothesis testing using the structural model. Either for C.R. or p-value, each hypothesis was considered as tested and it was accepted only if the value of C.R. is above 1.96, meaning the relation of this variable is significant. Based on these results, all hypotheses from H1 to H8 are accepted since their C.R values are more than the threshold value which is 1.96. Precisely, H1 is supported because destination sustainability has a significant direct influence on visit intention with C.R. = 2.186 and p = 0.029, confirming the relevance of sustainability in relation to tourists' intentions to visit destinations. H2 and H3 proposed that destination sustainability has strong positive effects on destination image and destination credibility at C.R. = 11.121 and p < 0.001, and C.R. = 23.857 and p < 0.001, respectively, thus indicating that sustainability significantly impacts destination image and credibility.

Table 4. Results of the hypotheses tests

Hypotheses	Paths	C.R.	P	Results
H1	Destination sustainability > Visit intention	2.186	0.029	Accepted
H2	Destination sustainability >Destination image	11.121	***	Accepted
H3	Destination sustainability > Destination credibility	23.857	***	Accepted
H4	Destination credibility > Destination mage	3,927	***	Accepted
H5	Destination credibility > Environmental motivation	17.343	***	Accepted
H6	Environmental motivation > Destination image	3.057	0.002	Accepted
H7	Environmental motivation > Visit intention	7.071	***	Accepted
H8	Destination image > Visit intention	3.844	***	Accepted

H4 shows that destination credibility significantly affects destination image (C.R. = 3.927, $p < 0.001$); H5 points out that destination credibility positively influences environmental motivation (C.R. = 17.343, $p < 0.001$). Lastly, in H6, it was seen that environmental motivation significantly influences destination image (C.R. = 3.057, $p = 0.002$), therefore proving that environmentally motivated tourism has a positive effect on perceived image.

In addition, H7 reveals that environmental motivation significantly affects visit intention at C.R. = 7.071 and $p < 0.001$, thus proving that tourists who are motivated in terms of the environment are willing to visit the destination. Lastly, H8 states that destination image has a significant effect on visit intention at C.R. = 3.844 and $p < 0.001$, thus proving true that destination image is the major predictor of tourists' behaviour.

DISCUSSION

As a result, H1 indicated that destination sustainability has a positive influence on visit intention. Thus, it can be argued that tourists have the intention to visit Ijen Geopark in case the destination is perceived as being sustainable. The finding confirmed the studies by Talwar et al. (2023) and Riva et al. (2022), as they also found that sustainability acts as an important factor in shaping the intention of tourists. Sustainable destinations are increasingly preferred by environmentally concerned tourists who seek to reduce impacts on the environment, while at the same time contributing to the protection of natural resources. In this perspective of tourism dynamics, sustainability practices at Ijen Geopark will likely appeal to the values of tourists in their effort toward environmental conservation and community empowerment by motivating them to pay a visit. Accepting this hypothesis leads to an emphasis on the adoption and communication of sustainability practices to attract environmentally aware visitors. As it has been noticed in previous studies, sustainable tourism programs enhance both the attractiveness of the destination and its long-term benefits by maintaining the ecological integrity of the site and assuring a responsible tourist experience. Discussion hypothesis H2 was accepted since Destination sustainability bears a positive influential impact on destination image, meaning that the tourist perceives the destination more favourably in cases where sustainability practices are in place. It was also confirmed by such studies as Silva (2018) and Hatzithomas et al. (2021), where it was found that good sustainable practices lead to better perceived images of the destination. There is also a strong focus on all that pertains to sustainability, which would further enhance this positive imagery by portraying the destination as environmentally responsible with concern for natural resource preservation. In that regard, Ijen Geopark probably enjoys an enhanced image from potential tourists through environmental conservation, community engagement, and the promotion of eco-friendly tourism. This positive association of sustainability with image thus reflects the growing importance of environmental responsibility in the construction of the perception of contemporary tourists. As highlighted by previous studies, for instance, a destination's image greatly varies depending on its sustainability commitment, insofar as tourists are increasingly looking for destinations that reflect their ecological values. Consequently, the acceptance of the hypothesized suggestion strengthens the notion that sustainability not only contributes to ecological added values at the destination but also contributes to an attractive public image.

Therefore, H3: Destination sustainability nurtures destination credibility. Thus, the more positive the attitude or commitment of a tourist destination to sustainability, the higher the chances that tourists will consider the destination as credible. This result supports the research of Rosli et al. (2019) and Cowan & Guzman (2020) in which they also indicated that local sustainability efforts contribute to increasing the level of trustworthiness and reliability of the tourism destination. Demonstrating concern about sustainable practices allows the company to reflect responsibility, transparency, and long-term vision that underpins the key elements of credibility. Efforts to preserve the environmental setting, involve local communities, and promote eco-friendly tourism practices in the Ijen Geopark would likely reinforce in tourists' minds the perception of the credibility for which the destination stands. When tourists perceive that a destination is truly committed to sustainability, more likely the destination is trusted to deliver on promises, such as maintaining environmental integrity and providing responsible tourism experiences. The identified link between sustainability and credibility is a sign of a general tourism market that increasingly demands ethical and trustworthy destinations. This hypothesis reverberates with the reiterated importance of sustainability practices, not only in pulling in tourists but also in the establishment of a destination as one that is credible and dependable.

Thus, H4: Destination credibility positively influences destination image was supported, which means that if tourists perceive a destination as credible, they are likely to form a better image of the destination. This finding also coincides with the results of Omeish et al. (2024) and Abad & Borbon (2021), respectively, who also found that credibility makes a huge difference in enhancing the overall perception about the destination. Credibility refers to trustworthiness, the ability to rely upon something, and to keep promises. It is an important dimension in the development of impressions about a destination. In this context, if Ijen Geopark has successfully established a good reputation in terms of delivering sustainable tourism without compromising environmental values, then its image would be trustworthy and appealing to visit. The more credible the statements about sustainability, conservation, and tourism management at a destination are judged to be, the better that destination is likely viewed. Again, this underlines the role of credibility in underpinning the public image of a destination since tourists increasingly seek those destinations that not only guarantee them aesthetic or recreational appeal but also ensure responsibility and transparency. The hypothesis H5 that destination credibility positively influences environmental motivation was accepted. This result means that the tourists who consider a destination as credible are more likely to show motivations inspired by environmental concerns when it comes to deciding about their visit.

The findings also align with the findings of Peña Froment et al. (2022) and Froment et al. (2021), showing that the more a destination is credible, the stronger the environmental motivation it creates among tourists. In other words, credibility in the destination's ability to reassure tourists about its environmental and sustainability promises will result in a gain of trust.

In this case, it might be expected that tourists would have much more confidence in Ijen Geopark because their managers are committed to sustainability, the development of areas of conservation, and ecological practices. This can reassure tourists who value protection of the environment that their visit will correspond with values of ecology. The eventual acceptance of this hypothesis emphasizes the role of trust and reliability in shaping not only the perception of tourists of their destination but also their motivation to engage in environmentally responsible tourism.

Thus, H6 stated that environmental motivation positively influenced destination image; therefore, it is accepted since tourists with high environmental motivation view the destination more favourably. Therefore, this finding is in line with the studies conducted by Tang et al. (2022) and Carreira et al. (2022) where they also established that those tourists who are sensitive to environmental concerns are more likely to build positive destination images that are reflective of their values. In the case of the Ijen Geopark, for example, tourists whose travel motivations are more driven by environmental concerns will perceive greater destination attractiveness in the park's embracement of sustainability and conservation efforts. The connection drawn between the environmental motivational factors and destination image emphasizes the rising interest in eco-friendliness in shaping the perceptions of tourists. If tourists felt that a destination supported environmental protection and provided sustainable tourism experiences, they would view it more positively, associated with responsible management and ethical practices. Thus, the acceptance of this hypothesis demonstrates that promoting environmental motivations among tourists not only enhances their intention to visit but also improves the overall image of the destination.

Therefore, H7: the positive environmental motivation of the visitor's intention was accepted. This means tourists whose motivations are influenced by environmental issues are more likely to show a good intention to visit Ijen Geopark. It hence confirms Suhud's (Purwana et al., 2015) findings and that of De Groot & Steg (2010), who also found that those people who are motivated by environmental values are more likely to visit a destination that mirrors their ecological orientation. In this case, tourists who have high environmental motivation may consider the commitment of Ijen Geopark for sustainability and conservation as part of their personal values, which in turn will enhance their intention to visit the park. Accepting this hypothesis means that, in turn, it is necessary to emphasize non-pollutive practices and point out how some destination contributes to environmental preservation by appealing to the ecological consciousness of international tourists. Indeed, proven linkage between motivation for visiting due to environmental concerns and intent of paying a visit is reflected in increasing demand for tourism services related to nature since most tourists prefer traveling to those places where they would have an opportunity to be engaged in environmental conservation.

Thus, H8 was supported, indicating that there is a positive relationship between destination image and visit intention; hence, the better the perception of tourists about the destination, the more likely they are to intend to visit the destination. This also supports the finding of Liang & Lai (2023), and Rodrigues et al. (2023), which established that positive destination image significantly impacts the decision-making process and visit intention of tourists. It is probable to believe that, in the context of Ijen Geopark, a strong and appealing destination image focusing on natural beauty, unique attractions such as the Blue Fire, and concern for sustainability enhances the tourists' desire to visit. A positive image would evoke emotions, trust, and a sense of anticipation; thus, the destination would be more attractive to potential visitors. The fact that this hypothesis is accepted underlines the important role of destination image in influencing the travel behaviour of tourists. It is when a tourism destination is perceived by tourists as appealing, responsible, and well-managed that they are willing to plan a tour.

COCLUSION

This research was conducted to study the factors that affect tourists' intentions to visit Geopark Mount Ijen. The research concentrated on destination sustainability, destination credibility, and environmental motivation in relation to their impacts on in shaping the destination image that affects visit intention. Indeed, the results, as visible in the structural model, reveal that destination sustainability has the highest direct effect on destination image—a pivotal mediator to visit intention—at 0.60, followed by destination credibility, which highly contributes to forming a positive destination image with a value of 0.25. This latter factor is strongly influenced by destination sustainability at 0.84.

Environmental motivation, even though it was relatively small in the direct influence on destination image, showed 0.12 and still contributed much to improving visit intention to the extent of 0.34. This, in general, leads the study to conclude that a good destination image, which would come from mainly sustainability and credibility, has a crucial drive for tourists to visit Mount Ijen, further motivated by environmental motivation. This research theoretically enriches the factors that drive tourists to visit Geopark Mount Ijen. The proposed linkages of destination sustainability and visit intention, destination image and visit intention, destination credibility and visit intention, and environmental motivation and visit intention would further enrich the interactions of these constructs in the setting of tourism sustainability. Taken together, these findings support that destination sustainability directly influences visit intention and, in the same moment, has an important role in the destinations' image and credibility development. Additionally, through this research, it was identified that destination credibility brings a relatively above-average effect on destination image and environmental motivation, adding trust and perceived competence to the importance of driving positive tourist perception. This research also contributes to the literature by showing how environmental motivation is one of the major mediators through which destination image and visit intention are influenced. Finally, confirmation of the positive impact exerted by destination image on visit intention underlines the significant role which tourists' perceptions about a destination play at the moment of taking decisions. These contribute to the theoretical discourse on sustainable tourism through the entwinement of environmental and psychological factors within the tourist behaviour framework for a more holistic understanding of how sustainability and credibility level affect tourism intentions.

This is crucial information for tourism managers and other stakeholders involved in managing Geopark Mount Ijen and similar sites. From these findings, promoting sustainability is vitally important among factors regarding shaping tourists' visit intentions as well as destination image and credibility. It follows that investment in sustainable tourism practices and clear communication of such practices to the potential visitors are bound to increase the reputation of a destination, as well as enhance tourists' propensity to visit. Besides, the research has indicated the necessity of the credibility of a destination in terms of promise delivery, consistency of quality, and trust. These are the aspects that managers must address to strengthen environmental motivation among tourists and make them feel positive toward the destination and interested in a visit. Additionally, the strong coefficient of destination image with visit intention means building and maintaining a good image through strategic marketing and public relations efforts will further drive tourist interest. These insights shall serve as guidelines for the tourism manager interested in luring more green-conscious tourists; the call is to make sure that sustainability issues remain upfront in the tourism marketing and operation strategies.

This therefore provides relevant insights into the factors influencing intentions to visit Geopark Mount Ijen, although any proper examination of this should be done in the light of several limitations. First, this research focuses on only one destination, which may limit the generalisability of the findings in other geoparks or tourism contexts. Further studies duplicating this kind of Multiple Destination Studies will improve the scope and hence the external validity of the results. This is also a cross-sectional data study that represents the perceptions of respondents in one period; it may not, therefore, be able to track changes either in tourist motivation or intention. Longitudinal studies regarding the evolution of these factors could reveal more dynamic results. Basically, this research focuses on tourists' motivations toward the environment and discusses the perception of sustainability and destination credibility. Other directions for future studies can be focused on other psychological and sociocultural factors-such as personal values or cultural background of tourists-which may also shape their travel intentions. Finally, although this study adopts self-reported data, future studies may also use behavioural data-for example, actual visitation rate-to complement the self-reported intensions and develop a fuller understanding of tourists' behaviours.

This research covers several UN SDGs, particularly those dealing with sustainable tourism and care for the environment. In fact, the objective of this study-destination sustainability impact on the visit intention of tourists-directly contributes to SDG 12, Responsible Consumption and Production, by fostering sustainable tourism practices that create jobs and highlight local culture and products. These findings also underlined the fact that how sustainability contributes best to the local area, such as Geopark Mount Ijen, for which tourism managers should therefore embrace sustainable tourism, which does not harm the ecology but attracts tourists. It also contributes to, as mentioned above, SDG 13: Climate Action. More importantly, the study points out how tourism can inspire tourists to be more environmentally motivated, thus appealing to SDG 15: Life on Land, focusing on protection, restoration, and sustainable use of terrestrial ecosystems. Consequently, it supports the greater objectives of the creation for resilient, inclusive, and sustainable systems of tourism that guarantee considerable benefits for both the environment and the local community through fostering credibility and a positive image for sustainable destinations, in tune with the attainment of SDG 8: Decent Work and Economic Growth. This work, therefore, feeds into the global agenda for integrating sustainability into tourism development to attain long-term ecological and economic benefits.

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BIBLIOMETRIC AND CONTENT ANALYSIS OF GLOBAL TRENDS IN DIGITAL TRANSFORMATION AND RURAL TOURISM

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Abstract: This article comprehensively reviews recent advancements in digital transformation in rural tourism research. It analyzes prominent studies, key authors, and influential journals while identifying potential future research directions. From a bibliographic perspective, the study used data extracted from the Scopus database. Analytical methods, such as co-citation and co-occurrence keyword analyses, were employed to evaluate the content and assess research performance. These techniques revealed discernible patterns of international collaboration. Research on digital transformation in rural tourism has grown significantly since 2017, with the first papers published in Malaysia and China. The number of articles increased sharply in 2021–2023. China leads with nine papers, followed by Malaysia, Spain, Poland and the United States. During the analysis period, 36 journals published articles on digital transformation in rural tourism. Some journals that published only one article but received the most citations included Journal of Tourism Futures, Cogent Social Sciences and Environment, Development and Sustainability. With a minimum co-citation threshold of two, the paper identified a cluster with 31 prominent authors. The study identified five key clusters of digital transformation in rural tourism: (1)-Digital Folklore and Smart Travel Technology Before and After the Pandemic, examining shifts in traveller behaviour and folklore digitization driven by COVID-19 disruptions; (2)-Digital Technology Solutions Supporting Green and Sustainable Tourism Development, highlighting eco-friendly innovations enabled by digital tools; (3)-Applying Information Technology in Developing Community-Based Rural Tourism, exploring IT's role in empowering local communities; (4)-Digital Communications and Marketing for Rural Tourism, understanding the impact of digital marketing strategies on rural destinations; and (5)-Geographic Information System (GIS) and Scanning Technology in Rural Tourism, investigating the use of spatial and scanning technologies for rural tourism management. Researchers should consider incorporating data from additional databases, such as Web of Science (WOS), Dimensions, and PubMed, to enhance the depth and comprehensiveness of future studies. Expanding the scope of bibliographic analysis to emerging digitalization areas within tourism could further strengthen the field's relevance and scholarly value.

Keywords: digital transformation, rural tourism, bibliometric, content analysis

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INTRODUCTION

Digital transformation (DT) has become increasingly significant in academic research, catalyzing profound changes through integrating digital echnologies (Rêgo et al., 2022). DT primarily aims to improve organizational performance by strategically utilizing technologies, including social networking platforms, smartphones, and advanced analytics (Gusakov et al., 2020). Formulating robust DT strategies is essential for successfully navigating the transformation process and maintaining operational continuity business (Chamboko & Tembi, 2021). The ongoing evolution of digital technology has profoundly impacted various industries, including tourism, facilitating transformative changes in processes, mechanisms, and revenue models (Ancillai et al., 2023). Adopting new technologies is crucial for achieving objectives such as enhancing user satisfaction, reducing costs, improving efficiency, and increasing sales (Mattila et al., 2021).

Information and communication technologies (ICT) have significantly influenced the industry's communication strategies, strategic planning, financial management, market research, and pricing. The advent of smart tourism underscores the importance of leveraging real-time data to co-create value, driven by advancements in real-time consumer intelligence, artificial intelligence, and data analytics (Jingjing et al., 2018).

In the 1970s, 1980s, and 1990s, rural tourism (RT) emerged as a novel and distinctive option (OECD, 1994). RT helps protect the environment, promote local economic growth, reduce regional disparities, and encourage development in developing countries (Litheko & Potgieter, 2021). The United Nations World Tourism Organization (UNWTO) defines RT

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as a form of tourism activity where the visitor's experience is associated with a diverse array of products, typically connected to nature-based activities, agriculture, rural lifestyles, culture, angling, and sightseeing (UNWTO, 2021). Similarly, the Organisation for Economic Co-operation and Development (OECD) offers a widely accepted definition, describing RT as traditionally sustainable tourism intricately linked to the local economy, history, and environmental landscape. RT is characterized by experiences in rural settings, such as open spaces and interactions with nature and local communities. It encompasses small-scale physical activities within nature, typically in villages and towns. OECD research refers to settlements of less than 10,000 inhabitants, involving many private sectors, often micro-enterprises, owned by families. This has given rise to various niche types of RT, including wellness tourism, activity tourism (e.g., cycling, walking, climbing, skiing), and cultural and heritage tourism, such as food and wine tourism. RT is linked to sustainable tourism development, as RT is associated with environmentally friendly forms of tourism (Naidoo & Sharpley, 2016).

Researchers have observed that farmers increasingly use RT to enhance and diversify their income sources (Tew & Barbieri, 2012). The Eurobarometer survey on Europeans' attitudes to travel shows that COVID-19 has impacted European Union (EU) citizens' travel behaviour and demonstrates the importance of sustainable tourism services for the tourism industry's recovery. The survey shows that a majority of EU citizens (82%) are willing to change some of their habits, for example, consuming local products (55%), choosing eco-friendly transport (36%), paying more for the protection of the natural environment (35%) or travelling that benefits the local community (33%) (European Union, 11.2021b, 24).

Over the past decade, the substantial disparity in broadband internet connectivity between urban and rural areas has diminished. By 2021, 93% of households in metropolitan areas within the EU had broadband access, compared to 86% of households in rural regions. Thirty-one percent of respondents regularly utilize online platforms to search for accommodation, car rentals, and flights, while 19% book rooms and apartments through these platforms. Additionally, 24% of respondents use hotel or airline company websites to make bookings (European Union, 11.2021a, 13). The European Tourism Agenda 2030 designates tourism as one of the 14 industrial ecosystems targeted for acceleration through green and DT (European Union, 12.01.2022, 12-17). Stakeholder consultations have underscored inadequate transport links and limited digital connectivity as critical challenges hindering the progress of green and digital transitions in RT. These consultations also emphasized the necessity of tailoring actions and monitoring efforts to each region's specific characteristics. The EU has introduced a new tourism dashboard to assist national and regional policymakers formulate DT strategies and enhance tourism resilience (European Union, 12.01.2022, 12-17). Rural communities can also directly showcase their culture and heritage to prospective tourists via platforms like Facebook, Instagram, and Twitter, reducing reliance on traditional tourism intermediaries. In the digital age, digitalization enhances accessibility and reshapes conventional tourism models (Lim, 2023). This shift encourages a comprehensive approach, weaving sustainability and ethical responsibilities into business operations that align with the evolving values of global tourists and industry stakeholders. Recent studies on DT in tourism have also contributed to identifying modern technological trends and their potential applications in the tourism industry. Technologies such as artificial intelligence (AI), big data, and the Internet of Things (IoT) are being widely applied to enhance customer experience and optimize tourism destination management (Madzík et al., 2023). Through online travel platforms and digital technology, DT is changing how businesses and destinations communicate with customers, increasing convenience and efficiency in the booking and experience (Asif & Fazel, 2024). DT is essential in promoting sustainable tourism development and suggests that new technologies can help better manage tourism resources, minimizing environmental negative impacts (Bekele & Raj, 2024).

In addition, digital technologies have great potential in creating sustainable tourism destinations, helping to collect real-time data and analyze information to support decision-making (El Archi et al., 2023). Smart tourism, with the support of digital technology, helps to enhance the tourist experience and improve interactions between stakeholders in the tourism ecosystem (Kumar et al., 2023). Digital technologies such as virtual reality (VR) and augmented reality (AR) have opened up innovative possibilities for preserving and showcasing local culture. They enable visitors to experience destinations from afar, which helps conserve cultural sites and lessens the strain on local resources (Beck et al., 2019). Furthermore, highlighting cultural heritage as an essential element of RT through tourism education bolsters residents' cultural pride in implementing sustainable tourism practices, emphasising environmental responsibility and cultural preservation (Strickland & Ratten, 2024). Overall, these studies agree that DT not only creates development opportunities but also supports more sustainable and efficient tourism management and operation, especially in the context of rapidly developing technology.

Despite the achievements, recent research on DT still has some significant limitations, especially when considered in the specific context of RT. Most studies using bibliometric analysis focus mainly on DT in the tourism industry in general and have not delved into RT. Studies lack specific analysis of RT's context and challenges (Madzík et al., 2023). This leads to general conclusions that are difficult to apply to practice in rural areas with limited technical infrastructure and lower digital participation than in urban areas. The lack of focus on RT results in research findings that do not fully reflect the specificities of the field, such as the problems of limited internet connectivity and difficulties in accessing technology for rural residents (Asif & Fazel, 2024; Bekele & Raj, 2024; El Archi et al., 2023;Raman & Aashish, 2023).

The lack of research on the applicability of technology in rural destinations creates a significant gap in promoting sustainable tourism in these areas, not fully reflecting the unique nature and needs of rural communities in the DT process. Recently, bibliometric studies on DT and RT have highlighted major trends and suggested future research directions, but they still have many limitations. Some studies identified major topics but lacked detailed analysis of the relationships between issues and their development over time (Rauniyar et al., 2021), only considered articles in leading journals, which may have overlooked essential studies from regional or lesser-known journals (Saravanan & Rajan, 2024), and only used the Web of Science database, which limited the scope of the literature and overlooked studies in other databases such as Scopus or Google

Scholar (Răcăsan et al., 2023). These limitations suggest that current bibliometric studies on DT and RT need to expand the scope of databases, enhance the analysis of relationships between topics, and consider local contexts. This will help to draw more comprehensive conclusions and support the sustainable development of DT and RT in different contexts. The research gap concerning technology's applicability in rural destinations significantly hampers efforts to promote sustainable tourism in these areas. It fails to address rural communities' unique characteristics and needs within the DT process.

These limitations make it evident that bibliographic research on DT in RT must prioritize rural destinations' specific characteristics and challenges. This study addresses the limitations in bibliometric research on DT in RT by prioritizing rural destinations' unique characteristics and challenges. In addition, the study aims to conduct a comprehensive analysis at the global level, using diverse data sources to assess the feasibility of technologies in different contexts. Through bibliometric analysis, this study mines data from scientific publications to examine multiple aspects of DT in RT. By analyzing research articles, citation patterns, collaboration networks, and other bibliometric indicators, the study helps to clarify the intellectual structure and impact of DT on the field of RT. Furthermore, the study identifies critical topics, prominent researchers, leading institutions, and emerging trends in DT in RT. The results will provide valuable information to researchers, industry experts, and policymakers on DT's current status and future direction in the RT field. The article is organized into several sections. The initial section examines the interest in DT within RT. The subsequent section details the data, specifying the sources and methodologies employed in the research. The third section presents the findings and analyses the data, including thematic analysis to identify critical topics, leading authors, and the most influential contributors. The final section discusses the results, draws conclusions, and provides recommendations for future research.

METHODOLOGY

Review articles are widely recognized as valuable academic works for presenting the current state of knowledge in DT, RT, and related studies (Saravanan & Rajan, 2024), (Ayaviri-Nina et al., 2023), (Madzík et al., 2023) proposed a comprehensive framework for categorizing review articles, encompassing four key elements: search, evaluation, synthesis, and analysis. As suggested by them, systematic reviews play a crucial role in scientific exploration, as they not only enable a thorough investigation of relevant sources but also assist in identifying existing knowledge and uncovering research gaps within a specific field of study. Bibliometric analysis involves the application of statistical methods to examine the development of scientific disciplines by assessing publication performance, mapping the structure and dynamics of the field, and utilizing data obtained from various written publications such as books, journals, proceedings, and articles (Köseoglu et al., 2015). This study was conducted in two main phases: document selection and bibliographic analysis (Figure 1).

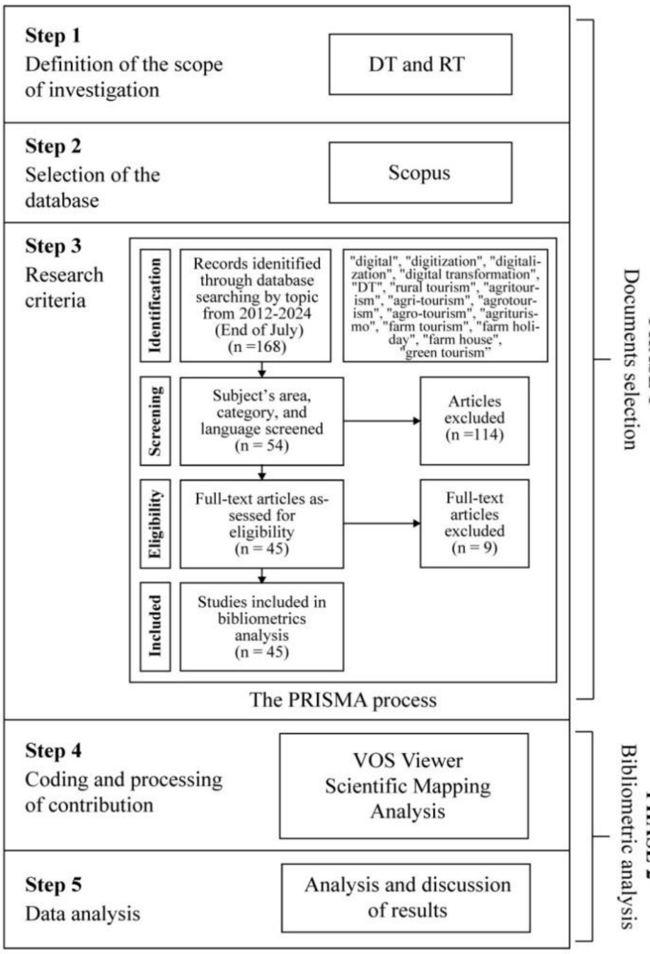

Figure 1. Research process developing the PRISMA diagram adapted from Moher et al. (2010)

In the first phase, there were three main steps: defining the scope of the investigation, selecting the database, and establishing research criteria. The first step was to define the scope of the study as the topic of DT and RT. The next step was to select the database as the primary source of documents. Information science and documentation advancements have generated numerous databases that users can easily access. However, it has been identified that these databases contain vast and fragmented amounts of information and scientific documents across various disciplines (Saravanan & Rajan, 2024).

Therefore, it is essential to utilize appropriate tools to manage data and facilitate the comparison and organization of research documents. To obtain bibliographic data, the authors chose to use the Scopus Database (Elsevier) as the primary source of information. This study selected Scopus as its primary data source due to its extensive and comprehensive coverage. Scopus is recognized as one of the two largest scientific indexing systems globally, encompassing a vast database that includes 57 million abstracts and nearly 22,000 journal titles from more than 5,000 publishers, with regular updates to ensure the inclusion of the latest research (Hallinger & Kovačević, 2019). Notably, Scopus has a broader scope in the social sciences and humanities than WoS, making it particularly valuable for research in DT with RT (Guz & Rushchitsky, 2009; Tabacaru, 2019; Pham et al., 2024). Furthermore, Scopus offers an array of advanced search functionalities that cater to various research needs, including document retrieval, citation analysis, and the evaluation of scientific impact (Falagas et al., 2008). Scopus's user-friendly interface and analytical tools facilitate efficient literature reviews and meta-analyses, making it a preferred choice for researchers conducting systematic reviews.

The third step of phase 1 is research criteria. To ensure a rigorous and systematic approach to the study, the authors followed a three-phase methodology aligned with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Moher et al., 2010; Haddaway et al., 2022). PRISMA is a reputable framework initially utilized in the medical sciences. In recent years, scholars from various fields have increasingly favored its use for conducting systematic literature reviews (Bertoglio et al., 2021; Krittayaruangroj et al., 2023). PRISMA ensures transparency, replicability, and comprehensiveness in the research process (Moher et al., 2009). By adhering to PRISMA, the study protocol is designed to minimize bias, enhance methodological rigor, and provide a clear framework for synthesizing existing literature, contributing to the reliability and validity of the research findings (Page et al., 2021). We combined relevant search phrases for all articles in English, including in the title, abstract, and keywords: digital OR digitization OR digitalization OR digital transformation OR DT AND rural tourism OR agritourism OR agri-tourism OR agrotourism OR agro-tourism OR agriturismo OR farm tourism OR farm holiday OR farmhouse OR green tourism. The search query mentioned in previous studies (Verhoef et al., 2021; Rauniyar et al., 2021; Madzík et al., 2023; Roziqin et al., 2023).

The initial screening process revealed 168 documents obtained by searching the Scopus website on 15 July 2024. Scopus filters were used to screen the documents based on broad categories. The authors filtered the documents by discipline, selecting only disciplines such as ‘Social Sciences,’ ‘Business, Management and Accounting,’ ‘Environmental Science,’ ‘Agricultural and Biological Sciences,’ ‘Economics, Econometrics, and Finance,’ and ‘Decision Sciences.’The studies that did not fall under the category of 'article' were excluded from the analysis. Additionally, non-English articles were also excluded. To maintain consistency across data sources, the Scopus database allows data to be exported in a widely recognized format, namely the CSV format. The obtained data were managed using the guidelines outlined in the reference documents. After this action, the database was reduced to 54 articles. The titles and abstracts of the documents were reviewed to determine their relevance to the subject in the next step. Several articles were excluded due to their focus on topics such as agricultural supply chains, biodiversity conservation, drought solutions, and carbon transition without addressing the role of digital technologies in these issues (9 articles excluded). Therefore, the final database included 45 articles for the final review. To improve data accuracy, the authors performed data synchronization, following the instructions of Van Eck and Waltman (Van Eck & Waltman Ludo, 2013). Before analysis, the process of standardizing synonymous keywords, abbreviations, complete forms, plurals, and singulars such as promotion of RT/RT promotion, Covid-19 pandemic/Covid-19, Rural tourisms/ RT/Rural tourism, Digital artefacts/Digital artefact, GIS/Geographic Information System, Digitalisation/Digitalization was conducted. In the second phase, two main steps were coding and processing of contributions and data analysis. The first step in phase two is to encode and select software to process the data.

The study utilized VOSviewer software, a widely recognized tool for constructing and visualizing bibliometric networks (Van Eck & Waltman Ludo, 2013). VOSviewer enables the creation of detailed maps that depict the relationships among various elements, such as journals, authors, and individual studies, based on different types of bibliographic coupling, co-citation, or co-authorship relationships. The software's ability to visualize complex data networks makes it particularly useful for exploring the underlying structure of scientific research, as it provides transparent and interpretable maps that can highlight key areas of scholarly activity and collaboration (Jasn & Ludo, 2010).

Moreover, VOSviewer supports the analysis of large datasets and allows for the customization of maps according to specific analytical needs, enhancing the ability to interpret the data meaningfully (Van Eck & Waltman, 2017). This capability is crucial in the context of bibliometric studies, where understanding the intricate relationships between different scholarly outputs is essential for drawing accurate conclusions about the development and dynamics of research fields.

The second step in phase two is data analysis and discussion of research results. The data were analyzed using a three-stage methodology to understand the research landscape comprehensively. The first is a descriptive analysis, which systematically presents the necessary information about the 45 documents. This provides an overview of the data set, including publication year, authorship patterns, and journal distribution, providing the background context for subsequent analyses. This is followed by a general citation analysis, which identifies relationships between articles based on the frequency with which other works cite the two documents (Small, 1973). Co-citation analysis helps uncover the intellectual structure of a research field by identifying clusters of documents that are frequently co-cited, suggesting a thematic or conceptual link between them. These clusters indicate core research areas, highlighting influential works and emerging trends. Finally, there is co-keyword analysis, a technique for quantifying how often specific keywords appear together across an entire dataset. Co-keyword analysis is instrumental in mapping the scientific structure of a research topic by identifying prominent themes and trends (Callon et al., 1983). The results of this analysis are visualized in the form of a co-keyword map, which illustrates the relationships between keywords. This provides insights into the interconnectedness of different research themes and identifies potential areas for future investigation.

RESULTS

1. Annual growth rate of publications and their distribution by countries

Figure 2 illustrates the research publication productivity on DT within the RT sector, highlighting a significant upward trend in recent years. The term "digital transformation" in 2012 has elevated its global importance, fundamentally altering business operations, product manufacturing processes, and marketing strategies.

Nonetheless, scholarly research on DT within the RT industry began to gain momentum only after 2017. However, academic research on DT in the RT industry only began to flourish after 2017, specifically the study titled '*Community Perceptions on the Usage of digital marketing for Homestays: The Case of Ba'kelalan, Malaysia*,' published in the International Journal of Business and Society (Cheuk et al., 2018) and the study titled '*Agricultural informatization: Research and design on the rural tourism recommendation system'* published in the International Agricultural Engineering Journal (Zhang & Yu, 2017). The volume of publications experienced a gradual rise, with a notable surge occurring in 2021–2022, during which ten papers were published. This upward trend persisted, culminating in 2023 with the publication of 14 research papers. Despite the relative novelty of the research area, the growing number of publications reflects an increasing scholarly interest in DT within the RT sector.

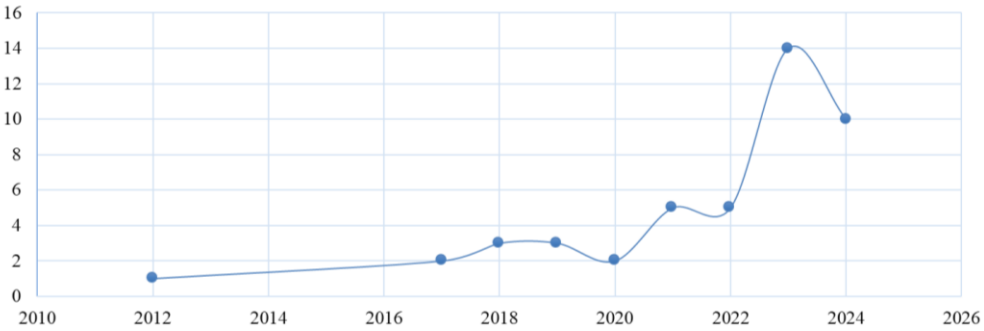

Figure 2. Number of publications by year during the period 2012 to 2024 of Scopus database to July 15, 2024

Figure 3 shows 34 countries actively publishing articles related to DT in RT. The map illustrates the collaboration between countries, with darker colors indicating higher publication frequency. The most significant number of authors and publications related to DT in RT originate from China, with nine articles. Other countries with prominent positions in terms of authors and publications include Malaysia (6 publications), followed by Spain (4 publications), Poland (4 publications), and the United States (3 publications). Among these countries, Malaysia exhibits the most substantial network, with 671 link strength. Notably, a country has conducted nine research studies, indicating significant opportunities for scholars from other nations to engage in this field. These observations underscore the necessity for further research on DT within the RT, with the potential for researchers from various countries to actively contribute to expanding the existing knowledge base.

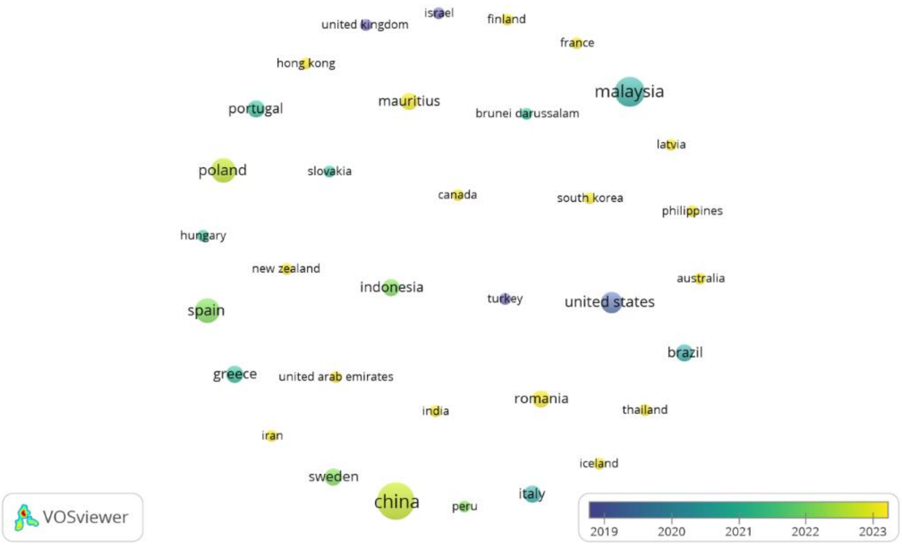

Figure 3. Distribution of scientific output by countries of Scopus database to July 15, 2024 (Source: Analysis using VOSViewer software)

The study used bibliographic coupling (countries) networks to investigate the collaborative relationships among authors from different nations. Based on a data set, Figure 4 presents the cross-collaboration patterns of 34 countries among researchers. Using VOS software and co-authorship analyses, 17 countries with three clusters were identified as closely connected. The first cluster includes scientific collaboration on DT in RT among Finland, France, Iran, Malaysia, New Zealand, South Korea, and Sweden. The second cluster comprises Brunei, Greece, Ireland, Romania, the United States, and Turkey. The third cluster involves India, Mauritius, and the United Arab Emirates. Notably, researchers from Malaysia, the United States, Mauritius, Sweden, India, France, New Zealand, and Finland demonstrated the highest levels of collaboration with international authors. This network may be attributed to the interest in RT activities and local policies promoting culture- and community-based activities in certain countries with similar characteristics. The node representing "Malaysia" exhibited the highest number of connections. Thicker lines between countries signify a substantial volume of collaborative publications. These findings are consistent with contemporary trends, emphasizing the concentration of research on DT in the RT sector and the high level of author collaboration in Malaysia. Besides, the results reveal a lack of research collaboration among scholars from Canada, Hong Kong, Israel, Latvia, the Philippines, and the United Kingdom.

Figure 4. Degree of scientific collaboration between countries of Scopus database to 15.07.2024 (Source: Analysis using VOSViewer software)

2. Network of authors and journals

The analysis utilized the Vosviewer software to explore content distribution across various sections of bibliographic information. Table 1 shows the top ten most-cited authors and articles related to DT in RT, the total number of citations of the top ten contributing authors for each publication, and their affiliations. The data indicate that Skinner Heather is the most influential author, with 122 citations, followed by Chin Wei Lee, Atun Resmiye Alpar, and Misso Rosa, with 41, 33, and 22 citations, respectively. The leading researchers are primarily affiliated with institutions in the UK, Brunei, Turkey, and Greece, suggesting that these countries have made substantial contributions to research on DT in the RT sector.

Table 1. List of the ten most-cited documents on DT in RT(Source: Table by the authors)

No	Authors	Article title	No of citations	Affiliation
1.	Skinner Heather et al., (2018)	Meeting the needs of the Millennials and Generation Z: gamification in tourism through geocaching	122	Manchester Metropolitan University Business School, United Kingdom
2.	Chin Wei Lee et al., (2021)	Agritourism resilience against Covid-19: Impacts and management strategies	41	Universiti Brunei Darussalam, Brunei
3.	Atun Resmiye Alpar et al., (2019)	Envisaging sustainable rural development through 'context-dependent tourism': case of northern Cyprus	33	Eastern Mediterranean University, Turkey
4.	Misso Rosa et al., (2018)	Sustainable development and green tourism: New practices for excellence in the digital era	22	Aristotle University of Thessaloniki, Greece
5.	Xabier Martínez-Rolán et al., (2019)	Instagram as a network for the promotion and hypermediation of rural tourism: The case of aldeias históricas	19	Universidade de Vigo, Spain
6.	Sorooshian Shahryar (2021)	Implementation of an expanded decision-making technique to comment on Sweden readiness for digital tourism	16	University of Gothenburg, Sweden
7.	Torabi Zabih-Allah et al., (2023)	On the post-pandemic travel boom: How capacity building and smart tourism technologies in rural areas can help - evidence from Iran	15	Tarbiat Modares University, Iran
8.	Mark Chris Lapuz (2023)	The role of local community empowerment in the digital transformation of rural tourism development in the Philippines	12	National University, Philippines
9.	Król Karol (2021)	Digital cultural heritage of rural tourism facilities in Poland	12	University of Agriculture in Krakow, Poland
10.	Król Karol and Hernik Józef (2022)	Digital Folklore of Rural Tourism in Poland	12	University of Agriculture in Krakow, Poland

The most-cited article corresponds to Skinner Heather, significantly contributing to the construction and discussion of gamification in tourism through Geocaching among Millennials and Generation Z (Skinner et al., 2018). Following this is the study by Chin Wei Lee, which addresses the resilience of RT in response to COVID-19 through its impact and management strategies (Chin & Pehin, 2021). Sorooshian Shahryar's work also focuses on Sweden's readiness for digital tourism using an expanded decision-making technique (Sorooshian, 2021). Another notable study by Lapuz Mark Chris M examines the role of empowering local communities in the process of DT in RT in the Philippines (Lapuz, 2023). These studies contribute to strengthening and expanding research opportunities on the applicability of DT in RT.

During the analysis period, 36 journals published articles on DT in RT, with Sustainability (Switzerland) leading with six articles, followed by Worldwide Hospitality and Tourism Themes with three articles, International Journal of Business and Society with two articles, and Geojournal of Tourism and Geosites with two articles (Figure 5, Table 2). Journals that published only one article on DT in RT but received the most citations include the Journal of Tourism Futures (122 citations), Cogent Social Sciences (41 citations), and Environment, Development and Sustainability (33 citations).

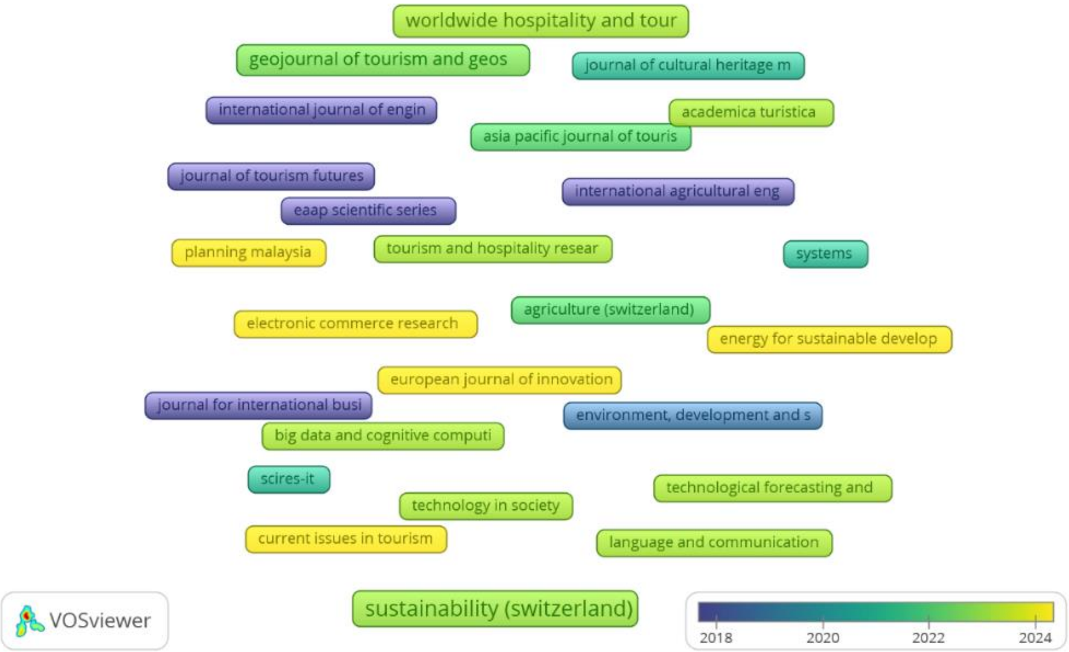

Figure 5. Journals publishing on DT in RT of Scopus database to July 15, 2024(Source: Analysis using VOSViewer software)

The United Kingdom leads with 15 journals with high Q1 and Q2 impact factors, Switzerland with five journals, the Netherlands with four journals, the United States with three journals, Malaysia with two journals, and the remaining countries such as Malaysia, Romania, Portugal, Italy, Slovenia, Spain, etc. have one journal.

Most journals publish topics related to DT, community-based tourism associated with sustainability, management, and action aspects of RT, helping to find the development perspectives of peoples and territories; some journals focus on publications in the fields of awareness, attitudes, management, and social sciences.

Table 2. Most influential journals, by number of articles and total citations (Source: Table by the authors)

Rank	Journal	No. of articles	Rank	Journal	Total citations	Average citations / document
1	Sustainability	6	1	Journal of Tourism Futures	122	122
2	Worldwide Hospitality and Tourism Themes	3	2	Cogent Social Sciences	41	41
3	Geojournal of Tourism and Geosites	2	3	Environment, Development and Sustainability	33	33
	International Journal of Business and Society	2	4	Sustainability (Switzerland)	28	4.67
4	Technology in Society	1	5	Journal for International Business and Entrepreneurship Development	22	22
	Journal for International Business and Entrepreneurship Development	1	6	Revista Latina de Comunicacion Social	19	19
	Systems	1	7	Worldwide Hospitality and Tourism Themes	18	6.0
	Cogent Social Sciences	1	8	Systems	16	16
	Revista Latina de Comunicacion Social	1	9	Technological Forecasting and Social Change	15	15
	Journal of Cultural Heritage Management and Sustainable Development	1	10	Technology in Society	12	12
	Environment, Development and Sustainability	1		Journal of Cultural Heritage Management and Sustainable Development	12	12
	Technological Forecasting and Social Change	1	11	Agriculture (Switzerland)	11	11
	Journal of Tourism Futures	1	12	Journal of Agriculture, Food Systems, and Community Development	10	10
	Journal of Agriculture, Food Systems, and Community Development	1	13	Asia Pacific Journal of Tourism Research	8	8
	Agriculture (Switzerland)	1	14	Geojournal of Tourism and Geosites	7	3.5
	International Agricultural Engineering Journal	1	15	International Agricultural Engineering Journal	6	6

3. Co-Citation Analysis

Co-citation analysis measures the similarity between documents based on their citation relationships. It allows scholars to explore the core interests of a particular field (Kessler, 1963). A high co-citation threshold may exclude emerging research topics that have not yet received sufficient citations, risking the omission of valuable studies (Trujillo & Long, 2018). Therefore, the authors set the minimum co-citation threshold at 2. We identified one cluster and 31 authors. Figure 6 shows a single red cluster. The most frequently cited authors in studies on DT in RT are (Kotler & Haider, 1993), Sharpley (2002), (Luo et al., 2004; Clarke, 2005; Greaves & Skinner, 2010; Garren, 2012), (Andreopoulou et al., 2008), (Lo et al., 2012), (Zhou et al., 2017), (Gao & Wu, 2017). The most frequently cited study on RT is by Richard Sharpley (2002). The study suggests that RT is a means to achieve economic and social development, explores the role of RT, highlights the challenges, and identifies several issues that hinder the success of RT (Sharpley, 2002).

Abby Liu's study, focusing on rural capacity to absorb tourism (Liu, 2006), advocates for the development of RT and emphasizes the involvement of rural communities in tourism. Stakeholders' perspectives, tourism planning authorities, community expectations, and their feedback in addressing tourism concerns are all considered. The study also indicates that insensitivity to cultural and ethnic differences between hosts and tourists hinders local participation. Nicola Greaves (2010) explores a destination's image and underlying factors that deter tourists. Respondents provided a range of words and images that reflect their perceptions of the destination (Greaves & Skinner, 2010). Additionally, May-Chiun Lo's findings indicate that the tourism industry has had a significant impact on the cultural aspects of the local community (Lo et al., 2012).

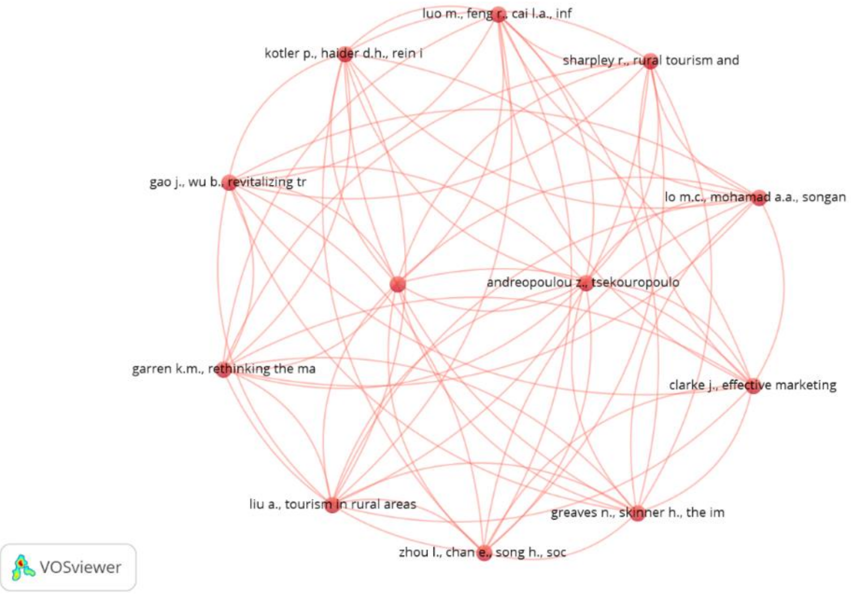

Figure 6. The co-citation of DT in RT research of Scopus database to July 15, 2024 (Source: Analysis using VOS Viewer software)

The application of IT and digital solutions for RT is cited in studies by Man Luo (2004) and Andreopoulou (2008, 2013). Based on consumer behaviour theory, Man Luo's research emphasizes the role of the Internet, examining the relationship between tourists' use of the Internet and other information sources. The study also found that demographic characteristics such as gender, income, trip purpose, and type of tourism are related to tourists' choice of information sources, influencing their accommodation and spending levels during the trip.

According to Andreopoulou's studies, creating online virtual markets unrestricted by time and space is a revolutionary concept in the agricultural sector (Andreopoulou et al., 2008). Andreopoulou's research also revolves around ICT, Internet marketing, online innovation for sustainable development, and RT. The study addresses environmental concerns, focusing on green IT, supporting the construction and improvement of the natural environment and resource monitoring systems as a means to protect and restore the potential of natural ecosystems (forests, lakes, rivers, wetlands, etc.), improving infrastructure and communication technologies, including GIS technology. Forests and agricultural lands are also assessed in the studies as crucial in mitigating climate change through carbon storage and the exchange of greenhouse gases between the atmosphere, soil, and vegetation (Andreopoulou, 2013).

Studies on digital folklore cite the works (Zhou et al., 2017; Gao & Wu, 2017). In the early stages, tourism destinations often seek external funding for establishment and investment at various levels. Therefore, the movement of businesses at these destinations is an important phenomenon that needs to be explored theoretically and empirically. Lingxu Zhou's (2017) research uses early-stage destinations in rural China to explore the experiences in tourism development, such as institutional support, community openness, and personal social networks (Zhou et al., 2017). Following Lingxu Zhou's research, Gao Jing highlights the growing attention paid to traditional villages with historical and cultural significance in China. RT has also been recognized as essential to rural development and poverty alleviation. Through a systematic literature review, the research proposes an RT-based Traditional Village Revitalization model better to understand the relationship between RT and village revitalization. Integrated Rural Tourism and Sustainable Livelihood theory and ideology are integrated in the research (Gao and Wu, 2017). Farmer cooperatives are identified as a means of equitable benefit distribution and community participation. Cohesion, endogeneity, empowerment, and trust are the critical factors in the village revitalization process mentioned in the studies.

Studies on Digital Communication and Marketing for RT cite the works of (Kotler & Haider, 1993; Clarke, 2005), and (Garren, 2012). Philip Kotler argues that the key to place marketing lies in investing in infrastructure, creating a skilled workforce, stimulating entrepreneurial spirit, expanding local businesses, developing public-private partnerships, identifying and attracting compatible businesses, creating unique attractions, fostering a service-friendly culture, and effectively leveraging advantages (Kotler & Haider, 1993).

Philip Kotler also discusses place marketing strategy as a framework for economic development during the 1990s and beyond. The study mentions ‘place buyers,’ which includes tourists, new residents, factories, corporate headquarters, and investors, and ‘place sellers,’ which include economic development agencies, tourism promotion agencies, and mayoral offices. According to Clarke, marketing for RT exists at various destination levels, from national to regional to local (Clarke, 2005). Clarke also suggests that RT destinations can design a portfolio of attractions categorized as ‘seeing,’ ‘buying,’ and ‘being/doing’ from the perspective of leisure consumers. ‘Seeing’ includes fixed attractions such as castles, historic houses and gardens, museums, religious buildings, railways, and festivals.

This type's motto for communication and promotion is ‘Look, see, and think.’ ‘Buying’ refers to attractions that offer goods such as souvenirs (low-value, mass-produced, large quantity, low profit), crafts (high-value, skill-intensive, limited quantity, high-profit margin), and food and beverages. ‘Being/doing’ attractions involve activities centered around skill acquisition and personal interests, attracting tourists for self-development, such as cave exploration, forest hiking, horseback riding, hot air ballooning, gliding, and participating in wellness activities.

These activities may stem from local identity or may be unrelated but benefit from the rural location and environment. These attractions' divisions are based on leisure purposes, domestic/international tourists, first-time or repeat visitors, and peak or off-peak seasons (Clarke, 2005). Garren Karoline distinguished between traditional marketing and destination marketing concerning rural areas by analyzing the challenges in destination marketing. She introduced a rural destination marketing model that integrates marketing activities, assets, destination characteristics, target market selection criteria, and destination branding to create a user-friendly model (Garren, 2012).

4. Co-occurrence keyword (content analysis)

This study segment utilized content analysis alongside VoSviewer software to analyze 45 articles. The authors selected all keywords that appeared at least twice, including both columns, the Author keyword, and the Index keyword. The results showed that 39 keywords were divided into 5 clusters. Figure 7 illustrates the network diagram representing the co-occurrence of keywords. This analysis provides significant insights into the relationships and development of the keywords under investigation.

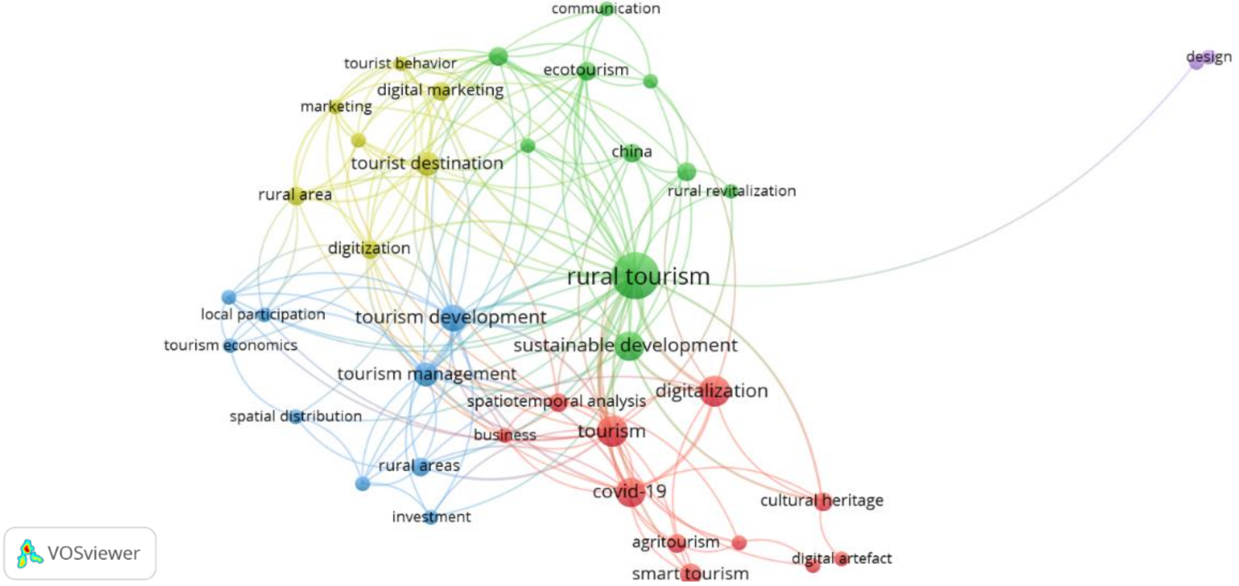

Figure 7. DT in RT research co-keyword network of Scopus database to July 15, 2024(Source: Analysis using VOSViewer software)

Cluster 1 (red) with 11 keywords. The keywords are smart tourism, COVID-19, digitalization, digital folklore, digital cultural heritage, digital artifact, and cultural heritage. This cluster was designated ‘*Digital Folklore and Smart Travel Technology Before and After the Pandemic.’* The prominent research in the cluster is on digital culture (material and intangible culture). The authors argue that analyzing the essential attributes of a website or its cultural content can be considered digital cultural assets (Król & Hernik, 2022; Król, 2021). Scholars often evaluate the presence of ready-made digital recordings and rustic folklore. These are usually found on the websites of RT farms in local communities of ethnic groups (Król & Zdonek, 2022). Another research direction highlighted in this cluster is the digital tools used for payment and customer communication by RT service providers (Auzina et al., 2023), destination recovery strategies through the combination of direct and digital marketing to attract tourists (Muangasame & Tan, 2023) and the role of using innovative tourism technology in developing countries. Studies have explored the development of intelligent technology during the pandemic and its impact on post-pandemic RT development (Torabi et al., 2023). The main research methods of cluster 1 were face-to-face interviews with a snow-balling technique (Torabi et al., 2023), participatory action research (PAR) of tourism stakeholders, community-based digitalization strategies in all stages of planning, development, implementation, and management of rural cultural heritage tourism products (Muangasame & Tan, 2023). A qualitative research method also mentioned in the studies of this cluster is the netnographic analysis of tourism enterprises' social media pages. The Netnography method was initiated by Kozinets and accepted by many qualitative researchers as a branch of the ethnographic approach (Kozinets, 2015). The main advantage of the Netnography approach is that consumers can voluntarily disclose information, including sensitive information (Muangasame & Tan, 2023). The uniqueness of the studies in this cluster is the application of a locally participatory approach to developing a collaborative strategy for community heritage management based on rural capacity building towards digitalization and empowerment.

Cluster 2 (green) has ten main keywords: rural tourism, sustainable development, sustainability, rural revitalization, green tourism, ecotourism, communication, information, and communication technology, China. Based on these keywords, this cluster was titled '*Digital Technology Solutions Support Green and Sustainable Tourism Development.*' Studies in cluster 2 consider the classification of tourism approaches to assess sustainable tourism diversification. The articles in this cluster are divided into three groups: (1) green and sustainable tourism, (2) solutions to support RT service providers, and (3) application of new technologies (Qin et al., 2022; Lapuz, 2023; Singh et al., 2023). Studies have addressed the seasonal characteristics of RT, tourist characteristics, geospatial distribution, RT return rates, and IT systems for RT, including interaction, visibility, information collection, and log processing, emphasizing personalization capabilities to help users make quick and accurate choices. Research results also show that digital technology can promote RT by minimizing business difficulties and risks, enhancing RT resilience. Activities such as digital payments, online booking systems, social media marketing, and virtual reality tours significantly and positively promote tourism industry sales and enhance internal management (Singh et al., 2023). By participating in the DT in the RT process, residents are empowered based on their characteristics (Lapuz, 2023), reducing 'scale discrimination' and supporting 'low education level bias.'

DT thereby supports small-scale businesses and increases resilience in the industry (Zhong et al., 2024). Research in this cluster mainly uses theories such as the stakeholder engagement theory (Lapuz, 2023), treatment effect model (TEM) (Zhong et al., 2024), digital footprint data of visitors with spatial characteristics, and spatial development model of RT (Qin et al., 2022). Cluster studies use qualitative research methods such as semi-structured interviews, descriptive statistics, inference (Lapuz, 2023), and quantitative research methods using big data (Yang et al., 2024).

Cluster 3 (blue) has nine main keywords: digital storage, investment, local participation, rural areas, spatial distribution, stakeholder, tourism development, tourism economics, and tourism management. We labeled this cluster '*Applying Information Technology in Developing Community-based RT (CBRT).*' Studies concluded that the COVID-19 pandemic has enhanced and accelerated digital tools and ICT use in several sectors, including tourism. However, the use of information technology in CBRT is still relatively new. Studies in this cluster consider CBRT as a driving force for rural development through job creation, heritage preservation, and local community participation (Maquera et al., 2022). The papers in this cluster present the conceptual development model of intelligent digital platform (IDP) (Maquera et al., 2022), the scale of rural accommodation establishments on the two most popular digital booking platforms, Booking.com and Airbnb (Bumbak, 2024), and the development possibilities based on business process management and business model canvas (Maquera et al., 2022). The research results of the third cluster also demonstrate the popularity of the sustainability theory of energy in the tourism supply chain (Chiwaridzo, 2024). From there, the success factors are described: (1) value creation, (2) value delivery, (3) value capture dimensions, (4) promoting and enhancing DT operations, (5) appropriate platform architecture and strategic assessment of platform providers, and (6) startup culture (Zhao et al., 2021). The results also confirm that digital product differentiation and stakeholder collaboration are key factors (Fernandez-Villaran et al., 2024).

Some of the countries mentioned in this cluster are Peru (Maquera et al., 2022), Romani (Bumbak, 2024), and Canada (Neumann & Mason, 2023). The research methods used are empirical mapping of the spatial and temporal distribution of lists from the region (Bumbak, 2024) and semi-structured interviews with industry stakeholders (Neumann & Mason, 2023).

Cluster 4 (yellow) has seven main keywords: digital marketing, digitization, marketing, rural area, tourism market, tourist behaviour, and tourist destination. Based on these keywords, this cluster was designated '*Digital Communications and Marketing for RT.*' Studies in this cluster analyze the tourism industry DT process (Alonso et al., 2024), digital media marketing and virtual tourism (Li et al., 2024), and tourist purchasing behaviour. Idyllic life destination image greatly influences tourists' choice of rural destinations (Li et al., 2024). RT has been shown to benefit local communities from an economic perspective. Digital marketing allows tourists to access destination information effectively, at low cost, without intermediaries (Cheuk et al., 2018). Studies in this cluster have also explored both the supply and demand aspects of RT, proposing regression models that combine indicators related to digital advancement with changes and characteristics of low-density areas (Alonso et al., 2024). Studies have also examined barriers to digital marketing adoption from the perspective of RT service providers (Cheuk et al., 2018). Physical, logistical, and social constraints can negatively impact community readiness, hindering the adoption of digital marketing at the individual and destination levels.

Findings show that marketing and promotion activities have emphasized strengthening the local business environment and cultivating close relationships with stakeholders (Abdul Rahman et al., 2024). Theories mentioned in this cluster include sensory marketing theory (Li et al., 2024), a new conceptual model based on Delone and McLean's Information Systems Success Model (Rodrigues et al., 2023). Research methods used include a discourse analysis of Chinese newspapers and WeChat articles (Li et al., 2024), in-depth interviews (Cheuk Sharon et al., 2018), mixed methods (Abdul Rahman et al., 2024) collecting opinions of local operators, expert opinions and proposed artifacts of potential suitability of items (Rodrigues et al., 2023). Several regions were evaluated in the cluster, such as the European Union (Alonso et al., 2024), Greece (Papadaki, 2024), Malaysia (Cheuk Sharon et al., 2018; Abdul Rahman et al., 2024). For example, Malaysia's Perak Tengah district applied Virtual Reality Geographical Information System (VRGIS) in developing its tourism roadmap, also known as 'Peta Pelancongan,' to encourage communication and data exchange, which are essential for the success of the area (Abdul Rahman et al., 2024).

Cluster 5 (purple) has two keywords: design and geographic information system (gis). Therefore, we labeled this cluster '*Geographic Information System and Scanning Technology in RT*.' The research in this cluster investigates scanning technologies and digital photogrammetry with the help of drones in RT to expand agricultural production capacity (Călina et al., 2022). This cluster includes studies conducted in various locations, such as the south-central region of Romania (Călina et al., 2022), tourist boarding houses in Mălaia, and fiber farmers in New York (Trejo et al., 2020). The theoretical framework employed in this cluster includes the Actor-Network Theory and the cartography of controversies method (Trejo et al., 2020). These theoretical approaches help to analyze the interplay between various actors and technologies within the research context. The cluster emphasizes practical methodologies for integrating technology into digital land navigation and tracking farms. This is achieved through the scanning or digitizing of maps—physical, printed, or digital—using photogrammetric techniques and aerial field scanning of the target areas (Călina et al., 2022). By leveraging these advanced technologies, researchers aim to improve the efficiency and accuracy of agricultural production and resource management in RT.

DISCUSSION AND CONCLUSION

1. Conclusion

In summary, this study thoroughly examines research on DT within the RT sector over the past twelve years. Although the volume of research papers and the number of researchers in the DT in RT has grown in recent years, it still needs to be bigger than other management studies. Therefore, we have presented a bibliometric analysis of the content of DT in RT to fill the gap and analyze the prominent research clusters in this field. A database of 45 articles from Scopus shows that the first study on DT in RT was published in 2012. The descriptive analysis indicates a growing emphasis on DT within the RT industry, particularly since 2017. The most significant number of articles is in 2023, with 13 articles; the first half-year data of 2024 (up to July 15) is ten. There are 34 countries actively publishing articles related to DT in RT, of which China, Malaysia, Spain, Poland, and the United States are the countries with the most prominent numbers. The most influential study identified in this analysis is "Meeting the Needs of Millennials and Generation Z: Gamification in Tourism through Geocaching" by Skinner Heather (2018), underscoring its importance in the literature. Influential authors such as Chin Wei Lee, Atun Resmiye Alpar, and Misso Rosa and reputable journals such as the *Journal of Tourism Futures* and *Cogent Social Sciences* emerged from the analysis, highlighting their significant contributions to the field.

With a minimum co-citation threshold of 2, our study yielded a single cluster with 31 authors. The researchers' performance assessment revealed that Andreupoulou was the most cited author in the field of DT in RT. Emerging research clusters in the DT in RT literature were manually but thoroughly identified. The study also emphasizes the predominant keywords in the research, including "rural tourism," "tourism development," "digital marketing," "digitalization," "smart tourism," "digital artefact," and "sustainable development." These keywords represent the core themes and issues explored in the literature, highlighting DT's significance for sustainable development and its economic and social impacts on the RT sector. With co-occurrence keyword and content analysis, the results showed that there were 39 keywords divided into five clusters: (1)-Digital Folklore and Smart Travel Technology Before and After the Pandemic, (2)- Digital Technology Solutions Support Green and Sustainable Tourism Development, (3)-Applying Information Technology in Developing Community-based Rural Tourism, (4)-Digital Communications and Marketing for Rural Tourism, (5)-Geographic Information System and Scanning Technology in Rural Tourism. Older studies have garnered more citations, suggesting a scarcity of recent literature in this domain. Numerous studies exhibit similarities in experimental areas, models, methodologies, and findings, underscoring the necessity for additional research to fill existing gaps and investigate new dimensions of DT in RT.

2. Theoretical implications

The article's findings show some crucial theoretical significance for the process of DT in the RT industry. These meanings highlight the importance of taking advantage of 4.0 technology, digital tools, and media information technology to the local community in the countryside (Maquera et al., 2022; Singh et al., 2023). DT in RT is crucial before and after the pandemic. In addition, digital culture, optimization of experience on the website, and technology integration can enhance the experience of tourists and conserve cultural heritage and innovation in the RT industry (Król & Zdonek, 2022). The study emphasized the importance of green tourism and sustainable tourism development in shaping the DT of the RT (Lapuz, 2023). Taking advantage of IT, resolving environmental challenges, and improving rural destination management organizations are crucial for effective smart tourism management.

This research is covered by theories such as Stakeholder Engagement Theory, Participatory Action Research (PAR), Sensory Marketing Theory, Treatment Effect Model (Stamp), Intelligent Digital Platform (IDP), and Information Systems Success Model. The theory that covers this research is the Digital Footprint Data of visitors with space characteristics and the space development model of RT. Finally, educating and understanding the growth motivation in the industry is essential to shaping the future of RT. These theoretical implications provide. This is a valuable guide for researchers in promoting the process of DT in the RT.

3. Practical implications

The practical implications of this study's findings significantly influence the RT's DT. Industry stakeholders can leverage these implications as actionable recommendations to develop and implement strategies and initiatives that support and advance the DT process. Firstly, investing in technological infrastructure is essential for tourism businesses and rural destinations. This involves enhancing interactions, visibility, information collection, and log processing, focusing on personalization capabilities to enable users to make swift and precise decisions (Singh et al., 2023). The adoption of cutting-edge technologies such as the Internet of Things (IoT), artificial intelligence (AI), and virtual reality (VR) presents considerable practical advantages. These technologies improve visitor experiences, optimize operational processes, and boost customer satisfaction. Additionally, integrating sustainable practices is a critical implication that can reduce the environmental footprint of tourism activities (Qin et al., 2022). Utilizing digital technologies and engaging with local communities can further advance RT by alleviating business challenges and risks and enhancing its resilience.

Advancing social media, interactive and gamified experiences, and employing scanning technologies and digital photogrammetry with drone assistance in RT to enhance agricultural production capacity (Călina et al., 2022). Collaboration and partnerships are crucial in overcoming the challenges associated with DT in the RT sector. Forming alliances with technology providers, local communities, government agencies, and industry associations facilitates sharing knowledge and best practices (Maquera et al., 2022). Investing in digital skills development, training programs, and start-up culture is vital for equipping tourism professionals with the competencies needed for the digital age (Zhao et al., 2021). When participating in the DT process in RT, residents are empowered based on personal characteristics, reducing scale discrimination and low education level bias. Since then, DT has supported small-scale business households and increased the ability to restore the industry (Zhong et al., 2024). Moreover, advocating for supportive policies and regulations is critical for promoting DT. Engaging with policymakers to support technology adoption, data protection, privacy, and sustainable practices is vital for creating a favorable environment for DT within the RT. Additionally, ensuring accessibility and inclusivity is essential. Complying with web accessibility standards and designing user-friendly interfaces that address diverse user needs to enhance the overall experience for all individuals (Król and Hernik, 2022). By implementing these practical measures, stakeholders in the tourism industry can effectively navigate the DT process, enhance business performance, and address the evolving expectations of travelers in the digital era.

4. Limitations and Future Research

The scarcity of literature on this topic presents a challenge for emerging researchers seeking existing studies on DT within the RT industry. Our research was confined to the Scopus database; therefore, future studies should consider exploring additional databases such as Web of Science, Dimensions, PubMed, and Google Scholar. The scope of our analysis was limited to English-language articles and specific subject areas.

Future research could benefit from examining various perspectives and incorporating a more comprehensive array of literature from diverse fields. Despite these limitations, our study provides valuable contributions to the existing body of knowledge and has implications for research and management in this field.

Moreover, Figure 7 depicts the research trajectory, highlighting potential areas for future investigation. By analyzing DT's dimensions, characteristics, and significance in RT, the authors have established a foundation for further examining its implications and identifying new areas for exploration in this field (Table 3).

Table 3. The potential line for future research (Source: Table by the authors)

Line of research	Field
Digital Folklore and Smart Travel Technology	Explore capacity-building programs' impact on improving digital literacy and reducing the digital divide between urban and rural areas. This activity will enhance the individual and organizational capacity of tourism stakeholders to access and use smart tourism technology innovatively.
	Explore the acceptance and use of smart tourism technology in rural areas after the crisis.
Digital Technology and Sustainable Tourism	Consider the needs and desires of tourists using virtual technology. Wine tourism is associated with RT, which needs to be considered in the future, bringing high profits and sustainability.
Information Technology in RT	Discover how smart technology enhances the overall travel experience on RT tours.
Digital Communications and Marketing for RT	Examine the impact of social media, smartphones, and multimedia platforms on tourism promotion and leverage digital technology to market and sell tourism services.
Geographic Information System and Scanning Technology in RT	Research on geographic information systems to manage and control the quality and efficiency of tourism service provision and sustainable agricultural production.

Our study suggests future research directions for DT in RT by comparing the recurrence and occurrence of new keywords in research. Such ideas deserve the attention of researchers and businesses and should be further explored.

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THE INFLUENCE OF INSIDE WORK AND OUTSIDE WORK WELL-BEING FACTORS ON ACTUAL AND FUTURE TRAVEL DESTINATION CHOICE

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Abstract: The study aims to analyze the impact of workplace and non-workplace well-being factors, along with demographic characteristics, on Hungarian employees' travel habits and preferences. This research investigates the interplay between well-being factors and travel preferences, emphasizing the potential implications for employee satisfaction and organizational strategies. A quantitative approach was employed, utilizing a structured online questionnaire distributed to randomly selected Hungarian employees from diverse industries. The collected data were analyzed using statistical techniques, including correlation and regression analysis, to identify significant predictors and relationships. The findings underscore that workplace well-being factors, particularly work-life balance, exert a profound influence on travel preferences, suggesting that employees seek restorative travel experiences to counteract workplace demands. Furthermore, demographic factors such as age and gender emerged as critical determinants of travel behaviors. Younger employees prioritized relaxation and wellness-oriented trips, while older age groups leaned towards health-related travel. Gender differences also shaped preferences, with men and women displaying distinct patterns in travel motivations and destination choices. The study highlights the relevance of integrating travel-related considerations into workplace well-being programs. Employer-supported initiatives, such as flexible working arrangements, health benefits, and subsidized travel opportunities, can enhance employee satisfaction and productivity. These measures are not only vital for stress management and burnout prevention but also for fostering loyalty and engagement among employees. Additionally, the findings provide insights for the tourism industry, offering a deeper understanding of the factors influencing travel decisions. Tailored marketing strategies targeting specific employee demographics and preferences can capitalize on these insights, leading to more effective engagement with potential travelers. This research contributes to the broader discourse on the intersection of workplace well-being, quality of life, and travel behavior, emphasizing the multidimensional nature of employee satisfaction and its implications for both employers and the tourism sector.

Keywords: workplace well-being, travel habits, demographic characteristics, quantitative research, Hungary, questionnaire survey, statistical analysis

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INTRODUCTION

In modern workplace environments, employee well-being is increasingly emphasized, affecting not only workplace performance but also the quality of life of employees. Well-being factors, such as work-life balance, workplace atmosphere, and benefits, play a crucial role in how satisfied and motivated employees feel at their workplace. However, these factors influence not only workplace behavior but also other areas of life, including travel habits and preferences.

Through globalization and technological advancements, employees have become increasingly mobile, and for many, travel has become an integral part of everyday life. Travel appears not only as a leisure activity but can also be an expression of employees' well-being and satisfaction. Wellness and health tourism trips have become particularly popular, aimed at physical and mental regeneration, as well as stress reduction. These trips encompass forms of travel for relaxation, recreation, and rejuvenation, and play a significant role in improving employees' quality of life.

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During wellness trips, employees find themselves in environments where various health and relaxation services are available, such as spa treatments, healthy nutrition, and meditation programs. Health tourism trips offer medical and rehabilitation treatments aimed at alleviating physical problems and maintaining long-term health. These forms of travel not only serve physical well-being but also contribute to mental and emotional freshness, which can help increase workplace performance and reduce workplace stress. The aim of this study is to explore the extent to which workplace and non-workplace well-being factors, as well as demographic characteristics, affect the travel habits and preferences of Hungarian employees, especially in the areas of wellness and health tourism, as well as leisure and recreational travel. Understanding these relationships can provide valuable information not only for employers to develop strategies to increase employee satisfaction but also contribute to a deeper understanding of the connection between workplace well-being and quality of life.

The relevance of the research lies in the fact that the problem of workplace stress and burnout is worsening nowadays, negatively affecting both individuals and organizational operations. Modern workplace environments are putting increasing pressure on employees, which in the long term not only reduces performance but also poses serious health risks. Maintaining a balance between work and private life is becoming increasingly difficult, increasing the need for preventive and health-preserving measures that alleviate the harmful effects of stress. Travel as a primary preventive tool is of paramount importance in this context, as it can play a key role in preventing stress and burnout.

The research also has practical utility, as exploring the connection between workplace health promotion and travel provides an opportunity for companies to more effectively support the health and well-being of their employees. The results of the research can help in developing corporate health promotion programs, creating strategies that contribute to employees' stress management and prevention of burnout. Integrating travel opportunities and workplace support can not only increase employee satisfaction and loyalty but also improve organizational performance, as healthy and balanced employees perform their work more efficiently. This approach can contribute to ensuring long-term competitiveness and sustainability in the corporate sector. In light of this, integrating travel-supporting measures into workplace health promotion programs can be an extremely effective strategy that is beneficial for all parties involved.

LITERATURE REVIEW

The study of employee well-being and travel habits has gained significant momentum in academic and professional communities in recent decades (Burkholder et al., 2010; Ettema et al., 2011; Van den Berg et al., 2019; De Vos et al., 2013). A healthy work environment and work-life balance fundamentally influence employee performance and satisfaction, which various studies have thoroughly mapped out (Abdirahman et al., 2018; Haider et al., 2018; Dousin et al., 2019).

The concept of workplace well-being encompasses multiple dimensions, including physical, mental, and emotional well-being (Zapf, 2002; Baldschun, 2014; Taris & Schaufeli, 2018). Research on workplace stress and the effects of the work environment is extensive, and according to the literature, workplace stress has a significant impact on employees' general health status and workplace performance (Goswami, 2015; Pandey, 2020; Sari et al., 2021). Job satisfaction and benefits, such as improving the work environment and flexible working hours, also play a significant role in increasing employee well-being (Warr, 2002; Rozlan & Subramaniam, 2020). The environment, whether natural or built, increasingly determines people's health. Therefore, beyond homes and workplaces, the examination of environmental factors is becoming more important in tourism as well (Ilies et al., 2023, a, b, c).

Workplace and non-workplace well-being factors are playing an increasingly important role in people's lives, especially when making travel decisions (Gonda et al., 2019; Tütünkov et al., 2021). In modern lifestyles, workplace stress has become an almost universal phenomenon (Salavecz, 2013; EU-OSHA, 2018). This stress, if persistent over the long term, can not only cause exhaustion and reduced performance but can also lead to serious health problems.

Because of these factors, people living in the 21st century prefer leisure services where the focus is on physical and mental relaxation as well as regaining mental performance (Hidvégi et al., 2019; Bíró et al., 2019; Lengyel, 2019; 2020). Travel is an excellent primary preventive activity as it helps prevent the development of stress and burnout-related health problems. Travel provides an opportunity for mental and physical relaxation, which contributes to maintaining overall well-being. Environmental change, rest, and leisure activities, such as time spent in nature or cultural experiences, strengthen the immune system, reduce anxiety, and improve mood (Szabó et al., 2022).

Thus, travel not only alleviates fatigue but also promotes long-term health preservation, preventing the development of more serious illnesses and burnout (Lőrincz & Sulyok, 2017; Gonda et al., 2019). The connection between workplace health promotion and travel is increasingly coming to the forefront as companies recognize the importance of healthy and satisfied employees. As part of health promotion programs, more and more workplaces are encouraging or supporting trips aimed at relaxation, rejuvenation, and stress reduction for employees.

Overall, it can be said that incorporating travel-promoting support into workplace health promotion programs can be an effective strategy that not only supports employee health and well-being but also contributes to increasing workplace satisfaction and company performance (Princz, 2020; Molnár & Müller, 2021a, b).

Travel as a complement to workplace well-being has also received significant attention. The growing popularity of wellness and health tourism reflects employees' needs for health and relaxation (Csobán et al., 2022). The aim of wellness tourism is to promote physical and mental regeneration, and research shows that regular rest and stress reduction have a positive impact on workplace performance and satisfaction. Various treatments and programs used during wellness trips - such as spa treatments, meditation programs, and healthy nutrition - promote physical and mental rejuvenation of employees (Smith & Puczkó, 2010, 2014; Praprom & Laipaporn, 2023). Health tourism, which offers medical treatments and rehabilitation programs, also plays an important role in increasing employee well-being (Sultana, 2021). The aim of health tourism is to provide support in treating patients' health problems and in their rehabilitation process, which contributes to improving employees' quality of life in the long term (Connell, 2013). During these trips, employees not only receive treatment for their health problems but also have the opportunity for physical and mental regeneration (Datta, 2020.). Health tourism destinations that combine treatments based on medicinal waters with high-quality tourist reception conditions are very popular (Stupariu & Morar, 2018; Eze et al., 2020; Hojcska & Szabó, 2021).

Leisure and recreational trips represent another important aspect of improving quality of life (Agybetova et al., 2023). Research shows that regular recreational activities, such as active leisure programs and time spent in nature, significantly contribute to reducing stress and improving mental health (Street et al., 2007). The possibilities for rest and leisure activities are closely related to workplace performance and employee satisfaction. The relationship between employee well-being and travel habits is a complex and multidimensional phenomenon. Strategies aimed at reducing workplace stress, the benefits of wellness and health tourism, and the role of rest and recreation all contribute to employees living fuller lives, which ultimately has a positive impact on workplace performance and satisfaction. This study aims to contribute to increasing employee well-being and a better understanding of travel habits through a deeper understanding of these connections.

MATERIALS AND METHODS

The sample consists of 1092 participants, with a majority being male (69.4%). The most represented age group is 18-24 years (47.9%), followed by 25-39 years (26.1%) (Table 1). A significant portion of the sample comprises students working alongside their studies (32.4%) and individuals with more than 20 years of work experience (18.1%) (Table1).

Table 1. The sample (Source: Own editing)

Variable	Category	Frequency	Percent
Gender	Female	484	44.3%
	Male	608	55.7%
Age Group	18-24	523	47.9%
	25-39	285	26.1%
	40-54	215	19.7%
	55+	69	6.3%
Work Experience	Student working alongside studies	354	32.4%
	Less than 1 year	77	7.1%
	1-5 years	177	16.2%
	5-10 years	125	11.4%
	10-20 years	136	12.5%
	More than 20 years	198	18.1%
	Retired but still working	25	2.3%
Education	Less than 8 years of schooling	42	3.8%
	Completed 8 years of schooling	101	9.2%
	Vocational training	536	49.1%
	High school diploma	101	9.2%
	Higher education	306	28.0%
Position	Company owner/manager	168	15.4%
	Senior executive	50	4.6%
	Middle manager	31	2.8%
	Employee	662	60.6%
	Expert	60	5.5%
	Freelancer	66	6.0%
	Casual worker	20	1.8%
	Occasional worker	35	3.2%
Type of Work	Light mental work	154	14.1%
	Heavy mental work	79	7.2%
	Light physical work	454	41.6%
	Heavy physical work	156	14.3%
	Mixed (both mental and physical)	249	22.8%
Sick Leave in 2022	None	591	54.1%
	1-5 days	231	21.2%
	5-10 days	134	12.3%
	10-15 days	78	7.1%
	More than 15 days	58	5.3%

In terms of educational background, almost half of the participants (49.1%) have vocational training, and 28.0% have higher education. The majority of respondents work as employees (60.6%), with a smaller proportion occupying positions as company owners/managers (15.4%) and freelancers (6.0%).

Regarding the type of work, the most common category is light physical work (41.6%), followed by mixed mental and physical work (22.8%). A majority of the participants did not take any sick leave in 2022 (54.1%), while 21.2% took 1-5 days of sick leave. Figure 1 visually represents sample characteristics.

Overall, the sample is diverse in terms of gender, age, work experience, education, position, and type of work, providing a comprehensive overview of the working population (Figure 1). Research methodology is outlines on Figure 2.

In this research, we applied a quantitative method, which involved conducting a structured questionnaire survey among Hungarian employees. The aim of the survey was to explore the impact of workplace and non-workplace well-being factors, as well as demographic characteristics (such as age, gender, educational background) on employees' travel habits and preferences. Data collection was carried out through an online platform, and the sample consisted of randomly selected employees from various industries. We processed the received responses using statistical analysis techniques, such as correlation and regression analysis, in order to uncover the relationships and effects between different variables. Based on the results, we drew conclusions about the significance of the examined factors and their practical applicability.

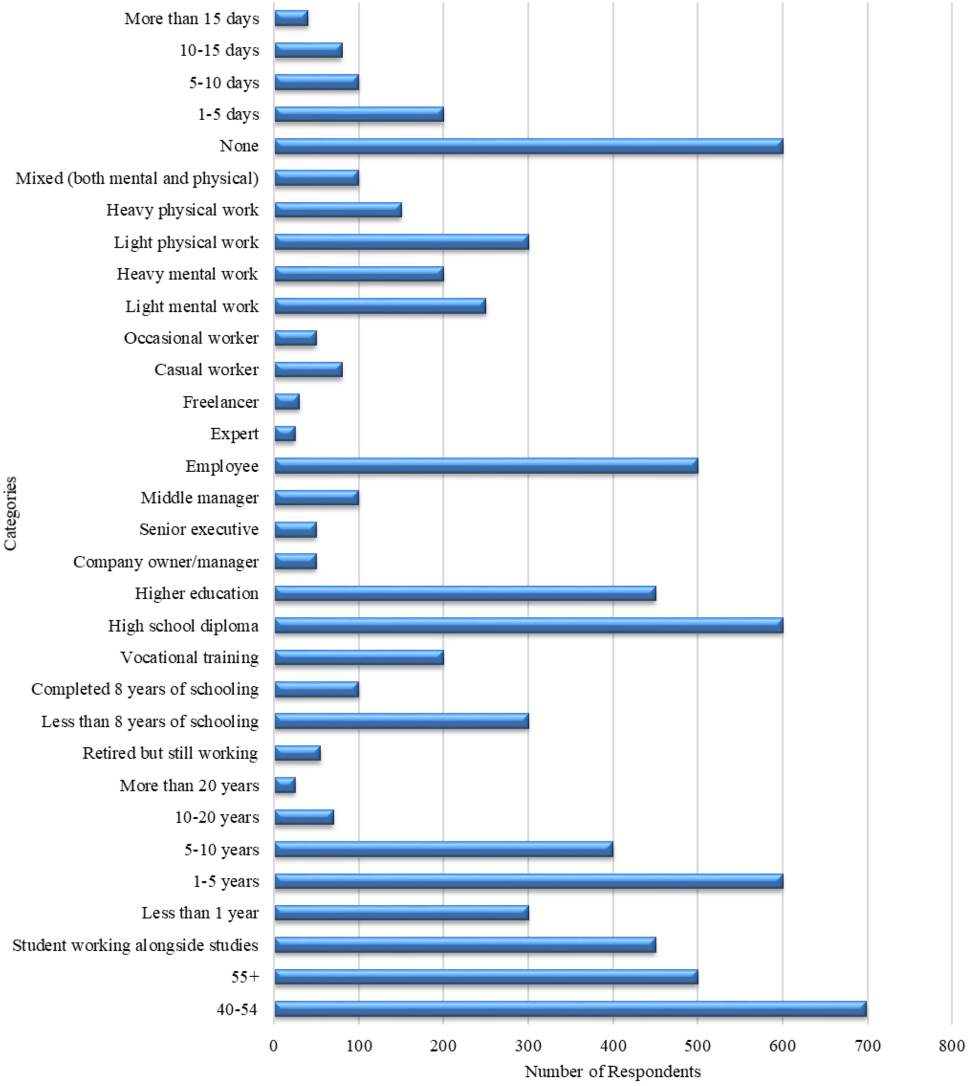

Figure 1. Sample characteristics (Source: Authors)

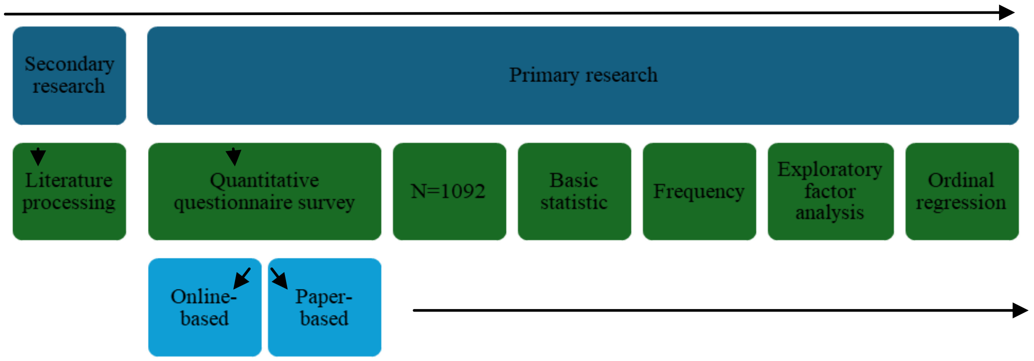

Figure 2. Research methodology (Source: Authors)

The predictor variables were grouped into factors through exploratory factor analysis (EFA) and factor scores were used as predictor variables in the regression analysis. The decision to carry out dimension reduction through EFA was made because analyzing the 97 variables individually would go beyond spatial constraints and would also impair interpretability. Detailed analysis of EFA results is also not viable for space constraints. The EFA was carried out in SPSS 28, using

Principal Axis Factoring and Promax rotation. Ordinal regression analysis was conducted, using the factor scores from the EFA, to examine the influence of various predictor variables on different travel preferences, including travel for relaxation, medical purposes, wellness, events, visits to friends/family, and preferences for specific types of destinations such as nature, water-related destinations, entertainment, sports, food-related destinations, and calm places.

RESULTS AND DISCUSSION

Demographic variables as predictors of travel habits and preferences

Table 2 presents the results of the ordinal regression analysis examining the relationship between various demographic variables and travel habits and preferences among Hungarian employees. This analysis helps us understand how factors such as age, education level, work experience, and job position influence different aspects of travel behavior. The table shows the odds ratios, statistical significance, and confidence intervals for each significant predictor variable across various travel outcomes. These results provide valuable insights into the demographic factors that shape employees' travel choices and preferences, which can be crucial for both employers and the tourism industry in tailoring their offerings and policies.

Table 2. Ordinal regression results (Source: Own editing)

Travel Outcome	Predictor Variable	Odds Ratio	Wald	df	Sig.	95% Confidence Interval
Travel for Relaxation	18-24 years	3.055	5.666	1	.017	1.218 to 7.665
Travel for Relaxation	25-39 years	2.333	4.069	1	.044	1.024 to 5.315
Travel for Relaxation	40-54 years	2.099	4.886	1	.027	1.088 to 4.047
Travel for Relaxation	Completed 8 grades	0.556	5.466	1	.019	0.339 to 0.909
Travel for Relaxation	Company owner/manager	0.448	4.107	1	.043	0.207 to 0.974
Travel for Relaxation	Top manager	0.381	4.505	1	.034	0.156 to 0.929
Travel for Relaxation	Team leader	0.449	4.930	1	.026	0.221 to 0.910
Travel for Relaxation	Occasional worker	0.240	6.234	1	.013	0.078 to 0.736
Travel for Events	Completed 8 grades	0.509	8.127	1	.004	0.320 to 0.810
Travel for Events	Vocational training school	0.579	11.623	1	.001	0.423 to 0.793
Travel for Events	High school diploma	0.607	5.059	1	.025	0.393 to 0.938
Travel for Medical	25-39 years	0.326	5.785	1	.016	0.130 to 0.812
Travel for Medical	Company owner/manager	0.246	12.771	1	.000	0.113 to 0.529
Travel for Medical	Top manager	0.276	7.151	1	.007	0.107 to 0.709
Travel for Medical	Team leader	0.266	14.034	1	.000	0.133 to 0.531
Travel for Medical	Light intellectual work	2.071	8.393	1	.004	1.265 to 4.008
Travel for Medical	Heavy intellectual work	2.614	9.841	1	.002	1.434 to 4.756
Travel for Medical	Mixed intellectual and physical work	2.296	11.113	1	.001	1.321 to 3.999
Travel for Wellness	Still a student, but also working	4.341	5.884	1	.015	1.326 to 8.645
Travel for Wellness	Working for less than 1 year	3.284	3.547	1	.060	0.954 to 6.768
Travel for Wellness	Working for 1-5 years	3.561	4.549	1	.033	1.109 to 6.663
Travel for Wellness	Working for 5-10 years	3.290	4.023	1	.045	1.029 to 6.668
Travel for Wellness	Company owner/manager	0.419	5.590	1	.018	0.203 to 0.861
Travel for Wellness	Top manager	0.449	3.517	1	.061	0.195 to 1.017
Travel for Nature Preference	Completed less than 8 grades	0.205	24.886	1	.000	0.110 to 0.396
Travel for Nature Preference	Completed 8 grades	0.408	15.289	1	.000	0.261 to 0.639
Travel for Nature Preference	Vocational training school	0.634	8.458	1	.004	0.467 to 0.862
Travel for Water Preference	Completed less than 8 grades	0.466	6.081	1	.014	0.254 to 0.855
Travel for Water Preference	High school diploma	0.528	9.161	1	.002	0.349 to 0.799
Travel for Sports Preference	Working for less than 1 year	3.252	4.670	1	.031	1.116 to 7.446
Travel for Calm Places	Completed less than 8 grades	0.492	5.106	1	.024	0.237 to 0.910
Travel for Calm Places	Light intellectual work	0.634	5.020	1	.025	0.401 to 0.944
Travel for Calm Places	Heavy intellectual work	0.536	5.885	1	.015	0.324 to 0.887
Travel for Calm Places	Mixed intellectual and physical work	0.712	4.551	1	.033	0.522 to 0.972

The results from the ordinal regression analysis indicate various significant predictors for different travel preferences.

Age: Younger age groups show a higher likelihood of traveling for relaxation compared to the reference group (55+ years). For instance, the odds of traveling for relaxation are 3.055 times higher for the 18-24 years group (OR = 3.055, 95% CI = 1.218 to 7.665, p = .017), 2.333 times higher for the 25-39 years group (OR = 2.333, 95% CI = 1.024 to 5.315, p = .044), and 2.099 times higher for the 40-54 years group (OR = 2.099, 95% CI = 1.088 to 4.047, p = .027).

Education: Lower levels of education are associated with a higher likelihood of certain travel preferences. For example, individuals with less than 8 grades completed are less likely to prefer nature-related travel (OR = 0.205, 95% CI = 0.110 to 0.396, p = .000) and more likely to travel for medical reasons (OR = 2.071, 95% CI = 1.265 to 4.008, p = .004). Those with a high school diploma show lower odds of preferring water-related destinations (OR = 0.528, 95% CI = 0.349 to 0.799, p = .002).

Work Position: Certain positions show distinct travel preferences. Company owners/managers are less likely to travel for relaxation (OR = 0.448, 95% CI = 0.207 to 0.974, p = .043) and medical reasons (OR = 0.246, 95% CI = 0.113 to 0.529, p = .000). Similarly, top managers are less likely to travel for relaxation (OR = 0.381, 95% CI = 0.156 to 0.929, p = .034) and medical reasons (OR = 0.276, 95% CI = 0.107 to 0.709, p = .007). Conversely, occasional workers are significantly less likely to travel for relaxation (OR = 0.240, 95% CI = 0.078 to 0.736, p = .013) (Figure 3).

Work Type: People engaged in light intellectual work are more likely to travel for medical reasons (OR = 2.071, 95% CI = 1.265 to 4.008, p = .004) but less likely to prefer calm places (OR = 0.634, 95% CI = 0.401 to 0.944, p = .025). Those involved in heavy intellectual work are also more likely to travel for medical reasons (OR = 2.614, 95% CI = 1.434 to 4.756, p = .002) and less likely to prefer calm places (OR = 0.536, 95% CI = 0.324 to 0.887, p = .015). Individuals performing mixed intellectual and physical work show similar trends, being more likely to travel for medical reasons (OR = 2.296, 95% CI = 1.321 to 3.999, p = .001) and less likely to prefer calm places (OR = 0.712, 95% CI = 0.522 to 0.972, p = .033).

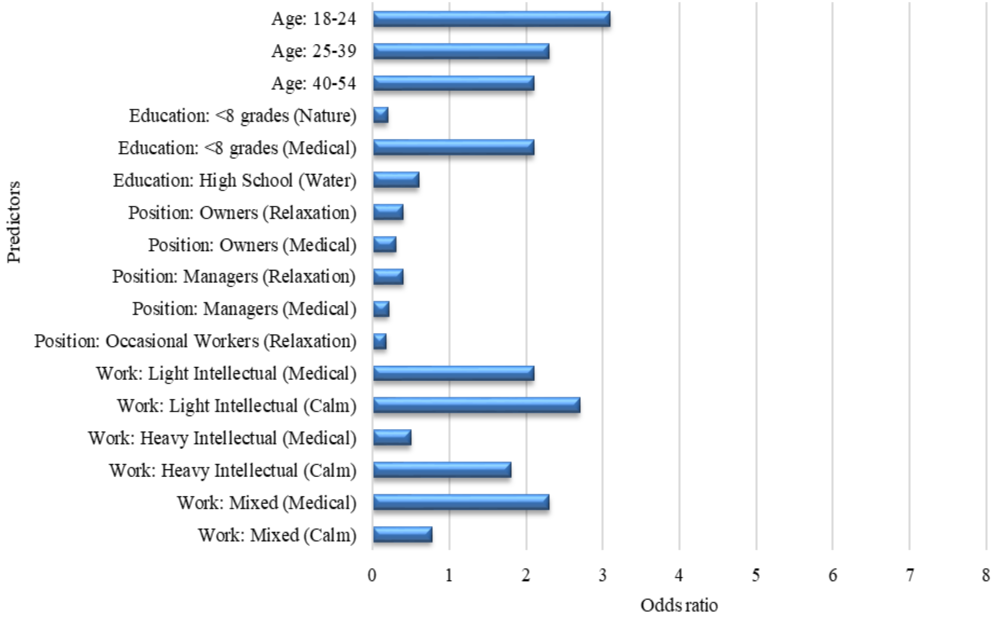

Figure 3. Demographic predictors of travel preferences (Source: Authors)

Outside work and inside work wellbeing factors as predictors of travel habits and preferences

The predictor variables were grouped into factors through exploratory factor analysis (EFA) and factor scores were used as predictor variables in the regression analysis. The decision to carry out dimension reduction through EFA was made because analysisng the 97 variables individually would go beyond spatial constraints and would also impair interpretability. Detailed analysis of EFA results is also not viable for space constraints. The EFA was carried out in SPSS 28, using Principal Axis Factoring and Promax rotation. The KMO measure of 0.895 indicated a high level of sampling adequacy, suggesting that the data is suitable for factor analysis. Bartlett's Test of Sphericity was significant (χ^2 = 40433.197, p < 0.001), indicating that the correlations between items were sufficiently large for EFA. 14 factors were extracted with number of indicators ranging from 3 to 8 and the loadings from 0.45 to 0.95. The ordinal regression analysis was conducted to examine the influence of various predictor variables on different travel preferences, including travel for relaxation, medical purposes, wellness, events, visits to friends/family, and preferences for specific types of destinations such as nature, water-related destinations, entertainment, sports, food-related destinations, and calm places (Table 3).

Table 3. Ordinal regression results (Source: Own editing)

Travel Outcome	Predictor Variable	Odds Ratio	Wald	df	Sig.	95% Confidence Interval
Travel for relaxation	Relaxation and Leisure (F6)	1.713	20.793	1	< 0.001	1.359 - 2.157
	Employer Health Improvements (F12)	11.16	357.094	1	< 0.001	8.695 - 14.313
	Choice Preferences (F13)	1.228	5.471	1	0.019	1.034 - 1.457
Travel for medical purposes	Benefits and Compensation (F5)	4.89	166.557	1	< 0.001	3.842 - 6.523
	Employer Health Improvements (F12)	5.94	179.194	1	< 0.001	4.572 - 7.865
	Job Satisfaction and Energy (F14)	1.46	7.234	1	0.007	1.107 - 1.921
Travel for wellness	Work Satisfaction (F1)	0.778	4.990	1	0.025	0.624 - 0.969
	Work-Life Balance and Stress (F2)	1.22	3.909	1	0.048	1.002 - 1.488
	Benefits and Compensation (F3)	0.546	27.080	1	< 0.001	0.435 - 0.686
	SZÉP Card Benefits (F5)	3.30	119.506	1	< 0.001	2.665 - 4.093
	Relaxation and Leisure (F6)	0.429	43.494	1	< 0.001	0.334 - 0.593
	Travel Preferences (F9)	2.41	47.389	1	< 0.001	1.876 - 3.085
	Employer Health Improvements (F12)	17.99	346.720	1	< 0.001	13.303 - 24.348
	Job Satisfaction and Energy (F14)	0.770	4.627	1	0.031	0.607 - 0.977
Travel for events	Benefits and Compensation (F3)	1.32	7.489	1	0.006	1.081 - 1.605
	SZÉP Card Benefits (F4)	0.802	3.943	1	0.047	0.646 - 0.997
	Free Time Activities (F5)	0.769	8.062	1	0.005	0.643 - 0.921
	Relaxation and Leisure (F6)	2.09	42.645	1	< 0.001	1.677 - 2.607
	Employer Health Improvements (F12)	16.44	418.275	1	< 0.001	12.572 - 21.509
	Job Satisfaction and Energy (F14)	0.695	11.114	1	0.001	0.561 - 0.850

Travel to visit friends/family	SZÉP Card Benefits (F4)	1.34	6.953	1	0.008	1.078 - 1.663
	Free Time Activities (F5)	0.492	53.861	1	< 0.001	0.407 - 0.589
	Employer Health Improvements (F12)	12.81	389.724	1	< 0.001	9.957 - 16.472
Preference for nature	SZÉP Card Benefits (F4)	1.63	25.566	1	< 0.001	1.348 - 2.008
	Free Time Activities (F5)	0.793	7.779	1	0.005	0.675 - 0.934
	Relaxation and Leisure (F6)	1.25	5.107	1	0.024	1.029 - 1.515
	Choice Preferences (F13)	2.11	92.433	1	< 0.001	1.809 - 2.479
	Job Satisfaction and Energy (F14)	0.674	16.087	1	< 0.001	0.556 - 0.817
Preference for water-related destinations	Work Satisfaction (F1)	0.645	22.295	1	< 0.001	0.538 - 0.774
	Free Time Activities (F5)	2.67	120.626	1	< 0.001	2.241 - 3.182
	Relaxation and Leisure (F6)	0.247	164.763	1	< 0.001	0.199 - 0.338
	Nature and Learning (F7)	0.777	8.984	1	0.003	0.628 - 0.916
	Preventive Health Activities (F8)	1.24	6.912	1	0.009	1.055 - 1.449
	Choice Preferences (F13)	1.24	8.085	1	0.004	1.068 - 1.445
Preference for entertainment	SZÉP Card Benefits (F4)	0.618	24.711	1	< 0.001	0.512 - 0.747
	Free Time Activities (F5)	1.35	13.635	1	< 0.001	1.150 - 1.579
	Choice Preferences (F13)	0.587	50.478	1	< 0.001	0.506 - 0.679
Preference for sports	Work Satisfaction (F1)	1.40	12.843	1	< 0.001	1.163 - 1.676
	Work-Life Balance and Stress (F2)	0.811	6.602	1	0.010	0.690 - 0.951
	Benefits and Compensation (F3)	0.693	15.553	1	< 0.001	0.577 - 0.831
	SZÉP Card Benefits (F4)	0.656	17.253	1	< 0.001	0.538 - 0.801
	Free Time Activities (F5)	1.42	16.996	1	< 0.001	1.202 - 1.678
	Relaxation and Leisure (F6)	6.33	251.484	1	< 0.001	5.037 - 7.960
	Nature and Learning (F7)	0.677	20.664	1	< 0.001	0.553 - 0.801
	Destination Preferences (F10)	0.317	112.628	1	< 0.001	0.257 - 0.392
	Employer Health Improvements (F12)	0.576	45.318	1	< 0.001	0.490 - 0.748
	Job Satisfaction and Energy (F14)	0.801	4.797	1	0.029	0.658 - 0.977
Preference for food -related destinations	Benefits and Compensation (F3)	0.729	11.284	1	0.001	0.606 - 0.876
	Free Time Activities (F5)	0.444	77.988	1	< 0.001	0.370 - 0.547
	Relaxation and Leisure (F6)	1.61	20.331	1	< 0.001	1.309 - 2.065
	Travel Preferences (F9)	27.14	508.958	1	< 0.001	20.386 - 36.635
	Destination Preferences (F10)	0.650	16.970	1	< 0.001	0.530 - 0.798
	Job Satisfaction and Energy (F14)	1.46	13.557	1	< 0.001	1.194 - 1.788
Preference for calm places	SZÉP Card Benefits (F4)	1.64	22.366	1	< 0.001	1.344 - 2.007
	Free Time Activities (F5)	0.546	46.294	1	< 0.001	0.460 - 0.654
	Employer Health Improvements (F12)	0.736	14.120	1	< 0.001	0.627 - 0.863
	Choice Preferences (F13)	1.74	46.872	1	< 0.001	1.484 - 2.051
	Job Satisfaction and Energy (F14)	0.577	27.099	1	< 0.001	0.469 - 0.710
	Job Satisfaction and Energy (F14)	0.577	27.099	1	< 0.001	0.469 - 0.710

Travel for Relaxation: The analysis revealed that relaxation and leisure (Factor 6) significantly predicted travel for relaxation, with an odds ratio of 1.713 ($p < 0.001$). Employer health improvements (Factor 12) had an even stronger impact, increasing the odds by 11.16 times ($p < 0.001$). Choice preferences (Factor 13) also positively influenced travel for relaxation, with an odds ratio of 1.228 ($p = 0.019$).

Travel for Medical Purposes: Benefits and compensation (Factor 5) significantly predicted travel for medical purposes, increasing the odds by 4.89 times ($p < 0.001$). Employer health improvements (Factor 12) were also a strong predictor, with an odds ratio of 5.94 ($p < 0.001$). Additionally, job satisfaction and energy (Factor 14) positively influenced this outcome (OR = 1.46, $p = 0.007$).

Travel for Wellness: Several factors significantly influenced travel for wellness. Work satisfaction (Factor 1) negatively predicted this outcome (OR = 0.778, $p = 0.025$), indicating that higher work satisfaction is associated with lower odds of traveling for wellness. Conversely, work-life balance and stress (Factor 2) had a positive impact (OR = 1.22, $p = 0.048$). Benefits and compensation (Factor 3) decreased the odds (OR = 0.546, $p < 0.001$), while SZÉP card benefits (Factor 5) increased the odds significantly (OR = 3.30, $p < 0.001$). Relaxation and leisure (Factor 6) and travel preferences (Factor 9) also positively influenced travel for wellness, with odds ratios of 0.429 ($p < 0.001$) and 2.41 ($p < 0.001$), respectively. Employer health improvements (Factor 12) greatly increased the odds (OR = 17.99, $p < 0.001$), while job satisfaction and energy (Factor 14) decreased them (OR = 0.770, $p = 0.031$).

Travel for Events: Benefits and compensation (Factor 3) positively predicted travel for events (OR = 1.32, $p = 0.006$), while SZÉP card benefits (Factor 4) negatively impacted it (OR = 0.802, $p = 0.047$). Free time activities (Factor 5) also reduced the odds (OR = 0.769, $p = 0.005$). In contrast, relaxation and leisure (Factor 6) and employer health improvements (Factor 12) increased the odds of traveling for events, with odds ratios of 2.09 ($p < 0.001$) and 16.44 ($p < 0.001$), respectively. Job satisfaction and energy (Factor 14) had a negative impact (OR = 0.695, $p = 0.001$).

Travel to Visit Friends/Family: SZÉP card benefits (Factor 4) significantly increased the odds of traveling to visit friends or family (OR = 1.34, $p = 0.008$). Free time activities (Factor 5) decreased the odds (OR = 0.492, $p < 0.001$), while employer health improvements (Factor 12) strongly increased them (OR = 12.81, $p < 0.001$).

Preference for Nature: Preferences for nature were significantly influenced by SZÉP card benefits (Factor 4) (OR = 1.63, p < 0.001), free time activities (Factor 5) (OR = 0.793, p = 0.005), and relaxation and leisure (Factor 6) (OR = 1.25, p = 0.024). Choice preferences (Factor 13) increased the odds (OR = 2.11, p < 0.001), while job satisfaction and energy (Factor 14) decreased them (OR = 0.674, p < 0.001).

Preference for Water-Related Destinations: Work satisfaction (Factor 1) negatively predicted preference for water-related destinations (OR = 0.645, p < 0.001). Free time activities (Factor 5) significantly increased the odds (OR = 2.67, p < 0.001), while relaxation and leisure (Factor 6) strongly decreased them (OR = 0.247, p < 0.001). Nature and learning (Factor 7) also had a negative impact (OR = 0.777, p = 0.003), whereas preventive health activities (Factor 8) positively influenced this preference (OR = 1.24, p = 0.009) supporting earlier research findings (Dimitrovski – Todorović, 2015). Choice preferences (Factor 13) had a similar positive effect (OR = 1.24, p = 0.004).

Preference for Entertainment: SZÉP card benefits (Factor 4) negatively predicted preference for entertainment (OR = 0.618, p < 0.001), while free time activities (Factor 5) increased the odds (OR = 1.35, p < 0.001). Choice preferences (Factor 13) also had a negative impact (OR = 0.587, p < 0.001).

Preference for Sports: Work satisfaction (Factor 1) positively influenced preference for sports (OR = 1.40, p < 0.001), in line with earlier research (Dixon – Warner, 2010), while work-life balance and stress (Factor 2) had a negative effect (OR = 0.811, p = 0.010). Benefits and compensation (Factor 3) and SZÉP card benefits (Factor 4) also negatively impacted this preference, with odds ratios of 0.693 (p < 0.001) and 0.656 (p < 0.001), respectively. Free time activities (Factor 5) and relaxation and leisure (Factor 6) positively influenced preference for sports, with odds ratios of 1.42 (p < 0.001) and 6.33 (p < 0.001), respectively. Nature and learning (Factor 7) and destination preferences (Factor 10) had negative impacts, with odds ratios of 0.677 (p < 0.001) and 0.317 (p < 0.001), respectively. Employer health improvements (Factor 12) also negatively influenced this preference (OR = 0.576, p < 0.001), while job satisfaction and energy (Factor 14) had a slight negative effect (OR = 0.801, p = 0.029).

Preference for Food-Related Destinations: Benefits and compensation (Factor 3) negatively predicted preference for food-related destinations (OR = 0.729, p = 0.001), as did free time activities (Factor 5) (OR = 0.444, p < 0.001). Relaxation and leisure (Factor 6) positively influenced this preference (OR = 1.61, p < 0.001), while travel preferences (Factor 9) had a strong positive impact (OR = 27.14, p < 0.001). Destination preferences (Factor 10) negatively impacted preference for food-related destinations (OR = 0.650, p < 0.001), whereas job satisfaction and energy (Factor 14) had a positive effect (OR = 1.46, p < 0.001).

Preference for Calm Places: Preferences for calm places were significantly influenced by SZÉP card benefits (Factor 4) (OR = 1.64, p < 0.001), free time activities (Factor 5) (OR = 0.546, p < 0.001), and employer health improvements (Factor 12) (OR = 0.736, p < 0.001). Choice preferences (Factor 13) positively impacted this preference (OR = 1.74, p < 0.001), while job satisfaction and energy (Factor 14) had a negative effect (OR = 0.577, p < 0.001).

These results highlight the complex interplay between various work-related, personal, and health-related factors in shaping travel preferences. The findings suggest that employer health improvements, relaxation and leisure, and specific benefits like the SZÉP card have significant impacts on travel and destination preferences among employees (Figure 4.).

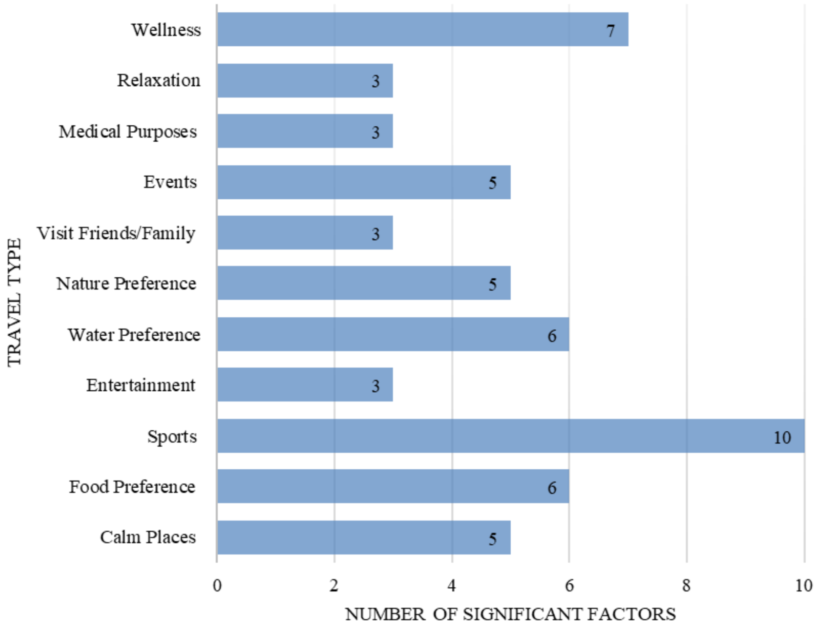

Figure 4. Number of factors influencing travle preferences (Source: Authors)

Demographic variables as predictors

Age and Travel for Relaxation: The higher likelihood of younger age groups travelling for relaxation could be attributed to several factors. Younger people might have fewer family responsibilities, allowing more freedom to travel. They may also have more energy and desire for new experiences.

Additionally, younger generations might prioritize work-life balance and self-care more than older generations. In contrast, older individuals (55+) might prefer other types of travel or have different priorities for their leisure time. Other international research has also examined motivation by age; younger people arriving in Barbados were more likely to come for relaxation and rest, while older people came to the destination for cultural motivation. The research was able to confirm this result for all nationality groups (Jönsson & Devonish, 2008). Other research also confirms that travel motivations and preferences differ among different generations (Basarić et al., 2016; Moniz et al., 2020; Verma et al., 2023).

Education and Travel Preferences: Lower education levels associated with less nature-related travel might be due to different cultural or socioeconomic factors influencing travel preferences. The higher likelihood of medical travel for those with less education could be related to poorer health outcomes often associated with lower educational attainment. Those with high school diplomas are less likely to prefer water-related destinations might be due to economic factors or different leisure preferences shaped by their educational background. A Chinese study also confirmed this result, showing that educational level influences socioeconomic status, which in turn influences travel motivation (Ma et al., 2018).

Work Position and Travel Preferences: Company owners/managers and top managers being less likely to travel for relaxation or medical reasons could be due to higher work commitments and responsibilities making it harder to take time off. They may also have potentially better health due to higher socioeconomic status, reducing the need for medical travel. It's possible they prefer different types of travel, such as business-related trips (Aguilera et al., 2008; Gustafson, 2012). Occasional workers being less likely to travel for relaxation might be due to financial constraints or job insecurity associated with their work situation. Work Type and Travel Preferences: Those engaged in intellectual work (light or heavy) being more likely to travel for medical reasons could be due to higher awareness of health issues and preventive care. They may also experience potentially more stressful work environments leading to health issues requiring medical attention. It's possible they have better health benefits allowing for medical travel. The lower preference for calm places among intellectual workers might be because they seek more stimulating environments to contrast with their daily work. They might prefer culturally rich or activity-filled destinations. The similar trends for mixed intellectual and physical work suggest that the intellectual component of work might be a key factor in shaping these preferences.

Wellbeing factors as predictors

Travel for Relaxation: The strong positive influence of relaxation and leisure (Factor 6) suggests that people who value and engage in relaxation activities in their daily lives are more likely to seek out relaxation-focused travel. The very strong impact of employer health improvements (Factor 12) could indicate that when employers invest in their employees' wellbeing, it may create a culture that encourages taking time off for relaxation. The positive influence of choice preferences (Factor 13) might suggest that having autonomy in decision-making at work translates to a higher likelihood of choosing relaxation-focused travel. Travel for Medical Purposes: The significant impact of benefits and compensation (Factor 5) could indicate that better financial resources and health benefits enable people to seek medical treatment through travel. Employer health improvements (Factor 12) strongly predicting medical travel might suggest that employers who prioritize health also support employees seeking specialized medical care, even if it requires travel. The positive influence of job satisfaction and energy (Factor 14) could imply that those who feel good about their work are more proactive about their health, including traveling for medical purposes if necessary.

Travel for Wellness: The negative prediction by work satisfaction (Factor 1) might suggest that those less satisfied with work are more likely to seek wellness travel as a form of escape or self-improvement. The positive impact of work-life balance and stress (Factor 2) could indicate that those who manage stress well are more likely to invest in wellness travel, reinforcing earlier research (Michalkó & Rácz, 2011; Kemppainen et al., 2021).

The strong positive influence of SZÉP card benefits (Factor 5) suggests that having access to these specific benefits encourages wellness-focused travel. Other domestic research has also confirmed that the SZÉP card, corporate benefits, and incentives are often used for wellness vacation purposes (Michalkó & Rácz, 2011; Vajta, 2012; Poór et al., 2013; Lövei – Kalmár, 2017). The very strong impact of employer health improvements (Factor 12) might indicate that employers who prioritize health create an environment where employees are more likely to engage in wellness activities, including travel.

Travel for Events: The positive prediction by benefits and compensation (Factor 3) could suggest that better financial resources enable more event-related travel. The negative impact of SZÉP card benefits (Factor 4) might indicate that these benefits are less likely to be used for event travel compared to other types of travel. The strong positive influence of relaxation and leisure (Factor 6) and employer health improvements (Factor 12) could suggest that a work environment that values employee wellbeing and leisure time encourages participation in events, even if travel is required. Travel to Visit Friends/Family: The positive impact of SZÉP card benefits (Factor 4) might suggest that these benefits are often used for personal travel to visit friends and family.

The negative influence of free time activities (Factor 5) could indicate that those who have satisfying leisure activities at home are less likely to travel to visit others. The strong positive impact of employer health improvements (Factor 12) might suggest that employers who prioritize employee wellbeing are more likely to create an environment where employees feel comfortable taking time off to maintain personal relationships through travel.

Managerial implication

The results of the study have significant implications for managers, especially in the areas of tourism, human resources, and workplace well-being. Understanding how workplace and non-workplace well-being factors influence employees' current and future travel preferences can help managers develop effective strategies that increase employee satisfaction and commitment, ultimately improving productivity and retention rates. Customized employee benefits and wellness programs: The study highlights the importance of workplace wellness initiatives, such as health promotion programs and stress management, which particularly shape preferences for wellness-type travel. Managers should consider tailoring their benefits and wellness programs to the diverse needs of the workforce. For example, providing flexible working hours, mental health support, or wellness retreats can not only improve job satisfaction but also align with employees' personal travel interests, resulting in a more motivated and healthier workforce.

Strategic use of incentives: The research points out that financial and non-financial benefits, such as bonuses, compensations, and the SZÉP card, significantly influence travel decisions. Managers can leverage this knowledge by designing reward programs that align with employees' travel desires. For instance, providing vouchers, discounted holiday packages, or additional paid leave as rewards can motivate employees to achieve higher productivity while allowing them to fulfill their personal travel desires. Work-life balance: The study emphasizes the critical role of work-life balance in determining employees' travel behavior, especially for wellness and leisure travel. Managers should prioritize policies that promote a healthy work-life balance, such as remote work options, flexible hours, and adequate leave provisions. By creating a supportive work environment that values employees' personal time, companies can reduce burnout and improve overall job satisfaction, likely resulting in more positive travel behavior and stronger commitment to the organization.

Targeted marketing strategies: For companies in the tourism sector, these results provide valuable insights into how different demographic groups, based on age, education level, and work type, influence travel preferences. Marketing campaigns can be more effectively targeted by focusing on the needs and preferences of different employee segments. For example, younger employees or those in intellectually demanding jobs are likely to lean towards leisure and wellness travel, while older employees or those in physically demanding jobs may prefer more restful and restorative destinations.

Increasing employee engagement through travel: Managers may consider incorporating travel opportunities into employee engagement strategies. Organizing company trips, team-building travels, or providing professional development opportunities at conferences and events in attractive locations can be an effective tool for strengthening team unity, rewarding hard work, and providing employees with the beneficial effects of travel.

In summary, by understanding and addressing employees' workplace and non-workplace well-being needs, managers can create a more engaged, satisfied, and productive workforce. This approach not only benefits employees but also contributes to the organization's long-term success and competitiveness.

CONCLUSION

The results of the research confirm that workplace and non-workplace well-being factors have a significant impact on the selection of current and future travel destinations. Ordinal regression analyses revealed that different demographic groups and workplace factors influence travel preferences in various ways.

Age-based analyses show that younger age groups are more inclined to travel for relaxation and entertainment, while the older generation prefers health-related travel. Educational level also plays an important role in shaping travel preferences; those with lower educational attainment are more likely to choose travel for medical reasons, while those with higher education prefer leisure and nature-oriented destinations.

In terms of workplace factors, position and job type also significantly influence the selection of destinations. Those in leadership positions show less willingness to travel for relaxation, while occasional workers are significantly less likely to choose leisure destinations. Additionally, the type of work is determinant: those performing light intellectual work are more likely to choose health-related travel, while for those doing heavy physical work, relaxation is less attractive.

Overall, well-being factors such as employer health improvements, work-life balance, and benefits and compensations play a significant role in travel preferences. The research results indicate that increasing workplace well-being, flexible working hours, and appropriate benefit packages can not only increase employee satisfaction but also have a positive impact on travel decisions. These findings can be useful for both employers and the tourism sector in understanding employee motivations and developing targeted tourism services.

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GASTRONOMY OF RELIGIOUS TOURISM: OVERVIEW AND FUTURE RESEARCH AGENDA

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Abstract: A statistic report from Grand View Research estimated a substantial expenditure of approximately 207.8 billion USD worldwide in religious tourism by 2027. The food industry in religious tourism represents a recent international economic and political development that has gained increasing importance, especially for developing countries, particularly those in Asia. Mapping the topic of gastronomy in religious tourism inside previous studies and creating a new concept map about those two topics. This study gathered the paper's metadata from the Scopus website. There were 55 studies used and being analyzed using the bibliometric method. This study used Biblioshiny and Vosviewer software to analyze the data. The analysis was divided into two, metric analysis and content analysis. The content analysis used a systematic literature review with a PRISMA flowchart to collect and screen the data sample. The were 45 samples used for content analysis using systematic literature review (SLR). The number of papers published on a certain topic did not influence the number of citations received. On the other hand, the result of the content analysis found that words frequently used in keywords of previous papers that were closely connected to the word gastronomy were food tourism, culinary tourism, satisfaction, cooking class, halal food, tapas, and monasteries. Gastronomy was closely related to food, halal, and monasteries. Gastronomy also included study in preparing food through a cooking class, especially related to preparing halal food. Monasteries were the places that could influence cuisine in the past through religious teachings in the past centuries. Tapas was a small appetizer from Spanish that was influenced by culture and closely related to gastronomy. The practical implication of this study was to be hoped to become a reference for authorities to focus more on the local culture that shapes the local dish as a positive point of tourist attraction. The novelty of this study is that no previous study observed the aspect of gastronomy that affects local tourist attractions and the concept of gastronomy and dishes. Further study is to observe more about the factors inside gastronomy that could influence the determinant intention of people to visit religious heritage. It would be wise to use a questionnaire in collecting the data to observe the cause-effect relationship between several factors inside gastronomy

Keywords: Culinary, economic growth, food availability, gastronomy, religious site

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INTRODUCTION

Recent literature on tourism points to the spending habits of tourists, emphasizing the need for more comprehensive insights into the behavior of tourists in purchasing food products in religious tourist sites. Culinary as an attraction point in tourism has emerged as a growing global phenomenon in the 21st century (Chew & Koeshendro, 2015), Each religious tourist spot has a different culture and tradition reflected in the local cuisine. This can be an attractive culinary diversity for tourists. Many religious tourist attractions, especially in Indonesia, have special dishes related to religious traditions or rituals. This dish has cultural value for tourists. The more tourists who buy food at religious tourist attractions, the more income the MSMEs in the area will earn, especially entrepreneurs and food stall employees. Food stalls offering local and typical dishes can be a significant source of income at religious tourism sites.

Figure 1 shows the rise of the market for religious tourism globally. A statistic report from Grand View Research stated the estimation of a substantial expenditure of approximately 207.8 billion USD worldwide in religious tourism by 2027 (Grand View Research, 2020–2027). The food industry in religious tourism represents a recent international economic and political development that has gained increasing importance, especially for developing countries, particularly those in Asia.

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Religious sites such as grand monasteries, ancient cemeteries of sacred persons, and Islamic boarding schools in countries like India, Malaysia, Indonesia, Japan, Middle Eastern countries, and Thailand have emerged as highly sought-after destinations for religious tourism (Moghavvemi et al., 2017). This needs inventive approaches to address the diverse challenges encountered within the realms of regulation and finance (Uula & Ikhwan, 2022).

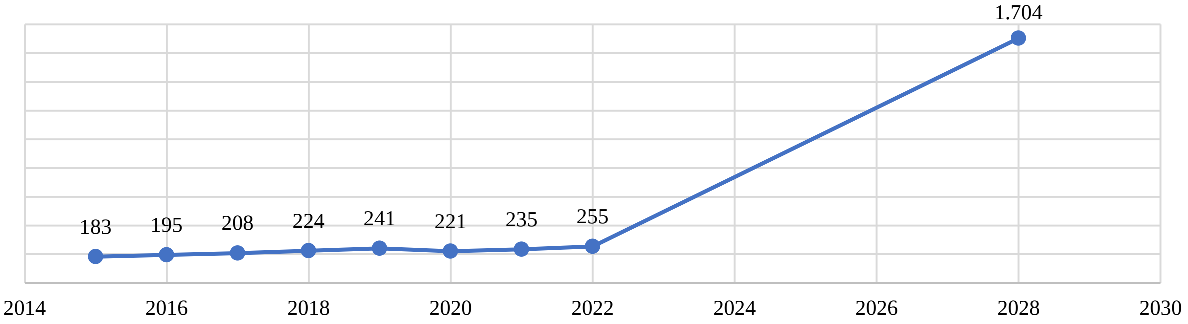

Figure 1. Market size of global religious tourism in Million Dollars (Source: Verified market research, https://www.verifiedmarketresearch.com)

The culinary industry in religious tourism sites has experienced significant growth in recent years, driven by rising awareness of faith in developed countries, affordable and sociable tourism life, and easy access to international travelers. This growth is projected to continue, with the food industry in the religious tourism market expected to grow by more than 20% annually. The increasing opportunities for the global food industry in religious tourism are therefore supported by the growing demand for high-quality and affordable healthcare services and the potential for economic development, job creation, and advances in medical research (Bürchler, 2023).

Each site of the religious tourist area had its local cuisine because the culture of the local people was different. Gastronomy is the study of food and culture. Studying the gastronomy of typical food at religious tourist attractions can be useful in searching for the roots of culture that influence the processing of food ingredients into typical culinary delights. Gastronomy is not only about tasting food, but also about understanding the culture, history, and philosophy behind the common culinary delights of a religious tourist spot (Surya et al., 2023). A local dish influenced by the culture of the local community. In the context of religious tourism, gastronomy can help tourism actors not only prepare and create high-quality food but also know the culinary traditions and history of various regions so that they can be implemented in their regions. Gastronomy can study the specific procedures and culture behind a dish so that it can be refined or combined with other typical foods in a particular area to add to the positive experience of visiting tourists (Sahoo, 2019).

According to that background, this study aims to observe the future research agenda related to gastronomy in religious tourism. However, the primary objective of this study was to investigate the role of gastronomy in enhancing religious tourism experiences. The theoretical implication of this study was to be used as a reference for future studies on what aspect should be developed related to gastronomy in religious tourism. This study formulated the research questions as follows:

1. How was the citations overview of the previous studies related to gastronomy in religious tourism?
2. What were the most used words in the authors' keywords of previous studies related to gastronomy in religious tourism?
3. What was the novelty for future research on gastronomy in religious tourism?
4. What was the suggestion for the government and stakeholders of religious tourism to develop the food industry and SMEs in that area?

LITERATURE REVIEW

Gastronomy in the Tourism Sector

Gastronomy plays a strategic role in tourist destinations, particularly in crafting a gastronomic image and a sense of place, and it is a vital component of the differentiation strategy Gastronomy tourism is a unique selling point for countries, bolstering their tourism image and promoting their rich cultural heritage (Japutra et al., 2022). Gastronomy, as is a critical element of the competitive landscape of tourist destinations. Even for tourists with diverse motivations, gastronomy plays a pivotal role in creating unique experiences, thereby adding value that can be decisive in their destination selection (Herianingrum et al., 2024). As Sharma et al., 2022 defines gastronomic tourism as a journey of cultural and historical discovery through food. This activity not only influences the creation of unforgettable experiences but also plays a significant role in fostering tourist loyalty through the attributes and impressions of local cuisine (Rosyidi et al., 2024). Gastronomy is a fundamental part of the hospitality and tourism industry. As Surya et al., 2023 note, gastronomy experiences can be considered a form of serious leisure as gastronomy tourists seek out activities and experiences that involve skill development, education, fulfilment, socializing, interaction, and recreation. Gastronomy tourism is an activity characterized by tourists' experiences with products and activities related to authentic and local foods.

Gastronomy is an art and science related to food. Gastronomy is not only about the art of preparing dishes but also studies a region or country's anthropology and food philosophy. The cultural origins and philosophy of food are essential to study because this greatly influences the tourism sector built in the area (Muñoz-Benito et al., 2023).

Gastronomy can provide a unique experience for tourists, allowing them to experience the exciting taste of typical food they have never tasted before. They can also explore the culture and traditions of a region when preparing dishes, especially those related to religious ceremonies. This can increase the variety of tourism activities available and attract tourists with different interests, thereby encouraging satisfaction (Romulo & Surya, 2021). According to a study by (Sgroi, 2021), gastronomy can increase tourism loyalty by maintaining culinary traditions and ancestral recipes.

Gastronomy is also involved in supporting the cultural heritage of tourism sites and growing awareness about the value and diversity of local culinary delights. The distinct value of local culture and diversity affected the tourism experience. The pleasant experience could maintain tourism loyalty so that tourists want to visit repeatedly and recommend this attraction to others. The more income from local products sold the more local food ingredients are used so that we can support local farmers and producers.

A study conducted by (Carral et al., 2020) through their analysis of publications on gastronomy and tourism, underscore the potential of specific regions in connecting visitors with the essence of the destination through local products, cuisine, gastronomy, traditions, and the historical component that it carries within itself. Gastronomy tourism can be thought of as not only a type of tourism but also as a marketing tool that undertakes significant tasks in promoting a destination. Gastronomy tourism can be considered a type of tourism and a marketing tool that undertakes significant tasks in promoting a destination (Japutra et al., 2022). The more income from local products sold, the more local food ingredients are used so that we can support local farmers and producers (Yudha et al., 2024).

Religious Tourism and its Potential

The terminology of 'religious tourism' has gained increasing significance recently and become more prevalent and even acknowledged by the World Tourism Organization and European Travel Commission (2018). Religious tourism involves traveling to religious sites for pilgrimage, worship, or participation in religious festivals and events. It includes visiting places for worship, and holy sites, and engaging in praying ceremonies (Huda et al., 2021). This form of tourism allows individuals to connect with their faith and cultural heritage of a religion. The popular destinations for religious tourism were Jerusalem, Mecca, Vatican City, and Varanasi (Hung Lee et al., 2021). Religious tourism benefits the local economy by attracting visitors who spend money on accommodations, transportation, food, and souvenirs. It also fosters understanding and tolerance among various religious groups and helps preserve historical and cultural heritage.

A study conducted by (Kim et al., 2020) religious tourism could support sustainable development in local communities by creating job opportunities and improving infrastructure. By promoting and preserving religious heritage sites, communities can experience economic growth and stability. This type of tourism serves as a cultural economic, and social force, uniting people about sacred places and traditions. The spiritual experience gained through religious tourism often leads to personal growth and reflection, offering solace, inspiration, and a deeper connection to their belief and values (Aulet et al., 2021). It provides a transformative and enlightening journey, allowing people to explore their faith in a meaningful way and reaffirm their spirituality amidst a rapidly changing world (Mawardi et al., 2022).

Religious tourism also plays a significant role in supporting sustainable development. Through visiting sacred sites and engaging in religious practice, individuals have the opportunity to foster global faith and understanding about the role of humans that God bestowed in protecting the environment. According to the study conducted by (Ismanto & Rofiq, 2022) stated that as people embark on their spiritual journeys through religious tourism, they deepen their spiritual connection and contribute to a world where religious diversity is embraced and celebrated. Moreover, religious tourism catalyzes the promotion of peace and harmony among individuals of different faith backgrounds. By engaging in shared religious practice and experiencing the sacredness of various pilgrimage sites, travelers can cultivate a sense of unity and mutual respect (Jia & Chaozhi, 2020). Many religions emphasize the importance of protecting the environment to keep natural resources renewable. Religious sites were often located in areas of beautiful scenery or green areas (Izudin et al., 2022).

By visiting religious sites, individuals could foster a connection between faith and environmental protection. By protecting the environment, natural resources could be used by the next generation of local people and indirectly increase their economic condition (Luz, 2020). Conversely, religious tourism benefits the host country's economic growth, particularly in less developed nations (Kala & Barthwal, 2020; Widiastuti et al., 2022). It generates revenue as visitors and their companions engage in hotel stays, dining, and sightseeing activities. This influx of religious tourists significantly boosts the nation's economy. Additionally, it can foster economic diversification and profitability by creating employment opportunities and improving the financial condition of local SMEs (Kokkranikal & Carabelli, 2024).

MATERIALS AND METHODS

Data Collection

This study used the bibliometric method to collect and analyze the secondary data. The use of a bibliometric approach serves as a valuable tool for assessing research trends within specific fields of study, as highlighted by (McAllister et al., 2021) and (Prasojo et al., 2019). It helps gauge research productivity, as demonstrated by Shonhe (2020), and allows for the examination of manuscript characteristics that can influence citation rates, as explored by Paracha et al. (2020). Additionally, it aids in outlining research roadmaps and directions, as seen in the work of Mukhlif et al. (2019) and Qadir et al. (2019), and it enables the evaluation of the impact of published documents. Moreover, bibliometrics was used to understand the distribution patterns of research in a particular field and its evolution over time. The secondary data was gathered from the Scopus website. Scopus has been chosen as a secondary data source for this study because Scopus was an indexing database of international journals used to rank universities by QS World Ranking universities.

Figure 2 above shows the flow of data obtained from Scopus. It also shows how many samples remained after being scrutinized for literature review. The data collection process of this study was done by using the queries entered in the search feature in the Scopus website namely *((TITLE-ABS-KEY ("gastronomy") AND TITLE-ABS-KEY ("tourism"))) AND* *("religious")*. There were 95 documents found. Then the documents that were categorized as *review* were expelled. The documents remaining after elimination were 55 documents. Then the documents were saved into a CSV form file. However, before documents were exported into a CSV file, several criteria needed to be clicked on the Scopus website such as *citation information, bibliographical information, and abstract & keywords* (El Mohadab et al., 2020).

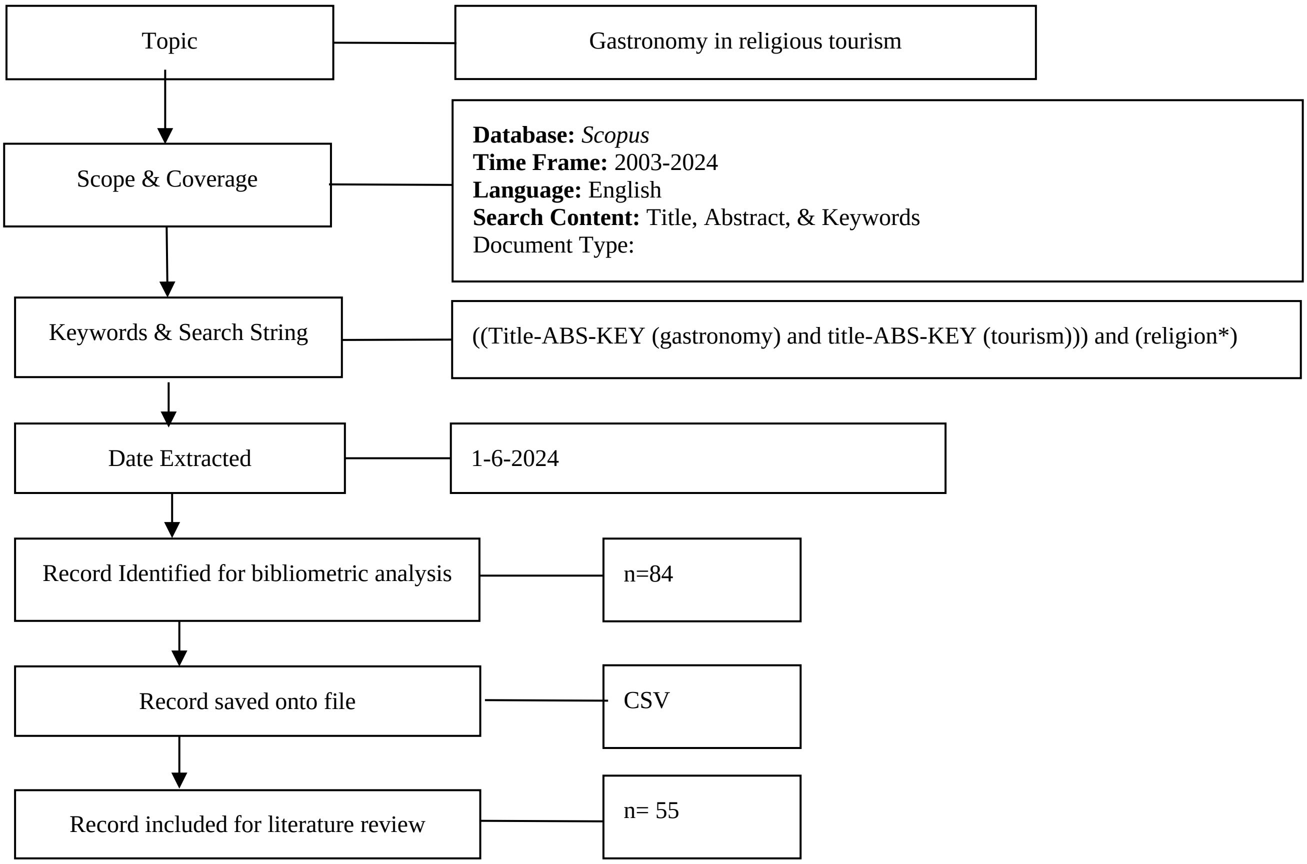

Figure 2. PRISMA flowchart of data collection (Source: According to the EQUATOR Network)

Data Analysis

After downloading the CSV file, it was analyzed using two software, Vosviewer, and Biblioshiny from R Studio. This study used two software because the bibliometric analysis of this study was divided into metric analysis and content analysis. The citation analysis of Vosviewer can only analyze the affiliation with the highest citation and the number of papers written by authors from that affiliation (Büyükkidik, 2022). It needs Biblioshiny to analyze citation development, number of papers published, Average and mean of citation/year, as well as main information of the dataset (Sa'ed & Al-Jabi, 2020). Besides metric analysis, this study used content analysis using Vosviewer and a literature review. For data analyzed using Vosviewer, the result was the image depicted mostly used words in authors' keywords inside previous studies contained in CSV files. For the literature review analysis, this study formulated a diagram of concepts for future research agendas related to gastronomy in the religious tourism sector, as well as suggestions for SME owners and the government. The flowchart of data analysis can be seen in Figure 3 below.

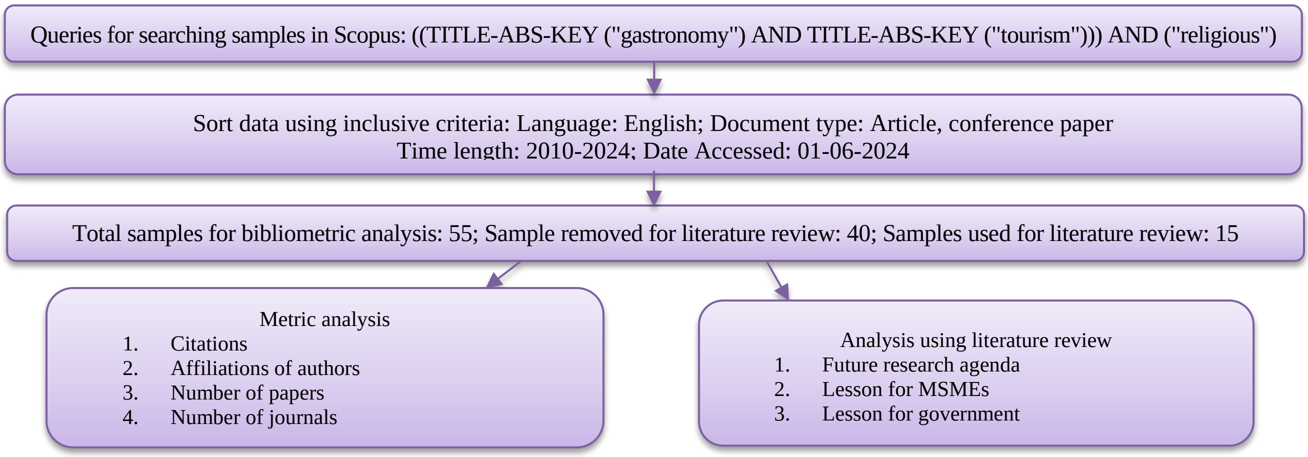

Figure 3. Flowchart of data collection and analysis (Source: Data processed according to a study by Calderon-Monge & Ribeiro-Soriano, 2024)

RESULTS AND DISCUSSION

Metric Analysis

Metric analysis using the bibliometric method is a statistical method for analyzing the effectiveness of scientific publications (El Mohadab et al., 2020). This method uses several indicators to measure publications according to certain criteria such as topic, field of study, year, etc (Sukmana, 2020). These indicators are the number of citations per paper, the development of the number of citations obtained, the number of papers published in a journal, the H-index factor, the average number of citations per year, the co-author or main author index, and the number of authors (Özdemir & Selçuk, 2021). Metric measurements are divided into two types, the S-Index which measures the number of citations divided by the number of publications, and the G Factor which measures the number of authors and order of authorship in publications. This study focuses more on the S-Index in analyzing citations (Farooq, 2023).

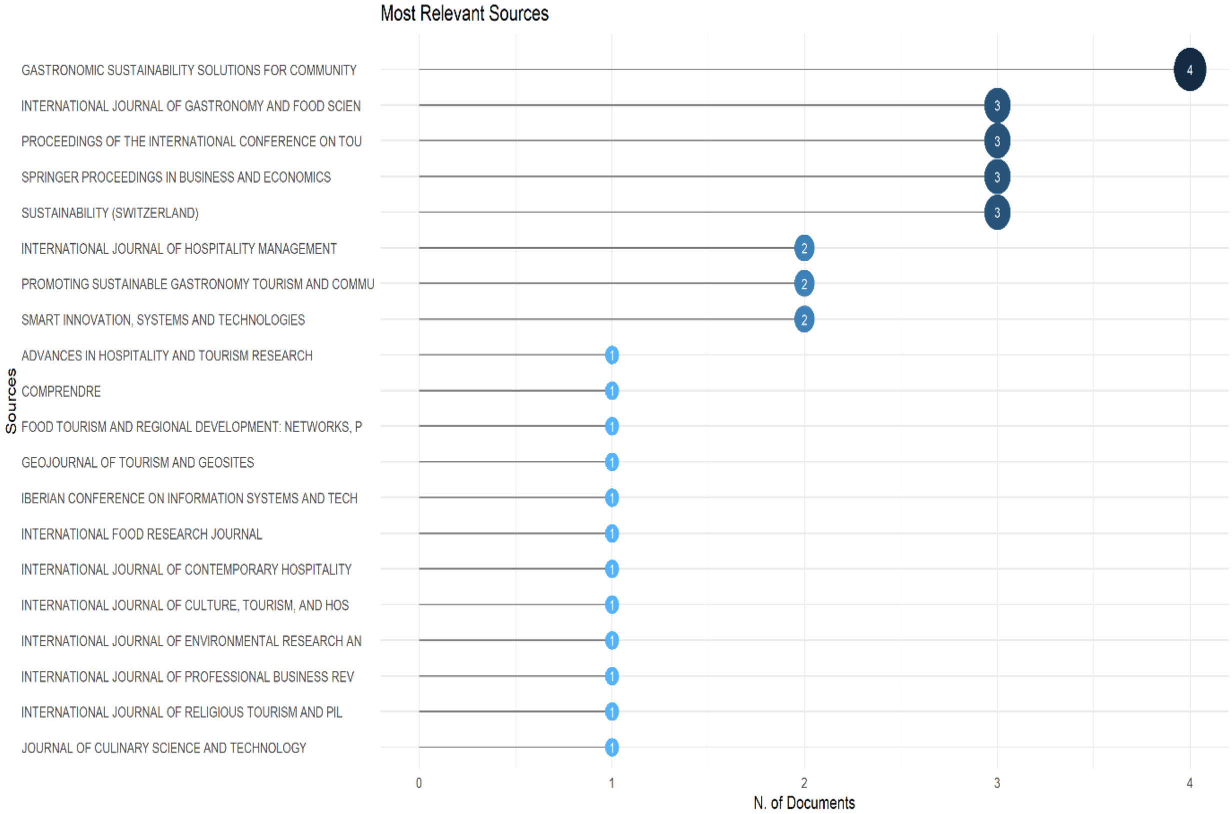

Figure 4. Mostly published papers in journals about gastronomy and religious tourism (Source: Data processed by Biblioshiny)

Figure 4 shows a journal that has the biggest number of published articles namely *Gastronomic Sustainability Solutions for Community*. The image also displays the number of articles on that topic in each journal, indicated by the color bar. The darker the color, the higher the quantity and relevance of the research. *Gastronomic Sustainability Solutions for Community* is a journal that is in the top position with the number of articles. Journals with similar names of the topic of the papers tend to have a larger number of published papers rather than journals with a common name related to a certain subject or major.

Table 1. Mostly published papers in journals about gastronomy and religious tourism (Source: Data processed by Biblioshiny)

Paper	DOI	Total Citations	Total Citation/Year
Mak Ahn, 2012, Int J Hosp Manage	10.1016/j.ijhm.2011.10.012	344	26.46
Okumus B, 2018, Int J Hosp Manage	10.1016/j.ijhm.2018.01.020	160	22.86
Ron As, 2013, J Herit Tour	10.1080/1743873X.2013.767817	51	4.25
Jiménez-Beltrán Fj, 2016, Sustainability	10.3390/su8050418	39	4.33
Sio Kp, 2024, Tour Recreat Res	10.1080/02508281.2021.1997491	19	19.00
Metaxas T, 2016, J Dev Entrep	10.1142/S1084946716500187	18	2.00
Gupta V, 2020, Int J Cult Tour Hosp Res	10.1108/IJCTHR-07-2018-0092	15	3.00
Sgroi F, 2021, Int J Gastron Food Sci	10.1016/j.ijgfs.2021.100435	13	3.25
Suna B, 2021, J Hosp Mark Manage	10.1080/19368623.2021.1877587	12	3.00
Yong Rym, 2022, J Travel Tour Mark	10.1080/10548408.2023.2184445	10	3.33
Matteucci G, 2016, Comprendre		9	1.00
Ullah N, 2022, Int J Environ Res Public Health	10.3390/ijerph19137734	9	3.00
Huete-Alcocer N, 2022, J Retail Consum Serv	10.1016/j.jretconser.2022.103095	8	2.67

Table 1 shows the number of citations of articles relevant to gastronomy on religious tourism from each author. *Mak Ahn* became the most prolific author with a total citation of 344 from published articles in 2021. Then, *Okumus B* came in second with several citations reaching 160. Both of them published on the same journal namely; *International Journal of Hospitality Management* but in a different year. The author with the least number of the citation was *Huete-Alcocer N*, who reached 8 citations. Table 2 shows that Taiwan and the UK ranked first with the country with the biggest number of citations, 344 articles. The USA came in third with 160 citations. The country with the biggest number of affiliations in Table 2 was India, with 3 universities ranked 10th to 12th. Table 3 shows that total citations as well as means of citation reached the highest number in 2012, while the lowest number was in 2023. It can be seen that the number of papers did not have any significant impact on the total citations received each year. It could mean that the quality of the paper published was not good enough to be cited by other academicians. It could also mean that the data presented in the paper did not give any significant help to the academicians that want to with a similar topic.

Table 2. Affiliation of authors with most citation (Source: Data processed by Vosviewer)

Organization	Documents	Citations
Department Of Tourism, Providence University, Taichung, Taiwan	1	344
School Of Hospitality and Tourism Management, University of Surrey, Guildford, Surrey Gu2 7xh, United Kingdom	1	344
Rosen Collage and Hospitality Management, Foodservice and Lodging Department, University of Central Florida, United States	1	160
School Of Hotel and Tourism Management, The Hong Kong Polytechnic University, Kowloon, Hong Kong, Hong Kong	1	160
Department Of Tourism and Leisure Studies, Ashkelon Academic College, Ashkelon, 78461, 12, Y. Ben-Tzvi St, Israel	1	51
School Of Community Resources and Development, Arizona State University, Phoenix, 85004, 411 N. Central Avenue, Suite 550, United States	1	51
Department Of Applied Economics, University of Cordoba, Agrifood Campus of International Excellence Ceia3, Córdoba, E-14001, Spain	1	39
Department Of Tourism, Sport and Hotel Management, Griffith University, Gold Coast, Australia	1	19
Department Of Economics, University of Thessaly, Korai 43, Volos, 38 333, Greece	1	18
Amity Institute of Travel and Tourism, Amity University, Noida, India	1	15
Amity School of Hospitality, Amity University, Noida, India	1	15
Department Of Hotel Management, Institute of Hotel Management, Pusa, India	1	15
Associate Professor, Department of Agricultural, Food and Forestry Sciences, University of Palermo, Palermo, 90128, Italy	1	13
Dpt. Of Tourism Administration, Boğaziçi University, Istanbul, Turkey	1	12
Tourism, Gaziantep University, Gaziantep, Turkey	1	12
College Of Hospitality and Tourism Management, Sejong University, Seoul, South Korea	1	10
Department Of Food Service and Management, Faculty of Food Science and Technology, Universiti Putra Malaysia, Serdang, Malaysia	1	10
Department Of International Business & Trade, School of Global Convergence Studies, Inha University, Incheon, South Korea	1	10

Table 3. Total and mean of citations each year (Source: Data processed by Biblioshiny)

Year	Mean Total Citations/Article	N (sample size)	Mean Total Citation/Year	Citable Years
2010	7	1.00	0.47	15
2012	344	1.00	26.46	13
2013	51	1.00	4.25	12
2016	10.43	7.00	1.16	9
2017	1	1.00	0.12	8
2018	55	3.00	7.86	7
2019	1.67	3.00	0.28	6
2020	5	3.00	1.00	5
2021	6.67	6.00	1.67	4
2022	6.8	5.00	2.27	3
2023	0.85	13.00	0.42	2
2024	1.82	11.00	1.82	1

Table 4. Main information of previous studies used for samples (Source: Data processed by Biblioshiny)

Description	Results	Description	Results
MAIN INFORMATION ABOUT DATA		Authors	163
Timespan	2010:2024	Authors of single-authored docs	8
Sources (Journals, Books, etc)	41	AUTHORS COLLABORATION	
Documents	55	Single-authored docs	8
Annual Growth Rate %	18.68	Co-Authors per Doc	3.04
Document Average Age	3.38	International co-authorships %	25.45
Average citations per doc	13.93	DOCUMENT TYPES	
References	0	Article	34
DOCUMENT CONTENTS		Book	2
Keywords Plus (ID)	110	book chapter	9
Author's Keywords (DE)	190	conference paper	10

Table 3 shows that the number of papers did not affect the number of mean of citations. It can be mean that the previous studies are less cited by academicians. One of the factors was because the topic was out of date it was not relevant to the current trend of research about specific topics. Moreover, the number of papers did not affect the citable years. This means that the number of papers published about the topic of gastronomy did not give any significant contribution enough for further studies (Okagbue et al., 2020). Table 4 shows that there were 163 authors published papers about gastronomy in religious tourism. From 163 authors, 55 papers were published, receiving an average of citations/document 13.93.

This is contrary to previous studies conducted by (Zhang & Liu, 2022) which stated that in the past, access to scientific papers was not as easy as it is now where many free digital platforms can be used to promote our papers for people to read. Apart from that, with the presence of AI technology, it has become easier for people to find papers with certain specific criteria. AI can also summarize the contents of a paper and answer questions about a topic in the paper. This is in line with previous studies (Li & Yin, 2022) where good-quality papers will continue to be read and cited by other academics. The presence of AI will result in better-quality papers being cited and low-quality papers being cited less because AI makes it easier for academics to see whether an application is of good quality or not. AI will also make it easier for academics to screen which papers that suit their research topic will be cited so that low-quality papers have less chance of being cited.

Content Analysis

Content that would be analyzed using bibliometrics mostly used words in the title, abstract, or author's keyword of previous studies related to Gastronomy and religious tourism. However, this study used only mostly used words in the author's keyword provided by Vosviewer and had more detailed results than the content analysis manifested most used words from the title or abstract provided by Biblioshiny. Figure 5 shows that words closely connected to the word *gastronomy* were *food tourism*, *culinary tourism*, *satisfaction*, *cooking class*, *halal food, and monasteries.* Gastronomy and halal food have an interrelated relationship. gastronomy is a science that studies cultural, historical, social, and aesthetic aspects. Halal food, on the other hand, refers to food that is permitted for consumption by Muslims per Islamic law. In both gastronomy and the concept of halal food, the importance of quality and origin of food are important. Gastronomy encourages foodies to appreciate the quality of fresh ingredients, authentic flavors, and traditional cooking techniques. Halal food also emphasizes the importance of animals slaughtered according to Sharia methods and ingredients that are free from prohibited substances (Zaki et al., 2022). There are some interesting findings related to this study. The first relates to the connection of the word *gastronomy* with the word *monasteries*. Gastronomy was deeply intertwined with cultural heritage. Gastronomy studied the root of regional cuisine as the product of cultural heritage. In religious tourism, food was manifested by the influence of religious beliefs and cultural practices (Rojas-Rivas et al., 2020). Regional cuisine was influenced by factors, such as historical events, local traditions, and religious ceremonies which could include the influence of monastery cooking practice. A study conducted by (Wang, 2024) stated that monastic rules in the 16th and 17th centuries emphasized a vegetarian diet and used food privations as moral correctives. Monastic rules in the past affected cultural practices in manifesting their moral principles into food.

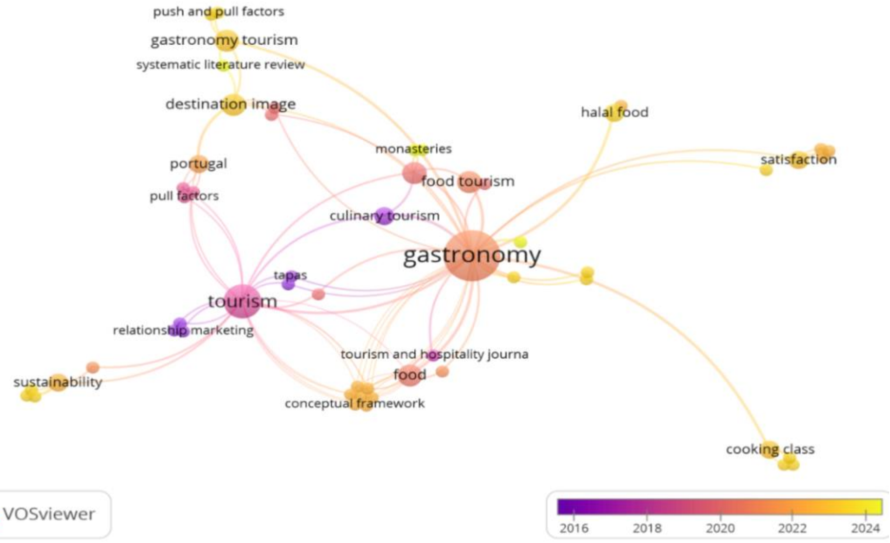

Figure 5. Mostly used words in author's keyword of papers (Source: Data processed by Vosviewer)

Figure 6 shows that the culinary in religious tourism industry encompasses many sectors focused on improving holistic well-being and people's satisfaction through fine plates that could enhance their mental and emotional. (tambahkan bu mengapa monastery way of thinking dapat menghasilkan kreativitas tentang makanan lokal yang dapat digunakan untuk meningkatkan religiou tourism??????) The industry emphasizes a wide range of products, services, and practices to improve the overall satisfaction and quality of life of visitors (Duarte Alonso et al., 2022). In recent years, religious tourism has grown substantially, propelled by a growing emphasis on religious practice, culinary, and cultural heritage (Ramírez-Gutiérrez, 2023). This expansion can be attributed to heightened awareness of religious issues. Social media emergence, stress-related problems that need spiritual guidance, and a desire for self-improvement, could cause religious issues in society (Napitupulu et al., 2024). Gastronomy or the science of culinary affairs and the culture that forms it has an important role in the growth of religious tourism globally. Studying gastronomy means studying the religious and spiritual meaning of food. For many people, eating certain dishes can be a way to connect with their ancestors, commemorate important events, or express gratitude for the grace God has given them.

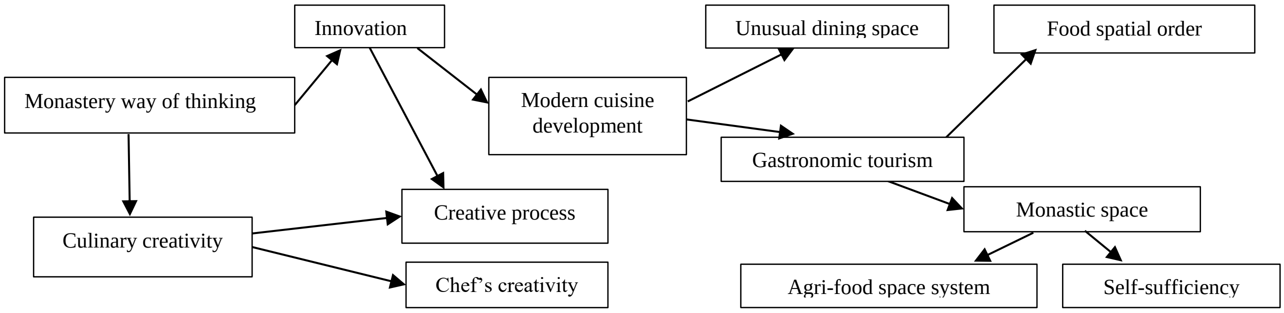

Figure 6. Concept map of monastery way of thinking in developing culinary (Source: Arranged by authors)

Figure 5 also shows that the word *food* tourism is closely connected to the major word *gastronomy. It could mean that* Gastronomy or the science of culinary affairs and the culture that manifests it has an important role in the growth of religious tourism globally. Studying gastronomy means studying the religious and spiritual meaning of food. For many people, eating certain dishes can be a way to connect with their ancestors, commemorate important events, or express gratitude for the grace God has given them. Tasting local delicacies can be a memorable religious tourism experience. Tourists who taste typical regional dishes will have deeper memories of their trip and will be more likely to recommend the tourist destination to others. According to the study conducted by (Greco, 2022), Gastronomy can help to develop high-quality culinary delights that have spiritual value so that they can become the main attraction for religious tourists. This can indirectly improve the image of the tourist destination. This study shows that foreign tourists carried out the Hajj and Umrah often taste local dishes such as *Basmati Mandi Rice, ghuzi,* and *kabsa*. These dishes have religious and spiritual meaning for many Muslims who visit the holy land and can strengthen their faith by creating an interesting impression of the holy land's typical culinary delights. Figure 4 shows that the word *halal food* was connected to the major word *gastronomy.* The gastronomy in religious tourism sector is a vital industry, necessitating innovative approaches to address the diverse challenges encountered within the quality and taste of tourism domains.

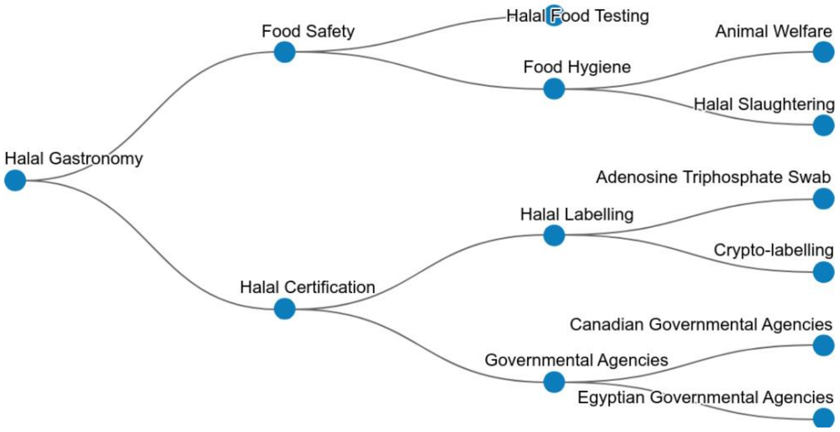

Figure 7. Concept map of correlation between gastronomy in halal food (Source: Arranged by Scopus web generator)

Figure 7 shows that the strategic management of knowledge-based assets focusing on advancing Muslim-friendly tourism could provide abundant and cheap halal food. Halal food emerges as a crucial imperative within the broader tourism sector that needs attention from researchers to study the root of culture that shaped it so that tourism sectors in OIC countries could build brand awareness of halal food. Overall, gastronomy could offer avenues for the expansion of markets for halal food in the religious tourism sector. The halal standardization for food must be upheld to ensure that the visitors can consume the dish without worry. As a result, the halal certification among the local dishes in tourist attractions must be executed. Table 5 shows the indicator of the background of gastronomy in influencing dishes.

Table 5 shows there was a correlation between religious practice, monasteries, and local dishes. Monasteries often act as guardians of cultural and religious heritage, a dual role that can be leveraged to enhance local cuisine within the framework of religious tourism (Peralta et al., 2024). By integrating the unique philosophy of the monastery with local culinary creativity, the potential to enrich religious tourism experiences becomes significant. Promoting Indigenous food traditions and creating memorable culinary experiences can attract tourists, bolster local economies, and contribute to the preservation of cultural heritage. This approach necessitates collaboration among various stakeholders and the development of thoughtfully designed tourism routes to maximize its impact. Monasteries have the potential to offer immersive culinary experiences that enable tourists to actively participate in local food traditions. This aligns with the concept of creative tourism, where visitors engage in the culinary process, such as preparing traditional dishes with locally sourced ingredients. The promotion of local cuisine through religious tourism can greatly benefit from the collaborative efforts of chefs, educational institutions, and local communities. This collective endeavor can enhance the role of local food in tourism and foster a sense of community pride (Živaljević et al., 2019).

By collaborating with local chefs, monasteries can create unique culinary offerings that reflect the region's heritage, thereby establishing a distinctive gastronomic identity that appeals to tourists (Wang, 2024). Emphasizing the authenticity of local cuisine can strengthen a destination's cultural identity and attract tourists in search of genuine experiences. With their rich cultural and religious backgrounds, monasteries are well-suited to serve as authentic venues for showcasing traditional foods. Moreover, integrating local cuisine into the religious tourism experience can aid in preserving culinary traditions and promoting cultural sustainability (Sukmana et al., 2023).

Table 5. Similar previous studies to this study about gastronomy (Source: Data processed by authors)

Title and author	Finding	Similarities with this study
(Kokkranikal & Carabelli, 2024)	The participants of the cooking classes considered four dimensions of the tourist experience framework significant: hedonism, involvement, local culture, and social interaction.	Similar dimensions affect gastronomy in religious tourism and local culture.
(Lochman & Vágner, 2024)	A meatless image can represent an opportunity for the future development of a destination. By focusing on environmental and socio-economic sustainability, long-term growth of visitors can be achieved	Environmental protection was important to preserve tourism resources.
(Peralta et al., 2024)	Benedictine monks have a long history of agricultural practices and food production, and their monasteries often produce high-quality food such as cheese, wine, bread, and honey	Monasteries were the object of religious tourism
(Kinkaid & Platts, 2024)	The transformation of food culture into a form of symbolic capital can animate broader urban development projects. However, this transformation can also generate racialized value differences and risk contributing to the inequities of Tucson's urban Geography in the USA. Kinkaid then turns to the community vision of food-based development to envision alternative trajectories for the gastro-development project.	Transformation through food culture
(González et al., 2024)	Fishing practices and techniques shaped the local cuisine that focused on seafood. The sustainable fishing practice was also important to ensure the long-term viability of the regional food heritage	The sustainable practice was essential in local cuisine

However, people need to be aware that the consumption of halal food in each country is influenced by cultural background and religious considerations. The demand for halal food in Saudi Arabia was different from Indonesia because they had different Islamic cultures and ethnic, and religious norms. As a result, the stakeholders in the religious tourism sector need to adjust the halal food taste and quality to meet expectations (Del Moral, 2020). Figure 8 below shows that the major word *gastronomy* was connected with the word *cooking class.* It could mean that the increasing popularity of religious tourism is driving the need for quality halal food at religious tourist attractions. To meet these needs, training for local communities involved in gastronomy is important (Hsu et al., 2022). This is so that the culinary delights served to tourists can create a good impression and convey spiritual values (Wijayanti & Ryandono, 2020). According to the study conducted (Suna & Alvarez, 2021), high-quality food can help improve the image of religious tourism destinations as friendly and comfortable places for tourists. The Ministry of Tourism and Creative Economy, regional tourism offices, and village governments are obliged to provide this training to local communities as halal tourists in the gastronomy sector (Mutlu & Doğan, 2021).

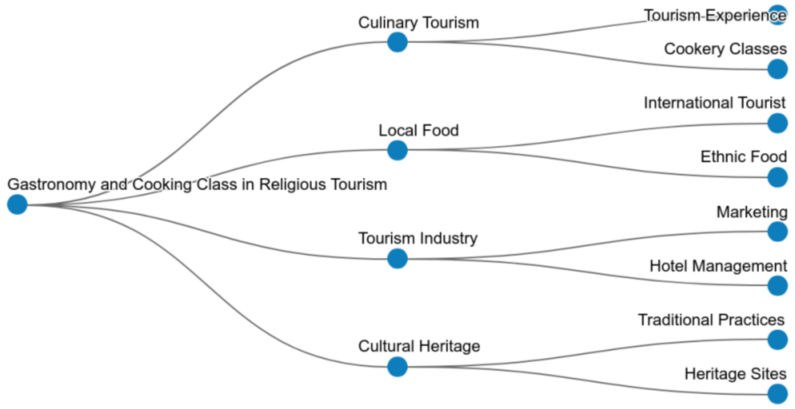

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Figure 8. Concept map of correlation between gastronomy and cooking class in religious tourism (Source: Arranged by Scopus web generator)

Figure 4 shows that the major word *gastronomy* was connected with the word *tapas.* Tapas was a term of *small appetizers* or *snacks* in Spain. A tapas menu is not just a list of dishes, it is an invitation to explore Spanish authentic food to acquire a pleasant experience (Ayora-Diaz & Vargas-Cetina, 2021). Unlike a traditional menu with starters, main dishes, and desserts, a tapas menu focuses on small plates meant for sharing. It can be stated in Figure 9 that *Tapas* was a cultural experience manifested as a local dish. Local Spanish allows customers to try a wide range of dishes and flavors from red meat, cheese, seafood, and vegetables (Forgas-Serra et al., 2021). Gastronomy tourism is closely linked to cultural heritage and new tourism trends, emphasizing the correlation between cuisine, tourist experience, and place (Park et al., 2023). The significance of local and regional food production systems as crucial destination attraction factors in gastronomic tourism were emphasized. As a result, it was important to understand the emotional situation of religious tourists to maintain their satisfaction and create a pleasant experience (Spence, 2023). *Tapas* was manifested because of cultural and culinary experience. It could contribute to the emotional maintenance of tourists in religious heritages. Both of tapas and gastronomy could contribute to religious tourism (Badu-Baiden et al., 2022; Romulo & Surya, 2021). The tourism experience was closely related to gastronomy, which was considered an important concept in attracting tourists to specific destinations and offering a unique experience (Muñoz-Benito et al., 2023).

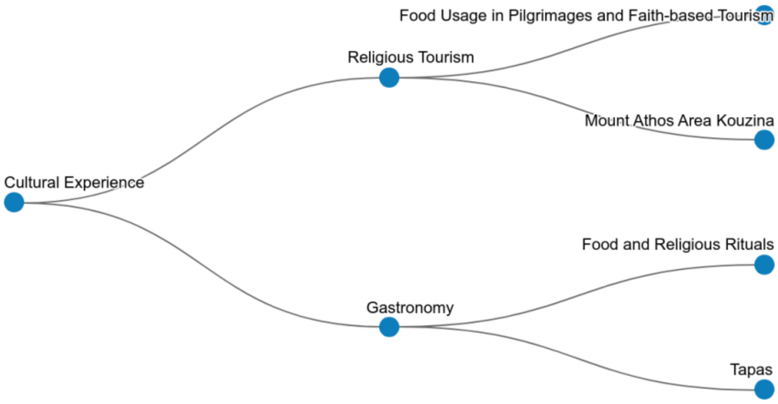

Figure 9. Concept map of correlation between tapas, gastronomy, and religious tourism (Source: Arranged by Scopus web generator)

CONCLUSION

According to the metric analysis result above, it can be concluded that the number of papers published on certain topics did not influence the number of citations received. Quality and the correlation with the topic that the academicians look for were the factors that determined a paper being cited as a reference or not. The metric analysis result in Figure 4 also showed that the journal namely *Gastronomic Sustainability Solutions for Community*. It had the highest number of papers published. Then, the affiliation of authors with the highest citation was Taiwan.

According to Figure 4, frequently used words in keywords of previous papers that were closely connected to the word *gastronomy* were *food tourism, culinary tourism, satisfaction, cooking class, halal food, tapas, and monasteries.* Gastronomy is a science of food and the philosophy behind it. Food tourism and culinary tourism were in the scope of gastronomy. Religious tourism that had a good grasp of gastronomy could maintain the satisfaction of tourists in enjoying cuisine inside religious heritage areas. Gastronomy also included study in preparing food through a cooking class, especially related to preparing halal food. Monasteries were the places that could influence cuisine in the past through religious teachings in the past centuries. Tapas was a small appetizer from Spanish that was influenced by culture and closely related to gastronomy. Therefore, based on the study's results, the authors recommend further study to observe more about the factors inside gastronomy that could influence the determinant intention of people to visit religious heritage. It would be wise to use a questionnaire in collecting the data to observe the cause-effect relationship between several factors inside gastronomy. Those factors were cooking classes, halal food matters, food and culinary tourism, satisfaction, and monasteries that affected people's intention to visit religious heritage. It is wise to explore more about the grounded theory of gastronomy in religious tourism, especially related to the anthropological factor of culinary.

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CONVEYING THE PERCEIVED URBAN SAFETY GEOGRAPHY OF A SMALL TOWN FROM LOCALS TOWARDS THE TOURISTS: EXPERIENCE AND DESTINATION DISCOURSE IN SIGHETU MARMAȚIEI (ROMANIA)

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Abstract: This study explores the geography of the perceived safety in Sighetu Marmației, Romania, a key cross-border hub in the Maramures tourist region, particularly impacted by the ongoing conflict in the neighboring country. As interactions between locals and tourists significantly influence the tourist experience, the research examines how local perceptions of safety shape tourist behavior and the destination's image. Utilizing a multidimensional approach, the study considers socio-demographic factors, neighborhood conditions, and embedded past experiences to analyze the perceived safety. Data collection involved mapping 35 strategically chosen points within a pedestrian city tour that links various tourist attractions. The research design is based on a qualitative analysis tool with the features of a short, structured human-operated interview. The visualization and mapping process is based on spatial analysis. It is argued that positive perceptions of safety, rooted in cognitive, emotional, and behavioral dimensions, contribute to the overall safety ratings, guiding tourists in their movement and decisions. The findings underscore the critical role of local insights in shaping the safety narrative of the destination, with implications for destination marketing strategies aimed at mitigating the negative impact of external conflicts on tourism development. The data retrieving tool is most effective when applied to small or medium-sized cities, where the city structure and the spatial distribution of institutions and services are common knowledge and allow the locals to express an informed opinion on each point throughout the process. Throughout the spatial analysis results show a good overall level of perceived safety. Discussions focus on the generally perceived safety map of Sighetu Marmatiei municipality, combined with map layers exhibiting detailed insights based on gender, age group, and frequent users of the space highlighted several specific points that need to be addressed. While evaluating the perceived safety of the designated points, the locals formulated advice for tourists along the pedestrian route. The resulting heatmaps, pseudo-relief maps, and other operational representations are specifically tailored for the tourism and urban planning domain. These results will serve as a decision-making tool for the tourism and local safety stakeholders – including the destination management organization (DMO Maramures), as well as the national and border police, to implement communication strategies on safety and labeling.

Keywords: perceived safety, urban tourism, Sighetu Marmației, Maramureș

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INTRODUCTION

Small tourist cities organized around their historical center share the space between locals and tourists, daily interactions or close encounters are significant parts of the tourist experience in the destination (Mansfeld & Pizam, 2006; Lewandowska et al., 2019). Locals also communicate with tourists on subjects such as the location of attractions, optimal wayfinding issues, current situations, or common service providers orienting them according to their independent perceived safety. In addition, Sighetu Marmației is the main cross-border hub for Maramures Land, a well-known tourist region

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situated on the border with Ukraine (Bar-Kołelis & Wendt, 2018; Deac et al., 2023; Aisha et al., 2024). That is why the current conflict between Russia and Ukraine impacts tourism in Maramures through the perceived safety of the destination, when dealing with cultural tours, pedestrian or self-guided tours, gastronomic experiences, dark tourism places of interest, etc.

Studies show that actual safety policies and discourse orient the perceived safety of the town involving all regular users of the space: inhabitants, economic operators, and tourists (Lever et al., 2024). The present study examines the geography of perceived safety in Sighetu Marmației, as a decision-making tool for the destination discourse on the safety issues, aiming to overwrite the concerned messages affecting it (Safarov et al., 2023; Ilies et al., 2024; Caciora et al., 2024). Particularly, it argues that if the locals consider an area safe for walking tours and self-planned activities, they would contribute to the generally perceived safety ratings and recommend certain pathways or accommodation units. Data visualization and analysis show features aligned with other domains, such as traffic safety or real estate.

STUDY AREA

Sighetu Marmației is a medium-sized town on the left bank of the Tisza River at the northern border of Romania (Figure 1). It has 40,000 inhabitants and exerts intense polarization on a larger territory comprising around 80,000 inhabitants. From a mental and cultural point of view, the city polarizes the entire space of the Maramureș Land.

As a tourist destination, it has a yearly flow of 250,000 – 300,000 tourists, with an average length of stay of 3-4 nights. According to local statistics, almost every tourist in the region walks the city for several hours (Wendt et al., 2021; Hassan et al., 2024; Josan et al., 2024). The tours are predominantly pedestrian, with a 2km range, linking points of interest for cultural and dark tourism in a lively inhabited historical center.

Within this area, we established 35 points for data collection, with different levels of actual safety, spatial relationships to tourist places, and other highly utilized urban infrastructure.

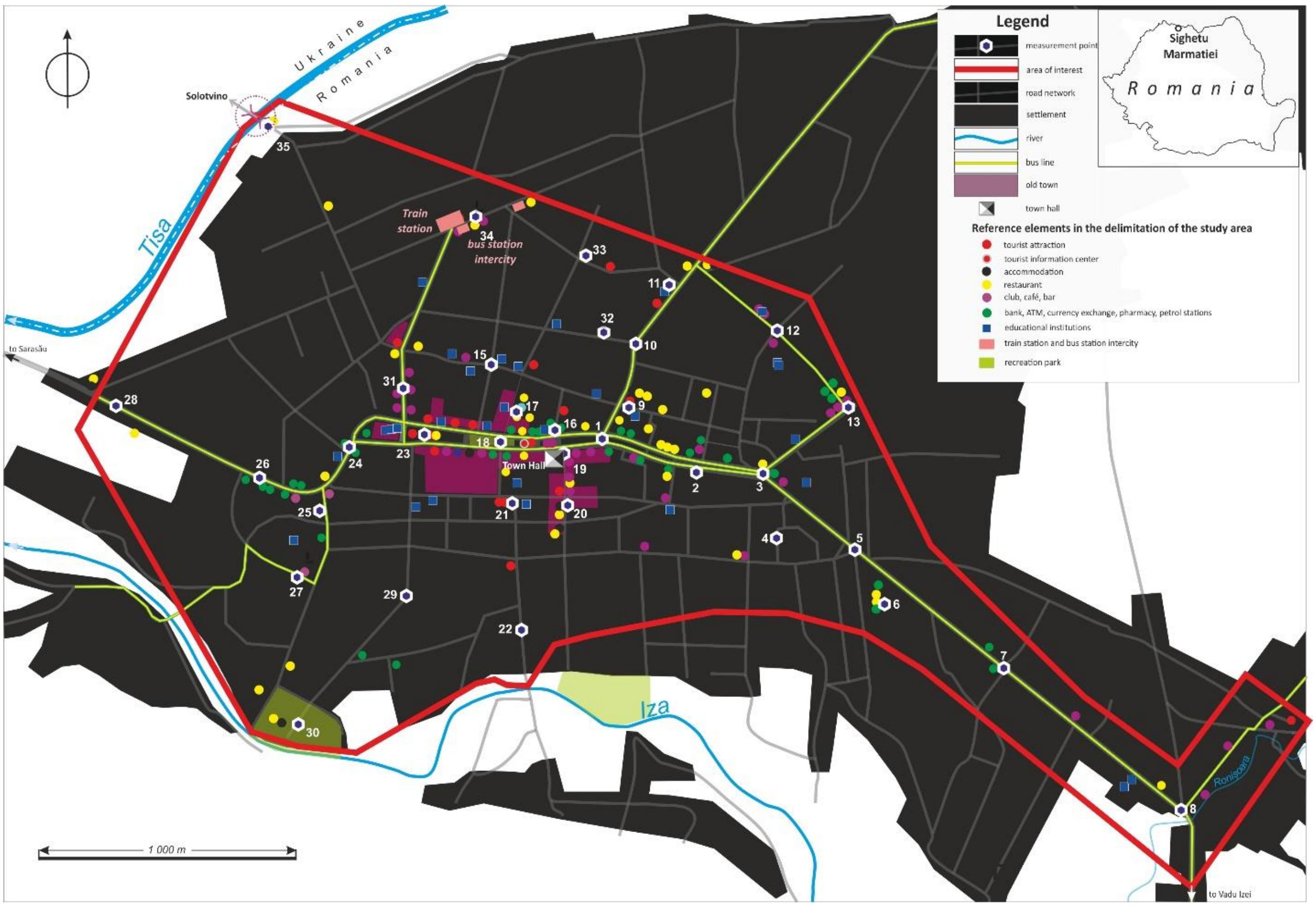

Figure 1. Study area (Source: Authors)

Background and context

Safety is linked to the state of protection against risk, danger, or injury (Yongguang & Qionglei, 2021). Community safety and tourism safety are both parts of a multidimensional social construct influenced by factors such as socio-demographic variables (age, gender, occupation etc), past victimization experiences, and physical factors (neighborhood condition) (Azevedo et al., 2020; Curiel & Bishop, 2016), hence the combined approach, starting with the locals.

First, tourism safety (actual and perceived) has a subjective dimension. It is developed during multiple tourism experiences, operating on three levels: cognitive, emotional, and behavioral (Navarrete-Hernandez et al., 2021; Bozogáňová, 2015). The cognitive aspect is typically assimilated with the destinations' features: a positive city image (a good place-brand) and a safe environment. The emotional level of the construct is linked to a low crime rate and safe-haven discourse internalization, which (1) often forms before the visit, (2) is stronger in close communities and (3) depends on the general atmosphere, like social (un)-rest, war, political stability. The behavioral level is related to preventive behaviors, where ratings and recommendations are included (Ding & Wu, 2022; Curtis et al., 2014; Mansfeld & Pizam, 2006).

Second, cultural walking tours in smaller towns mix the tourists with the locals. This interaction is an important element of the tourist experience. Current literature focuses on the mental space shaped by tourists and locals, in a dissociative manner, leaving good prospects for the intertwined approaches (Lever et al., 2024). This study aims to understand how the locals shape the tourists' safety map at the destination.

The perceived safety literature corpus shows a critical link between tourism, safety, security, and development (UNWTO, 2024; Wendt & Bógdał-Brzezińska, 2024; Safarov et al., 2024). Regarding the development of tourism within a destination, the features of the geo-brand and tourism brand are interlinked (Ilies et al., 2015; Bógdał-Brzezińska et al., 2023), therefore perceived safety in tourism is a crucial part of the destination image and discourse (Yongguang & Qionglei, 2022). Destination Management Organization Maramures (the DMO) is considering several communication strategies to minimize the impact of the war in Ukraine on the tourist brand mainly by conveying messages related to the safe environment.

The retrieving methods for the area-based data are derived from studies on neighborhood safety correlated with other layers: mobility routes, crime maps, environmental risk maps etc. There are also, more segmented studies focusing on gender- safety or age-related safety (Amir et al., 2015).

DATA AND METHODS

Safety evaluation methods often focus on how safe the people feel, rather than how safe a place is. The actual safety of a place is correlated with the levels of security within the built environment, social environment, security enforcement, or risk management (Safe City Index, 2021) while the perceived safety is approached in studies linked to locals' and visitors' perceptions of uncertainty, sense of control, trust, comfort, and experience without intersecting them (Xie et al., 2020).

Therefore, the present study uses a qualitative approach to the general perceived safety of the locals with good spatial knowledge background and frequent interactions with tourists. Regarding the data visualization of safety perception, the study focuses on two mainstream common types: area-based indexes and web tools with heatmaps. Literature shows that these are effective ways to communicate with the tourism stakeholders and local safety stakeholders: the DMO, the local and border police (Zhou et al., 2023; Hardesty, 2013; Cho et al., 2009).

1. Defining the area of interest (AOI)

Sighetu Marmației municipality is stretched over a 111 km^2 area, with a densely built environment in the center, encompassing the majority of tourist attractions, as well as urban infrastructure and services. Due to its features, the mobility between the points of interest is mostly pedestrian. Considering these, the research area was delineated to include points of interest, concentrations of elements, and access routes between them. Figure 1 shows the location and the spatial distribution of the 35 measurement points and the following categories:

- Limits of the old city center
- Tourist attractions (museums, memorial houses, monuments, places of worship, places with special meanings, significant events, etc.) and tourist information center
- The communication network that connects the elements of interest, including the border crossing bridge.
- Railway stations and train stations, bus stations and bus stations for urban public transport, but also for the one that connects the city with the countryside it polarizes
- Accommodation, restaurants, entertainment services
- Public parks and food markets
- Complementary services (banks, ATMs, currency exchange, pharmacies, petrol stations)
- Educational institutions disaggregated on three levels
- Public institutions and security enhancers (city hall, hospital, police, and border police).

2. Defining the measurement system for the perceived safety and tool design

The measurement system for perceived safety is area-based research on a simple question addressed to locals regarding 35 points within the city using a four-degree scale to indicate the general level of perceived safety. The main question was: *In your opinion, are the following places safe for tourists?* The locals were asked to rate the perceived safety level for a list of 35 indicated points, where +2 is very safe, +1 safe, -1 unsafe, and -2 very unsafe. Preliminary research on the subject used to calibrate the tool indicated the utility of a scale without zero. The point grid is conceived considering the place names used by locals - residents or daily commuters, usually pedestrians. The respondents can easily identify the 35 points on the map while expressing an opinion regarding the safety around them.

The research tool has the features of a short, structured human-operated interview. Although it looks like a quantitative analysis, the main question elicits a subjective response based on multi-scale factors. Fixed order of the points of interest and a limited range of response options try to reduce the bias. The attention to the question's phrasing ensured the internal validity, the preliminary tests showed that a more positive approach (on how safe they feel) is more suitable than a negative or neutral one, similar to other neighborhood safety studies (Ciobanu, 2020). Besides the main question, it collected data regarding demographics linked to the type of residence (urban-rural), gender, age group, and education level.

The research was carried out in November-December 2022 by a group of post-graduate students specializing in tourism planning, in person, with prior informed consent, using a mixed sampling method: voluntary response sampling on the public domain, and convenience sampling - friends and family. The average response is 10 minutes and starts with an opening talk regarding the location of the POIs in the interview.

3. Primary data processing methods

The raw data treatment considered the multivariate analysis data visualization and the segmentation algorithm. Table 1 shows the demographics of the study, a total of 491 validated interviews, distributed as evenly as possible by gender, age group, education, and residency. Daily commuters and individuals engaged in urban activities from the settlements around Sighetu Marmației were labeled as rural.

Table 1. Demographics of the respondents

Variable	Frequency	%
Total	500	
Valid	491	98.2
Residence		
Urban	291	59.27
Rural	200	40.73
Gender		
Male	217	44.19
Female	274	55.80
Education		
Higher education	197	40.12
Secondary education	294	59.87
Age group (years old)		
< 20	94	19.14
21-40	221	45.01
41-60	137	27.90
> 60	39	7.94

The retrieved data was then segmented for multivariate analysis into 28 categories (Figure 2), to capture the features of the perceived safety map layers as a socio-demographic construct. Additionally, data was processed according to common statistical methods to ensure relevance for the following spatial analysis (statistical tables and indexes are not shown here).

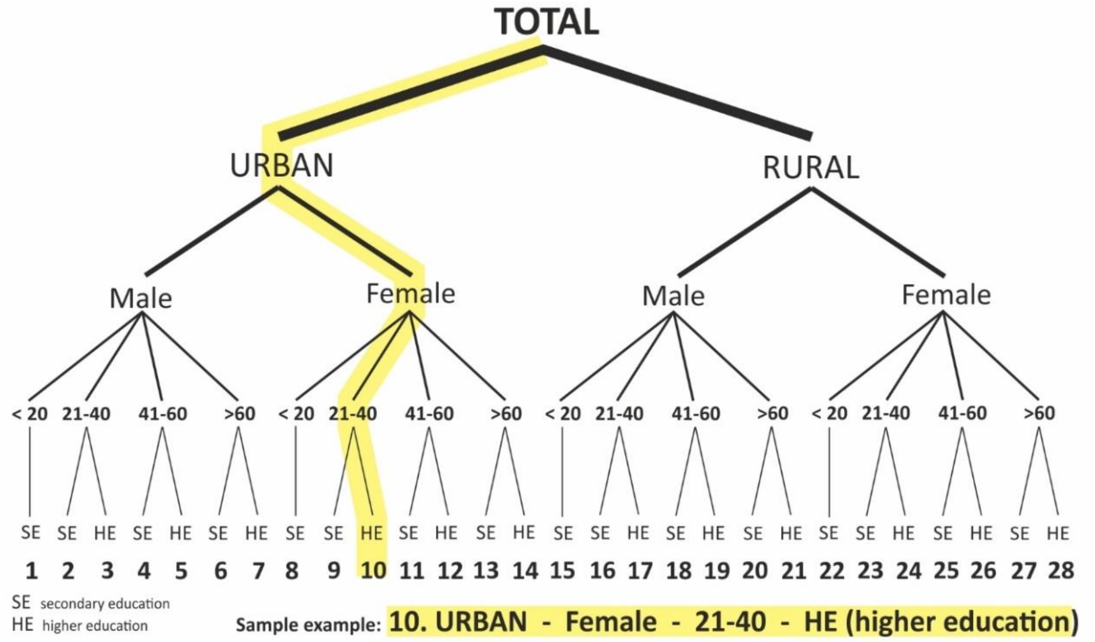

Figure 2. Segmentation design for the multivariate analysis of collected data (Source: Authors)

4. Mapping and data visualization methods

Mapping and visualization of data processed by statistical and spatial analysis were approached as a general perceived safety index, combining the embedded cognitive, emotional, and behavioral layers. The four-degree scale provided a baseline for the heatmaps depicting the level of the average perceived safety, distributed on the base map comprising the relevant landmarks. Besides the general safety map, we provided a pseudo-relief 3D representation for the stakeholders involved in tourism and urban planning, enabling suggestive visualization of different aspects.

Heatmaps are set with 12 classes where the positive values suggest a higher level of general perceived safety, while the negatives infer a lower safety degree. Heatmap properties display red areas for the unsafe hotspots.

The pseudo-relief 3D representation is derived from the heatmaps, processed as contour lines, where a higher degree of safety is seen as elevated places and those with a lower degree as depressions and valleys. This is consistent with representations of emotional responses in qualitative studies on cities (with a flat terrain) and other tourist places (Niccoli and Lynch, 2012).

RESULTS AND DISCUSSIONS

1. General perceived safety

The general perceived heatmap uses the data from the multivariate analysis as a general index. Data for each point was computed as a weighted average score. Further, the built environment along the road network oriented the interpolation process. Figure 3 heatmap illustrates an extensive blue area corresponding to a higher level of perceived safety, and a few island areas considered slightly unsafe, with a minimum value of -0.52, corresponding to the central axes in the old center, followed by a gradual decrease towards the peripheries. The general index does not show the areas labeled as "*very unsafe*" by some respondent categories; thus, a more fine-tuned map layer is necessary.

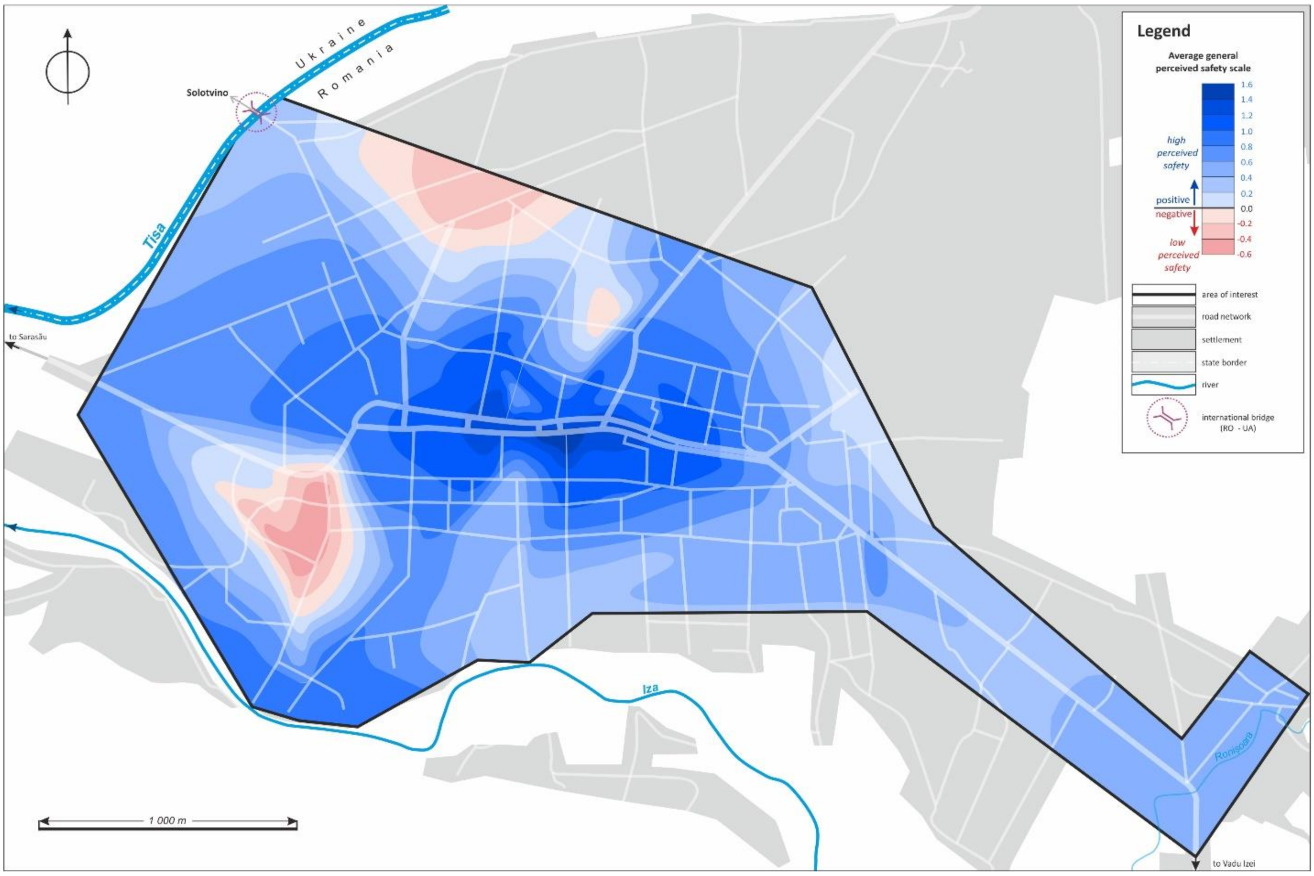

Figure 3. General perceived safety heatmap of Sighetu Marmației municipality (Source: Authors)

1.1. Tourist attractions situated in safe places

The perceived safety index shows that the tourist attractions are located within the safer area: town hall, city center, most frequented museums, and Iza waterfront. Two potentially unsafe places are situated along the side pathway towards the waterfront/stadium and the peasant food market, where safer alternative routes are available and recommended by the locals.

1.2. Transportation hubs are unsafe

The main transport stations - railway and bus main stations are perceived as slightly unsafe. This is a major problem for local tourism, in a region with chronic accessibility issues. That is why, intraregional bus operators prefer to embark travelers around the city center, and these are valuable local tips.

1.3. Emergency service providers' neighborhoods

Safety stakeholders such as the border police, the national police, and the hospital ER are considered safe, even when the actual safety index is lower, due to the vibrant nature of the area. Nevertheless, the unsafe red island corresponds to the area with lower-income housing exhibiting overpopulated flats and a low standard of living or blocks with social safety issues.

2. Age-related perceived safety map

Age-related segmentation allows the observation of differences in perception from one generation to another, not necessarily linear, but rather determined by certain specificities (Figure 4). The map shows the magnitude of the differences, considering the age group and school location.

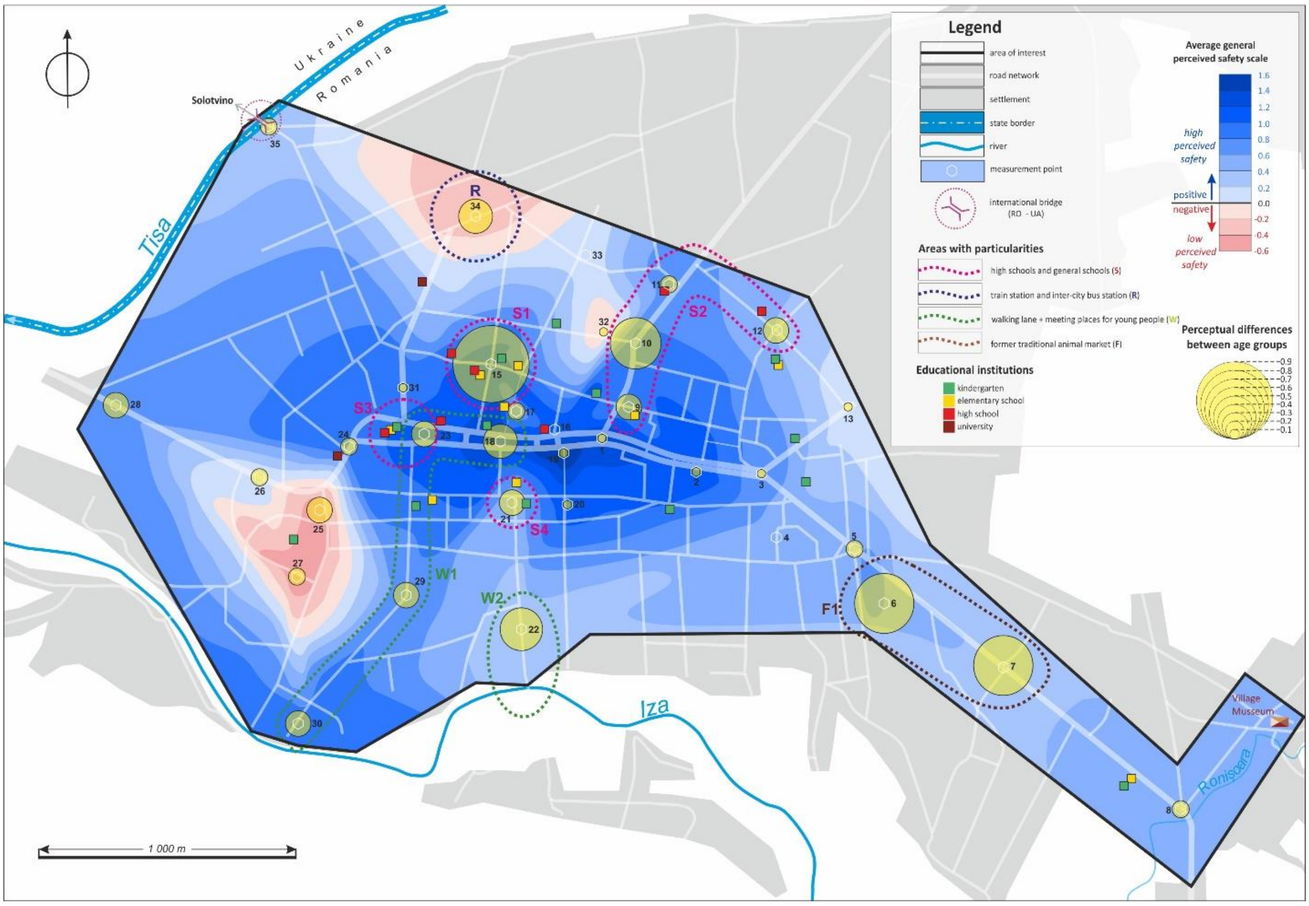

Figure 4. Age group contrast of the perceived safety in Sighetu Marmației (Source: Authors)

2.1. High schools' area is safe for the younger generation

Marked on the map with S, the area exhibits the contrasts in perception between students and parents with school-age children. The first category considers these locations very safe, while the second group considers them with much less confidence. The area with the highest density of youth-frequented restaurants and clubs is situated there.

2.2. Old unsafe places

Older generations (60+ years old) perceive a gentrified neighborhood as unsafe, triggered by a bad collective memory about the livestock fair surroundings (F1). Nowadays, the area is popular among tourists for the supermarket with its parking lot used as a starting point for pedestrian walks.

2.3. Safe or unsafe?

Some nostalgic/ unrealistic elements enhance the perceived safety, by contrast. This draws a dissonant map layer in the area corresponding to the walking lanes described in section 3.1.1., with younger generations feeling safer than the older.

3. Gender and the perceived safety

The perceived safety map comprises two layers based on gender segmentation (Figure 5). The male respondents describe the safety geography as similar to the general index in contrast with the female respondents displaying lower thresholds and a more intricate interpolation. Gender-related maps confirm the existing literature corpus (Qinyu et al., 2023; Bozogáňová, 2015).

3.1. Unsafe areas have different extensions

Unsafe areas have similar positions but wider extensions in the layer connected to female respondents. The opposite differences between men and women are not an issue here.

3.2. Women's avoidant behavior

The features of the built environment such as openness, green park areas, and transport hubs are linked to a lower level of perceived safety in women, triggered by avoidant behavior. Isolines show an abrupt drop in the perceived safety described by women. That is why they point out the unsafe places more intensely.

3.3. Economic development level

Less developed areas are perceived as less safe by women. It is also linked to cognitive and emotional factors, and exposure to information about safety issues. Nevertheless, the map shows an area where the phenomenon is inversed - around the hospital.

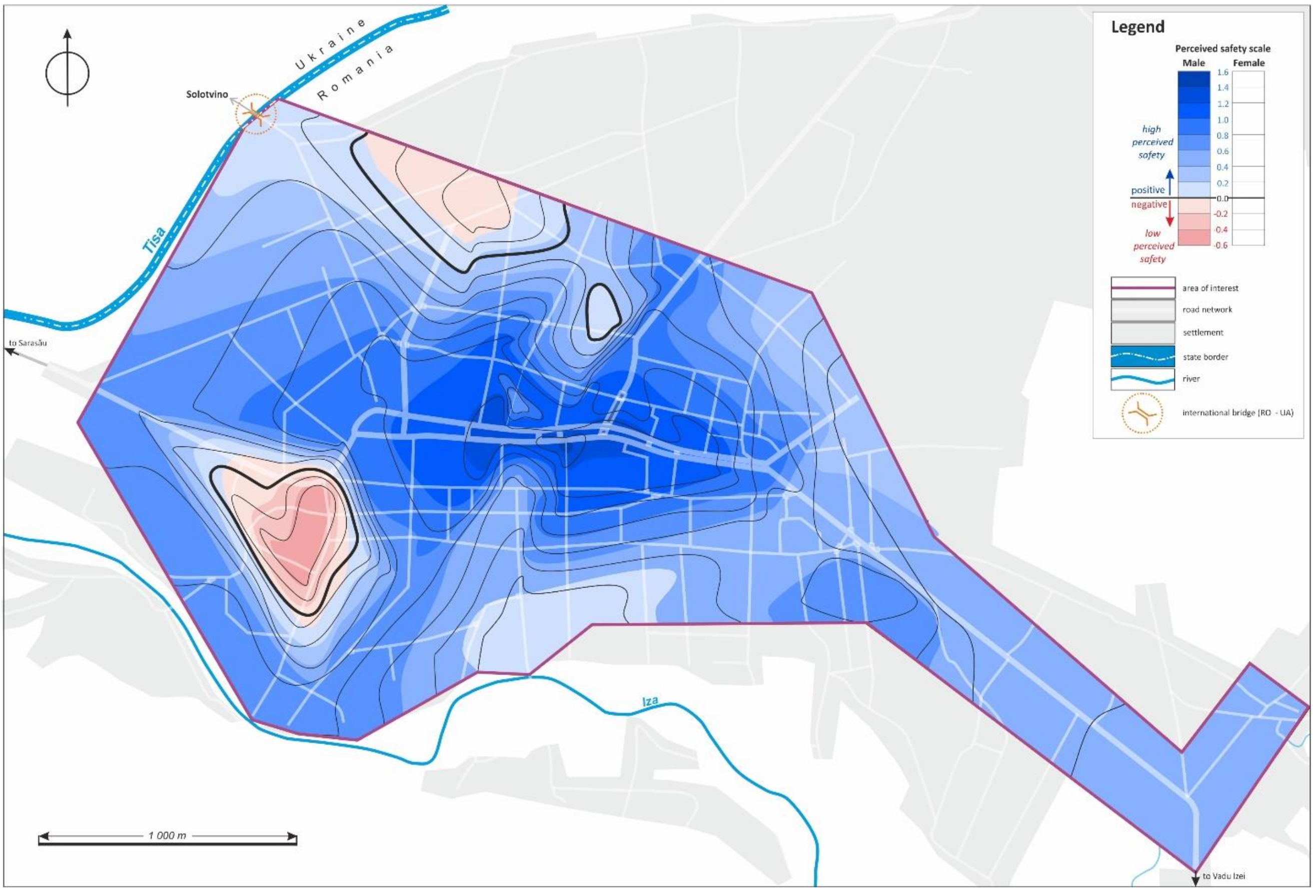

Figure 5. Perceived safety differences by gender in Sighetu Marmației (Source: Authors)

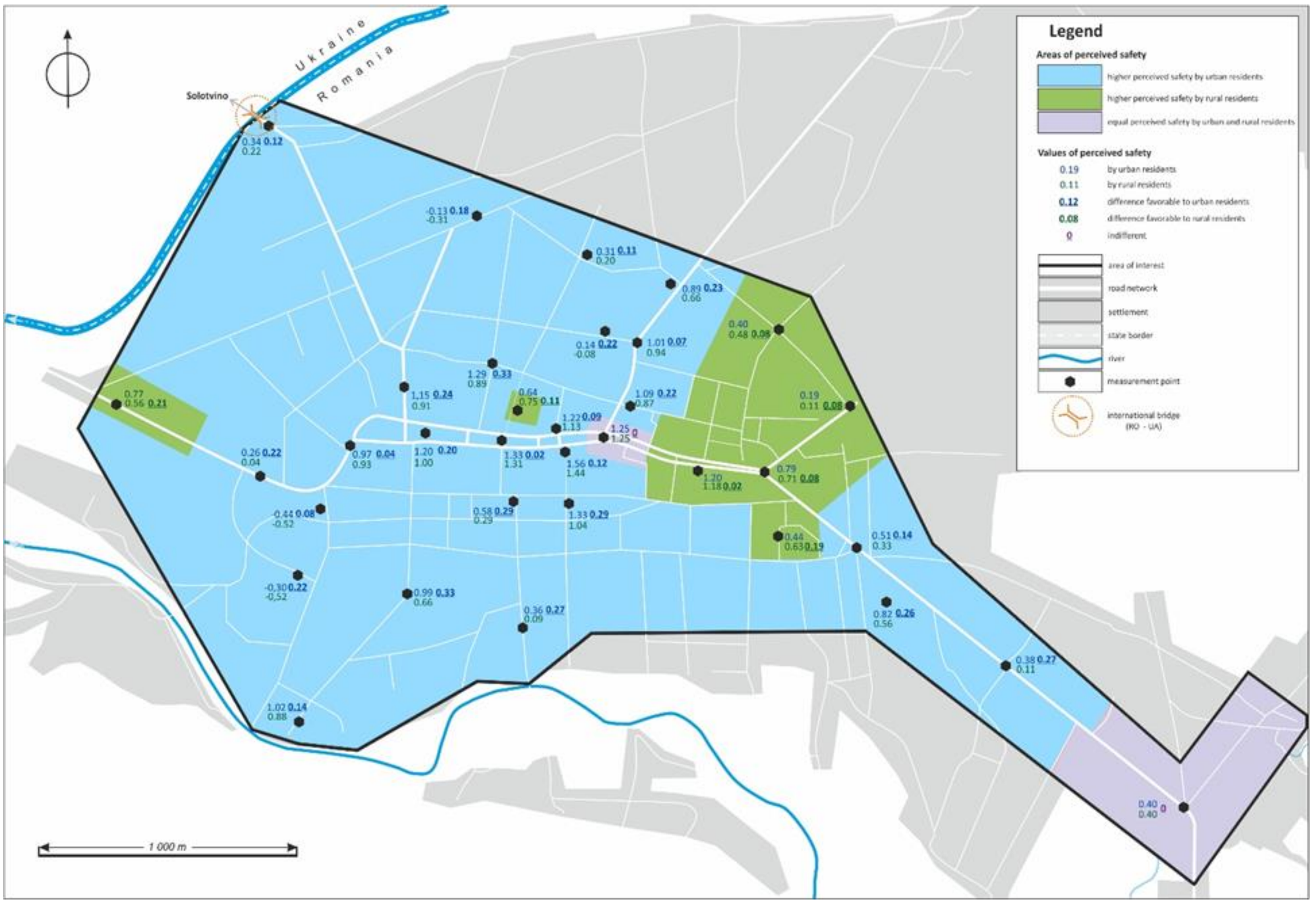

Figure 6. Perceived safety differences by residence in Sighetu Marmației (Source: Authors)

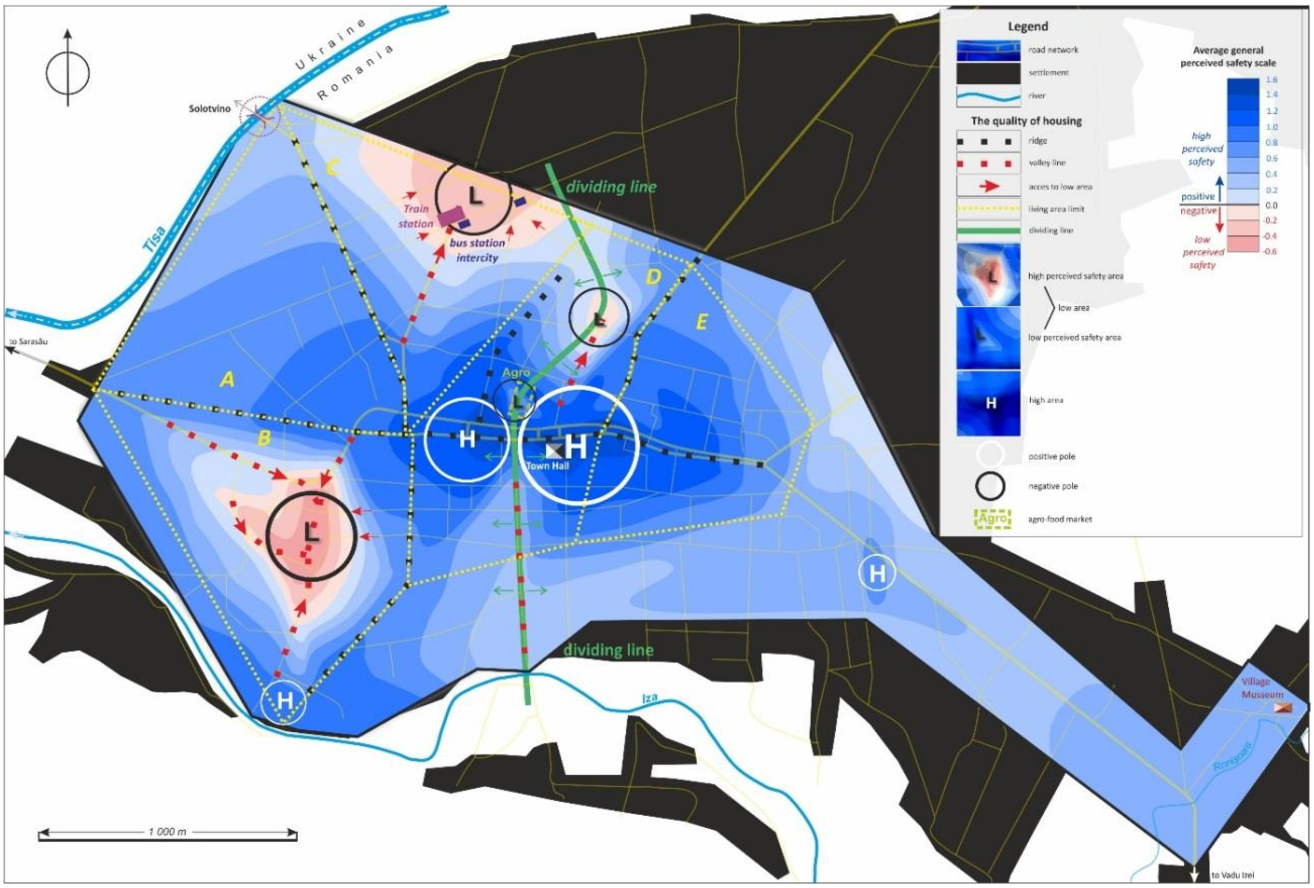

Figure 7. Annotated perceived safety zoning of Sighetu Marmației (Source: Authors)

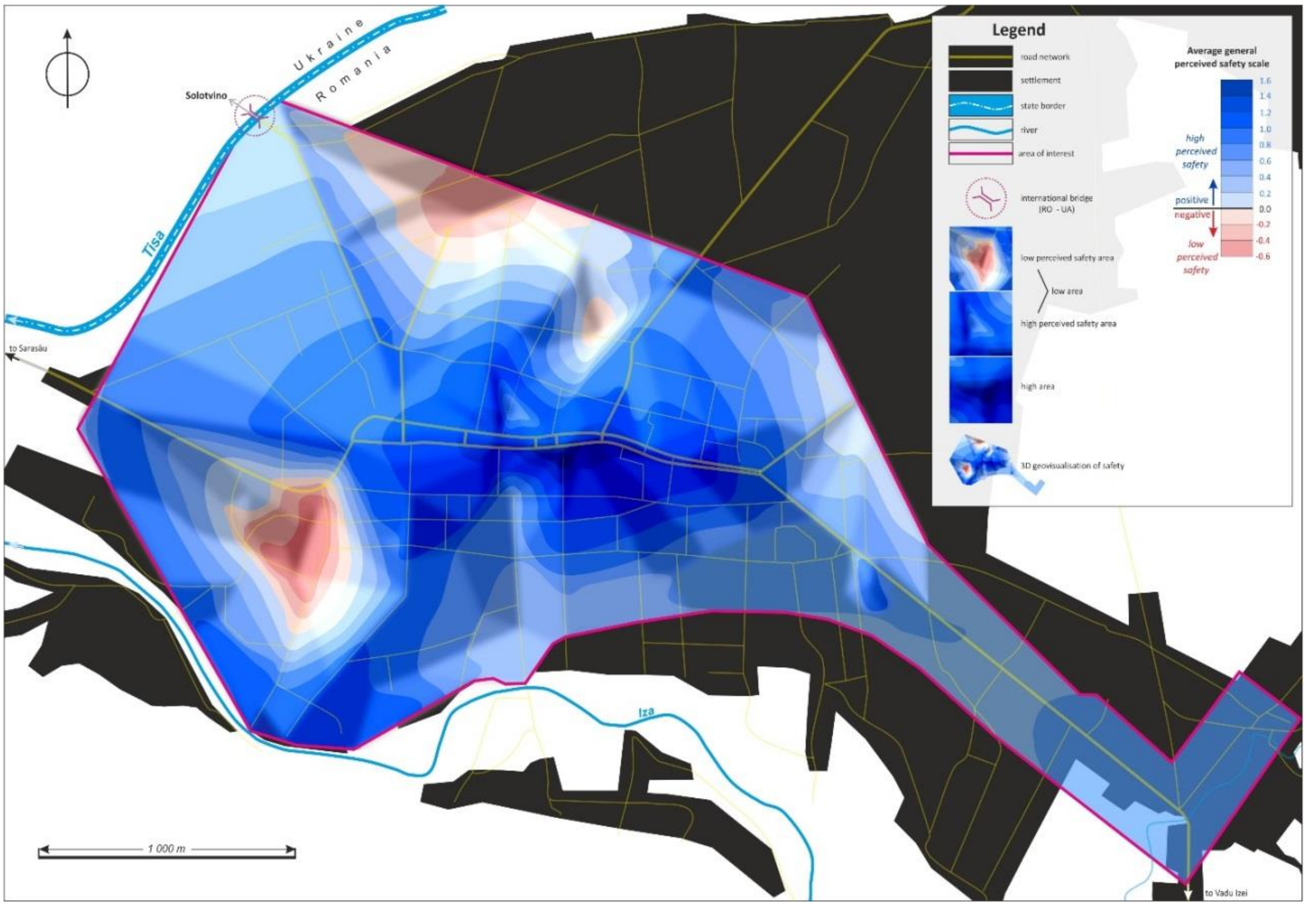

Figure 8. Pseudo-relief 3D representation of the general perceived safety in Sighetu Marmației (Source: Authors)

4. Frequent non-resident urban space user

Newer inhabitants feel the place is safer; this follows the literature corpus on community-perceived safety (Zeng et al., 2023). The map layers with non-residents' responses show a higher degree of perceived safety in the peripheric neighborhoods, contrasting with the locals' perception. This corresponds with their typical activity space and environment, as well as the more affordable decent housing area.

5. Integrated maps

Tourism and safety stakeholders in Sighetu Marmației municipality were provided with two maps aiding in conceiving the discourse on the destination. First, an annotated heatmap (Figure 7) highlights the main perceived safety areas concerning the city center, the tourist attractions, and the most frequented access points. Second, the pseudo-relief 3D representation renders a more intuitive image of the phenomenon, with ridges and valleys similar to the real landforms depicting the safer areas as positive relief and the less safe as lowlands (Figure 8).

CONCLUSIONS

The perceived tourism safety map is drawn according to the locals' view, revealing a slightly different representation than the actual safety map. The heatmaps illustrate the safer areas according to a multicriterial analysis, where the cognitive, emotional, and behavioral exert the strongest impact. Consequently, this study will be used as a decision-making tool for the tourism and local safety stakeholders (the DMO, the national and border police) to implement communication strategies on safety and labeling. The data retrieving tool is most effective when applied to small or medium-sized cities (with population under 50,000), where the city structure and the spatial distribution of institutions and services are common knowledge and allow the locals to express an informed opinion on each point throughout the process. Additionally, the research will be complemented by an in-depth study of the tourists' perspective, before and after the visit.

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INNOVATIVE TECHNOLOGIES TO IMPROVE TOURISM EXPERIENCE IN NATIONAL PARKS: DEVELOPMENT OF GIS MAPS AND THEIR VALUE

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Abstract: This article describes Ulytau National Park, its natural features, and unique attractions. The goal of this study is to create a favorable environment for using innovative technologies to discover historical sites and improve the tourism experience. It is necessary to focus on creating more sustainable and innovative solutions by considering the changing demands and expectations of tourists. This helps to improve the quality of services, develop more efficient tourist routes, meet the needs of eco-friendly tourism, and promote sustainable development in this sphere. In this case, GIS methodology provides a useful and systematic approach to work with geodata for decision-making, analysis, and visualization of spatial information. Using GIS maps in ecotourism contributes to creating more optimal and exciting routes, improving infrastructure, and providing more informative services for tourists. The integration of GIS technologies in tourism management not only enhances visitor experiences but also supports effective resource planning and environmental conservation within the national park. The study analysis provides recommendations for public and private organizations and travel agencies on using GIS technologies to achieve sustainable development in ecotourism. Constructed GIS maps give information about the park's territory, the location of main objects and routes, which improves the awareness and orientation of tourists. The study highlights the importance of integrating GIS technologies with strategic planning, infrastructure development, and continuous monitoring to enhance the effectiveness of tourist routes and promote sustainable regional tourism. By applying cluster analysis, the study identified optimal routes and facilitated more efficient management of tourist flows. Additionally, GIS maps created during the study contribute to improved accessibility, providing tourists with up-to-date information on attractions, routes, and services. The findings demonstrate that GIS-based solutions can optimize the overall tourism experience, leading to more sustainable tourism practices and better resource management. The research showed that integrating data from multiple sources, including GPS devices and satellite images, allows for accurate mapping and route planning. This experience reveals new perspectives in tourist navigation, discovery, and obtaining information about historical sites and main tourist attractions.

Keywords: specially protected natural parks, tourist routes, GIS-map, cultural and historical objects, Ulytau, interactive technologies

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INTRODUCTION

Nowadays tourism is considered as one of the dynamically developed spheres of economy, which contributes to create new working areas, attract investments, and improve quality of local citizens' lives. The tourism industry growth requires constant improvement and innovations, moreover, sets new challenges for countries and recreational areas (Khan et al., 2020, Zharkenova et al., 2023). The use of modern technologies in the field of geoinformation systems (GIS) is considered as one of the key aspects of innovative tourism development. Particularly, the creation of GIS maps plays a vital role in improving the tourist experience and integrating national parks into world tourism (Johnson, 1990). Geoinformation systems are powerful tools for analyzing, presenting, and processing spatial data. This article uses GIS to monitor and develop tourist routes in Ulytau National Park. Exploring the area and its attractions is crucial. GIS

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played a decisive role in the spatial analysis and development of the proposed maps. By analyzing spatial data, these maps can be used to develop different types of tourism, including ecological tourism.

Ecotourism focuses on sustainability, minimizing the negative impacts on the environment and creating positive interactions between tourism, nature, and culture. Additionally, ecotourism strives to maintain a balance between meeting the needs of tourists and preserving valuable natural resources for future generations (Björk, 2000). In the future, separate ecological maps will be developed using GIS. In this case, sustainable and environmentally responsible tourism, which is based on the use of innovative technologies and GIS maps development, can contribute to the conservation of natural and cultural resources of the region and helps to create favorable conditions for tourism experiences.

Because of that, a new state national natural park named “Ulytau" was opened in Ulytau region in 2021. All lands of the state forest fund of the Ulytau district included in the State Administration were transferred to the category of lands of specially protected natural areas: Ulytau’s land (20.911 thousand hectares), Arganat’s land (33.358 thousand hectares) and three forest blocks located in south of the existing reserve with a total area of about 4.647 thousand hectares. Thus, the area of the national park is about 58.912 thousand hectares. The main goal of this study is to attract tourists to Ulytau region by creating strategic development programs for tourism in the Ulytau Natural Park, design tourist routes maps and navigation applications, as well as cooperation between government agencies, local authorities and communities, ecological organizations, and commercial structures to create a sustainable tourism industry.

On the territory of Ulytau district there are more than 700 historical monuments, 282 of them are included in the historical and cultural map of the Ulytau museum fund. Such historical monuments as Zhoshy Khan (XII century), Alasha Khan, Dombauyl, Baskamyr, Ayakkamyr, dating back to the VIII-XIII centuries BC, Altynshoky (XII century), Khan Ordasy (XV century), Erden, Edyge, Khan Ordasy, mausoleum of Sandybay have global significance. Every year, more than 30 thousand people with tourism and pilgrimage purposes visit Ulytau’s main historical and holy places.

Nowadays historical and cultural sites of the region are under the management and protection of the national historical-cultural and natural reserve-museum “Ulytau,” which practically coordinates all types of tourism activities in the territory of the Ulytau natural park. Furthermore, the strategic program for the development of ecotourism with an emphasis on unique sacred, natural, and cultural sites is gradually beginning to be implemented in Ulytau Nature Reserve. For the further development of ecotourism in the analyzed region, there was specially opened the Ulytau Visit Center, which provides information about tourist services, individual and group tours, expeditions, excursions, and organizes cultural and entertainment programs. Ulytau Visit Center is a complex facility that includes an administrative building with an area of 926.5 m2 and a dormitory with a gallery of 570.9 m2. The administrative building design includes two floors, including various functional areas: foyer, information rooms, conference room, lecture hall, catering equipment, and laundry. The dormitory has living rooms with a bathroom and shower. In addition, there have been created a guide and map-scheme based on Google Maps with a description of sacred places for Ulytau region. The Google Earth system has been supplemented with the first time photographed from the air 3D models of Ulytau historical and cultural monuments. Mount Akmeshit in Ulytau was included in the list of 100 national sacred sites in Kazakhstan (Shuptar, 2016). Mapping plays a significant role in the development and promotion of ecotourism routes in modern conditions (Thecla & Odum, 2014). This allows to facilitate the work of travel agencies, which provide services and organize tours in open nature, also significantly increases the awareness of tourists about the travel area. In this study, the authors attempt to answer the following questions:

- what is the role of GIS technology and mapping in designing ecotourism routes?
- what elements of the territory can be mapped for ecotourism development?
- how is it possible to build ecotourism routes in the locality by considering the algorithm of tourist behavior and the features of existing objects on the ground?

To answer the questions above, the main characteristics of the Ulytau State National Natural Park and features of attractive objects within the park’s boundaries were studied from ecotourism point of view.

Analysis of literary sources shows the possibilities of using GIS technology, especially when compiling thematic maps of various natures. The purpose of this work is to develop a tourist route using the GIS program, taking into account the features of the natural national park. The main characteristics of the Ulytau State National Natural Park, as well as the features of attractive objects within the park for the development of ecological tourism, are necessary to develop ecological routes. During the study, four routes were created, and all routes were tested taking into account the passage and time and historical and cultural sites were indicated. The route was developed using the ArcGIS program to develop tourist routes in the studied territory, we applied the methodology of using map compilation.

LITERATURE REVIEW

Ecotourism and nature conservation are closely related and are considered as the important concepts in the field of environmental protection. The development of tourism in the region, especially of the ecotourism, has a good perspective (Sagatbayev et al., 2019). Ecotourism is represented itself by the visit to natural areas with the aim of not only enjoying their beauty, but also of bringing benefits to the population and the environment. The interconnection between ecotourism and the nature is dynamic and one of the relevant subjects of debates in theory and practice. Ecotourism contributes to education and culture in nature conservation, attracts ecotourists and stimulates local economic development (Ghoddousi, et al., 2018). It can change people's attitudes and behavior towards nature protection and can help countries to reduce their dependence on natural resources. In some countries it is assumed that ecotourism is one neoliberal conservation tools, which provides opportunities for local participation in decision-making and benefit-sharing process. Local communities can develop businesses to preserve the environment and develop a green economy.

Tourism is considered to be one of the most active and important industry in many countries and plays a vital role by contributing to the economy of many developing countries (Akbar et al., 2020). Tourism is a socio-economic activity associated with a specific space where tourism events and activities are provided. In this context, maps become a valuable tool for various stakeholders, including tourists, managers, route planners, economic indicators analysts and others. Maps play a key role in navigation, planning and providing information related to various purposes of tourism.

Literary research sources of lakes of Western, Northern, and Central Kazakhstan are analyzed. The study area has excellent opportunities for the development of certain types of tourism (Azbantayeva et al., 2022).

Travelers often rely on maps to navigate their travels and plan routes. GIS plays a significant role in satisfaction increasing needs for reliable and accurate data for transportation models and forecast. Due to the constant expansion and intensive dynamic development of cities, the ability of a person to control changes in the environment has decreased (Issakov et al., 2022). GIS allows tourists to create and display spatial data on a map, integrate different layers of information and provide convenient tools in analyzing and decision-making processes. Because of that travelers receive up-to-date information about main tourist attractions, geographic features, accommodation, and other crucial factors needed in planning routes and trips. Mobile GIS applications help, which allow you to quickly navigate and navigate the terrain of unfamiliar places, and contain complete, accurate, geo – information about geographical, tourist and local lore objects (Issakov et al., 2022). Thus, GIS plays a key role in ensuring the accuracy and efficiency of navigation and travel planning.

Google Earth Map and Flash version are the most popular tools with elevated level of interactivity, which gives users the opportunity to cooperate with geographic information. Google Earth provides a 3D model of the Earth with access to satellite imagery, maps, and 3D city models. The Flash version allows users to create and view animated and interactive maps. These tools help tourists to better understand and comprehend geographic information more effectively, providing more vivid and visual representations of places and objects (Hanyoung & Ulrike, 2010). They play a vital role in creating more interactive and memorable visual images for a deeper understanding of location and space.

Nowadays tourists are mostly relying on interactive technologies in the process of planning the trips. Interactive interaction is a key moment in tourism, and information technology plays a key role in the development of this industry. Technologies make it possible to meet the needs of tourists and service providers, demonstrate the high quality of tourism products (Bilgihan et al., 2014). Using information technology simplifies the interaction between tourist attractions managers and tourists, create convenient opportunities for exchanging information and satisfy the needs of tourists.

Brokou et al. (2021) considered GIS as an interactive platform that meets the information needs of tourists. Tourists widely use online GIS maps to find the location of tourist sites, calculate distances, and navigation. GIS plays a key role in tourism management by providing data collection, storage, processing, and spatial analysis functions [Wei, 2012]. Using the functionality of contemporary instrumental GIS and interpretation algorithms, the indicators of productivity of geosystems and anthropogenic transformation are determined (Sagatbayev et al., 2019). As an integral means of transformation, spatial information maps help destination managers to provide detailed information and map-based guides based on cartographic objects (Eboy, 2017). Creating informative and meaningful tourist maps is challenging for cartographers. Salomão Graça & Fiori (2015) emphasized that, planning maps are developed by tourism management organizations, while guide maps are used for tourist navigation. One of the relevant problems is the static nature of the maps, their absence of reflection on the local characteristics and potential of tourist destinations. Tourists do not have enough information about the local community, cultural heritage protection and tourism development. Maps of remote regions do not provide sufficient information about landscapes and natural objects. According to Ghorbanzadeh et al. (2019), mapping should be informative, accessible, and understandable to ensure better interaction and understanding among tourists. Tourist maps are often created without the input of cartographers and are based on subjective preferences. Furthermore, many tourist maps are not critically evaluated and evaluated based on cartographic principles. The lack of a professional view of cartographers can affect the content and quality of the map (Boers & Cottrell, 2007).

Finally, maps can be useful tools for tourists. Tourist geo sites are landscapes or places on Earth that have historical, natural, or cultural significance and becoming increasingly interesting for tourists (Achmad et al., 2020). Geo sites may include geological formations, archaeological finds, natural landmarks, cultural monuments, or architectural sites. Tourists visit geo sites to explore unique natural and cultural aspects, gain educational or aesthetic satisfaction, and deepen connections with local traditions and history (Krishna et al., 2016). The development of special geo sites for tourists usually involves creating information panels, tourist routes and conducting excursions for educational and entertaining experiences.

Geo-data and GIS in tourism can be used to create interactive maps of tourist destinations, route planning, analyze tourism infrastructure, forecast demand for tourism services and manage tourism resources.

Wulung et al. (2020) identified that due to GIS and geodata, it is possible to create intelligent solutions and information systems that ensure effective management and development of tourism. Geological and geomorphological sites stimulate the development of ecological and cultural tourism, attract tourists from different countries and contribute to the development of local communities. One potential tourist attraction that has not been effectively managed is the Benteng Alla in Enrekang District, South Sulawesi. Bulan (2021) considers that the area has not been responsibly managed, and the local community is unable to provide sufficient information about its history and geological aspects. In this regard visitors cannot fully understand or interpret the features of the landscape.

The development of the Benteng Alla geosite as a tourist destination is conducted by visualizing the landscape of the area and describing its socio-cultural objects (Parent, 2020). Ethnographic mapping is used in the geosite designing process, which allows to collect spatial (maps) and textual (descriptions) information. Ethnographic mapping represents the places where the activities and locations of individuals or groups are located (Wainwright & Bryan, 2009).

According to Tripathi et al. (2010), it plays a key role in the study of geographical areas and provides current information about changes in social structure, networks, and social demography. Ethnographic mapping is important for studying geographic areas and providing the latest information about social change and the society demographics (Oliver-Velez et al., 2002). Conversely, it has been found that millennials tend to prefer travel with cultural experiences (Xu et al., 2022). Millennials represent a massive portion of the business travel. They are mostly interested in authenticity, self-development, and sustainability (Sofronov, 2018). In compliance with Pramono et al. (2020), millennials were born into the digital age and always rely on internal technology in every aspect of their lives. Travel enhancement comes from visiting various local attractions. Millennials seek cultural immersion and want to experience local features with specific information about available tourist attractions (Ershad & Ali, 2020). Regarding this, there are needed visualization and deeper information support for travel planning. The main emphasis in researching the Ulytau Natural Park was on developing tourist routes maps of cultural, historical, natural sites, mining, and metallurgical sites of the 5th century BC, when metallurgical production began to develop in Kazakhstan. The study of geographical and ethnographic objects made it possible to imagine the space and specify tourist destinations more clearly. Jovanovic & Njeguš (2008) presented GIS in their article as a management and marketing planning system in tourism and examined the benefits and potential of using GIS to improve tourism operations and decision making. Additionally, the article describes the collection and analysis of spatial data, visualization techniques, and tools used to manage and optimize tourism resources.

Considering the economic, social, and environmental requirements of sustainable development, decision-making in tourism development and planning is becoming an increasingly complex study. GIS can be used as a powerful tool to achieve this sustainability. GIS allows to explore spatial data, assess impacts, and model different scenarios. They help to analyze conflicts, make decisions, and integrate sustainable development principles into planning tourism projects. More accurate environmental impact assessments and access to integrated data tools improve the planning process. The process of using GIS in tourism continues to evolve, particularly in the UK, where tourism organizations are making considerable progress in integrating GIS and sustainable development (Bahaire et al., 1999). One of the directions for developing GIS capabilities in decision support is the integration of maps with multi-criteria decision models.

Jankowski et al. (2001) proposed new prototype spatial decision support tools that highlight the role of maps as a source of structure in multi-criteria spatial decision problems. In these tools, the role of the map goes beyond simply displaying the geographic decision space and the results of multi-criteria assessment. Maps become a "visual index" through which the user organizes decision options, assigns priorities to decision criteria, and enriches the criterion result space with heuristic knowledge derived from the map. As an additional means of structuring multi-criteria spatial decision problems, an experimental use of intelligent data analysis can be presented to reduce problem dimensionality in integrated form with dynamic maps and multi-criteria decision models. It is necessary to outline the future research directions that focus on supporting map-based group decision making.

Chu et al. (2011) presented a study describing the process of development and implementation of this system. They provided information in creating a convenient and efficient platform which allows tourists to access information about sites and services through mobile devices using GIS and GPS technologies. Furthermore, their article gave details of developed system, as well as the results of its application and an assessment of its effectiveness in providing tourism services.

Today, the development of a green economy - a new form of economy that considers the needs of the market, and is based on traditional industry and strives to achieve harmony between economic goals and environmental protection, has become an important challenge for society. Green economy development is a key factor to achieve sustainable and ecologically responsible development and ensure well-being for a long-term period.

Chen (2023) discussed various aspects of tourism impact on residents, who live in natural parks areas, and possibilities of improving their quality of life. However, the author notes that issues of tourism quality are rarely discussed, and ecotourism in these areas does not receive sufficient attention due to the lack of ways to develop and protect the environment. Finally, the author calls for further research and development of ecotourism in these areas in accordance with the principles of green economy to achieve sustainable development and environmental protection.

Clifton & Benson (2006) identified the challenges of planning sustainable ecotourism in developing countries. In this case limited industry development, the impact of political events, matching ecotourism with the local environment, and the motivations of exploratory ecotourists were considered as main aspects of the study. These results have important implications for planning and management in the tourism industry. Fatemeh et al. (2020) explored the assessment of ecotourism development using the FUZZY-OWA scenario approach and combined methods such as renewable linguistic quantifier (RLQ), fuzzy logic and environmental factors. They investigated applying an integrated approach to determine optimal ecotourism development strategies and make informed decisions that promote sustainable development and ecotourism benefits. Based on the findings, it can be concluded that the OWA method has enormous potential for modeling complex decision-making problems due to a new concept in this method called "order weights."

Sintayehu & Raminder (2020) examined the relationship between ecotourism and biodiversity conservation in Bale Gebele National Park, Ethiopia. The results showed that while ecotourism development and conservation may be conceptually positively linked, in practice conflicts arise due to issues such as lack of awareness and education, limited community participation, uneven distribution of benefits and costs, lack of sustainable financing and ecological concerns. Urgent policy intervention is required to address these issues and realize sustainable development of ecotourism and nature conservation.

Fadillah et al. (2021) reviewed ecotourism literature over the last five years (2015-2020) from the Scopus database by using the PRISMA report framework to explain the selection process. The study identified that ecotourism promotes environmental protection, generates economic growth, and conserves natural resources without harming flora and fauna.

Additionally, it was described a growing trend of ecotourism, which can be effectively promoted through social networks and innovative technologies to achieve environmental sustainability. Aldi & Heidi (2021) concluded that the question of whether sustainable tourism is necessary for the local community raises a variety of views in the context of a study in the Koomodo Nature Reserve in Indonesia. This indicates the complexity and multifaceted nature of the problem in this region. A critical analysis of the transition to an ecotourism-based economy has identified several failures in achieving sustainable development goals. However, further research and collaboration among various stakeholders are key aspects in addressing this issue positively and developing effective tourism policies that consider multiple views and interests.

Roque et al. (2021) noted that there is a lack of researchers and managers who participate in the integration of tourism and ecosystem services into the environmental planning process in Brasilia. This limitation leads to insufficient development of this theme. In addition, the lack of adequate ecological planning poses a risk to developing countries, which are subject to severe environmental and demographic pressures. Incorporating an ecosystem services perspective into planning is particularly important because it highlights the importance of natural resource conservation for local economic development, which is an integral part of sustainable development.

Oh et al. (2019) demonstrated the importance of developing tourist routes and identified three main factors influencing visitor satisfaction and behavior: the quality of the proposed tourist routes, the provision of information and landmarks, and the availability of services such as campsites, cottages, and picnic areas. The development of tourist routes requires costs for their creation and maintenance, information support, management, and land resources.

Aliyeva et al. (2019) applied the approaches of arithmetic (calculated) and multivariate regression modeling of the integral efficiency of tourism, the results showed that allow the approach to be transferred and applied to other regions of Kazakhstan. In the article, GIS technology was used in the development of maps for compiling a tourist cluster.

Duan et al. (2024) found that the critical areas of ecosystem service functioning, ecological vulnerability, and ecosystem integrity exhibited cross-border contiguity characteristics. In addition, the spatial distribution pattern of priority conservation areas in the Altai Mountains was revealed through weighted overlap analysis. Zhensikbayeva et al. (2024) conducted that the results of the study propose specialized and multi-thematic routes connecting the main natural and cultural attractions of the main recreation areas for international and domestic tourists, as well as for educational and educational field programs and research trips. The study of the territorial and recreational potential of a mountainous region has its characteristics, since, compared with plain territories, its knowledge is insufficient. Analysis of literary sources shows the possibilities of using GIS technology, especially when compiling thematic maps of various natures. When developing tourist routes in the studied territory, we applied the methodology of using map compilation.

METHODOLOGY

The research group sets the following objectives:

- creation and development of geospatial maps that contain information about the territory, location of attractions, routes, infrastructure. GIS maps can be presented in various scales and formats, their goal is to provide accessible and visual information for tourists and specialists;
- determining the most suitable routes for travelers, considering several factors such as nature, attractions, level of difficulty and accessibility. Creating routes that satisfy the needs and preferences of tourists in the best way, as well as control and manage tourist flows;
- using GIS tools to analyze data on tourist flow, their activity and behavior, identify trends, forecast demand, determine popular destinations, and discover factors influencing tourism activity;
- GIS application and study tourist routes to implement sustainable tourism planning and development. Assessing the environmental impact of tourism, addressing community needs, managing, and allocating resources, and taking measures for sustainable development of tourism industry.

Calderón-Puerta & Arcila-Garrido (2020) noted the importance of developing tourist routes according to tourists' preferences, providing information about attractions, helping and orientation in the area, as well as creating opportunities for participation in active recreation and living close to nature. Within the framework of this work, the issues of developing tourist routes and creating GIS maps in Ulytau Natural Park ecotourism development were studied in accordance with the field research work. Field research involved first source data collection such as observations, interviews with residents and experts, questionnaires, and collecting geographic information on site. In the process of exploring difficult routes, researchers used geolocation devices (GPS), trackers or mobile devices with applications to record routes, measure distances and take notes about cultural and historical sites and attractions.

These studies provided an in-depth understanding of location, natural resources, cultural and historical sites and attractions, potential barriers to develop tourist routes. In the process of designing GIS maps and tourist routes, programs, and applications for processing geographic data, which provide the ability to create detailed maps, spatial analysis, and modeling were used (GIS applications ArcGIS, QGIS, Google Earth). Detailed maps with tourist routes, information about attractions and other principal factors to help develop tourism in the analyzed area were created (Barchukov, 2008).

The database of Ulytau Natural Park’s tourism activities monitoring system was structured and it represents a systematic set of tourist routes (Figure 1). A cluster analysis algorithm was used to determine the optimal location of interest points on the map tourist routes on a GIS map, helped easier navigation and provided useful information for tourists in the Ulytau Natural Park. Satellite images, topographic maps, GIS data, photo materials, field research data, archival materials, and resident information were used to determine data sources. Data was entered into the GIS system, and coordinates were entered for subsequent processing and visualization of the tourist route.

Thus, the basis for maps was created using the GIS system and ready-made topographic maps. In the future, they will be used to create complex tourist maps of the national park's territory.

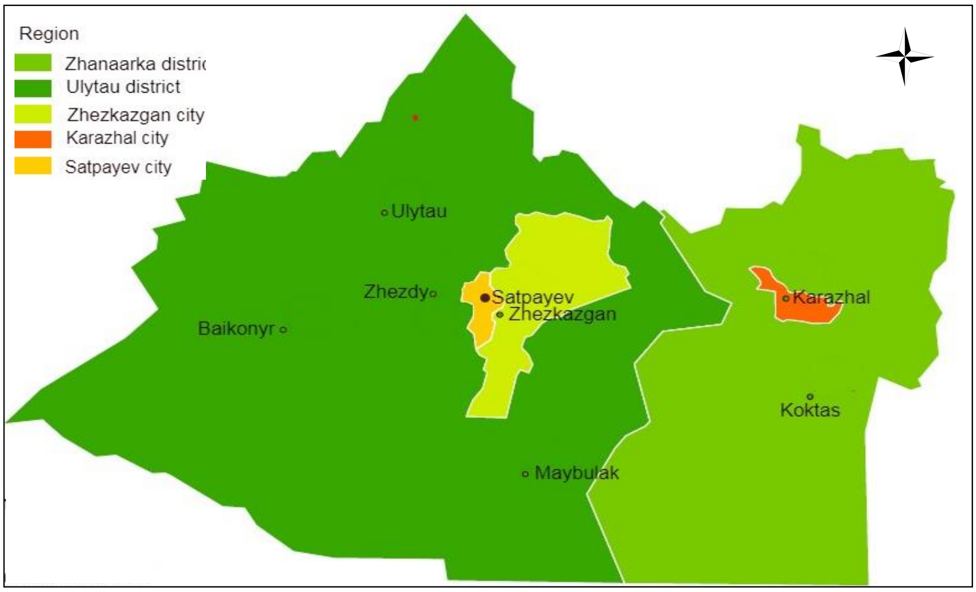

Figure 1. Ulytau region (Source: The figure was constructed by authors based on the ARGIS program)

RESULTS AND DISCUSSION

1. Case State National Natural Park "Ulytau"

Nowadays, protected natural areas in Kazakhstan are represented by 122 objects. The data is given in Table 1. It can be seen from the Table 1 that the largest number of protected areas are natural reserves (zoological -32). They are followed by state national natural parks (14) and state nature reserves (10). The smallest number of objects in the table are natural reserves (complex - 7) and state protected areas (7). The total area of protected natural areas is 12,782.7 thousand hectares. The largest territory is occupied by state protected areas (4392.5 thousand hectares) and regional natural parks (8217.13 thousand hectares), natural reserves (zoological - 4362.8 thousand hectares) and state national natural parks (2667.37 thousand hectares). Natural reserves (botanical - 155.7 thousand hectares) and natural monuments (6.5 thousand hectares) have the smallest area. There is a considerable number and territory of protected natural areas in Kazakhstan, which shows a high attention to the conservation of country's biodiversity and natural resources. These areas play a vital role in maintaining environmental sustainability and providing habitats for many species of flora and fauna. Additionally, they play a crucial role in the development of ecotourism and environmental education and turning Kazakhstan to an attractive country for tourists and nature researchers.

Table 1. Areas of Specially Protected Natural Areas and their number

The name of Specially Protected Natural Areas	Number	Area, thousand hectares
State nature reserves	10	1613.7
State national natural parks	14	2667.37
Nature reserves (zoological)	32	4362.8
Nature reserves (complex)	7	1713.7
Natural reserves (botanical)	10	155.7
Natural Monuments	27	6.5
State protected areas	5	4392.5
Reserves	7	3122.1
Regional natural parks	10	8217.13
Total	122	12782.7
Note - Specially protected natural areas (Tourism Map of the Republic of Kazakhstan, 2021)		

The creation of a new integrated reserve made it possible to ensure the protection of wild ungulate pastures, the preservation of unique plant communities, nesting sites of predator birds' rare species, as well as the connection and integrity of all protected areas (including natural park clusters) and, as a result, a sufficient size of the protected area to preserve ecosystems. In the future it could be possible to restore the argali population in Ulytau.

Ulytau region has an immense potential to develop ethno-tourism (Mukatova et al., 2022). Ulytau offers many amazing attractions that reflect its rich history: Zhoshy Khan mausoleum (12th century), Alasha Khan, Dombaul, Baskamyr, Ayakkamyr, dating back to the 8th -13th centuries B.C., Altynshoky (XII century), Khan Ordasy (15th century), Erden, Edyge, Khan Ordasy, Bolgan Ana, and all of them have their own unique history and importance for Kazakh culture. These monuments are witnesses of regional rich history and offer fascinating opportunities to study and understand the past. The most popular historical sites of Ulytau are given in Figure 2.

Figure 2. Historical and cultural objects in the State national natural park "Ulytau" a - Zhoshy Khan mausoleum, b – Alasha Khan mausoleum, c – Dombauyl mausoleum, d – Edyge peak Note: photo based on the results from field research (Source: The authors)

Ulytau Nature Park offers unique opportunities to explore historical monuments, such as fortification structures, mausoleums and cities that were left as a legacy of powerful empire of the Golden Horde. Examples of such sites include the mausoleum of Zhoshy Khan and the site of Baskamyr. These cultural and historical sites are significant places that allow tourists to immerse themselves in the history and culture of the Golden Horde. In addition, Ulytau Nature Park has natural attractions and scenic spots to offer, including unique landscapes that can create a variety of experiences for tourists. Nowadays new for ecotourism strategy, which connected to natural and cultural features is developing in Ulytau and is actively involving researchers and experts from various organizations.

A recreational structure with analysis of recreational load on tourist routes and determination of various tourism types of optimal placement is considered as one of the main development goals. Regulating tourist flow and determining their accommodation are becoming key factors in ensuring the sustainable development of tourism activity. It is important to provide protective measures for sensitive areas and identify the optimal number of visitors for each location.

Due to these, a special Visit Center, which provides information services, organizes excursions and entertainment programs, was opened in Ulytau. It is necessary to develop tourism infrastructure, routes and centers considering environmental sustainability and maximum use of renewable resources. Furthermore, the involvement of the locals in ecotourism development, offering trainings and opportunities for cultural, gastronomic, and agricultural activities are important. This process of ecotourism development will contribute to the conservation of biodiversity and cultural values and will provide new economic opportunities for the residents. Additionally, the principles of waste minimization and the use of environmentally friendly technologies are vital. Mukatova et al. (2024) analyzed residents' attitude towards ethno-tourism development in Ulytau, and identified positive connection between locals' innovativeness, economic, social, and environmental conditions to sustainable development of ethno-tourism.

Ulytau Nature Park has enormous potential for tourism development, especially its cultural and historical types. Cultural and historical sites associated with the Golden Horde attract the attention of tourists interested in history and archeology, as well as those who want to immerse themselves in the rich cultural heritage of the past. Tour routes developed by researchers provide an opportunity to get acquainted with the cultural and historical sights of the Golden Horde, including mausoleums, fortifications, and cities. The development of tourism in the Ulytau Nature Park has some problems. Some sites are in remote areas without access to the Internet or paved roads, which makes travel difficult for tourists. An infusion of investment to create and develop the necessary infrastructure, cooperation between government agencies, local authorities, environmental organizations, and commercial enterprises are required for the successful tourism development in Ulytau Nature Park. It is also important to consider the target audience who strives for extreme tourism and create conditions for a comfortable and safe trip. The developed map of tourist routes, combining geographic information and mobile navigation, will help visitors easily orient and navigate in the park territory. One of the main aspects of ecotourism development in Ulytau Nature Park is the creation and development of infrastructure that allows visitors to fully enjoy natural and cultural attractions. This includes the creation of well-marked hiking trails and routes, the placement of information signs, the creation of observation platforms and other facilities that ensure safety and comfort for tourists. At the same time, it is necessary to pay attention on the upbringing and education of local communities and tourists. It is important to develop ecological awareness and eco-ethical behavior to ensure the conservation of park's unique natural resources for many years. Additionally, it is important to conduct marketing research and promote Ulytau Nature Park as a tourist destination. This includes creating a website with information about the park, using social networks and other online platforms, participating in tourism exhibitions, and collaborating with tour operators and agencies.

2. GIS technology and mapping the area

Geoinformation mapping is based on the use of geoinformation technologies and databases with geographical knowledge, such as geological, environmental, socio-economic and others. It consists of an automated process for compiling maps and using modern geographic information tools and methods. One of the main tasks of geographic information mapping is the creation of digital map models to use for practical and scientific reasons. Digital models created at the stage of geoinformation mapping are a crucial tool for research in the field of geoinformatics. The geographic information system was used in the process of developing tourist routes maps, which support the following types of work:

1. Type of Geodatabase: GIS is a spatial database containing datasets that represent geographic information in the context of the overall GIS data model (vector features, rasters, topology, networks, etc.)

2. Type of geovisualization: GIS is a set of smart and other types of maps that show spatial features and relationships between objects on the earth's surface. Based on that, several types of maps can be constructed, and they can be used as "windows into a database" to support queries, analysis, and information editing.

3. Type of Geoprocessing: GIS is a set of tools for obtaining new geographic data sets from existing data sets. Spatial data processing (geoprocessing) functions extract information from existing datasets, apply analytical functions to them, and write the results into new derived datasets. In ArcGIS software, these three types of GIS are represented by a catalog (GIS as a collection of geodata sets), a map (GIS as a smart map view), and a toolbox (GIS as a set of tools for processing spatial data). All of them are integral components of a complete GIS and are used to a greater or lesser extent in all GIS applications (Wei, 2012). The study of Ulytau Natural Park emphasized the tourist routes developing maps in connection to cultural, historical, and natural sites (Figure 3). Nowadays, the Ulytau Nature Park is represented by cultural and historical sites of the Golden Horde. The great empire's heritage attracts the attention of tourists interested in history and archeology, as well as those who want to get acquainted with the rich cultural traditions and legacy of this time.

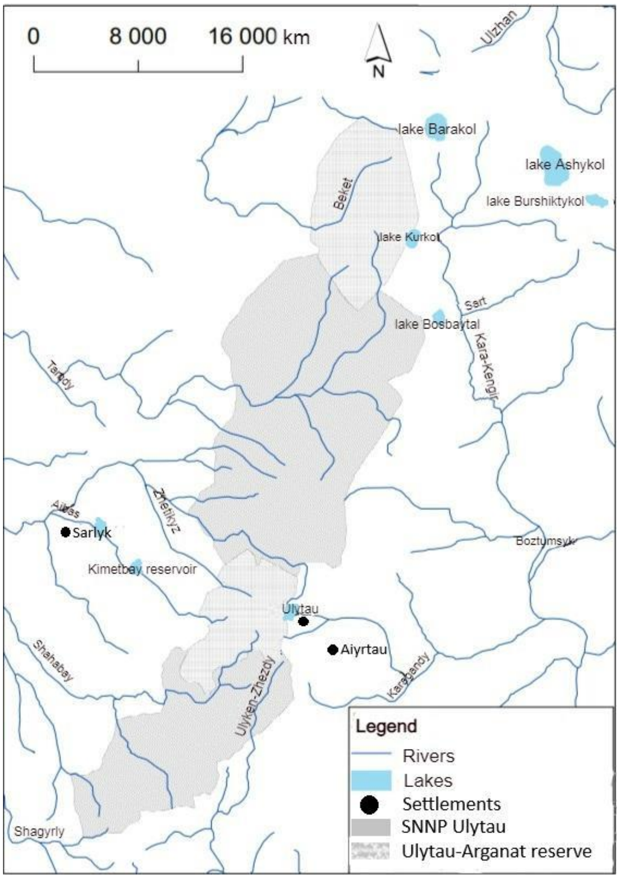

Figure 3. Map of the State National Natural Park "Ulytau" (Source: The figure was constructed by authors based on the ARGIS program)

To facilitate access to information for tourists about the cultural and historical sites of the Golden Horde and their movement within the park, a group of scientists undertook research work to study tourist routes of natural and historical significance. During the field research, photo fixation of cultural, historical, and natural objects was taken.

Based on the studied territory of more than 1000 km, there have been compiled 4 tourist routes, which can be economically beneficial for local community and territorial authorities. Field research shows that the analyzed objects are mostly located in hard-to-reach areas where there is no Internet connection and paved roads. In creating strategy for the development of the Ulytau Natural Park, it is necessary to consider the target audience that strives for extreme tourism and can travel to places of cultural and historical significance by jeep. The developed map of tourist routes using the ArcGIS, special GIS application, will allow tourists to access mobile navigation and use the developed map to explore and freely move between various cultural and historical attractions. During the study of Ulytau village territory, natural and historical objects that can be attractive for the tourist community were identified. Ulytau is an administrative district, which has basic infrastructure, including hotels, visitor center, communications, post office, Internet connection, road, cultural and historical attractions. Cultural and historical objects located in distinct parts of Ulytau Natural Park and are presented in the village of Ulytau as monuments associated with spiritual shrines, batyrs (knights in Kazakh) and ethnic villages. The map of attractions in Ulytau village developed by the research group is presented in Figure 4.

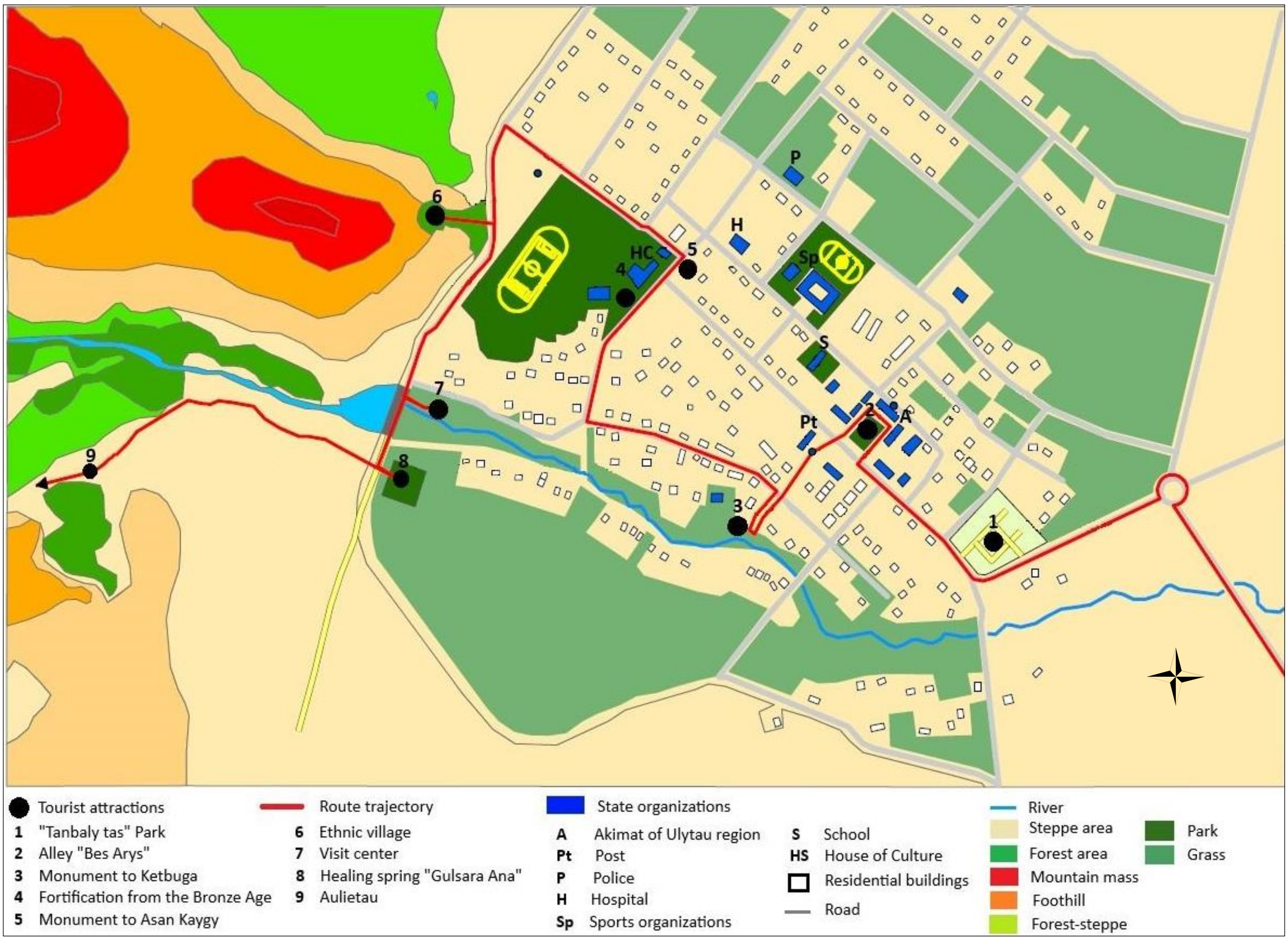

Figure 4. Ulytau village. Sightseeing objects (Source: The figure was constructed by authors based on the ARGIS program)

The development of tourism in this region can contribute to the creation of new working areas and economic development of locals. It can also contribute to the preservation of historical monuments, since increased tourist flows gives more opportunities for monuments' conservation and restoration, as well as for their protection from destructive factors (Baipakov, 1998). Consequently, the Golden Horde heritage sites play a significant role in world tourism development, offering a unique combination of historical heritage, cultural wealth, and natural beauty. Their importance in tourism sector connected to attracting the interest of tourists and creating opportunities for excursion routes development, additionally, museums, hotels, and other enterprises can contribute to ecotourism and cultural tourism development.

3. Mapping ecotourism routes

In the process of field research, the research group developed GIS maps of 4 tourist routes based on the ARGIS program.

Route 1: Zhezkazgan city -mausoleum of Zhoshy Khan – Dombauyl - mausoleum of Alasha Khan - Baskamyr settlement - Ulytau village.

Route 2: Ulytau village - Aulie tau mountain - Khan Ordasy – Altynshoky - peak Edyge - Toktamys.Khan.

Route 3: Ulytau village - Zhezdy village - Karsakpay village - Baikonyr village (Battle of Bulanty).

Route 4: Zhezkazgan city - Terekti Aulie, Zhezkazgan city - Bolgan ana, Kulan ana.

In creating tourist route, documents from Ulytau National Natural Park and other important sources of information were analyzed: data from the Historical and Industrial Museum named after K.I. Satpayev of "Kazakhmys" corporation (Zhezkazgan), Historical and Archaeological Museum with the exhibition hall "History of the Development of Cosmonautics" (Zhezkazgan), Museum of the History of Mining and Smelting named after M. Toregeldin (Zhezdy), House-Museum of Kanysh Satpayev (Karsakpay), Museum of Secondary School No. 17 (Baikonyr).

3.1. Route 1: Zhezkazgan city -mausoleum of Zhoshy Khan – Dombauyl - mausoleum of Alasha Khan - Baskamyr settlement - Ulytau village

The mausoleum of Zhoshy Khan was mentioned firstly in the notes of Hafiz Tanysh (16th century). An archaeological expedition led by A. Margulan discovered two burials in the mausoleum in 1946. According to the assumption of scientists, one of them belongs to Zhoshy Khan, the other to his eldest wife Bektumysh. Mausoleum of the Hunnic period Dombauyl (5 km). One of the largest stone structures in Kazakhstan, built in the pre-Islamic period (8th – 9th centuries). The mausoleum is a tall cone-shaped structure on a base which looks like a square. The Mausoleum of Alasha Khan (15 km), erected in the first half of the 13th century, built from baked square bricks, and has a portal-dome structure. According to popular legend, Alasha Khan was a fair, brave, and courageous leader of the Kazakh tribes. The mausoleum of Duzen Sandybayuly was built in the mid of 19th century (1863 – 1866) by the Kazakh master Seraly Elamanuly, ordered by major feudal lord Erdyn over the grave of his brother Zhuzden. It is a poor copy of the Alasha Khan mausoleum. The mausoleum was constructed from baked bricks on clay-adobe mortar. According to the stories, sheep's milk was added to bricks to make them stronger in the process of constructing. This mausoleum has a cubic structure with a hemispherical dome (Figure 5).

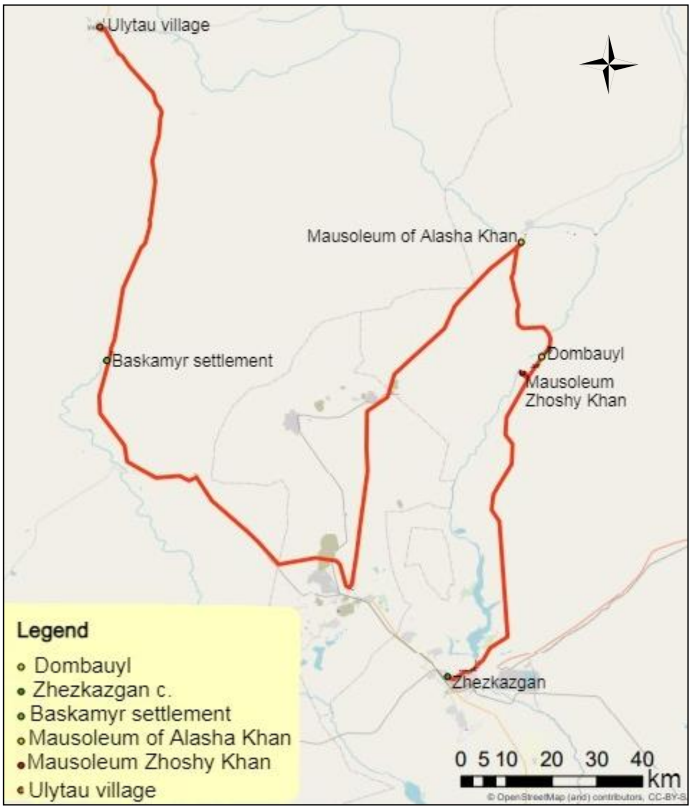

Figure 5. Route 1 (Source: The figure was constructed by authors based on the ARGIS program, 2023)

3.2. Route 2: Ulytau village - Aulie tau mountain - Khan Ordasy – Altynshoky - peak Edyge - Toktamys.Khan

Aulietau is a high peak located 2 kilometers west of Ulytau village. The height of this peak is 1133 meters above sea level. It may take from 1 to 3 hours to reach the top and descend. According to legend, Aulietau has spiritual significance, and the heaven and earth meet each other at this peak. Khan Ordasy is a reconstruction of camp from the Golden Horde, which was designed and created to reflect the atmosphere and architectural style of that time. Khan Ordasy is a group of buildings, including tents, yurts, and wooden buildings, made in the traditional style, which allows visitors to immerse themselves in the spirit of historical period. Khan Ordasy also hosts various demonstrations and performances to showcase the old occupations, crafts, and traditions of the Golden Horde. This place attracts both domestic and foreign tourists who are interested in the history, architecture, and culture of this time. The mountainous upland of Altyn-shoky has historic and natural significance and attracts the attention of tourists and researchers. It is known that Tamerlane (Amir Timur) ordered the erection of a monument at the top of the hill during his military expedition. According to historical data, about 200 thousand soldiers were involved in this task, each of whom brought one stone to the top of the mountain (Bakytova & Medeuova, 2023). The words of Tamerlane were immortalized on one of these stones: *“I am, Amir Timur, have arrived on the sacred land of Ulytau and am heading with my army on a great campaign against Tokhtamysh.”*

It is worth nothing to mention, that original stone is in the collection of the Hermitage in St. Petersburg (Figure 6). Edyge Peak, located near the village of Ulytau (35 km), is a geographical feature with the highest point of the Ulytau mountain range in Kazakhstan. At the top of this peak is the burial place of Tokhtamysh, the famous khan of the Golden Horde. According to history, the mountain was named after Edyge after his death.

Figure 6. The inscription of Tamerlane (Source: The authors)

Edyge was a contemporary of Tokhtamysh, who ruled the Golden Horde from 1380 to 1395. They became the founders of the horde, named Nogai Horde, which dominated the territory from the Volga to the Ural. The name of Edyge became a symbol of the founder of Nogai Horde in Kazakh, Karakalpak and Bashkirian folk tales and legends. In the “years of unrest” between 1410 and 1412, Edyge lost his power in the Golden Horde, and in 1419 he was killed by the son of Tokhtamysh, Kadyrberdy. His body was buried in the Ulytau Mountains, and there was installed a special tombstone. It has become a tradition to call these place as “Edyge Mountain” and “Edyge Tomb.” Legends describe his courage, intelligence, and wisdom. He was a respected hero and orator, who was always concerned about the welfare of his people and defended his homeland from enemies. The route is given in Figure 7. Toktamys was the famous khan of the Golden Horde, who reigned from 1379 to 1395. He belonged to the Zhoshy dynasty, one of the great branches of the Mongol Empire.

Figure 7. Route 2 (Source: The figure was constructed by authors based on the ARGIS program)

Toktamys went through a long path of political ascension, was a powerful military leader and politician. He was known for his wisdom and organizational skills. Under his leadership, the Golden Horde regained its power and stability after previous conflicts and internal strife. The historical personality of Toktamys Khan can have a significant impact on the development of tourism in Ulytau, as it provides an opportunity for in-depth study of the history, culture and heritage of the Golden Horde and offers a huge amount of tourism opportunities (Zhanaidarov, 2008).

3.3. Route 3: Ulytau village - Zhezdy village - Karsakpay village - Baikonyr village (Battle of Bulanty)

Baikonyr village is known because of coal deposits discovery in Baikonyr tract, which gave the possibility to launch coal mining from the beginning of the 20th century. Karsakpay village is famous for its rich ore deposits, additionally coal mining and metallurgical industry are developed in this place. Zhezdy village is famous for its deposits of manganese ores. It is an important center for their extraction and processing. The development of mining and metallurgical industries connected Zhezkazgan city and three villages - Baikonyr, Karsakpay and Zhezdy, also turned them into centers for the extraction of coal, manganese, and other valuable minerals. The quality of the ores is exceptionally high, which attracts interest from investors and ensures the economic development of the region. This direction can be attractive to some types of tourism development, such as mountain, industrial and historical. The historical significance of this area is associated with the Battle of Bulanty. The battle took place in 1728 in the interfluve of the Bulanty (Baikonur) and Bileuti

(Kalmakkyrgan) rivers. The Kazakhs attacked the Dzungars there. In honor of this battle, Bileuty River was renamed as Kalmakkyrgan, which means "Place of Kalmyks death." The route is given in Figure 8.

Figure 8. Route 3 (Source: The figure was constructed by authors based on the ARGIS program)

3.4. Route 4: Zhezkazgan city - Terekti Aulie, Zhezkazgan city - Bolgan ana, Kulan ana

Route 4 can be interesting for tourists too (Figure 9). Terekti-Aulie is an archaeological complex located 90 km northeast from Zhezkazgan city. The complex consists of petroglyphs, various artifacts, and attractions. Petroglyphs found in Terekti-Aulie are stone images that were carved or scratched into the surface of rocks (Figure 10). One of the main themes there is horse image, but there are also images of other animals such as bulls, goats, deer, snakes and cats of prey, chariots. In addition, there are symbolic marks, holes, cup-shaped recesses, and geometric shapes that are part of this rich cultural heritage.

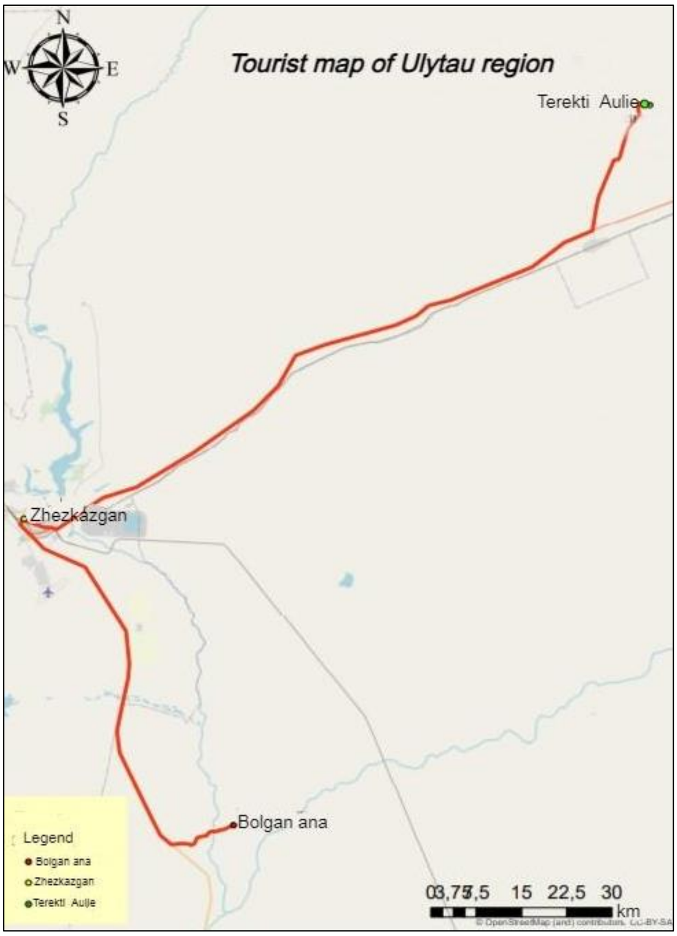

Figure 9. Route 4 (Source: The figure was constructed by authors based on the ARGIS program)

Figure 10. Terekti-Aulie Petroglyphs (Source: The authors)

Beautiful natural views and springs make Terekti-Aulie more attractive to tourists and explorers. This archaeological complex contributes to the preservation and popularization of the cultural and historical heritage of Kazakhstan, and stimulates interest in the study of ancient cultures and art. Cultural and historical sites Bolgan Ana and Kulan Ana are located on the southeast of Zhezkazgan city. Historical facts indicate that Bolgan Ana was the second wife of Genghis Khan during his early manhood and youth. She was considered as one of the most influential women in the life of Genghis Khan and provided him with great support during his political and military activities (Kadirbayeva et al., 2015).

In addition, Kulan Ana, as stated, was the daughter of Kasar, son of Genghis Khan. She played a vital role in the life of Genghis Khan and was his advisor. These women were members of the great empire, created by Genghis Khan, and made important contributions to the development of that empire.

Their family ties to the great leader gave them importance and status, and their presence in his life helped strengthen Genghis Khan's power and maintain his leadership. Some historical sources and legends gave information about them, and their role and influence are turning to subject of debates and discussions.

CONCLUSION

The results of the study show that it is necessary to use the following mechanisms for the successful development of tourist routes in natural parks:

1. Research and analysis: Conducting a comprehensive regional study to identify its tourism potential and unique features. It includes analysis of the region’s historical, cultural, natural, and gastronomic heritage, attractions, events, and other tourism resources. Systematic collection of data on the provided tourist routes can be one of the key tools for determining their effectiveness. It consists of visitor counts, tourist surveys, analysis of hotel and other accommodation data, statistical information from government agencies. This data will help determine the popularity of the route, the seasonality of visits, tourists’ preferences, and their level of satisfaction.
2. Planning and coordination: Development of a strategic plan for regional tourism development, which includes identifying priority areas, goals, and objectives. Cooperation with government agencies, local authorities, tourism operators and other stakeholders are crucial. Coordinating all participants’ efforts helps to provide effective implementation of plans, and achievement of main goals.
3. Infrastructure development: Creation and support of necessary tourism infrastructure, such as hotels, restaurants, transport routes, information centers and other facilities that provide comfort and convenience for tourists. Infrastructure development includes the creation and maintenance of tourist routes with sufficient level of facilities and services to provide an interesting and rich tourist experience.
4. Marketing and promotion: Development of effective marketing strategies and tools to attract tourists, including creation of attractive tourism brands, promotion through various communication channels, organizing events and advertising campaigns. Marketing and promotion should be aimed at attracting the target audience and increasing awareness of the region's tourism opportunities.
5. Education and training of specialists in tourism is important for effective development and management of tourism routes in the region. Training may include educational programs, seminars, and experience exchange to improve competence and professionalism of personnel.
6. Monitoring and assessment: Regular monitoring of tourism activities and evaluation of tourist routes effectiveness. It allows to identify problems and opportunities, correct plans, as well as measure the results achieved and analyze the effectiveness of activities.
7. Tax revenue: Developed tourism routes should lead to increased revenue for the region through increased visitor numbers and spending. Assessment of tax revenues from tourism activities helps to determine the impact of developed routes on the regional economy and their effectiveness. The development of tourist routes is a complex process that requires the interaction of various mechanisms and resources. This includes research and analysis, planning and coordination, infrastructure development, marketing and promotion, training, monitoring, and assessment. Only using these mechanisms together will make it possible to effectively develop and manage tourist routes in the region. Rational planning, collaboration, infrastructure and attracting tourists and investment can help to preserve cultural and natural heritage in protected areas, as well as contribute to economic growth and well-being of residents.

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THE ROLE OF TERRITORIAL IDENTITY IN THE SUSTAINABILITY OF TOURISM IN HUNGARY

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Abstract: There is evidence of a strong link and close interaction between territorial identity, whether at the local level or defining a larger territorial unit, and tourism, and several aspects of this have been discussed in the literature. The National Tourism Strategy 2030 in Hungary, among its strategic objectives, pays special attention to the creation and strengthening of national identity and attachment, stating that strengthening domestic tourism contributes to the domestic population's knowledge of Hungary's values and heritage and to the experience of its national identity. Identity is an important pillar of social sustainability, but it also has a role to play in the marketing of destinations and can be investigated from the tourist's point of view as well. The aim of this research is to examine the relationship between tourism and territorial identity from different angles and to confirm the potential for synergies between the two. The novelty of the paper is that it examines territorial identity in the context of sustainable tourism development. The research analyses territorial identity in the context of social sustainability in the designation of new tourism areas and, in parallel, their contribution to sustainable development goals. By analysing and summarising the identity-forming elements of destinations, the relationship between identity, tourism, and social sustainability will be defined. The relationship between tourism and territorial identity is well-documented, with organisations responsible for marketing and branding in the sector utilising this relationship to a great extent. The relationship is employed as a distinctive, unique feature, as part of the development of a regional image and along the lines of cultural identity. The result indicates the starting position of territorial identity, identified as a key indicator of tourism competitiveness, which is changeable and constantly evolving along the dimensions of strategic and functional identity, independently of tourism. The added value of this analysis could be to show which aspects of destinations need to be developed and which areas need to be strengthened in relevance of territorial identity. The enhancement of territorial identity has been demonstrated to exert a favourable influence on tourism demand, whilst concomitantly contributing to the enhancement of the quality of life experienced by the local population. This is achieved by establishing and adhering to the fundamental principles of sustainable and responsible tourism, which is in harmony with the local community.

Keywords: social sustainability, sustainable tourism, territorial identity, tourism, destination

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INTRODUCTION

For the future of tourism, it is important to get to know the role of sustainability and the effects of implementing the concept of sustainability (Butler, 1980; Weaver, 2006; Dávid et al., 2012). At the same time, it is also necessary to study and get to know the role of social sustainability and the effects of activities towards it (Paskova & Zelenka, 2019). One of the elements of social sustainability is territorial identity, which also plays an important role in tourism.

There is evidence of a strong link and close interaction between territorial identity - whether its at a local level or is defining a larger territorial unit - and tourism, and several aspects of this are discussed in the literature. For example, the National Tourism Development Strategy 2030 (NTS2030, 2017) of Hungary, among its strategic objectives, pays special attention to the creation and strengthening of (national) identity and attachment, stating that strengthening domestic tourism contributes to the domestic population's knowledge of Hungary's values and heritage and helps them to experience and live their national identity. Identity is also a fundamental pillar of regional marketing (Spiegler, 2009) and can be examined from the perspective of the consumer, the tourist.

It is widely accepted that the representation of territorial identity is essential in regional and local development strategies and programmes, especially in rural areas (Roca & Mourão, 2004).

The aim of this paper is to present the relationship between tourism and territorial identity from different perspectives and to demonstrate the potential of synergies between the two, with the relevant literature as an essential basis (and secondary source of information). The novelty of the paper is that it examines territorial identity in the context of sustainable tourism development. The research analyses territorial identity in the context of social sustainability in the designation of new tourism areas and, in parallel, their contribution to sustainable development goals. The study examines the correlations through Hungarian research, but the results can also be interpreted in an international context. The research seeks to answer the question of the role of territorial identity in social sustainability and whether its existence influences competitiveness. The answers to these questions and the conclusions can also be interpreted internationally.

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LITERATURE REVIEW

In the literature review section, we examine sustainability in tourism and the definition of territorial identity. Then, linking the two phenomena, we examine how and where the international literature uses territorial identity in the sustainable development of tourism.

1. Sustainable tourism

The concept of sustainable development was first introduced in the second half of the 20th century. The literature focuses on the relationship between the three pillars of sustainable development (environment, society, economy), which can only be effective if they are analysed together (Happ, 2014). Since the emergence of the concept of sustainability in tourism, the phenomenon has been addressed in a variety of ways in both literature (Harris et al., 2012) and practice (Hughes et al., 2015). Sustainable tourism "refers to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability" (UNEP & UNWTO, 2005). Tourism is in a special position in contributing to sustainable development, as it plays a significant role in moving towards sustainability in all three pillars.

However, sustainable tourism must be seen as an approach. It must be clear that the term 'sustainable tourism', which means 'tourism based on the principles of sustainable development', refers to a fundamental objective: making tourism as a whole more sustainable. The term should be used to describe a state of tourism, not a type of tourism.

2. Definition of territorial identity

There are several typologies in the terminology of territorial identity, which define the concept according to different criteria depending on the discipline, mainly along the lines of territorial attachment (Table 1).

Table 1. Conceptual approaches to territorial identity (Source: Own editing)

Social psychological approach	Territorial identity is based on the socio-cultural space, which is based on a "collective feeling"; the similarity and solidarity between group members.	Risse (2002), Roca & Mourão (2004), Capello 2018)
Geographical approach	Territorial identity is based on a relational space, i.e. a set of functional and hierarchical relationships in a geographical space.	Camagni (1980), Dematteis (1994), Caldo (1996), Pollice (2003)
Political approach	The consequence of the territories created by political interventions, the effect of the institutionalisation of the region.	Bourdieu (1985), Ipsen (1993), Paasi (2003), Raagmaa (2002)

Key words are associated with this theme, which, whether they are used to describe spatial division from a tourism perspective or to brand a destination, are also part of the basic 'value set' in tourism.

The specificity of territorial identity lies in the link between territorial units and the territorial elements of social identity (Bugovics, 2010). In most cases, the starting point for defining it is by the smallest unit, the municipality, which is one of the most defining factors of the concept (Bugovics, 2007; Pénzes et al., 2014). Territorial identity is inseparable from the criteria of territorial delimitation process. There are different stages of its development (self-awareness, identification, desire to belong), but, whatever the reason for the division of territorial units, identity is part of the delimitation of territorial units (Somlyódiné, 2007). According to Jablonczay (2013), the steps of spatial division are the following (Figure 1):

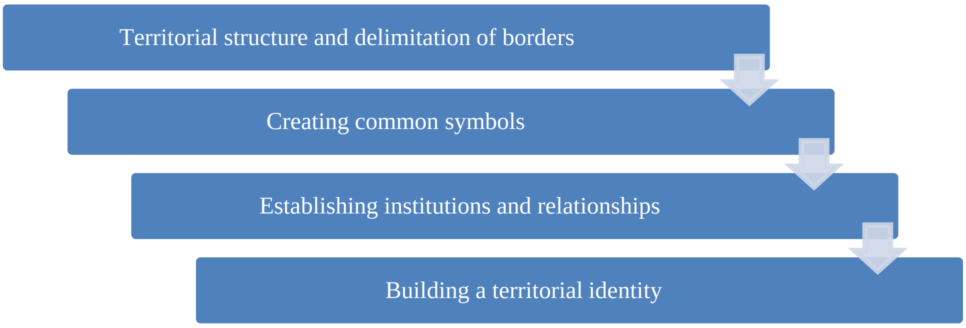

Figure 1. Steps of spatial division (Source: own editing based on Jablonczay, 2013)

According to Somlyódiné's (2007) essay on the interpretation of regional identity, self-identity has two basic forms: attachment to a particular territorial unit ("homeland") and a region-specific (i.e. area-specific) expression of consciousness, the latter including aspects of territorial development. Jablonczay (2013) follows a similar line of thought. In their view, each territory will have an identity of its own if belonging (i.e. collective identity) is created along the following dimensions:

- cultural identity (shaper of a shared consciousness);
- strategic identity (the shared goals associated with the territory);
- functional identity (socio-economic links).

Many researchers, however, question the existence of territorial identity in territorial units where delimitation is the result of a top-to-down (state-led) process (Palkó, 2011), as society is not necessarily able to identify with artificially drawn boundaries. In their opinion, territorial identity is most often formed in places where the creation of a territorial unit is the result of a decentralisation process.

The importance of territorial identity is unquestionable, because it is one of the most important factors that builds the territorial brand and influences the image that is formed (Urbánné, 2020). However, as regards to the identity-forming effect of image, it can be said that it involves 'only the image inherent in the relevant space', i.e. the first impression of a given space does not lead to identity formation (Bugovics, 2010). The next related concept to be identified - and a fundamental factor used in tourism - is competitiveness, of which the image of the area is an integral part, and which is significantly influenced by the territorial identity of its inhabitants (Murphy, 2022). A synthesis of the above-mentioned ideas can be seen in Anholt's (2007) model of competitive identity, which defines its dimensions along six criteria - a hexagon (Figure 2).

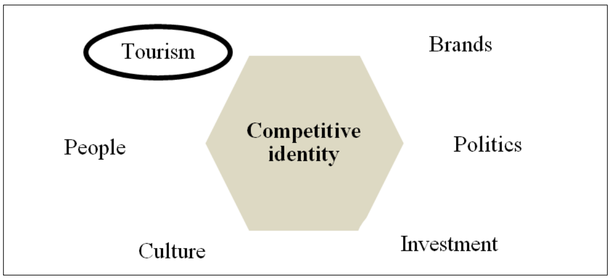

Figure 2. Anholt's model of competitive identity (Source: Murphy, 2022; based on Anholt, 2007:26; own editing)

The six dimensions are as follows:

1. Tourism promotion and visitor experience (word of mouth)
2. Brand that conveys the values and traditions of the place
3. Policy decisions and their influence on local activities
4. The ability of the place to attract capital (investment promotion activities)
5. Cultural activity, export of local heritage
6. Residents' behaviour, hospitality

The theory suggests that in order to create the desired positive image, decision-makers need to address and coordinate each points of the hexagon.

3. Territorial identity and sustainable tourism

The relationship between tourism and territorial identity is complex and there are many pieces of literature on the subject. Authors of works of academic interest (Spiegler, 2009; Piskóti et al., 2015; Titisari, 2021) approach the topic from two main perspectives:

1. Territorial identity as a tourism branding element
2. Tourism as a factor of territorial identity

Based on our research, these can be complemented by social sustainability and two additional aspects at the same time, namely

3. Tourism as an element of social sustainability
4. Territorial identity as a component of social sustainability

A novelty of our research is the addition of new elements to the relationship between territorial identity, tourism and social sustainability, which is illustrated in the figure below (Figure 3).

Figure 3. Model of the relationship between sustainable tourism and territorial identity (Source: own editing)

3.1. Territorial identity as a branding element

According to the European and UN Tourism's definition of destination branding, the brand is the competitive identity of the product itself (ETC-UNWTO 2009). Sulyok (2014) added to the definition that globalisation and as a result, the increasingly competitive environment are making territorial identity even more valuable. From a certain perspective, territorial identity in tourism can also be seen as an artificial factor, as decision-makers consciously and often artificially create distinctive features in order to market it, so that image and identity are not only the goal but also the starting point of territorial branding (Spiegler, 2009). This view is reinforced by the claim that the creation of a tourism image generates new identities and cultures, some of which are exploited as the basis for products and services in the sector (Csurgó et al., 2022). One of the risks of the latter is the homogenisation of supply as a result of globalisation, which can lead to the homogenisation of territorial identity as well (Michalkó, 2002).

Identity can also be interpreted from the perspective of the consumer, i.e. the tourist, although it cannot be seen as an identity-forming effect of image (Bugovics, 2010). It cannot, however, be separated from branding, which is closely linked to identity. Travel is, among other things, a way of self-expression and a search for experiences. One of the basic motivations for travel is the search for authenticity (Koncz, 2018), during which tourists identify with traditional values, also a form of identity search (Tóthné, 2005). The Bauer-Kolos author pair, synthesising these two ideas, conclude that identity can be recognised in two forms in the process of territorial branding:

- On the one hand, it represents territorial identity and the possibility of distinctiveness,
- On the other hand, it represents the ability and attitude of target groups to identify with the area.

The positioning of destinations is therefore an essential element of territorial identity, and the conscious construction of it in practice is equal to branding. In other words, identity building becomes branding and then brand image (Bauer & Kolos, 2016).

3.2. Tourism, as a factor in strengthening of territorial identity

The organisation of tourism routinely constructs destination identity at different spatial scales (Dredge & Jenkins, 2003). In addition to sectoral objectives, the Hungarian National Tourism Development Strategy 2030 also identifies national strategic objectives, among which the creation of 'identity and attachment' is a priority. The document sees education and training as the key to this, from primary education, through secondary education, to the specialisation of higher education (in tourism). This will result in the creation and strengthening of national and regional identity, contributing to the travel choices of children who become tourists in adulthood. It also contributes to the choice of careers and professions by young adults, which otherwise is becoming an increasing problem in the sector (NTS2030, 2017).

In the context of tourist destinations, the branding process is where the territorial identity intervenes in order to capture the essence and provide the motivation for a visit (Răcăşan & Egresi, 2019). Highlighting the specificities of a region through tourism branding can not only attract potential tourists, but also create opportunities for local communities to rediscover their regional identity and encourage investment, which in turn contributes to increasing the performance of the (local) economy and improving the quality of life of local people.

3.3. Tourism as an element of social sustainability

Of the Sustainable Development Goals (SDGs), the most directly linked to tourism are 8 and 12 (https://www.globalgoals.org/). The focus within SDG 8 titled Decent Work and Economic Growth is SDG 8.9, which focuses on developing and implementing policies to promote sustainable tourism that creates jobs and promotes local culture and products by 2030. Within the Responsible Consumption and Production Sustainable Development Goal (12) the main focus is on the development and implementation of tools that monitor the impact of sustainable progress to reach sustainable tourism that creates jobs and promotes local culture and products (12B) (Kassai, 2016; Kőmíves & Vehrer, 2024). Martínez et al. (2020) and his co-authors examined the need to consider social sustainability in relation to tourism development and local support as factors. Social sustainability is a useful concept for addressing tourism development issues (Helgadóttir et al., 2019).

3.4. Territorial identity as part of social sustainability

Territorial identity can provide a basis for tourism development plans to help social sustainability. Today, tourism promotes the rediscovery of values such as the preservation of tangible and intangible cultural heritages, which can be achieved through different cultural and social factors (identity, traditions, memories, attachments, local specificities) (Ivona, 2021). Thus, territorial identity can become part of social sustainability (Roca & Mourão, 2004).

The promotion of specific types of territorial attractiveness may prove to be a crucial element in the context of sustainable development planning, programming and project formulation, particularly in rural areas that are currently facing challenges in establishing viable economic activities and social innovation in terms of globally competitive identity features (Roca & Oliveira-Roca, 2007).

METHODS

Nowadays, the tourism industry, while mitigating the negative effects of the pandemic and the economic crisis that followed, is mostly interested in the renewed demarcation of tourism territorial units and the investments in tourism that have been made/are being made with domestic funding. In 2016, tourism in Hungary was given a completely new role: the main task of the state-level tourism management, i.e. the Hungarian Tourism Agency (MTÜ), in addition to its marketing-type activities, is to implement the strategic objectives of the new territorial approach, based on the National Tourism Development Strategy 2030 (NTS2030, 2017), adopted by the Government of Hungary in the Government Decision 1747/2017 (X. 18.) and its updated version, Tourism 2.0. The first step in the implementation of this new approach was the delimitation of tourism areas covering smaller geographical areas, by abolishing the former classification of tourism regions, which has resulted in the current legislation designating 11 tourism areas.

This research investigates the existence and the possibilities for the development of territorial identity in tourism areas in Hungary. It is important to emphasise that the aim of the analysis is not to criticise the delimitation, but to objectively examine the existence of territorial identity as a factor of competitiveness (Figure 4).

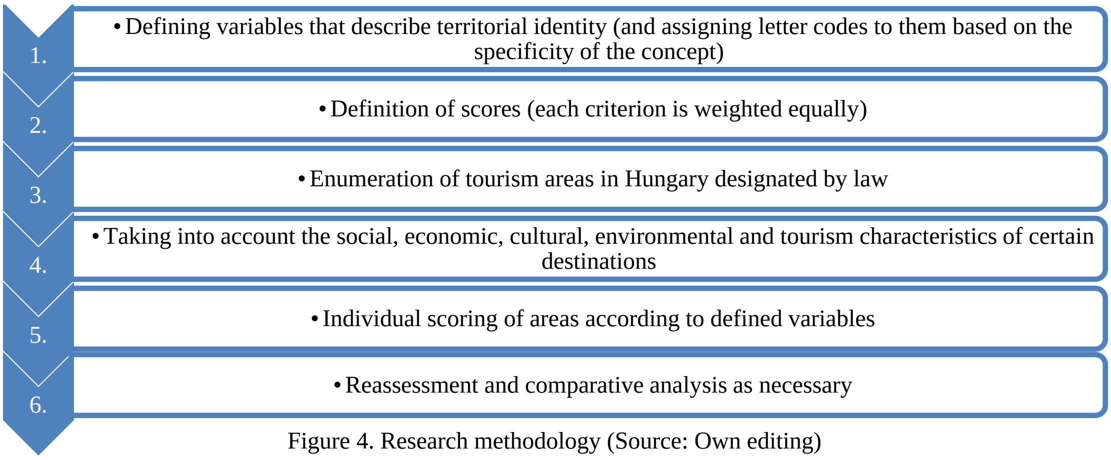

Figure 4. Research methodology (Source: Own editing)

In order to ensure an objective assessment, it was necessary to review the primary assessment after the individual assessment of each region, as the verifiable existence of a criterion is not necessarily true for the whole of each delimited region. The analysis will take into account characteristics of territorial identity factors, which existence can be objectively established and identified at regional level. In the matrix describing territorial identity, these characteristics are indicated by letters as follows:

- Tourism - existing tourism and tourism promotion activities at regional level (A)
- Prosperity of the area in other aspects (B)
- Cultural activity, export of local heritage (C)
- Organisation of local society (D)
- Existence of other identities (E)
- Prominence of the area (F)

The basic criterion for the research was that there should be no overlap between the destination characteristics of each identity element under evaluation, i.e., the identified characteristics should be attributable to a single aspect only. The evaluation was based on the information available on each area, based on descriptive studies and databases. This included the general characteristics of the areas (location, population, economic development, main industries, etc.) as well as their existing image and social organisation based on their geographical, historical, and cultural heritage.

RESULTS

Each of the six factors provides a score for a given tourist area, which can be used to determine the extent to which the foundations of territorial identity are present in the regions at the start of branding and positioning activities, i.e. the position from which destinations start from (Table 2).

Table 2. Characteristics describing the territorial identity of tourist areas (Source: own editing)

Tourist areas	**A**	**B**	**C**	**D**	**E**	**F**	**Points**
Balaton	1	1	1	1	-	1	**5**
Sopron-Fertő	1	-	1	-	-	-	**2**
Bük-Sárvár	1	-	1	-	-	-	**2**
Tokaj and Nyíregyháza	1	-	1	1	-	-	**3**
Mátra-Bükk	1	-	1	-	-	-	**2**
Gyula and its surroundings	1	-	1	1	-	-	**3**
Győr-Pannonhalma	1	1	1	-	-	-	**3**
Szeged and its surroundings	1	1	1	-	-	-	**3**
Pécs-Villány	1	-	1	-	-	-	**2**
Debrecen and its surroundings	1	1	1	-	1	-	**4**
Budapest and its surroundings	1	1	1	-	-	-	**3**

In terms of evaluation, it should be noted that a score was only given for a criterion if it is valid for the whole region and/or if the criterion can be used to identify the destination as a whole. In this way, a factor specific to a single municipality in the region was not assessed.

A. Tourism - existing tourism and tourism promotion activities at regional level: Given that the basic criterion for defining a territory for tourism purposes is existing tourism demand, the existence of tourism as a stable element of the Anholt model is not in doubt for each region, and therefore all the identified tourist areas were scored for this criterion.

B. Prosperity of the area in other aspects: For this criterion, areas, which were prosperous beyond tourism were examined, with emphasis on the regional level, including the economic development of the areas, the competitiveness of other sectors and successful other activities that have an impact on the life of the destination as a whole. Based on the criteria described, other prosperity aspects in 5 of the 11 destinations was assessed. The Balaton destination can clearly be classified as a prosperous area, especially in the Balaton Highlands. This includes the general social well-being of the population, the growing real estate market and the high quality of gastronomy - although it should be noted that none of these activities can be clearly separated from tourism in this region. Győr-Pannonhalma's heavy industry, especially its automotive industry, makes it a prosperous region, which places it among the most developed destinations in rural Hungary. Szeged and its surroundings were assessed on the basis of the food industry, which is not only an economic factor but also a factor of identity (e.g. Pick salami, Szeged paprika, Makó onions). The prosperity of Debrecen and its surroundings and Budapest and its surroundings can also be identified: while the former is the most dynamically developing area of rural Hungary, the latter is a favourite location for global companies (e.g. Suzuki, Samsung) due to its proximity to the capital. In the other areas, the criterion cannot be interpreted at the level of the destination as a whole; the scope of the development of a settlement is not regional.

C. Cultural activity, export of local heritage:As with the first criterion, the export of cultural activity and local heritage is not an issue for any tourist area, since the existence of this criterion is an essential factor in the marketing potential of tourism. It is not just a matter of culture in the narrow sense; the 'spa culture' of Bük-Sárvár, for example, or the agricultural activity of the historic wine regions, are also included here.

D. Organisation of local society: This criterion includes both tourism-type and other forms of organisation - the latter is having a direct or indirect impact on tourism.Balaton, Tokaj and Nyíregyháza, and Gyula and its surroundings got points in this aspect, as these are the places where we can speak of regional organisation independent of financial support (e.g. Balaton Development Council, Tokaj Wine Region Council) or where the local tourism organisation is independent of grant type support and is beyond the local scope (e.g. Nyíregyháza). Gyula and its surroundings is in some ways the exception, as the destination consists of only two municipalities (Gyula and Békéscsaba), but the spa town in the South Great Plain is one of the few municipalities where tourism is growing dynamically thanks to its conscious organisation and where the motivation to travel to the destination is expected to continue to be directed towards a single municipality.

E. Existence of other identities: Finally, the existence of other identities was the least valued of the selected criteria, as the regions are often areas that cut across counties and/or areas, with a rather heterogeneous composition. Although this criterion seemed to be applicable to any region during the first evaluation attempt, the results of the objective analysis show that it is difficult to apply validity at the level of the destination. Landscape, ethnic or religious identity almost nowhere to be found at the regional level. Among the destinations, the other sense of identity is only true for Debrecen and its region, where the mention of "Puszta" (and not intentionally the Great Plain) is associated with and linked to the area.

F. Prominence of the area: As with the previous criterion, there are settlements in almost any region that could bring scores for each destination, but the spatial scope described in the methodology requires a more rigorous assessment. Therefore, for this criterion, only those destinations that really contribute to the identification of the area could be highlighted. This criterion is met only by Lake Balaton, which has events that cannot be linked to any other area (e.g. the Blue Ribbon sailing race, the Balaton Crossing, or the Balaton Sound).

DISCUSSION

Summarising the evaluations, the results for the delimited areas are rather mixed. Unsurprisingly, the highest score was achieved by Lake Balaton, which, irrespective of the identity analysis, can be clearly stated to be a tourist area with a competitive identity already. Debrecen and its surroundings scored four points, as it is a prosperous region with an existing tourism demand and cultural heritage, where the added value of a competitive identity is the existence of other specifications with which the destination can be recognisedr. In terms of competitive territorial identity, five destinations can be characterised as having a medium "score": Tokaj and Nyíregyháza, Gyula and its surroundings, Győr-Pannonhalma, Szeged and its surroundings, and the area around Budapest. These delimited areas have a prosperous economy (Győr-Pannonhalma, Szeged and its surroundings, Budapest region) or an outstanding local organisation (Tokaj and Nyíregyháza, Gyula and its surroundings), in addition to the two basic dimensions (tourism and culture). At the lowest level, two points were given to regions which can only be assessed on the level of basic aspects of tourism, while other factors necessary for a competitive territorial identity are not (yet) present in the portfolio of the regions. These territorial units are Sopron-Fertő, Bük-Sárvár, Mátra-Bükk and Pécs-Villány. In view of the aforementioned points, it should be noted that the result signifies the initial stage of territorial identity, identified as a basic indicator of tourism competitiveness, which is variable and constantly changing along the dimensions of strategic and functional identity, independently of tourism.

The added value of this analysis could be to show which aspects of the destinations need to be developed and which areas need to be strengthened in terms of relevance to territorial identity.

CONCLUSION

Among the dimensions defined for the analysis, "tourism and promotion at regional level" (A) and "export of local heritage" (C) were the main considerations for decision-makers in the territorial delimitation. However, the development and evolution of the other dimensions should become a common strategic objective as well, which will have a positive impact not only on territorial identity, but also on the quality of life of the local society as a whole. A further research direction could be a detailed analysis of these dimensions with a view to their development. Tourism and territorial identity has an unquestionable and direct relationship, which is used by organisations responsible for marketing and branding in the sector, mainly as a distinctive, unique feature/property, as part of the development of a regional image and along the lines of cultural identity.

The role of identity is also undeniable in the case of spatial distribution for tourism, although its use is much less conscious. The delimitation can be defined primarily in terms of strategic and functional objectives, with geographical criteria and the common economic objectives linked to the areas playing the most important role among the identity-forming factors. In the case of an area delimitation that is considered to be fresh, the assessment of the identity of the area is an inevitable factor and an integral part of the decision-making, with the condition that if the tourism potential can be demonstrated in terms of other criteria, the creation of areas with a weak territorial identity should not be rejected, since identity is changeable and, by its very nature, constantly evolving.

The aim of those who drew up the new tourism delimitations was to define territorial units that not only comply with the provisions of the Tourism Act but also serve the fundamental objective of tourism, which is to maximise the sector's revenue by improving tourism performance indicators (e.g. number of guests and overnight stays, average length of stay, specific expenditure). Although some elements of territorial identity in tourism are often artificially generated, consciously building them is an essential part of branding. Strengthening territorial identity has a positive impact not only on tourism demand (optimally) but also on the quality of life of local society by creating and respecting the basic conditions for sustainable and responsible tourism that coexists with the local population.

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ENHANCING TOURIST EXPERIENCE: A FUZZY TOPSIS APPROACH TO DESTINATION RECOMMENDATION SYSTEMS

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Abstract: To promote tourism effectively, it is essential to drive flexibility and sustainable growth within the sector. This requires a multi-faceted approach involving various organizations, as well as the development of systems that assist tourists in decision-making. The objective of this research is twofold: (1) to develop a recommendation system based on Fuzzy TOPSIS that integrates data from expert opinions, tourist behavior, and survey feedback, and (2) to design a system that enables tourists to make personalized destination choices through a recommendation process that accommodates diverse user preferences. This research employs a Multi-Criteria Decision Analysis (MCDA) approach using Fuzzy TOPSIS, leveraging survey data collected from 250 respondents, including tourism experts and visitors in Maha Sarakham province. The survey evaluated ten key criteria influencing destination selection, such as accessibility, safety services, and the availability of cafés and coffee shops. Accessibility and safety services emerged as the most critical factors, both receiving the highest scores of 9, while dining options also scored highly with a rating of 7. Conversely, criteria such as shuttle services and proximity to police stations were deemed less significant. According to the Fuzzy TOPSIS analysis ranked Phra That Na Dun, Wat Puttha Wanaram, and the Phra Yuen Mongkhon Buddha Image as the top three attractions, showcasing their strong alignment with tourist preferences. Lower-ranked sites, such as Ban Chiang Hian Museum and Chi Long Forest Park, highlight opportunities for development through infrastructural improvements and enhanced marketing efforts. The system's user satisfaction evaluation demonstrated favorable results, with high ratings for decision-making capability (4.67) and ease of use (4.67), reflecting the system's ability to align recommendations with user preferences effectively. Quantitative evaluations of the system yielded a precision of 85%, recall of 80%, and an F1-score of 82.42%, indicating a balanced performance in delivering accurate and relevant recommendations. Furthermore, the integration of Fuzzy MCDA with user-centered design ensures that the recommendation system remains adaptable to evolving tourist preferences. This framework demonstrates the importance of integrating flexible, user-centered recommendations into tourism to meet evolving visitor needs effectively.

Keywords: Fuzzy TOPSIS, tourism recommendation system, multi-criteria decision analysis, GIS, sustainable tourism, user preferences

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INTRODUCTION

Tourism, a multifaceted industry, significantly contributes to global economies, cultures, and environments. It encompasses a range of activities, including leisure travel, business trips, and cultural explorations, drawing millions of people to various destinations worldwide. Beyond driving economic growth by generating revenue and creating jobs, tourism fosters cultural exchange and understanding (UNWTO, 2020). However, its impact on the environment and local communities necessitates careful planning and management to ensure sustainable development. According to the World Tourism Organization, tourism is a substantial component of non-commodity international trade, ranking as the world's third-largest export category and the top export product for many wealthy countries. It has one of the largest multiplier effects on the economy, adding value to industries like as transportation, trade, services, construction, and building materials production (Chalkiadakis et al., 2023). Moreover, tourism generates substantial socio-economic benefits, including increased employment, income growth, and the development of entrepreneurial culture (Gamidullaeva et al., 2023).

The tourism industry increasingly utilizes technology to enhance service efficiency, improve the tourist experience, and boost customer satisfaction. Innovations such as digital marketing and online booking platforms have made travel more accessible and stress-free while effectively promoting destinations (Xu & Gursoy, 2021; Feng et al., 2022). Among these technologies, Recommender Systems (RS) are pivotal. Recommendation systems utilize statistical and knowledge discovery techniques to recommend things based on user preferences and behaviour. Recently, they were used in the tourism business to recommend destinations to travellers (Forouzandeh et al., 2021). By analyzing user data, RS offer personalized recommendations, enhancing destination competitiveness and fostering deeper interactions between tourists and their surroundings (Hanafiah & Zulkifly, 2019; Solano-Barliza et al., 2023; Isinkaye et al., 2015). In today's digital age, RS are essential tools for recommending destinations, accommodations, and activities based on user preferences, behaviors, and patterns. They address the common reliance on others' experiences and recommendations in unfamiliar or information-rich environments (Solano-Barliza et al., 2024)]. Integrating Geographic Information Systems (GIS) with

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recommender systems adds a spatial dimension, allowing for consideration of geographic and environmental factors. This combination supports a more comprehensive approach to tourism management, promoting lesser-known destinations and helping to distribute tourist traffic more evenly (Alhijawi & Kilani, 2020). GIS techniques were used to create explanatory variable maps GIS techniques were employed to create maps illustrating the influence of various factors in different applications (Sangpradid, 2023; Waiyasusri et al., 2023; Fallah et al., 2023). For example, factors such as the distance from major roads, forest areas, institutional land, and elevation were considered. The data for each factor was converted into raster format, enabling detailed spatial analysis (Aunphoklang et al., 2021). To enhance the decision-making process, Multicriteria Decision Analysis (MCDA) can be integrated with recommender systems. MCDA is a method designed to evaluate complex decisions that involve multiple, often conflicting, criteria (Prasertsri & Sangpradid, 2020). It employs frameworks and methods that combine quantitative, qualitative, and sometimes contradictory information, along with stakeholder input, to support decision-making. MCDA is adaptable to different contexts, as it aligns with specific user goals, scenarios, and alternative management decisions, incorporating a system for evaluating these alternatives (Cegan et al., 2017). GIS techniques play a crucial role in analyzing and visualizing spatially referenced data, while MCDA provides a structured approach for addressing decision problems and assessing various alternatives (Malczewski, 2006).

In the context of tourism, MCDA can help in balancing various factors such as cost, convenience, environmental impact, and personal preferences when generating recommendations. The characteristics of the MCDA process helps analysts implement the process effectively and recommend appropriate methods, enhancing traceable and categorizable development of decision support systems (Cinelli et al., 2020). By combining MCDA with recommender systems, tourism services can better address the complexities of decision-making in tourism planning. For instance, when tourists are choosing a destination, MCDA can weigh factors like cultural interest, safety, cost, and environmental sustainability, ensuring that the recommendations not only match individual preferences but also align with broader tourism development goals. Moreover, when used alongside GIS, this approach can optimize travel routes, identify strategic investment areas, and improve resource allocation, leading to a more sustainable and balanced for ecotourism and tourism industry (Kaymaz et al., 2021). A multi-criteria recommender system offers a deeper understanding of user preferences by factoring in the underlying attributes that influence choices. Therefore, incorporating additional insights into each user’s preferences can improve the accuracy of the recommendations, leading to more personalized and precise suggestions (Zhuang & Kim, 2021).

MCDA, also known as Multi-Criteria Decision-Making (MCDM), has been increasingly applied in tourism to improve decision-making by evaluating and ranking options based on multiple factors. This structured approach supports complex decision-making scenarios, which is especially useful in tourism. Methods such as Fuzzy MCDA and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) are frequently utilized to enhance accuracy and relevance in tourism recommendations. Vatankhah et al. (2023) highlighted that MCDM techniques provide structured solutions to hospitality and tourism (H&T) challenges, helping to minimize decision risks. Their findings reveal a growing trend in applying MCDM, particularly Fuzzy MCDA, within H&T, although certain techniques remain underutilized, with some areas seeing repetitive applications. Kwok & Lau (2019) introduced a Vague Set TOPSIS modification for hotel ranking, addressing limitations in conventional TOPSIS by enhancing users' ability to express nuanced preferences. Similarly, Putra et al. (2022) applied a Best-Worst Method (BWM) combined with TOPSIS to select tour guides in the Guidemu app, achieving high recommendation accuracy and expert alignment. Dawi et al. (2021) demonstrated that TOPSIS can support both personalized and group-based destination recommendations, with strong correlations between system recommendations and user choices. Despite these advances, studies call for further customization options in MCDA-based systems to better accommodate individual preferences. Modified TOPSIS approaches partially address this, though additional improvements are needed to enhance overall user satisfaction.

The National Tourism Development Plan of Thailand, Phase 3 (2023-2027), envisions comprehensive and inclusive tourism development over a five-year period, with the goal of driving resilience and sustainable growth in the tourism sector. The vision outlined in this plan is: “Tourism in Thailand is an industry that prioritizes value, demonstrates adaptability, fosters sustainable growth, and promotes inclusivity.” This strategic plan emphasizes that tourism should contribute meaningfully to the economy and society, while upholding environmental responsibility and fostering community engagement (National Tourism Policy Committee, 2024). Singtuen & Galka (2024) discuss a creative approach to sustainable tourism by integrating cultural, geotourism, and gastronomic elements to enrich the tourist experience, promote local culture, boost community income, and preserve the environment. This aligns with the Sustainable Development Goals (SDGs), fostering cultural exchange and creativity. In the context of environmental sustainability, Choosuk et al. (2024) focus on community-driven marine debris management to tackle waste challenges brought about by tourism and population growth, emphasizing sustainable practices that respect ecological balance and engage the community. Meanwhile, Lee-anant & Rungreaung (2024) provide insights into enhancing service quality in small boutique hotels to attract domestic workcation tourists, supporting the development of a tourism ecosystem that is responsive to changing market demands. The plan underlines the importance of promoting tourism as a means to strengthen the economy, preserve Thailand’s rich cultural heritage, and improve the quality of life for communities, demonstrating that a well-managed tourism industry can be a powerful driver of national progress.

The aim of this study is to develop a spatial tourism recommendation system that utilizes Fuzzy TOPSIS alongside MCDA to improve the accuracy and relevance of tourism recommendations. This study has two primary objectives: (1) to create a recommendation system based on Fuzzy TOPSIS that integrates expert input, tourist behavior data, and survey feedback to produce precise, targeted recommendations, and (2) to design a system that empowers tourists to make personalized destination choices through a recommendation process that accommodates diverse user preferences.

MATERIALS AND METHODS

Study area

Maha Sarakham province plays a key role in the development of cultural tourism, offering immense potential through its rich history, culture, and unique local wisdom. Attractions such as Phra That Na Dun, Ku Santarat, and the Ancient House Museum showcase this heritage. Consequently, developing a tourism recommender system is crucial, as it provides personalized recommendations, enhances tourist experiences, and promotes sustainable development by distributing visitors efficiently. Furthermore, the province, located between latitudes 15.43º to 16.63º N and longitudes 102.72º to 103.54º E, with a population of 963,047, features a low elevation and is bounded by low hills (Sangpradid & Aroonsri, 2023), making it well-suited for geographic and tourism studies. Additionally, Maha Sarakham is home to historical sites with remnants from the Khmer and Dvaravati periods, as well as a rich culinary history of traditional foods originating from these eras (Jecan et al., 2021). Preserving and promoting these assets, particularly through educational integration, could support tourism growth by blending cultural storytelling with local learning. This approach broadens the tourism landscape, appealing to both cultural heritage enthusiasts and visitors interested in the region's historical cuisine and traditions.

METHODOLOGY

This research develops a spatial tourism recommendation system by utilizing MCDA, GIS, and Fuzzy TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution). Fuzzy TOPSIS is employed to effectively manage uncertainties and subjectivities inherent in user preferences, thereby providing a flexible and nuanced decision-making process for generating tourism recommendations. GIS introduces a vital spatial dimension, allowing the system to incorporate location-based criteria, while MCDA ensures a balanced consideration of multiple factors, thereby personalizing recommendations that are both sustainable and aligned with tourism development goals. The research follows a four-step methodology as in Figure 1.

(1) Data Collection: Key data related to tourism, geography, and user preferences are gathered for Maha Sarakham province, which serves as the case study area. This data is structured to fit both the Fuzzy TOPSIS and GIS frameworks, enabling a combination of qualitative and quantitative analysis.

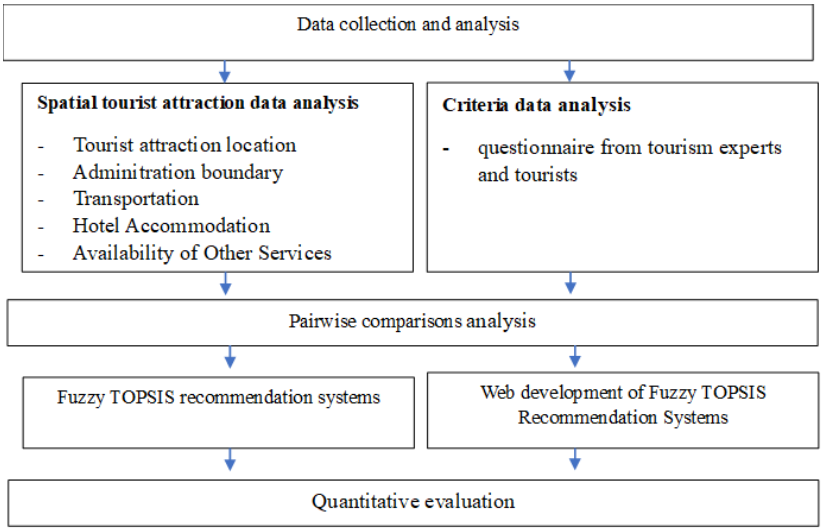

Figure 1. Research framework

(2) Criteria Selection and Fuzzification: In this study, a set of ten decision-making criteria was identified to evaluate and recommend tourism destinations effectively. These criteria are essential for understanding the multifaceted needs of tourists and include: Accessibility to the Site: The ease with which tourists can reach the destination. Availability of Restaurants: The presence of dining options within proximity to the tourist site. Transportation Services: The availability of shuttle services or public transportation for tourists. Accommodation Services: Quality and availability of hotels or lodging near the site. Cafes and Refreshment Places: The presence of coffee shops or cafes in the vicinity. Parking Facilities: Availability of adequate parking for visitors. Safety Services: Access to security services for ensuring tourist safety. Proximity to Hospitals: The closeness of medical facilities for emergencies. Proximity to Police Stations: The presence of local law enforcement to ensure safety. Cost Considerations: The overall cost associated with traveling and visiting the site (including entrance fees). To address the inherent uncertainty in user preferences regarding these criteria, a fuzzification process was implemented. Each criterion was represented using fuzzy logic, allowing qualitative assessments such as "good accessibility" or "reasonable cost" to be quantified. Membership functions were established for each criterion to facilitate a nuanced evaluation that reflects the varying degrees of user satisfaction and preference.

(3) Fuzzy TOPSIS Application: Next, based on how closely the options (activities or locations) resemble the ideal answer, Fuzzy TOPSIS is used to rank them. This approach includes (Prasertsri & Sangpradid, 2020).

- Constructing a decision matrix with the fuzzified data for each criterion.
- Determining the fuzzy positive ideal solution (FPIS) as well as the fuzzy negative ideal solution (FNIS).
- Calculating the separation between FPIS and FNIS for each option.

- The proximity coefficient, which gauges how near each option is to the ideal answer, is used to rank the options.

(4) GIS Integration and Spatial Analysis: GIS tools integrate spatial data with the Fuzzy TOPSIS results. This integration ensures that spatial attributes such as proximity to tourist attractions, accessibility, and environmental impact are considered alongside user preferences. The combination of Fuzzy TOPSIS and GIS yields personalized, location-aware tourism recommendations that promote sustainable tourism by effectively distributing tourists and highlighting lesser-known attractions.

Data Collection and Data Analysis

The data collection process is essential to the success of the Fuzzy TOPSIS and GIS-based tourism recommendation system. The following types of data are gathered from both primary and secondary sources:

(1) Geospatial Data: Geographic information such as elevation, land use, proximity to major roads, and tourist attractions are collected from government databases, satellite imagery, and open-source platforms. These data points are converted into a format compatible with GIS, allowing for detailed spatial analysis.

(2) Tourism Data: The data collection process was designed to gather relevant information related to the ten criteria identified above. The following methods were employed:

Surveys: A survey targeting tourists visiting Maha Sarakham province was conducted. Questions focused on user experiences concerning each of the ten criteria, allowing for a qualitative understanding of tourist preferences.

Site Visits: Direct observations were made at selected tourist sites to assess the availability and quality of services related to the criteria.

Secondary Data Sources: Information regarding accommodations, restaurants, and safety services was collected from local tourism authorities and business directories.

The collected data was then processed and integrated into the Fuzzy TOPSIS framework for further analysis. The data is compiled and processed into a decision matrix for the Fuzzy TOPSIS analysis after it has been collected. The spatial data is integrated into GIS for further analysis and visualization, ensuring the final recommendations are both contextually and geographically relevant. The data analysis gathers opinions from tourism experts and tourists on the criteria used for evaluating tourist sites. The feedback was collected through a survey of 250 respondents and analyzed using the scale of pairwise comparisons method, which involves comparing criteria in pairs to determine the relative importance of each criterion when evaluated against others. Table 1 presents the results of this analysis, showing which criteria are considered more important according to the respondents. The scale of pairwise comparisons technique enables systematic analysis and establishes a ranking of the various criteria, revealing the factors that most influence tourists' choices in selecting destinations.

Table 1. Analysis of criteria for evaluating tourist sites based on expert and tourist opinions using the scale of pairwise comparisons (Source: Prasertsri & Sangpradid, 2020)

Definition	Intensity of importance
Equal Importance	1
Weak or Slight	2
Moderate Importance	3
Moderate Plus	4
Strong Importance	5
Strong Plus	6
Very Strong	7
Very, very Strong	8
Extreme Importance	9

MCDA for Recommendation Systems

Multi-Criteria Decision Analysis (MCDA) encompasses a set of methodologies designed to evaluate complex decision-making scenarios involving multiple, often conflicting criteria. MCDA has been extensively applied in recommendation systems to enhance their capacity to provide tailored suggestions by considering a range of factors and user preferences. Rather than relying on a single criterion (e.g., user ratings), MCDA enables recommendation systems to incorporate various dimensions such as cost, quality, user preferences, and contextual factors, thereby enhancing decision support capabilities. According to the MCDA process greatly influences decision outcomes by focusing on model building and criteria selection, which establish the value concerns for assessing alternative options (Angelis & Kenavos, 2017), thereby improving decision-making in complex environments through structured evaluations of qualitative and quantitative data (Roy, 1996). In the context of recommendation systems, MCDA enables more nuanced recommendations by accounting for the complexities inherent in real-life decisions. For instance, Benítez et al. (2020) employed MCDA techniques in e-commerce recommendation systems to rank products according to multiple criteria such as price, user reviews, and delivery time. Such systems aim to enhance the decision-making process by enabling more sophisticated recommendations aligned with the diverse needs and preferences of users.

Recommendation Systems

Recommendation systems have emerged as efficacious tools to assist users in navigating substantial volumes of information, offering personalized suggestions based on user data. These systems employ a range of methods, such as content-based filtering, hybrid techniques, and collaborative filtering. With the premise that users who have previously shown a preference for a particular thing would do so again in the future, collaborative filtering makes suggestions based on user-item interaction data. Content-based filtering makes recommendations for products that are comparable to those the user has already shown they enjoy based on the features of the item. Hybrid systems combine multiple recommendation techniques to enhance accuracy. Recommendation systems have found application across diverse domains, from e-commerce and entertainment to tourism and healthcare. According to Ricci et al. (2015), recommendation engines examine user behavior, interests, and exchanges to propose goods or services that users are probably to use. In the tourism sector, for instance, recommendation systems analyze user data to propose travel destinations, accommodations, and activities based on user interests, thereby facilitating more personalized and satisfying travel experiences.

Multi-Criteria Recommender Systems

Multi-Criteria Recommender Systems (MCRS) extend the traditional recommendation system framework by incorporating multiple decision criteria into the recommendation process. Traditional recommendation systems typically focus on a single rating value, such as the user's overall satisfaction with a product or service. MCRS, however, consider multiple dimensions such as quality, cost, availability, and user preferences, thereby enabling a more comprehensive evaluation. Adomavicius & Kwon (2011) posit that MCRS offer a more balanced recommendation output by integrating various criteria that influence user decisions. For instance, in a hotel recommendation scenario, an MCRS might consider criteria such as room quality, price, location, and user ratings. This approach results in recommendations that align more closely with the user's diverse preferences.

TOPSIS in Multi-Criteria Recommender Systems

TOPSIS is a widely utilized MCDA method in multi-criteria recommender systems. In order for TOPSIS to function, solutions should display the maximum separation from the negative ideal solution as well as the minimum separation from the ideal solution (Prasertsri & Sangpradid, 2020). This methodology is predicated on the principle that the recommended option should be as proximate as possible to the optimal outcome and as distant as possible from the least favorable scenario. According to Hwang & Yoon (1981), TOPSIS demonstrates efficacy in ranking alternatives within multi-criteria decision-making contexts, rendering it particularly applicable for recommendation systems where multiple attributes, such as cost, quality, and user preferences, must be balanced. Recent studies, applied TOPSIS in tourism recommendation systems to rank destinations based on multiple criteria, including distance, travel time, entrance fees, and cleanliness. It ranks attractions to help users make informed decisions (Ubaidillah & Dwidasmara, 2020; Abbasi-Moud et al., 2021; Forouzandeh et al., 2022). TOPSIS is a MCDM method designed to rank and select options from a set of alternatives. TOPSIS evaluates each alternative by measuring its distance from an ideal solution (best possible outcome) and a negative-ideal solution (worst possible outcome). The alternative closest to the ideal solution and farthest from the negative-ideal solution is considered the best choice. Steps in TOPSIS (Prasertsri & Sangpradid, 2020):

(1) Construct Decision Matrix: List alternatives and criteria with performance scores.
(2) Normalize Matrix: Standardize values to make criteria comparable.
(3) Apply Weights: Multiply each normalized score by the importance weight of its criterion.
(4) Identify Ideal Solutions:
a. Ideal solution: Best values for each criterion.
b. Negative-Ideal solution: Worst values for each criterion.
(5) Calculate Distances: Measure each alternative’s distance to the ideal and negative-ideal solutions.
(6) Calculate Relative Closeness: Compute how close each alternative is to the ideal solution.
(7) Rank Alternatives: Rank based on relative closeness; the higher the score, the better the alternative.

Fuzzy Logic in Multi-Criteria Recommender Systems

Fuzzy logic, introduced by Zadeh (1965), addresses uncertainty and vagueness in decision-making processes, rendering it a valuable tool in multi-criteria recommender systems. This approach extends binary decision-making processes by allowing intermediate values between absolute truth and falsehood. Within the context of recommendation systems, fuzzy logic facilitates the management of ambiguity in user preferences and the imprecise nature of certain criteria. Fuzzy Multi-Criteria Decision Analysis (Fuzzy MCDA) has been employed to generate more accurate and personalized recommendations by capturing the uncertainty inherent in user preferences. Osman et al. (2017) demonstrated the efficacy of, wherein fuzzy logic to search and recommend food based on taste, user preference, and other parameters, providing better results than existing systems. The incorporation of fuzzy logic into Multi-Criteria Recommender Systems (MCRS) enables the provision of more flexible recommendations that more accurately reflect the nuanced nature of user preferences.

Fuzzy TOPSIS in Recommendation Systems

Fuzzy logic is used in fuzzy TOPSIS, a MCDM technique, to address the subjectivity and ambiguity that come with weighing options against a range of criteria. This method is very helpful in complex decision-making circumstances because it uses fuzzy numbers, or linguistic rating variables, to evaluate the options according to each criterion (Prasertsri & Sangpradid, 2020). Fuzzy TOPSIS uses the strengths of both fuzzy logic and TOPSIS to handle ambiguity in MCDM. In this method, fuzzy sets are utilized to represent ambiguous or imprecise user preferences, which are then integrated into the TOPSIS framework to rank options. Fuzzy TOPSIS is a powerful decision-making tool that leverages fuzzy logic to handle uncertainty and imprecision, making it suitable for complex real-world applications. By integrating subjective and objective criteria and employing advanced fuzzy sets, it delivers robust and reliable recommendations across various domains. This method's ability to reduce uncertainty and information loss in group decision-making further enhances its effectiveness, making it a preferred choice for many decision-making scenarios (Mathew et al., 2020; Hatami-Marbini & Kangi, 2017; Rashidi & Cullinane, 2019). Studies such as Forouzandeh et al. (2022) have effectively used fuzzy TOPSIS model effectively recommends the best tourist spots for users, improving their decision-making process in the tourism industry. The inclusion of fuzzy logic into TOPSIS enables a flexible decision-making paradigm, which is especially beneficial in instances where consumer preferences. An outline of the steps in Fuzzy TOPSIS (Prasertsri & Sangpradid, 2020)**:**

1) Define fuzzy decision matrix: identify alternatives and criteria and represent the ratings of each criterion and alternative as fuzzy numbers (triangular fuzzy numbers).
2) Normalize fuzzy decision matrix: Convert all values to a comparable scale, considering the fuzzy nature of each criterion.
3) Apply weights to criteria: Assign a fuzzy weight to each criterion, reflecting its importance.
4) Determine fuzzy ideal solutions: Fuzzy positive-ideal solution (FPIS): The best values for each criterion across alternatives. Fuzzy negative-ideal solution (FNIS): The worst values for each criterion across alternatives.
5) Calculate distances to fuzzy ideal solutions: Compute the distance of each alternative to the FPIS and FNIS, using a distance measure (e.g., Euclidean distance) suitable for fuzzy numbers.
6) Calculate relative closeness coefficient: For each alternative, calculate the relative closeness to the FPIS. This is done by dividing the distance to the FNIS by the sum of distances to both FPIS and FNIS.
7) Rank alternatives: Rank the alternatives based on their relative closeness coefficient. The higher the value, the closer the alternative is to the ideal solution, and thus, the more preferable it is.

Quantitative Evaluation

Quantitative evaluation focuses on measuring outcomes that can be expressed numerically, such as the accuracy and efficiency of the recommendation system. Metrics like Precision, Recall, and F1-Score are commonly used for this purpose (Chompoosri et al., 2024; Arif et al., 2021). The following methods can be employed: Precision: Measures the percentage of recommended tourist destinations that users actually chose to visit. Recall: Measures the percentage of tourist destinations selected by users from those that should have been recommended. F1-Score: Represents the weighted average between Precision and Recall to assess the balance between accurate and comprehensive recommendations.

$$Precision = \frac{TP}{TP+FP}; \quad Recall = \frac{TP}{TP+FN}; \quad \text{F1} - \text{Score} = 2 \times \frac{Precision \times Recall}{Precision + Recall}$$

Where TP represents the number of correctly recommended items, FP represents the number of incorrectly recommended items, and FN represents the number of relevant items that were not recommended by the system according to test users.

RESULTS AND DISCUSSION

Overview of Survey Responses

A total of 250 surveys were collected from tourism experts and tourists visiting Maha Sarakham province. The purpose of the survey was to evaluate ten key criteria influencing the selection of tourist destinations. Respondents assigned importance scores to each criterion using a rating scale from 1 to 9.

Table 2. Summarizes the average scores assigned to each criterion based on the survey results

Criterion	Score
1. Accessibility to the site	9
2. Availability of Cafés and Coffee Shops	7
3. Shuttle Service	1
4. Hotel Accommodation	3
5. Proximity to Cafés and Coffee Shops	7
6. Parking Facilities	5
7. Safety Services	9
8. Proximity to Hospitals	3
9. Proximity to Police Stations	3
10. Cost Considerations (Travel and Entrance Fees)	5

The results from Table 2 indicate that different criteria carry varying levels of importance for tourists when selecting a destination. The scores are based on a rating scale from 1 to 9, where higher numbers indicate greater significance. Highest rated criteria: Accessibility to the site and safety services both received the highest score of 9, emphasizing that ease of travel and security are the most critical factors influencing tourist decisions. Tourists prioritize destinations that are easy to access and ensure their safety. The availability of cafés and coffee shops and proximity to cafés and coffee Shops also scored relatively high, with a score of 7. This suggests that dining options play a significant role in the overall tourist experience and decision-making process. Moderately rated criteria: Parking facilities and cost considerations (Travel and entrance fees) received moderate scores of 5. While these aspects are relevant, they are not as crucial as accessibility, safety, and dining options.

Lowest rated criteria: The shuttle service received the lowest score of 1, indicating that it is the least important criterion for tourists. Tourists appear to place minimal importance on the availability of shuttle services when selecting destinations. Hotel accommodation, proximity to hospitals, and proximity to police stations each scored 3, showing that while these factors are considered, they are not primary concerns for tourists in this study. The results regarding tourist decision-making show significant alignment with recent research. Accessibility and safety, ranked as the highest criteria, confirm the findings of studies like those by Choi et al. (2020), which underscore the increasing importance of these factors in shaping tourist behavior. The high rating for dining options (cafés) supports research by Provenzano & Baggio (2020), highlighting the growing role of gastronomic experiences in destination choices. The lower importance of shuttle services and accommodations echoes a trend towards more individualized travel options, as noted in recent studies on evolving tourist preferences.

Fuzzy TOPSIS Analysis of the Recommendation System

The collected data was processed using the Fuzzy TOPSIS method, ranking the potential tourist destinations based on their alignment with the identified criteria and weights. The following table summarizes the results. From Table 3, which ranks tourist attractions based on the Fuzzy TOPSIS analysis, it is revealed that Phra that Na Dun is the top-ranked tourist attraction in Maha Sarakham, with the highest score of 0.00362, demonstrating strong alignment with key decision criteria such as accessibility and safety. Wat Puttha Wanaram follows closely with a score of 0.00108, reflecting significant tourist interest and a close match to the preferred factors. Mid-ranked attractions like Phra Yuen Mongkhon Buddha Image and Kae Dam Wooden Bridge, scoring 0.00045 and 0.00025 respectively, exhibit moderate appeal, suggesting that they meet some, but not all, important criteria.

Table 3. Rankings of tourist attractions based on Fuzzy TOPSIS analysis

No.	Tourist Attraction	Score	Rank
1	Phra that Na Dun	0.00362	1
2	Wat Puttha Wanaram	0.00108	2
3	Phra Yuen Mongkhon Buddha Image	0.00045	3
4	Kae Dam Wooden Bridge	0.00025	4
5	Khong Kut Wai Fish Sanctuary	0.00022	5
6	Wat Nong Hu Ling	0.00019	6
7	Phra Buddha Ming Mueang	0.00017	7
8	Maha Sarakham University Museum	0.00016	8
9	Wat Mahachai	0.0001	9
10	Ku Santarat	0.00007	10
11	Ku Mahathat	0.00006	11
12	Kaeng Leng Chan	0.00005	12
13	Kosamphi Forest Park	0.00004	13
14	Ban Chiang Hian Museum	0.00003	14
15	Chi Long Forest Park	0.00003	15

Lower-ranked sites, such as Ban Chiang Hian museum and Chi Long forest park, received the lowest scores, indicating lesser interest from tourists based on the evaluated criteria. These findings suggest that Phra that Na Dun and Wat Puttha Wanaram are the most desirable destinations, while the analysis can help guide tourism development strategies to enhance the appeal of mid- and lower-ranked attractions. Figure 2 shows the geographic location of a specific tourist attraction, highlighting its position based on the results of the Fuzzy TOPSIS recommendation system.

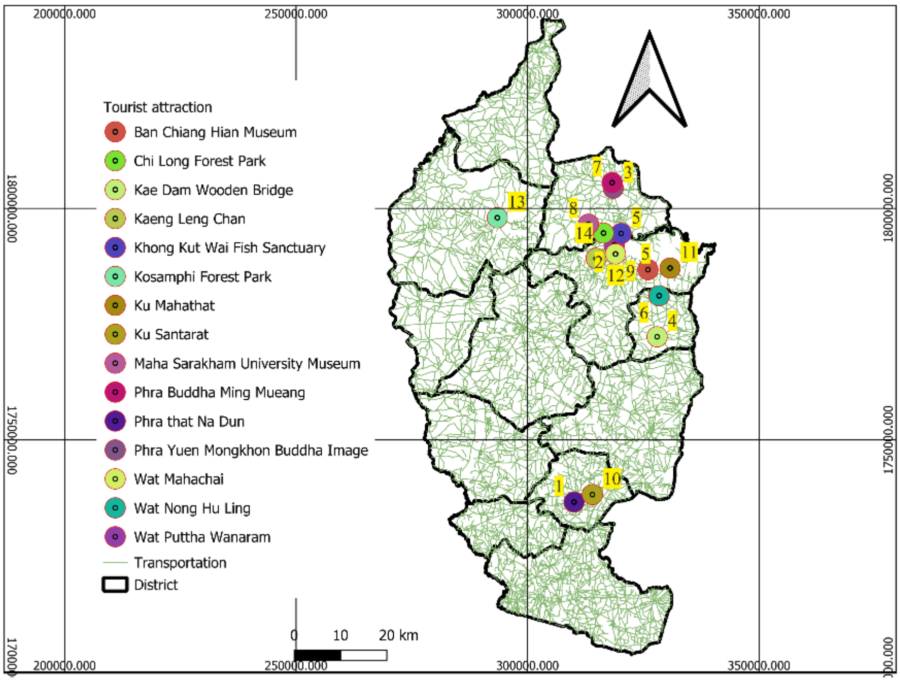

Figure 2. Shows the geographic location of a specific tourist attraction (Source: authors)

Results of the Survey on the Recommendation System

The survey aimed to evaluate the effectiveness of the recommendation system for tourists, focusing on various performance aspects. Table 4 shows the evaluation of the Recommendation System by tourists. The analysis of results reveals the following: Decision-Making Capability: The system received a high mean score of 4.67 for its ability to make appropriate decisions regarding tourist options, indicating strong performance in this aspect. Accessibility: With a score of 4.58, the system effectively addresses the accessibility of tourist destinations, making it a valuable tool for users. Overall Effectiveness: A rating of 4.42

suggests that tourists view the system as a reliable alternative when planning their trips, reinforcing its overall utility. User Satisfaction: The criterion related to matching attractions with user preferences scored 4.58, reflecting high satisfaction among users regarding the relevance of recommendations. Ease of Use: The system scored 4.67 in usability, highlighting its intuitive interface and variety of options available to tourists, contributing to an overall positive user experience. The evaluation findings indicate that the recommendation system is well-received by tourists, consistently scoring high across various criteria. Its strengths lie in decision-making capabilities and ease of use, making it a reliable tool for enhancing the travel experience. Continued improvements and updates could further increase its effectiveness and overall user satisfaction.

Table 4. Evaluation of the Recommendation System by Tourists

No.	Criterion	Mean	Std.	Level
1	Decision-Making Capability	4.67	0.85	Good
2	Accessibility	4.58	0.86	Good
3	Overall Effectiveness	4.42	0.86	Good
4	User Satisfaction	4.58	0.64	Very Good
5	Ease of Use	4.67	0.47	Very Good

Quantitative Evaluation of the Recommendation System

The performance of the recommendation system was quantitatively assessed using the precision, recall, and F1-score metrics. Below is a summary of the outcomes. Table 5 presents the definitions of key performance metrics used in evaluating the recommendation system: Precision: Precision gauges how well the system predicts good outcomes.

A precision score of 85% indicates that 85% of the recommendations provided were relevant to the users. Recall: Recall gauges how well the system can locate all pertinent recommendations. A Recall score of 80% means that the system successfully identified 80% of all available relevant recommendations. F1-Score: An F1-Score of 82.42% suggests that the system effectively balances accuracy and coverage, ensuring that users receive both precise and comprehensive recommendations. Quantitative Evaluation: The quantitative evaluation demonstrates that the recommendation system performs effectively, with high Precision and Recall values, leading to a strong F1-Score.

These data demonstrate how the system may minimize irrelevant recommendations while increasing useful ones. Continuous monitoring and refinement of the system will help maintain and potentially improve these performance metrics.

Table 5. Quantitative Evaluation of the Recommendation System

Metric	Value
Precision	85%
Recall	80%
F1-Score	82.42%

CONCLUSION

The implementation of Fuzzy MCDA through the Fuzzy TOPSIS method has proven to be a valuable approach in developing an effective tourism recommendation system. The findings from the survey and subsequent analysis provide critical insights into how this method can enhance the decision-making processes for tourists and improve their overall travel experiences. The survey results highlighted the importance of specific criteria in influencing tourists' choices of destinations. Notably, accessibility to the site and safety services emerged as the most significant factors, each receiving a maximum weight of 9. This underscores the necessity for destinations to prioritize ease of access and security measures to attract tourists. The high importance assigned to restaurants and coffee shops indicates that modern travelers not only seek cultural and natural attractions but also value social and culinary experiences as integral components of their visits.

Incorporating these preferences into the recommendation system enhances its relevance and usability. By aligning the system's suggestions with the criteria that matter most to users, the Fuzzy TOPSIS method effectively narrows down options to those that truly fit the tourists' desires. The Fuzzy TOPSIS method's ability to rank tourist attractions based on multiple criteria demonstrates its effectiveness as a decision-making tool in the tourism sector. The rankings generated where Phra that Na Dun and Wat Puttha Wanaram were identified as top destinations offer actionable insights for tourism stakeholders.

These findings suggest that focusing promotional efforts and resources on these attractions could yield higher visitor satisfaction and engagement. The low scores associated with attractions like Ban Chiang Hian Museum and Chi Long Forest Park reveal opportunities for development. Stakeholders can explore enhancing these sites' features or services, possibly through infrastructural improvements, increased marketing, or additional amenities. This targeted approach can help diversify tourism offerings and stimulate local economies. The effectiveness of the recommendation system, as indicated by high scores across various performance metrics (mean scores exceeding 4.5), reflects users' satisfaction with its usability and decision-making capabilities. The system's design to match attractions with user preferences demonstrates a user-centered approach that enhances its overall utility. High precision (85%) and recall (80%) scores indicate that the system reliably identifies relevant attractions while minimizing irrelevant suggestions. This capability is crucial in fostering trust among users, as they can depend on the system to deliver accurate and tailored recommendations. Moreover, the commendable F1-Score (82.42%) emphasizes a balanced performance in both identifying relevant options and ensuring their accuracy. The findings suggest that integrating Fuzzy MCDA methods like Fuzzy TOPSIS into tourism recommendation systems can significantly enhance user experience and satisfaction. Future iterations of the system could benefit from incorporating additional factors such as user feedback and dynamic data (e.g., real-time availability, seasonal attractions) to further refine recommendations.

Additionally, Longitudinal studies that evaluate user experiences over time might offer additional information about the system's efficacy and potential areas for development. Leveraging machine learning techniques to adapt the recommendation system based on user interactions could create a more personalized experience, aligning recommendations even more closely with individual preferences. Limitations of Using a Fuzzy TOPSIS approach are the effectiveness of Fuzzy TOPSIS can be significantly influenced by the sensitivity of its results to criteria weights. Even small changes in these weights may alter the rankings, potentially affecting the consistency and reliability of the recommendations. Additionally, since tourist preferences can shift over time due to trends or individual factors, the static nature of certain criteria in Fuzzy TOPSIS may limit its ability to capture these evolving preferences accurately. To address these limitations, improving data collection methods, refining fuzzy criteria definitions, and incorporating more dynamic or hybrid models could enhance the adaptability and accuracy of the recommendation system for destination selection.

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EXPLORING MARINE TOURISM ON SUSTAINABLE DEVELOPMENT SEGMENT IN INDONESIA: SPAR-4-SLR

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Abstract: Marine tourism has emerged as a rapidly growing sector within the tourism industry, offering diverse recreational activities in coastal and marine environments. Marine tourism encompasses various forms, from beach tourism to whale watching, and plays a significant role in many countries' tourism economies, including in Indonesia. Exploring marine tourism in Indonesia reveals significant potential for sustainable development, particularly through community involvement and effective policy implementation. Despite the potential, challenges such as inadequate infrastructure, low human resource capacity and limited investment hinder the progress. Thus, addressing these issues is vital for realizing the full benefits of marine tourism in Indonesia. This study is designed to elucidate the evolution and development of marine tourism within the Indonesian context, while simultaneously evaluating the extent to which academic discourse has concentrated on the principles and practices surrounding sustainable development, and ultimately, to outline prospective research agendas that could guide future researchers in this vital area of study. The methodological approach adopted for this research is a systematic literature review (SLR), which rigorously incorporates the SPAR-4-SLR protocol in conjunction with a robust analytical framework known as the Theory, Context, Characteristic, and Method (TCCM) that facilitates a comprehensive analysis of the relevant literature. Our findings revealed that Indonesian marine tourism possesses considerable potential to serve as a pivotal engine for advancing the blue economy. However, it is imperative to acknowledge that this sector is concurrently grappling with significant obstacles that impede the establishment and maintenance of sustainable marine ecosystems; inadequate management of tourist destinations, minimal innovation and application of technology need to be further academic focus. In conclusion, there is a strong emphasis placed on the imperative need for cooperative initiatives that engage a diverse array of stakeholders, including both public and private sector entities, to formulate and implement effective and sustainable tourism policies that are conducive to long-term ecological and economic resilience. Overall, our research facilitates understanding marine tourism development in Indonesia and provides useful theoretical insights to fill the research gap in this context.

Keywords: marine tourism, sustainable tourism, SPAR-4-SLR, TCCM, Indonesia

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INTRODUCTION

The tourism industry is a growing sector with harsh criticism; economic improvement along with diluting local identity, capital accumulation, environmental damage, and increased pollution (Baloch et al., 2023; Bianchi & Milano, 2024; Mulyadi et al., 2024). In response to criticism, academics and stakeholders conceptualized sustainable tourism as an alternative to reduce the negative impact of the industry's development (Zolfani et al., 2015). Sustainable tourism is expected to create multiple impacts, substantively impacting economic circulation through accommodation rentals, culinary, souvenirs, transportation, tourist guides or as a medium to boost the development of other sectors (Andolina et al., 2021; Portella-Carbó et al., 2023). At the same time, the rapid development of the tourism industry, although it has attracted criticism and debate, has grown with significant economic potential (KC et al., 2024). The beauty of the beaches and the diversity of marine life attract tourists to explore marine tourism (MT). From an economic perspective, tourist demand for underwater recreation is relatively high, attracting at least 600,000 tourists yearly (Zimmerhackel et al., 2019).

Arcos-Aguilar et al. (2021) estimate economic transactions to reach US$ 36 billion globally and are expected to be a pioneer in improving the blue economy, which will lead to improvements in the local, regional, and national economy (Smith et al., 2014). However, Lamb et al. (2014) assess coral disease as the primary source of coral degradation, and this

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is closely related to human activities that have changed environmental conditions through inappropriate fishing, use of coastal land that removes freshwater filters and waste from land, and marine environmental pollution. This condition is exacerbated by underwater recreation assessing the ecological damage to underwater habitats caused by tourist interactions (Atkins et al., 2011; Lucrezi et al., 2021). We investigate marine tourism development (MTD) by reviewing relevant literature. This article explores sustainability ideas in MT, discussing how academics' attention and sustainability of MT in Indonesia. How do we understand the development of Indonesian MT? How do academics explore sustainable development in the context of MT? What are the future research agendas? are the key questions we formulated. Researchers explored articles from international journals with the Scopus index and determined the search keywords "marine, coastal, seafront tourism in Indonesia". The data collected through this study can promote sustainable tourism, increase awareness of ecosystem conservation and MT attractiveness, and provide direction for future research.

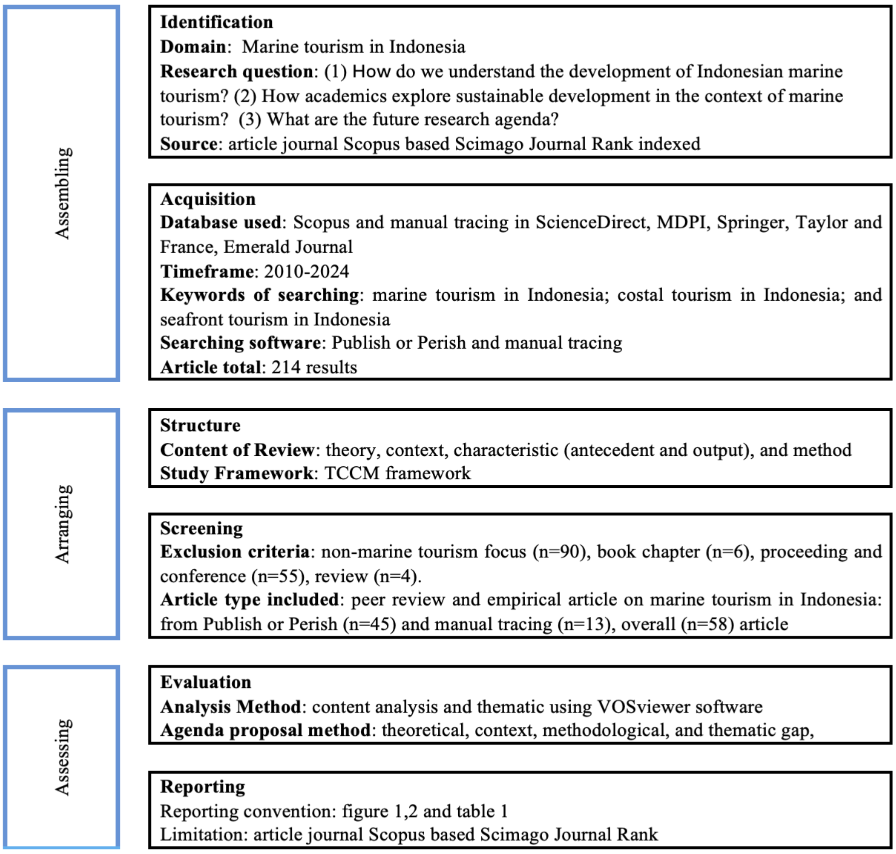
MATERIALS AND METHODS

This research analyzes marine tourism research (MTR) by emphasizing the views of academics regarding the MTD. This research adopts a systematic literature review (SLR) approach with a strict and transparent process in determining which manuscripts to use as references. The researcher then used SLR with a structured and domain-based systematic approach to identify, assess, and comprehensively evaluate research relevant to the themes discussed in this research. Furthermore, researchers adopted the TCCM framework (theory, context, characteristics, and method).

The discussion of "theory" leads to a conceptual or framework of thought; "context" discusses the study area; "characteristic" explores factors or variables and output; and "method" discusses the use of analytical methods or tools (Veerabhadrappa et al., 2023). Furthermore, the researchers used a methodological design of SPAR-4-SLR protocol to assess, organize, and combine (Figure 1), which is recommended by (Paul et al., 2021a).

Data Collection Procedures

Researchers followed procedures at the data collection stage (Paul et al., 2021b) (Figure 1). In the initial stage, the researcher determined the limitations of the reference articles. First, we defined the journal's scope as a source and eliminated types of articles that did not match the focus of the research discussion. Furthermore, researchers also limited the time interval to 2010 to 2024. The process of searching for articles, researchers used the software "Publish or Perish" by setting the criteria "Scopus" and the keywords "marine, coastal, and seafront tourism in Indonesia." More detail, the researchers carried out manual article tracing by visiting the official website of the journal article source; "ScienceDirect, Taylor & Francis, Emerald, springer, and MDPI Journal, etc." The next stage, we entered keywords to track articles reviewing MT. Furthermore, article selection included an analysis of the title, abstract, and keywords included in the article manuscript. Simultaneously, we provided an assessment of the context of the discussion of the article addressed. This approach ensured the appropriateness of the article's discussion, which is the research reference.



Identification
Domain: Marine tourism in Indonesia
Research question: (1) How do we understand the development of Indonesian marine tourism? (2) How academics explore sustainable development in the context of marine tourism? (3) What are the future research agenda?
Source: article journal Scopus based Scimago Journal Rank indexed

Acquisition
Database used: Scopus and manual tracing in ScienceDirect, MDPI, Springer, Taylor and France, Emerald Journal
Timeframe: 2010-2024
Keywords of searching: marine tourism in Indonesia; costal tourism in Indonesia; and seafront tourism in Indonesia
Searching software: Publish or Perish and manual tracing
Article total: 214 results

Structure
Content of Review: theory, context, characteristic (antecedent and output), and method
Study Framework: TCCM framework

Screening
Exclusion criteria: non-marine tourism focus (n=90), book chapter (n=6), proceeding and conference (n=55), review (n=4).
Article type included: peer review and empirical article on marine tourism in Indonesia: from Publish or Perish (n=45) and manual tracing (n=13), overall (n=58) article

Evaluation
Analysis Method: content analysis and thematic using VOSviewer software
Agenda proposal method: theoretical, context, methodological, and thematic gap,

Reporting
Reporting convention: figure 1,2 and table 1
Limitation: article journal Scopus based Scimago Journal Rank

Figure 1. Methodological design using the SPAR-4-SLR protocol

This was also a step to avoid selecting articles subjectively based on the title. After determining several search stages, the researchers took 58 journal articles about MT that were relevant and did not involve book chapter manuscripts, conferences, or proceedings. The specified text was a reference for exploring academics' views on MTD and their attention to exploring sustainable marine tourism (SMT). Data was collected from March to April 2024.

Data Analysis Procedures

In the data analysis process, researchers conducted an in-depth and comprehensive evaluation of from each article. The researcher tabulated the articles in the future by following the flow of the TCCM framework. The researcher highlighted the "theory" used by each author - the theoretical approach used in discussing MTD. Next, the discussion regarding the "context" of tourism development is examined in detail, highlighting the focal points of development, e.g., development location in terms of province considering Indonesia as an archipelagic country. Paul & Rosado-Serrano, (2019) suggest a "characteristic" review by emphasizing the "antecedent" and "output" of the research being referenced. Furthermore, researchers analyzed based on the methods used by previous researchers; methods are classified into three forms. Quantitative research leads to empirical data analysis using statistics or mathematical calculations. Research that uses observation, interviews, FGDs, and document studies and does not use statistical techniques to process data is classified as qualitative. Researchers used qualitative and quantitative methods into mixed methods (Ribeiro et al., 2023).

RESULTS AND DISCUSSION

Theory and Concept

In our review of 58 scientific articles, 44 (75.86%) articles used theory, four used more than one theory, and two articles with concepts and theory. 10 of the 58 (15.52%) used concepts, and 5 (8.62%) without theory and concept approaches. The theory most widely employed in the MTR we reviewed uses the Sustainable Development theory (Pohoață et al., 2020) (19 of 44, 38,78%) to offer a development model that prioritizes the harmony of socio-economic improvement with the environment and culture without sacrificing each other. The dominance of sustainable development theory indicates the increasing awareness of the negative repercussions of tourism on the environment, socio-culture, and climate change. Interestingly, the application of sustainable development theory in contemporary literature has experienced a shift in investigating the consequences and services of tourism more deeply.

For example, tourism's sustainable economic contribution is increasingly being debated intensely. Kinseng et al. (2018b) found economic and welfare improvements increased access to education and health. Previous research employing the Sustainable Development theory framework evaluated the impacts with different analysis centers. This research plays a significant role in assessing sustainable tourism because it emphasizes long-term consequences that can be felt, collaboration and empowerment, and reciprocal benefits between hosts and tourists. For example, Turisno & Dewi (2021b) and Dodds et al. (2010b) adopted this conceptualization to explore environmental and conservation challenges. Another study by Gerungan & Chia (2020b) reminds us of environmental damage that can result in long-term business potential loss and conflicts of interest between groups (Lasso & Dahles, 2018b). Furthermore, the concept of sustainability in the context of MT is more widely utilized to analyze sociocultural and economic dimensions (Table 1).

Table 1. List of articles in the literature of review

Authors	Theory/concept	Context	Antecedent	Output	Method
(Sukuryadi et al., 2021a)	Stakeholder theory	West Nusa Tenggara	Tourism management; institutions	Ecotourism areas are less sustainable, socio-economically unsustainable	Quantitative – observation, interview and questionnaire (n=100)
(Singgalen, 2020)	Resources-based Theory	North Maluku Province	Mangrove forest tourism potential;	Benefits of mangrove forest: environmental, local culture and livelihoods sustainability	Qualitative – interview (n=17), observation and study documents
(Albasri & Sammut, 2022)	Resources-based Theory	Riau Island Province	Ecotourism development	Fish farming and ecotourism in medium sustainability; natural resource utilization patterns	Mix method – interview, questionnaire (n=66) and document study
(Lasso & Dahles, 2018a)	Sustainable development theory	East Nusa Tenggara	Tourism development	Tourism development stops fishing activities; economic dependence on tourism	Qualitative – observation and interview (n=15)
(Naja et al., 2021a)	Stakeholder Theory	Bali Province	Diving business; business actors collaboration	Centralized collaboration network; establishment of conservation institutions	Qualitative – interview (n=27) and document study
(Nuraini et al., 2021a)	Institutional theory	West Papua Province	Destination affordability; performance of marine ecotourism institutions	The social and ecological dimensions are appropriate; the economy is inappropriate	Mix method – questionnaire, interview, focused group discussion (n=90) and observation
(Mafruhah et al., 2020)	Social Network theory and empowerment theory	Central Java Province	community empowerment; stakeholder participation	Institutional readiness; community involvement	Mix method – interview (n=150)
(Lukman, 2020a)	Theory of Reasoned Action	Bali Province	Diving tourism attraction; commu-nity participation;	Protection of cultural heritage; social and economic improvement of society	Qualitative – interview (n=9), informal conversation dan observation

(Tjaija et al., 2022)	Sustainable development theory	Central Sulawesi Province	Tourism development	Sustainable tourism development; tourism environmental impact management	Mix method – interview and questionnaire (n= -)
(Phelan et al., 2020a)	Ecosystem services	South Sulawesi Province	Environmental protection; community-based ecotourism	Community-based ecotourism development model sustainable management is supported by community culture	Qualitative – interview (n=38)
(Lagarense & Walansendow, 2015)	Public Participation Theory	North Sulawesi Province	Tourism development impact	Economic impact; environmental awareness;	Mix method – survey questionnaire, interview (n=15) and observation
(Atmodjo et al., 2017a)	Transaction cost theory	West Papua Province	Marine conservation; institutional arrangement	Changes in destination entry fee policies; increased transparency and participation	Qualitative – interview (n=33), observation, dan document analysis
(Towner, 2016a)	Stakeholder theory	West Sumatra Province	Surfing management	Stakeholder collaboration, decision -making and coordination problems	Qualitative – interview (n=108)
(Turisno & Dewi, 2021a)	Sustainable development theory	Central Java Province	Environment reclamation regulation	Coastal community empowerment and business development	Qualitative – study document, observation
(Booth et al., 2022a)	Willingness to pay	West Nusa Tenggara Province and Aceh Province	Environmental responsibility; shark endan-ger and protection	Experience and economic value; conservation and tourist satisfaction	Mix method – interview, focus group discussion, survey (n=206)
(Hayati et al., 2020)	Theory of Planned Behavior	Special Province of Jakarta	Tourism debris; waste management	Management is not integrated, and there is an accumulation of waste, unsustainable tourism destinations, and fewer tourist visits and satisfaction.	Quantitative – interview (n=50)
(Intyas et al., 2023)	Maximum sustainable Yield	West Nusa Tenggara Province	Utilization of coral reefs	Use of moderate condition corals; coral reef transplantation training	Quantitative – time series
(Kinseng et al., 2018a)	Sustainable development theory	Special Province of Jakarta	Tourism development; social change in society	Increasing people's income and living standards, easy access to education and health, moral and behavioural changes.	Mix method – questionnaire and interview (n=120)
(Bakri et al., 2023a)	Sustainable development theory	Lampung Province	Sustainability of ecology, socio-cul-ture, economy, in-frastructure and technology, institutions	The ecology is quite sustainable; sustainable socio-culture, economy, infrastructure, and institutions are less sustainable.	Quantitative – observation, interview, and questionnaire (n= -)
(Nurhayati et al., 2019a)	Sustainable development theory	West Java Province	Economic, cultural, social, environmental and infrastructure sustainability	Economy, culture, society, environment, and infrastructure support sustainable ecotourism.	Quantitative – interview (n=50)
(Mulyadi, 2019a)	Sustainable development theory	Riau Island Province	Quality of human resources, culture and environment	Quality of human resources, culture and environment influence the quality of ecotourism; the benefits of ecotourism on the economy and environmental conservation	Quantitative – questionnaire (n=200)
(Abidin et al., 2022a)	Theory of Reasoned Action	East Java Province	Ecotourism management	Health risks; attitude towards risk	Mix method – survey, interview (n=362), observation, and documentation
(Towner & Orams, 2016)	Sustainable development theory	West Sumatra Province	Surfing tourism development; Impacts of surfing tourism	Long-term unsustainable impacts; changing behaviour to negative	Qualitative– interview (n=28)
(Gerungan & Chia, 2020a)	Sustainable development theory	Bali Province	Environmental issues; government support; operator competition	Diving destinations are not sustainable; coral reef degradation; damage to the marine environment and loss of business potential	Qualitative – interview (n=10)
(Partelow & Nelson, 2020a)	Evolutionary Governance Theory, Social Network Theory, and Collective Action Theory	West Nusa Tenggara Province	Social network; governance	Threat of environmental damage; self-governance adaptation	Mix method – interview (n=50), observation, and ethnographic
(Suteja et al., 2021a)		Bali Province	Source and amount of waste	Level and type of waste at each destination; Differences in waste weight during the rainy and dry seasons	Quantitative – field survey
(Huang & Coelho, 2017)	Sustainable development theory	Indonesia, Malaysia, Philippines, Papua New Guinea, Timor Leste and Solomon Islands	Environmental impact	Coral reef conditions are poor	Quantitative – Data Envelopment Analysis

(Marlina et al., 2020)	Sustainable development theory	Southeast Sulawesi Province	Tourism management; local wisdom	Collaboration on ecosystem resource management and local wisdom	Qualitative – interviews (n= -), observation, documentation and literature review
(Bottema & Bush, 2012a)	Entrepreneurship theory,	Bali and West Nusa Tenggara Province	Business development; institutional framework	Increasing awareness of marine conservation; alternative local economic sources	Qualitative – interview (n=17) and observation
(Sulistyadi et al., 2024)	Sustainable development theory	Gorontalo Province	Local wisdom; environmental sustainability	The role of the community in transforming tourist areas; alignment of tourism with the environment, culture and universal sustainability; increase in livelihood	Qualitative – interview, focus group discussion, and questionnaire (n=18)
(Hengky & Kikvidze, 2021a)	Sustainable development theory	Belitung Islands Province	Policy implementation; stakeholder involvement	Policy effectiveness; Enhanced Socio-Economic Activity; drive to reduce environmental impact	Mix method – questionnaire, interview (n=150), observation and secondary data
(Lukman et al., 2022a)	Sustainable development theory	Central Java Province	The impact of tourism on the economy, social, culture and environment	The economic impact of tourism is low; there is a positive sociocultural impact, threat of environmental damage, changes in marine ecosystems	Quantitative – interview and questionnaire (n= -)
(Praptiwi et al., 2021a)	Sustainable development theory	South Sulawesi Province	Livelihood change; tourism development impact	The benefits of tourism are not evenly distributed; tourism does not make a big contribution to conservation and development.	Qualitative – interviews, focus group discussion (n=31), and secondary data
(Kurniawan et al., 2016a)	Ecological resilience	West Nusa Tenggara Province	Tourism activities; local wisdom	Changes in coastlines and coral reefs; the destination is in vulnerable, low, medium status; decline in ecosystem quality	Scoping, baseline data development, indicator analysis
(Nurhayati et al., 2022a)	Theory of Planned Behavior	Bali Province	Conservation education; hatchling release program	Increased conservation awareness; reduced consumption of turtle products	Quantitative – interview and questionnaire (n= -), secondary data
(Dodds et al., 2010a)	Sustainable development theory	West Nusa Tenggara and Thailand	Environmental problems: tourists' intention to pay	Willingness to pay for environment sustainability	Quantitative – survey questionnaire (n=400)
(Harianto et al., 2023)		Lampung Province	Tourist access; natural resources	Tourist interest in Pasaran and Permata Island	Quantitative – interview and questionnaire (n=228)
(Adrianto et al., 2021)	Sustainable development theory	Special Province of Jakarta	Social-ecological system carrying capacity	Decline in the quality of coral reefs	Quantitative – questionnaire (n=74), WorldView-2 satellite, observation, and ground checkpoint,
(Charlie et al., 2013a)	Environmental Governance Network Theory	West Nusa Tenggara and Bali Province	Environmental conservation; governance; environmental governance network	Conservation networks are action-oriented, dependent on non-government stakeholders on Trawangan Island; policy, planning, and international networks on Lembongan Island	Qualitative – observation, stakeholder consultations (n= -), study document
(Mustika et al., 2013a)	Sustainable development theory	Bali Province	Dolphin tourism; tourism management	Tourist satisfaction is low-medium; there is potential for improving the local economy.	Mix method – observation, interview, and questionnaire (n= -)
(Nelson et al., 2021a)	Willingness to pay	West Nusa Tenggara Province	Socio-Demographic; environmental attitudes	Most tourists condensed paying for sustainability; trust, environmental awareness, climate change, and conservation are willingness-to-pay factors.	Quantitative – questionnaire (535)
(Banarsyadhimi et al., 2022a)	Cultural ecosystem services	West Nusa Tenggara Province	Management of marine tourism activities; marine protected area; ecosystem service	Tourist features, ecosystem service benefits, spiritual well-being, social ties and identity influence property prices	Quantitative – questionnaire (n=263) and secondary data
(Vipriyanti et al., 2024a)	Sustainable development theory	Bali Province	Suitability of mangrove ecotourism; area carrying capacity; internal and external factors	Utilization of mangrove forests; improving the socio-economic conditions of society	Mix method – interview (n= -) and observation
(Kurniawati et al., 2022a)		East Java Province	Role of youth; digitalisation process	Opening a culinary business; tourism and conservation movements; use of media and digitalization	Qualitative - observations, field measurements, documentation, and interviews (n= -)

(Atmodjo et al., 2020a)	Theory of Collaborative Governance	West Papua Province	Marine conservation tourism governance; Changing governance arrangements	Change of management to shared governance	Qualitative – interview (n=37), observation and study document
(Anna & Saputra, 2017a)	Willingness to pay	Central Papua Province	Economic value; ecosystem service	Increasing the community economy; increased conservation awareness	Quantitative – questionnaire (n=71)
(Hermawan et al., 2023)		Central Sulawesi Province	Natural resources	Suitable for marine development	Quantitative – hydro-dynamic and Analysis Hierarchy Process
(Kurniawan et al., 2023)		West Nusa Tenggara	Development of marine tourism; management of marine protected areas	Decreased water quality	In situ and ex-situ methods dan quantitative, Geographic Information System
(Chen et al., 2021a)	Stakeholder Theory	West Nusa Tenggara Province	Understanding stakeholders, stakeholder satisfaction, resource development	Tourism conditions are well organized; the role of customary regulations; value orientation towards satisfaction	Quantitative – questionnaire (n=130)
(Solihin et al., 2020a)	Stakeholder Theory	West Nusa Tenggara Province	Collaborative management; sustainable institutional arrangements	Participative and communicative management model; ecological preservation in conservation areas	Qualitative – interview (n= -) and secondary data
(Insafitri et al., 2020a)	Willingness to pay	East Java Province	Conservation: willingness to pay	Willingness to pay for snorkelling; willingness to pay with a ticket system	Quantitative – questionnaire (n= -)
(Azzahra et al., 2023)	Social network theory and Resources-based theory	Central Java Province	Natural tourism potential; carrying capacity of mangrove ecotourism; role of stakeholders,	Ecotourism development strategy; positive perception from society	Mix method – interview and questionnaire (n=74)
(Lelloltery et al., 2018)	Resources-based theory	Maluku Province	Coral reefs condition; coral reef potential	The suitability index for snorkelling and diving is decent;	Quantitative – survey and interview (n= -), observation, study literature
(Zamzami et al., 2021a)	Ecosystem Services	West Sumatra Province	Conservation regulations	Priority of fishermen on the economy and stakeholders on conservation	Mix method – questionnaire, interview (n=36), and observation
(Nelson et al., 2019a)	Assimilation–contrast theory and heuristic decision-making	West Nusa Tenggara Province	Environmental conservation issues; waste management	Tourism management is not environmentally friendly; collection of environmental service fees	Quantitative – interview (n=790)
(King et al., 2021a)	Livelihood Resilience	Southeast Sulawesi Tenggara Province	Governance structure; tourism development	Tourism supports social-ecological resilience and livelihood change, encouraging foreign operators to follow local operators.	Qualitative – interview (n=50) and focus group discussion
(Eider et al., 2023a)	Stakeholder theory	West Nusa Tenggara Province	Social-ecological network	Social cooperation networks; reef use pattern	Mix method – interview (n=37), secondary data,
(Mustika et al., 2020a)	Purchasing Power Parity	Bali, East Nusa Tenggara, North Maluku, North Sulawesi, West Nusa Tenggara, East Kalimantan Province	Shark and ray tourism; marine tourism development	Estimated economic value of shark and ray tourism; tourism encourages conservation	Mix method – questionnaire (n=365), literature study

Concentration on sustainability is also supported using Planned Behavior and Resources-based theory (Ajzen, 2011; Kozlenkova et al., 2014), which is closer to encouraging individual responsibility and resource utilization. The previous works of literature use the Ecosystem Service concept (Hølleland et al., 2017), Ecological Resilience (Chambers et al., 2019), Cultural Ecosystem Service (Fish et al., 2016), and Livelihood Resilience (Kuipers & de Jong, 2023) indicate increasing attention to the ecological and social sustainability of communities. Academics' attention employed those concepts, for example Kurniawan et al. (2016b) regarding the level of vulnerability of conservation areas and Banarsyadhimi et al., (2022b) tourism management in protected areas. Zamzami et al. (2021b) employed the Ecosystem Service concept to explore sustainability issues in the socioeconomic dimensions of fishermen affected by MTD. These researchers' theoretical framework illustrated the conceptual evolution in understanding tourism development. Furthermore, theories related to MTD also frequently use the theoretical frameworks of institutions, actors, and networks. Those studies predominantly explore influence, involvement, decision-making, economic sharing, and controlling potential conflicts, social and organizational systems, institutional evolution and performance, which are juxtaposed with Stakeholder theory (Parmar et al., 2010), Institutional theory (Risi et al., 2023), Evolutionary Governance theory (Assche et al., 2014), Social Network Theory (Krause et al., 2007), Environmental Governance Networks theory (Chaffin et al., 2024) dan theory of Collaborative Governance

(McIvor, 2020). Previous research on stakeholders and institutions provides conceptual meaning for understanding the work patterns of stakeholders and institutions and managing shared interests (Charlie et al., 2013b; Partelow & Nelson, 2020b).

Context of the Studies

The 58-marine tourism research (MTR) referred to, the research context was carried out in 21 provinces out of 38 provinces in Indonesia, with four articles across regions. MTR mostly focuses on the context of West Nusa Tenggara (15 of 58, 25.86%), followed by Bali (10, 17.24%) and Central Java Province (4, 90%). Other studies were conducted in East Java Province, West Sumatra Province, Special Province of Jakarta, West Papua Province (3 of 58, 5.17% each), Central Sulawesi Province, South Sulawesi Province, North Sulawesi Province, North Maluku Province, Riau Island Province, East Nusa Tenggara, Southeast Sulawesi Province, and Lampung Province (2, 3.45% respectively). Lastly, the research was conducted in West Java Province, Aceh, Maluku, Gorontalo, East Kalimantan Province, Belitung Island Province, and Central Papua, and one Indonesian in general (1, 1.72%) (Table 1).

Our findings confirmed how MTRs have focused on West Nusa Tenggara and Bali. In West Nusa Tenggara, studies were concentrated on the Gili Matra destination (Trawangan, Air, and Meno Island), with analysis centres on the environment, management, and stakeholders. Previous literature provides a meaningful understanding of Gili Matra conservation management (Banarsyadhimi et al., 2022c; Sukuryadi et al., 2021b). Furthermore, a study on Gili Matra discussed stakeholder networks (Partelow & Nelson, 2020c), stakeholder interest in developing ecotourism (Chen et al., 2021b), mapping stakeholders based on independence and influence (Solihin et al., 2020b), and community resilience influenced by tourism operator (King et al., 2021b). Outside the Gili Matra area, research conducted by Sukuryadi et al. (2021c) and Booth et al. (2022b) reviewed mangrove ecosystems from collaborative tourism management and willingness to pay for conservation.

MTRs in Bali were mainly conducted in the Buleleng area (4 articles) and Nusa Penida (2 articles). Several review studies and previous research have mostly reviewed conservation, management, and stakeholders. Conservation reviews, for example, emphasize conservation education (Nurhayati et al., 2022b), the sustainability of dolphin watching and the economic value of sharks (Mustika et al., 2013b, 2020b) mangrove forest conservation and the resulting economic impact (Vipriyanti et al., 2024b). Concerning management, previous research explored the active participation of communities in site management (Lukman, 2020b), marine conservation management (Bottema & Bush, 2012b), and marine debris (Suteja et al., 2021b). Furthermore, MTR examines stakeholders, emphasises stakeholders' characteristics and network pattern and scuba diving operator challenges for sustainability (Gerungan & Chia, 2020c).

Other provinces, MTR tended to be viewed from the same perspective as research conducted in Bali and West Nusa Tenggara. Abidin et al. (2022b) explored marine tourism management after COVID-19 in East Java Province. Nuraini et al. (2021b) and Atmodjo et al. (2017b) discuss ecotourism management and management of entry fees in Raja Ampat, West Papua, and Towner, (2016b) researched surf management from a stakeholder perspective in West Sumatra Province. Research related to marine conservation was also carried out by (Insafitri et al., 2020b) in East Java Province and (Atmodjo et al., 2020b) in West Papua Province. We confirm the majority of MT literature in Indonesia has focused on the context of ecology and conservation, stakeholders and institutions, and management. However, few articles comprehensively reviewed the economic value of each destination. We found two studies that reviewed economic value, specifically in single destinations in West Sumatra and Central Java Province (Anna & Saputra, 2017b; Zamzami et al., 2021c).

Antecedents of the Studies

In this section, we presented the antecedents that are the focus of MTR in Indonesia. The results of our review regarding antecedents emphasize stakeholders, institutions, and management (33.59%), socio-economic and cultural (31.25%), environment and conservation (27.34%), and others (7,83%) (Table 1).

Stakeholders, institutions and management: these findings showed academic attention regarding MTD was more directed at institutions, the role of actors, and tourism management models. The academics preferred to observe the institutions and management, although it relies primarily on natural beauty and other attractions, stakeholders in forming networks and determining management models play a crucial role. Understanding stakeholders, institutions, and management is important in providing services, controlling conflict and risk, encouraging collaboration, and creating a more sustainable tourism climate. The literature in the study has provided insights into understanding the critical role of tourism governance, collaborative management, and performance institutions in creating major contributions to tourism (Atmodjo et al., 2020c; Solihin et al., 2020c).

Social, culture, and economics: Those antecedents explored changes in livelihoods and economic improvement, encouragement of tourism business development, and changes in social and cultural attitudes of the community. For example, in tourism business development, this factor has contributed positively to increasing alternative income and encouraging conservation awareness in local communities (Bottema & Bush, 2012c). Tourism business can lead to better quality tourism because it takes actors responsibility for developing quality tourism. Furthermore, social factors such as community participation, community empowerment, and quality of human resources play an important role in the sustainable tourism agenda. Widespread community involvement increases positive perceptions, responsibility, and ownership of the community regarding tourism development. Active community involvement in tourism is an opportunity for innovation, economic independence and cultural preservation (Kurniawati et al., 2022b; Lukman, 2020c), and culture is an important variable in shaping tourism quality (Mulyadi, 2019b).

Environmental and conservation: regarding environmental factors in tourism, many studies noticed this as the main attraction. Researchers highlight environmental and conservation antecedents, ecological sustainability, ecological carrying capacity, tourism waste, and conservation of marine animals such as rays, sharks and dolphins, and coral reefs. For example, a maintained beach environment and adequate environmental carrying capacity are the main reasons tourists visit destinations. The beauty of underwater attractions has attracted tourists to various activities, such as diving and snorkelling. The availability of coral reefs and the presence of rays, sharks, and dolphins add to the value of MT. In this regard, many tourists are willing to pay more value for preservation and sustainability (Anna & Saputra, 2017c; Insafitri et al., 2020c). Consideration of the important role of ecology and conservation has received much attention from academics as the main factor in the sustainability of MT (Charlie et al., 2013c; Nurhayati et al., 2022c). In short, reference literature has contributed to understanding several important variables in MTD. The literature emphasizes factors such as stakeholders, institutions, management, social, cultural, economic, environmental, and conservation as crucial variables for maintaining and improving the quality of MT services. Other antecedents, such as policies and regulations to increase the effectiveness of tourism management (Hengky & Kikvidze, 2021b), are not widely explored as determining factors in the treasures of MT in Indonesia.

Output of the Studies

In this section, we mapped the MTR output variables into three categories. We group the study's output into categories related to the institution, stakeholder, and development model (25.58%), social, cultural, and economic (40.70%), and environmental and conservation (32.94%).

Institution, stakeholder, and development model: The research used as a reference in this study provides an important understanding of institutional output, stakeholders, and MTD models in Indonesia. For example, institutional readiness, community-based ecotourism development models, and stakeholder collaboration are outputs of the transformation of tourism development. Increasing community participation allows them to formulate development models based on the social structure of society and culture. The demand for increased transparency, participation, and changes in management patterns was a form of tourism transformation that encouraged institutional readiness and regulation, stakeholder participation, and tourism development models (Atmodjo et al., 2017c). Furthermore, developing conservation institutions and conservation networks between actors was an effort to maintain tourism sustainability (Charlie et al., 2013d; Naja et al., 2021b). However, the literature reports negative output regarding disharmonious relationships between stakeholders, resulting in a loss of tourism economic potential and difficulties in making joint decisions (Gerungan & Chia, 2020d; Towner, 2016c).

Social, culture, and economics: The output variables related to socio-cultural, and economics were significant for reviewing MTD. The output variable that stands out is the impact of tourism development, which leads to improving education and health and strengthening local identity and prosperity. However, this also impacts changes in attitudes towards established local values (Kinseng et al., 2018c). Tourism and local culture integration positively impact preservation (Lukman et al., 2022b). Economic output, most studies revealed economic potential and business development. However, tourism development can pose a new threat to the sustainability of the local community's economic aspects; tourism changes the livelihoods of local communities and creates dependency on the vulnerability of the tourism economy (Lasso & Dahles, 2018c).

Environmental and conservation: A beautiful environment and natural landscapes are important for tourism development. However, environmental damage due to excessive natural exploration has received much attention from academic circles. MTD leads to an unsustainable environment, coral reef degradation, the threat of damage to the marine environment, the accumulation of tourism waste, a decrease in water quality, and the shrinking of the coastline around the destination. However, these are accompanied by efforts to improve awareness and sustainable practices. Host participation and tourist awareness to preserve the environment and improve the quality of marine destinations create encouragement for marine wildlife conservation, reduction in turtle consumption, tourists' willingness to pay more value for conservation, and coral reef cultivation (Eider et al., 2023b; Mustika et al., 2020c). Reviews of the MT environment in scientific literature provide a meaningful understanding of creating attractive, sustainable tourism.

METHOD

The methodological review of the analyzed literature focused on quantitative methods (32.76%), qualitative (36.21%), mixed methods (27.59%), and several articles using other methods (Table 1). Our findings showed that quantitative methods are most often used to understand issues of sustainability, the amount of waste, conservation, perception, carrying capacity, socio-culture, and tourism, as well as the issue of tourists' willingness to pay. This method was often combined with data collection instruments such as questionnaires, followed by interviews and secondary data. Because of the quantities tested, the involvement of participants with this method is at least 50 and 790 participants. Qualitative methods emphasized interviews as the main data collection approach. Our findings showed that almost all qualitative research uses interviews, observation, and document studies. Since in-depth information was the main concern, the researchers only involved 10-50 participants.

Mix-method methodological reviews combined interview and questionnaire approaches, and some studies combined observation and secondary data or literature studies. This research approach involved diverse participants ranging from 15 to 365 participants. Most of the previous research has advantages in data collection because most of them do not use a single data collection instrument, so they can minimize limitations. However, the results of our review found that focus group-based data collection methods, both qualitative, quantitative, and mixed methods, are not very popular among researchers. We also assess research trends separating local communities, stakeholders, and tourists in research. The integration of local communities and tourists simultaneously is still a matter of little concern. Longitudinal and experimental research designs are still minimal. This is important for testing causal relationships of MTD.

Thematic analysis based on co-occurrence network

Utilizing the Vosviewer, a thematic analysis was carried out on data concerning co-occurrence networks within MTR (Figure 2). The thematic analysis aimed to identify and interpret key themes within the gathered data, providing a deep contextual understanding of various issues across different disciplines, including MT. We classified and categorized these keywords, visually depicting their significance and connections on an automated map. The coloured dots' size in this figure indicates the significance of literary topics, while the lines connecting them represent the relationships between identified themes.

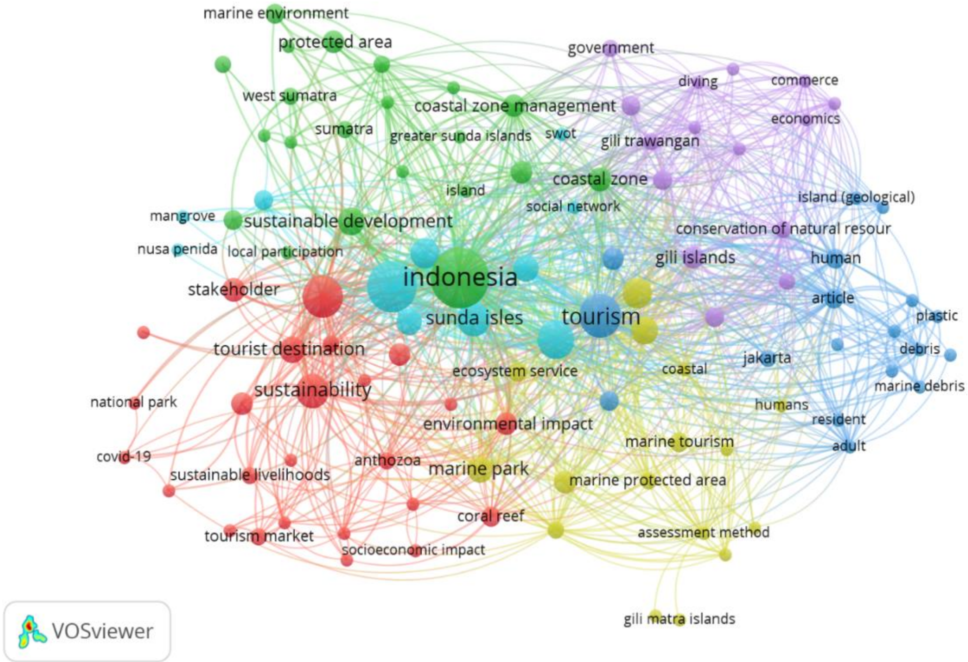


Figure 2. Network visualization of word co-occurrence of MT. Legend: Nodes: represent keywords (the node's size represents the frequency of the keywords); Links: represent relations between keywords; Link Thickness: represents the words' strength. Note: clusters are formed based on three parameters in VosViewer software (clusters resolution 1.00, minimum cluster size 1, and merge small clusters)—type of analysis: co-occurrence, unit of analysis: all keywords, number of occurrences: 2

Theme 1 focused on "environment." The items included in this theme are Indonesia, islands, Sunda Islands, marine environment, coastal zone, Sumatra, West Sumatra, Greater Sunda Islands, Gili Islands, Gili Trawangan, Gili Matra Islands, Nusa Penida, Jakarta, Marine Park, national parks, coastal, tourist destinations, and mangroves (Figure 2). Articles related to this theme generally explored caring capacity, waste issues, and environmental sustainability of tourism destinations in several regions in Indonesia. For example, Dodds et al. (2010c) explored motivation, perception, awareness, role, and willingness of tourists to pay for environmental protection tourism on small islands in West Nusa Tenggara, and Nelson et al. (2021b) reviewed tourists' willingness to pay for environmentally friendly and responsible hotel certification. These three articles exemplified research that aligns with theme 1. Theme 2 focused on "conservation and sustainability." The items included in this theme are sustainability, sustainable livelihoods, sustainable development, protected area, marine protected area, conservation, natural resource, debris, marine debris, plastic, coral reef, ecosystem service, environmental impact, and Anthozoa. Articles related to this theme generally explored conservation efforts towards an MT destination and mapping of sustainable MT destinations. Vipriyanti et al. (2024c) analyzed the benefits of tourism and the conservation of mangrove forests, and Insafitri et al. (2020d) conducted a study focusing on coral reef conservation through visitors' willingness to pay in East Java Province. These three articles exemplified research that aligns with theme 2. Theme 3 focused on "management and stakeholder." The items included in this theme are Government, social networks, humans, residents, assessment methods, stakeholders, local participation, swot, and coastal zone management. Articles related to this theme generally explored the management of a tourist destination and the role of tourism stakeholders in a destination. For example, Phelan et al. (2020b) explored the ecosystem services approach for community-based ecotourism, and Towner (2016d) explored surfing tourism management in the Mentawai Islands, Indonesia. Meanwhile, in terms of stakeholders, Chen et al. (2021c) measured the relationship among stakeholders from value-satisfaction-demand in the development of ecotourism in the Marine Park Area, and Nelson et al. (2019b) measured the visitor donation behavior for coastal conservation.

Theme 4 focused on "economics." The items included in this theme are economics, the tourism market, and socioeconomic impact. Articles related to this theme generally explored local income and economic development concerning the presence of MT destinations. For example, Anna & Saputra (2017d) conducted research that aims to measure the economic value and environmental services of whale shark tourism, and (Mustika et al., 2020d) aimed to measure the economic value of shark and ray tourism using analysis of tourist preferences and local community perceptions to predict future tourism and conservation agendas. Furthermore, Zamzami et al. (2021d) analyzed the socioeconomic impacts of tourism and understanding of fishing communities in Ampiang Parak Village, West Sumatra Province.

Factors influencing marine tourism sustainable development

We highlighted prominent points in the literature used as a reference: stakeholder, management, culture, socio-economic, environment, and conservation. Understanding these dimensions through existing literature helps identify issues and the urgency of further research to explore each dimension in detail and comprehensively. It should be noted that we conceptualize the factors that influence sustainable tourism based on our findings in the literature review.

Stakeholder: Part of this mission has been assigned to stakeholders in the sustainable tourism agenda. Understanding and involvement of stakeholders in applying the concept of sustainability is one of the keys to success. Academic attention on sustainable MT has been directed at stakeholder involvement and actor collaboration networks. Sukuryadi et al. (2021d) employed Stakeholder theory as a theoretical framework to explore the collaborative management model between actors in developing mangrove ecotourism. Through the lens of institutional theory, Nuraini et al. (2021c) found that institutional performance creates the right social and ecological conditions for tourism development. However, internal stakeholder conflicts triggered by personal interests can impact the loss of the essence and make tourism conditions unsustainable (Gerungan & Chia, 2020e). The role of actors in carrying out sustainable tourism is very crucial and complex; they must be able to unite common interests in careful planning to produce long-term positive impacts.

Management: management in the sustainable MT segment has received intensive attention from academic circles. Proper tourism management is one of the crucial steps in forming a tourism image. This should include tourism development planning, tourist destination management, and crisis management. For example, improving the management of entry fees in the Raja Ampat destination positively impacts transparency, community participation, and sustainability (Atmodjo et al., 2017d). On the other hand, MT management is still an issue that threatens the sustainability of destinations. A lack of integrated tourism waste management systems threatens sustainability, reducing visits and tourist satisfaction. However, regarding residents' and tourists' feedback, MT management must be further explored. Management systems based on the Internet of Things for easy access and mobility are rarely discussed in scientific literature. The use of appropriate technology in waste management, such as wastewater management for reuse and recycling of solid waste so that it does not cause harm to the community, is still rarely explored.

Social, economic, and cultural: Socio-economic and cultural sustainability issues in a sustainable context were highlighted through livelihoods, welfare, education, economic impacts, social and cultural changes, and the potential for MT business development. These dimensions tend to be explored more as they impact tourism development. According to Lasso & Dahles (2018d), tourism development has an impact on stopping people's livelihoods through fishermen and depending on the tourism economy by selling souvenirs and creating negative behavior. However, a more comprehensive reciprocal relationship between tourism and fishermen needs to be given more attention to how livelihoods shift, how communities adapt to tourism, and how the perceived benefits compare. The socio-economic and cultural consequences are also explored by Kinseng et al. (2018d) and Bakri et al. (2023b) regarding the benefits of tourism in encouraging local economic improvement and increasing access to education, health, and protection of cultural heritage. A central socio-economic and cultural analysis as a subject that influences tourism needs to be carried out for further review. For example, how local culture influences the MTD and how society's social and economic forces develop MT. Emphasizing these dimensions as influencing variables is useful for strengthening the community's position in tourism development.

Environment and conservation: in the context of the environmental sustainability of MT, research has been preoccupied with environmental impacts that drive conservation agendas and increase environmental awareness among communities and tourists. Several studies describe how coral reef degradation and coastline changes indicate damage due to tourism activities (Kurniawan et al., 2016c). The conservation agenda and increasing environmental awareness are among the issues that are often raised in several studies (Nelson et al., 2021c; Praptiwi et al., 2021b). Studies on the environmental impacts of MT concentrate on recurring issues. Attention to issues related to technology in upholding environmental sustainability, tourism wastewater, tourist welfare and satisfaction from environmental quality, and animal sustainability still needs to be a future research plan for academics.

Future Marine Tourism Research Agenda

Theoretical future research direction: Our review indicated the need for theoretical development in a comprehensive understanding of MTR. Most research used sustainable development and stakeholder theory, which focuses on environmental, social, and economic factors and the role of stakeholders in developing marine destinations. Our observed, none of the research has comprehensively reviewed the life cycle of the MT industry, innovation and new ideas in tourism development, and how MTD shapes tourist experiences through social interactions, policies and regulations on tourism development. To examine related issues, we recommend future research explore the Tourism Area Life Cycle to predict destination life phases as a step towards renewal. The theories of diffusion of innovation, dependency, social interaction, and combined theories can also be applied to understand the impact of MT more comprehensively.

Future research for geographical context: Our findings confirmed that MT studies in Indonesia have been explored in 21 out of 38 provinces, mostly in West Nusa Tenggara and Bali provinces (43.10%). Furthermore, these studies focused on one destination; research in West Nusa Tenggara focused on Gili Matra, and several other destinations were the national government's focus. We have concerns about generalizing how maritime tourism is developing in Indonesia. Considering the geographical context, future MTR needs to highlight tourism potential and the main focus of Indonesian tourism development to provide a comprehensive understanding. Strategic areas such as the southern part of Lombok Island, Tambologan Island, Natuna Sea, Bunaken, and Wakatobi, which are on the national strategic tourism development agenda, and Likupang and Mandalika as super priority destinations for tourism development have not been explored much.

Future research for policy and regulation context: reference literature has focused on stakeholder studies and MT management. These two things are closely related to policies and regulations in implementing tourism development. However, academic attention is currently lacking in measuring policy and regulation on the impact of tourism. Scientific literature for future research needs to go deeper than what appears on the surface to guide development implementation. Protection of the environment, cultural heritage, spatial planning, and development should not only be reviewed from the impacts caused. However, a comprehensive review of established policies and regulations is required. Careful policies, regulations, and development planning are crucial to maintaining ecosystem balance and promoting long-term sustainability.

Future research for technological and innovation context: in various parts of the country, especially developed countries, along with the rapid development of technology, innovation has been made in tourism. The emergence of technology and innovation in tourism impacts improving service quality, ease of sharing information and promotion, creation of experiences, and sustainability. Meanwhile, this topic seems to be rarely studied by tourism academics. Technological developments in tourism are important for achieving sustainable destinations, recycling waste, improving waste management, and managing potential crises. Innovation in tourism plays an important role in understanding the behavior, mobility, and changes in tourist preferences so that they can provide the best version of quality tourism services. In this regard, we recommend that future research explore technological developments and innovation in tourism.

Sustainable marine tourism development: As tourism's negative impacts worsen, scholars increasingly highlight sustainable ideas. Sustainable tourism carries responsibility for the environment, improving the local economic, cultural, and social preservation. Previous research has discussed environmental sustainability through carrying capacity and waste management, economics through business potential and new alternative livelihoods, social sustainability through increasing access to education and health, and changes in community attitudes resulting from tourism development. The research emphasizes the social dimension as the object affected. However, there is still little research on the dimensions of sustainability that measures the economic impact of tourism through statistical calculations on local communities in a comprehensive manner. Future research also needs to emphasize the role of the established socio-culture of local communities in shaping tourism, especially in coastal areas and small islands with traditional lifestyles and unique cultures. Tourism is a link between hosts and tourists who influence each other, so the review needs to be done from two sides. In terms of the environment, future researchers need to review environmental changes periodically over a certain duration.

Methodological future research direction: methodological exploration in MTR has provided significant results in understanding the industry. Research tends to use one direction of information sources rather than combining, for example, tourists. Few studies use cross-source or multi-source information. For the benefit of future research, we recommend that researchers expand information sources such as tourists, communities, workers, and stakeholders for a broader understanding. However, longitudinal and experimental research methods can also be applied to examine changes over time in the causes and effects of long-term tourism development and this is a recommendation for future research.

CONCLUSION

Research on MT is an important part of the agenda to provide an in-depth understanding of the contributions and impacts produced. Tourists' high interest in spending their time exploring MT attractions is a challenge for academics to conduct further research. We have not found systematic literature research that examines this topic comprehensively to stimulate further research. We conducted a rigorous and transparent review of 58 literature using the recommended SPAR-4-SLR protocol (Paul et al., 2021c). Our findings highlighted the urgency of further research regarding geographical context, policy and regulation, socio-economic, culture and environment, tourist perception and perceived benefit, technology-based management, and technological innovation. Since this study relies on a systematic literature review (SLR), its findings are inherently constrained by the existing research's availability and scope. Furthermore, the study’s focus on Indonesian marine tourism may limit the generalizability of its conclusions to other regions with differing socio-economic and environmental contexts. While the study emphasizes the importance of collaborative efforts to establish sustainable tourism policies, it may lack a detailed analysis of the practical steps and potential barriers to policy implementation. By acknowledging these limitations, future research could build on this study’s findings by incorporating more comprehensive methodologies, empirical research, and comparative analyses across different regions and contexts.

Furthermore, future research needs to combine theories and expand the research context to the main destinations for MTD in Indonesia. Regarding methodology, we suggest involving more diverse participants, testing cause-effect relationships, and experimental and longitudinal research. For sustainable MT, future research needs to measure the economic effect, explore the feedback of residents and tourists in tourism management, and examine the role of socio-culture in tourism, not just the objects that are influenced. Regarding environmental sustainability, environment effect, integrating technological support for sustainability, tourism wastewater management, tourist welfare and satisfaction from environmental quality, and animal sustainability still needs to be a future research plan for academics.

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AUGMENTED REALITY OF STREET ART ROUTE FOR TOURISM, THAILAND

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Abstract: Augmented Reality (AR) has been identified as a powerful tool for enhacing the tourism experience. It enables the visualization of historical attractions, cultural narratives, and educational content, and fostering deeper engagement with destinations. For tourism engagement, the ancient city as Sonkhla in Thailand should be adoped AR for information services. This study aimed to investigate the proposed model and evaluate the tourist satisfaction in AR based on navigation technology, namely the AR StreetArt@Songkhla. The convenience sampling was the technique to collect data from 115 tourists using survey questionnaire. For analysis, the SmartPLS was used to investigate the proposed model and evaluate the tourist satisfaction on AR based on navigation technology. The findings illustrated the insight relationships in proposed model. It indicated that several factors on tourist satisfaction were not direct influences in every technology, especially AR based on navigation in street art. The results showed high level of tourist satisfaction in terms of perceived usefulness, perceived ease of use, perceived enjoyment, immersive experience, and tourist engagement. The AR StreetArt@Songkhla was successful development for tourists. The findings indicated that this technology can communicate culture and historical storytelling based on tourist's enjoyment during visiting street art. In addition, the proposed model revealed the direct and indirect influences on tourist satisfaction. Three perceptions did not have the direct influence on tourist satisfaction at the significant level of 0.05. However, perceived enjoyment have the indirect influence on tourist satisfaction through tourist engagment, while perception of usefulness and ease-of-use have the indirect influences on tourist satisfaction through immersieve experience. The paper provided in both theoretical and practical contributions. For theoritical contribution, the future researchers in tourism can develop their frameworks based on our proposed model, when they study in AR technology. In practical contributions, this study can help the AR developers to understand the processes of AR design and development. Additionally, the findings help the developers focusing on highlight factors in their AR design and development processes, in order to achieve tourist satisfaction, immersive experience, and tourist engagement.

Keywords: Augmented reality, culture, history, navigation, route, street art, tourism, Thailand

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INTRODUCTION

Augmented Reality (AR) is a transformative technology that overlays digital content on the real world, enhancing users' perception of their surroundings. AR blends the physical and digital worlds, allowing users to interact with both simultaneously. AR has moved beyond the realm of entertainment and gaming and is increasingly being applied across several sectors. Its versatility and the ability to deliver immersive experiences are driving innovation in several contexts such as education, healthcare, marketing, and advertising. In tourism and navigation, AR can enhance travel experience by providing real-time information on landmarks, museums, or historical sites. Tourists can use AR apps on their smartphones to view historical facts or interactive content while exploring attractions. In navigation, AR can assist tourists by displaying directions and points of interest overlaid on the physical world, improving the wayfinding experience (Hien & Trang, 2024; Lee et al., 2024, Lim et al., 2024, Zhang et al., 2024).

Songkhla is a big city in the southern Thailand. It is rich in historical, culture, and natural beauty. In recent years, it has become a vibrant hub for street arts because Songkhla is a Thai ancient city and has several storytelling of history and cultures. However, tourists are facing the problem of navigation and storytelling today. It is not convenient for them to find the nearby street art and receive the storytelling in a service. Most of them use Google Map for navigation to nearby street art, and use YouTube and Google Search Engine to get storytelling in each street art.

For solving the mentioned problem, this study developed AR StreetArt@Songkhla which is the smart technology to enhance the experience of tourists exploring Songkhla Street Art in Thailand. By combining geo-location with AR, tourists could receive guided tours that presented AR content dynamically adjusts based on the tourist's physical location, and

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enhancing the connection between the virtual and real world. The immersive content provided the significance of the art, information on the local artists, and how it tied to the country's broader cultural or historical narrative (Zhu et al., 2024). In addition, this AR used geolocation to guide tourists through specific routes, showcasing key areas where street art was located.

For successful development before launching the technology among tourists, it needed to understand the level of tourist satisfaction on AR StreetArt@Songkhla. Additionally, this study proposed a research model to understand factors on tourist satisfaction in the context of AR based on navigation technology.

LITERATURE REVIEWS

1. Augmented Reality (AR) in Tourism

Augmented Reality is a technology that overlays digital content in the real-world. AR blends virtual elements with the physical world such as 3D models, videos, texts, animations, audio, and images. Users offend viewed AR through devices like smartphones and tablets. In tourism, AR can provide additional information of historical and cultural landmarks, guide tourists through a city with digital navigation aids layered over the real landscape, and create interactive experience with art. Table 1 includes a variety of studies in several countries that investigate the role of AR in promoting, enhancing, and transforming the interaction between street art and tourism, focusing on urban environments, cultural storytelling, sustainability, and tourist engagement. Many previous studies indicated the integrating AR in tourism impacted tourist satisfactions (Chourasia et al., 2023: 42; Lee et al., 2024; Wang et al., 2024; Zhu et al., 2024). Furthermore, Chourasia et al. (2023) highlighted that AR significantly enhanced tourist engagement and knowledge acquisition, especially helping tourists understand the cultures of street art better (Yaakob et al., 2023). In addition, the location-based AR and AR navigation also enhanced tourist experiences (Moustafa et al., 2024; Omran et al., 2024; Zhang et al., 2024)

Table 1. Previous studies in tourism using AR

Authors	Summary	Context or Country
Chourasia et al. (2023)	Investigating the potential and effectiveness of augmented reality (AR) and virtual reality (VR) technologies to promote tourism in India.	Tourism Industry in India
Lee et al. (2024)	Examining the user experience of an augmented reality in AR heritage apps, and evaluation of user satisfaction and behavioral intentions.	Heritage Tourism In Hong Kong
Moustafa et al. (2024)	Influencing Augmented Reality Navigation on Human Perception: An In-depth Investigation.	Navigational Route in Egypt
Omran et al. (2024)	Illustration of systematic reviews and surveys of virtual reality and augmented reality applications on tourist engagement.	Tourist Engagement
Wang et al. (2024)	Virtual reality and augmented reality in artistic expression: A comprehensive study of innovative technologies	Artistic Field
Yaakob et al. (2023)	Enhancing tourist’s experience in tourism by developing of augmented reality on Penang’s Street art	Street Art in Malaysia
Zhang et al. (2024)	Exploring the impact of location-based augmented reality on tourists’ spatial behavior, experience, and intention through a field experiment	Location-based AR in China
Zhu et al. (2024)	Interpreting the impact of augmented reality on heritage tourism: two empirical studies from World Heritage sites	Heritage Tourism in China

2. Tourist Satisfaction

Tourist satisfaction is a key to a successful tourist destination and the push factors influence tourist satisfaction such as enjoyment, new experiences, and cultural learning (Nguyen, 2021). The following literature reviews explored the variables from various studies related to tourist satisfaction or intention to use technology as presented in Table 2.

Table 2. Construct variable and its sources

No.	Variables	Sources
1	Perceived usefulness	Liu et al., 2023; Chouykaew et al., 2024; Hossain et al., 2024; Lim et al., 2024; Rasul et al., 2024; Soltani et al., 2024
2	Perceived ease of use	Lim et al., 2024; Prakhar et al., 2024; Rasul et al., 2024; Soltani et al., 2024; Xiong & Zhang, 2024
3	Perceived enjoyment	Liu et al. (2023); Huang et al., 2024; Lee et al., 2024; Rasul et al., 2024; Soltani et al., 2024; Zhang et al., 2024
4	Immersive experience	Peng et al., 2023; Afzal et al., 2024; Hien &Trang (2024); Lee et al., 2024; Soltani et al., 2024; Zhang et al., 2024
5	Tourist engagement	Peng et al., 2023; Moliner-Tena et al., 2024; Rasul et al., 2024; Soltani et al., 2024; Xiong & Zhang, 2024
6	Tourist satisfaction	Liu et al., 2023; Huang et al., 2024; Lee et al., 2024; Lim et al., 2024; Prakhar et al., 2024; Soltani et al., 2024; Zhang et al., 2024

Liu et al. (2023) and Soltani et al. (2024) found perceived usefulness was a factor of tourist satisfaction, while several previous studies found perceived ease of use was a factor of tourist satisfaction (Lim et al., 2024; Prakhar et al., 2024; Rasul et al., 2024; Xiong & Zhang, 2024). In the AR study, Lim et al. (2024) also indicated perceived usefulness and perceived ease of use influenced on tourist satisfaction. Furthermore, most previous studies found the positive impact of memorable experience on tourist satisfaction (Afzal et al., 2024; Chia et al., 2024; Hien et al., 2024; Zhang et al., 2024), likewise, enjoyment and fun (Huang et al., 2024; Lee et al., 2024; Lui et al., 2024; Soltani et al., 2024). Additionally, the tourist engagement may be the factors of tourist happiness or satisfaction in context of AR StreetArt@Songkhla (Peng et al., 2024; Soltani et al., 2024), even though Afzal et al. (2024) did not find direct influence on tourists’ satisfaction on the smart tourism technology. Rasul et al. (2024) also did not find the relationship between perceived enjoyment and tourist intention to visit heritage sites via tourist engagement. They illustrated the indirect influences of these two factors on tourist satisfaction. Based on literature reviews, all variables in this study were derived from previous studies as presented in Table 1 and Table 2. The proposed hypotheses were presented as follows:

H1: Perceived usefulness has a positive impact on tourist satisfaction.
H2: Perceived ease of use has a positive impact on tourist satisfaction.
H3: Perceived enjoyment has a positive impact on tourist satisfaction.
H4: Perceived usefulness has a positive impact on impressive experience.
H5: Perceived ease of use has a positive impact on perceived usefulness.
H6: Perceived ease of use has a positive impact on impressive experience.
H7: Perceived enjoyment has a positive impact on tourist engagement.
H8: Impressive experience has a positive impact on tourist satisfaction.
H9: Tourist engagement has a positive impact on tourist satisfaction

RESEARCH METHODOLOGY

1. AR Design and Development

In Figure 1, there were nine processes to design and develop AR of this study, namely “AR StreetArt@Songkhla”. The first process began by researching and understanding the storytelling of Songkhla Street Art, Thailand. This process included gathering information about the art, history, and culture. Based on the storytelling, the second process prepared storyboards, scripts, and flow of the experiences. Third, the study evaluated the different AR cloud service providers such as ARLOOPA and Activive, and select the best one that was appropriate for project’s requirements. This study selected ARLOOPA in Education Plan for schools and universities because of unlimited AR views, enough cloud storage (100 GB), navigated supports, and appropriate price. Forth, Adobe Photoshop was used to create characters and elements. The fifth process used Adobe Illustrator to combine visual elements, and then create animation and motion using Adobe Affter Effect in the sixth process. Seventh, all elements were integrated using Adobe Premiere Pro to enhance the storytelling aspect. The eighth process used Unity and Vuforia to create AR experience such as AR interactions, and markers for tracking. Finally, the uploading process was done to upload AR video to ARLOOPA and set up image markers.

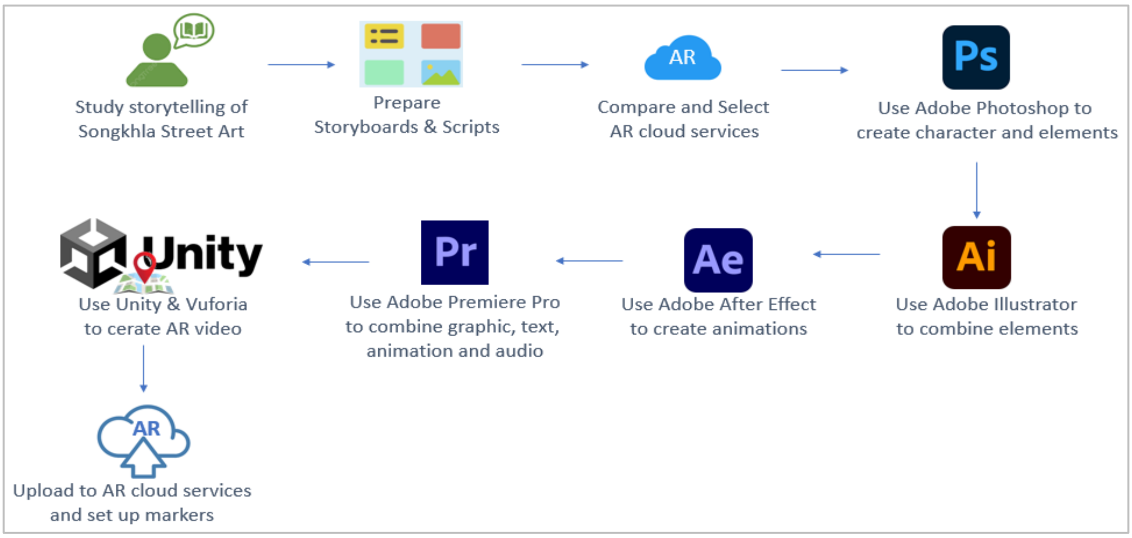


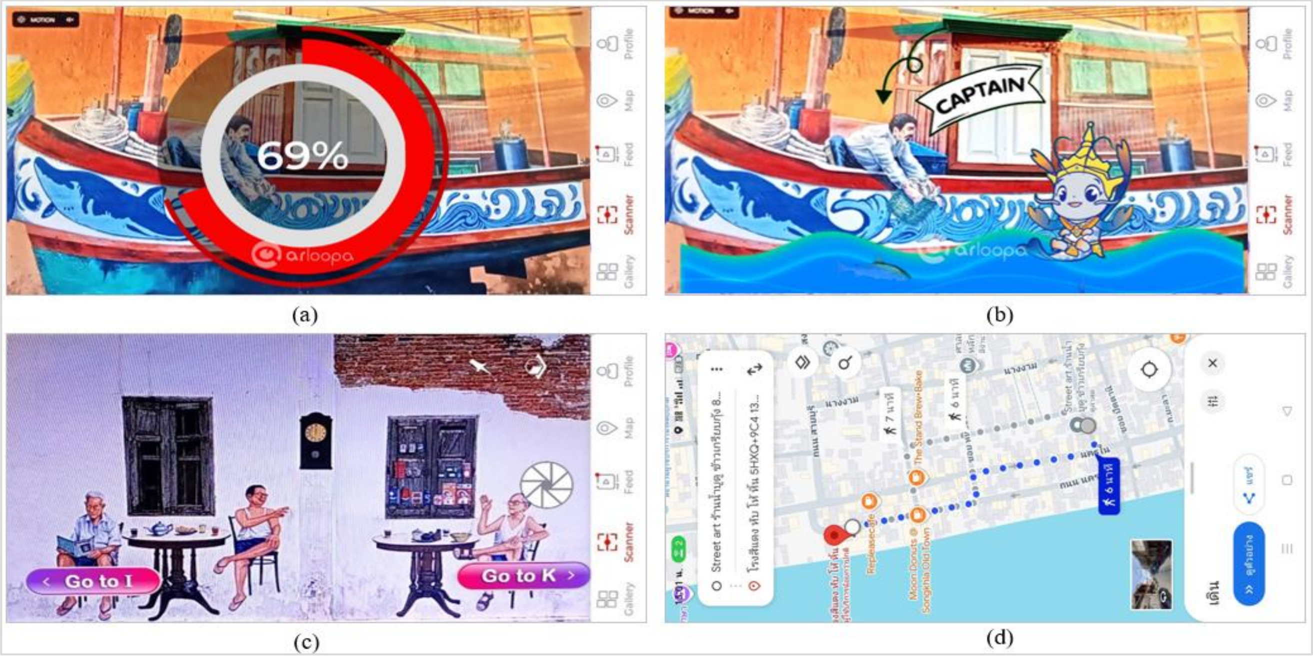
Figure 1. Processes of AR design and development (Source: personal original data)

For AR route development, the study selected 15 points (A-O) of street art in Songkhla, Thailand: (A) Shadow puppets in suits; (B) Grandparents sitting in front of the house; (C) Old man holding salted mackerel in front of the door; (D) Traditional cart coffee shop; (E) Thai fishing boats of the south; (F) Chinese opera actress; (G) Aunt Pranee's steamed dumplings; (H) Coffee shop; (I) Children of three nationalities; (J) Budu soup and shrimp crackers shop; (K) Stir-fried noodles for fortune; (L) Sidecar or Lor Lee; (M) Khor Noo & Khor Maew; (N) Ships and planes from World War II; and (O) Ancient city wall. Figure 2 showed the route of AR StreetArt@Songkhla and nearby attractions.

Figure 3 demonstrated the usage processes of AR StreetArt@Songkhla. First, tourists must install ARLOOPA application on their mobile phone before using this technology. During travel, tourists can scan the specific mural or artwork at Songkhla Street Art using ARLOOPA app’s scanner feature. As the app processes, tourists should wait until the red circular progress bar displays 100% as presented in Figure 3 (a). Next, the virtual world added a layer of interaction, turning the static mural into a more engagement experience by combining the physical and digital elements.

In the virtual world, the AR elements consisted of text, image, audio, video, and animation as the example screen in Figure 3 (b). After the storytelling ending, the app provided interactive buttons such as “Go to I” and “Go to K” as presented in Figure 3 (c). These buttons could represent navigational features, allowing the user to explore nearby AR locations or murals connected through the app. It highlights the possibility of integrating AR for guided tours, suggesting other murals or points of interest in the Songkhla Street Art. Finally, the app offered navigational features through Google Map as Presented in Figure 3 (d). The map highlights where the tourist is and where additional AR murals can be discovered, enhancing the exploration experience.

Figure 2. Route map of AR StreetArt@Songkhla (Source: personal original data)



(a) (b) (c) (d)

Figure 3. Examples of screen on AR StreetArt@Songkhla (Source: Personal original data)

2. Measurement Development

The research instrument of this study was a survey questionnaire. There were three parts of the assessment: (1) Personal information included gender, age, education, AR experience, AR experience in tourism, and experience of Songkhla Street Art; (2) A five-point Likert scale was used to evaluate tourist satisfaction in terms of usefulness, ease of use, enjoyment, immersive experience, and tourist engagement. The questions in this part were adopted from previous studies where Cronbach's Alpha values were greater than 0.7 (Hien & Trang, 2024; Lim et al., 2024; Moliner-Tena et al., 2024; Soltani Nejad et al., 2024; Xiong & Zhang, 2024; Zhang et al., 2024). Furthermore, the research instrument was sent to three experts in fields of tourism and information technology for assessment of index of item-objective congruence (IOC). The IOC value was 0.87, which indicated the items can clearly measure research objectives (Turner & Carlson, 2003); and (3) Suggestions in an open-ended question.

3. Data Collection and Data Analysis

Data were collected from tourists who visited Songkhla Street Art in Thailand between January and February 2023. The sampling technique was convenient sampling and sample size was 115 cases. According to Tabachnick and Fidell (2019), the acceptable sample size of five predictors was 90 (Rule of thumb: 50+8P), thus the data collection of this study was reliable for examining predictors. For data analysis, the SmartPLS program was used to analyze collected data in terms of mean, frequency, standard deviation (S.D.), and regression analysis. The research measurement was presented in Table 3.

Table 3. Research Measurement

Item	Measurement	Source
	Perceived Usefulness	
PU1	Using AR on my trip can increase my understanding of street art.	Lim et al. (2024), Soltani-Nejad et al. (2024)
PU2	AR can navigate to the nearby street art.	
PU3	AR is very useful for my trip.	
	Perceived Ease of Use	
PE1	Using AR is easy.	Lim et al. (2024), Soltani-Nejad et al. (2024), Xiong and Zhang (2024)
PE2	Usage learning of this AR is easy.	
PE3	This AR is easy to increase my technological skill.	
	Perceived Enjoyment	
PJ1	During trips, AR can make me have fun.	Soltani-Nejad et al. (2024), Zhang et al. (2024)
PJ2	I enjoy using AR while visiting street art.	
PJ3	AR can help me to be more excited during my trip.	
	Impressive Experience	
BI1	I like to be in the virtual reality world using this AR.	Hien and Trang (2024), Zhang et al. (2024)
BI2	The experience of using AR at my destination is truly unforgettable.	
BI3	I am very impressed when I am in the virtual reality world.	
BI4	The travel experience using AR is amazing.	
	Tourist Engagement	
TE1	AR engages me to understand street art.	Moliner-Tena et al. (2024), Soltani Nejad et al. (2024)
TE2	AR engages me to visit the other street art in Songkhla.	
TE3	AR engages me to explore nearby AR street art.	
TE4	AR engages me to take photos with Songkhla Street Art.	
	Tourist Satisfaction	
TS2	I am happy to use AR StreetArt@Songkhla.	Hien & Trang (2024), Lim et al. (2024)
TS2	I am satisfied to use this AR on my trip.	
TS3	I will suggest this AR to others.	
TS4	In overview, I like to use this AR for my trip to Songkhla Street Art.	

RESULTS

1. Demographic Analysis

For demographic analysis, 115 complete questionnaires were analyzed using descriptive statistics as presented in Figure 4. Most respondents are young females (74.14%), aged 18-25 (84.45%), and primarily have an education level below a bachelor's degree (74.14%). A large portion of volunteers lack experience with AR (65.52%) and AR in tourism (77.59%), though more than half have toured the Songkhla Street Art (62.93%).

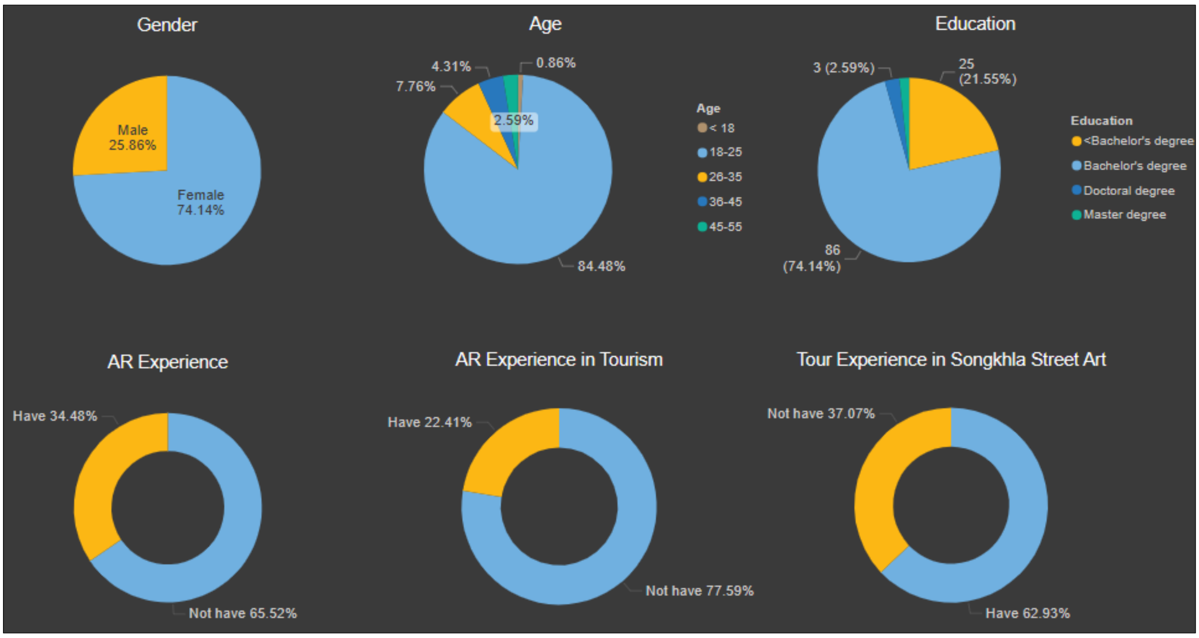


Figure 4. Results of demographic analysis (Source: personal original data)

2. Measurement Analysis

2.1 . Convergent validity and reliability

In Table 4, the results showed that all variables were high factor loadings (> 0.70), indicating strong item-construct relationships. In addition, reliability was strong across all constructs, as evidenced by Cronbach's Alpha and Composite Reliability (CR) values were above 0.70. Convergent validity was demonstrated with high Average Variance Explained (AVE) values, all above the threshold of 0.50, showing that each construct can explain a large portion of variance in its items (Hair et al., 2013).

Table 4. Convergent validity and reliability

Variables	Item	Loading	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	AVE
Perceived usefulness	PU1 PU2 PU3	0.913 0.894 0.880	.876	.877	.924	.802
Perceived ease of use	PE1 PE2 PE3	0.942 0.961 0.940	.943	.943	.963	.898
Perceived enjoyment	PJ1 PJ2 PJ3 PJ4	0.907 0.989 0.919 0.882	.923	.924	.946	.891
Immersive experience	IE1 IE2 IE3 IE4	0.938 0.927 0.932 0.916	.947	.947	.962	.862
Tourist engagement	TE1 TE2 TE3 TE4	0.931 0.927 0.907 0.917	.940	.940	.957	.848
Tourist satisfaction	TS1 TS2 TS3 TS4	0.910 0.946 0.916 0.913	.940	.941	.957	.848

2.2 . Discriminant validity

The results showed that the discriminant validity was satisfied because the bold diagonal values (square roots of AVE) were greater than the correlations between constructs as presented in Table 5. Furthermore, the Variance Inflation Factor (VIF) values were lower than 5, indicating all predictors in the model do not highly overlap measures or it does not have any problem of multicollinearity. In addition, the average scores (Mean) identified the high degree of level in each latent.

Table 5. Discriminant validity and descriptive analysis

Latent	Mean	S.D.	Fornell-Larcker						VIF
			PU	PE	PJ	IE	TE	TS	
Perceived usefulness (PU)	4.30	.823	**.896**						2.44
Perceived ease of use (PE)	4.12	.905	.851	**.948**					4.75
Perceived enjoyment (PJ)	4.20	.855	.843	.815	**.944**				3.51
Immersive experience (IE)	4.14	.958	.794	.798	.867	**.928**			4.26
Tourist engagement (TE)	4.27	.859	.814	.802	.918	.795	**.921**		3.85
Tourist satisfaction (TS)	4.28	.828	.783	.808	.886	.846	.904	**.921**	3.98

3. Hypothesis Testing

For evaluating the structural model, the results revealed the relationships between latent constructs in the context of AR StreetArt@Songkhla as presented in Figure 5. The Standardized Root Mean Square Residual (SRMR) value was 0.044 (< 0.080) and the Normed Fit Index (NFI) value was 0.904 (>0.900), then the proposed model had a good fit (Hair et al., 2013). In addition, the proposed model had higher R^2 values than 0.670 (0.865, 0.687, 0.725, 0.844), indicating model predictive relevance in high level (Hair et al., 2013).

3.1. Direct Effect

Consistent with earlier studies on tourist satisfaction, this study revealed that all direct effects were significant as presented in Table 6. The perception of usefulness (H1: $\beta = -0.088$, $p > 0.05$), ease of use (H2: $\beta = 0.127$, $p > 0.05$), and enjoyment (H3: $\beta = 0.098$, $p > 0.05$) were insignificant directly influenced on tourist satisfaction.

Tourist's perceptions of usefulness (H4: $\beta = 0.422$, $p < 0.001$) and ease of use (H6: $\beta = 0.440$, $p < 0.001$) have a significant positive influence on their immersive experience. In addition, tourists' perception of usefulness had significant positive influence on their ease of use (H5: $\beta = 0.851$, $p < 0.001$). Similarly, tourists' perception of enjoyment had the significant positive influence on tourist engagement (H7: $\beta = 0.919$, $p < 0.001$).

Table 6. Results of direct effects

Hypothesis	β	Sample Mean	S.D.	T-value	*p*-value	Result
H1: PU -> TS	-.088	-.085	.094	.928	.177	Rejected
H2: PE -> TS	.127	.131	.088	1.435	.076	Rejected
H3: PJ -> TS	.095	.087	.156	.609	.271	Rejected
H4: PU -> IE	.422	.419	.116	3.639	.000	Accepted
H5: PE -> PU	.851	.851	.037	22.726	.000	Accepted
H6: PE -> IE	.440	.422	.109	4.032	.000	Accepted
H7: PJ -> TE	.919	.919	.022	40.958	.000	Accepted
H8: IE -> TS	.345	.351	.093	3.717	.006	Accepted
H9: TE -> TS	.630	.622	.095	6.649	.000	Accepted

Specifically, the factors of tourist satisfaction in AR StreetArt@Songkhla context were immersive experience (H8: $\beta = 0.345$, $p < 0.001$) and tourist engagement (H9: $\beta = 0.630$, $p < 0.01$). Therefore, H4, H5, H6, H7, H8, and H9 were accepted, while H1, H2, H3 were rejected as presented in Figure 5.

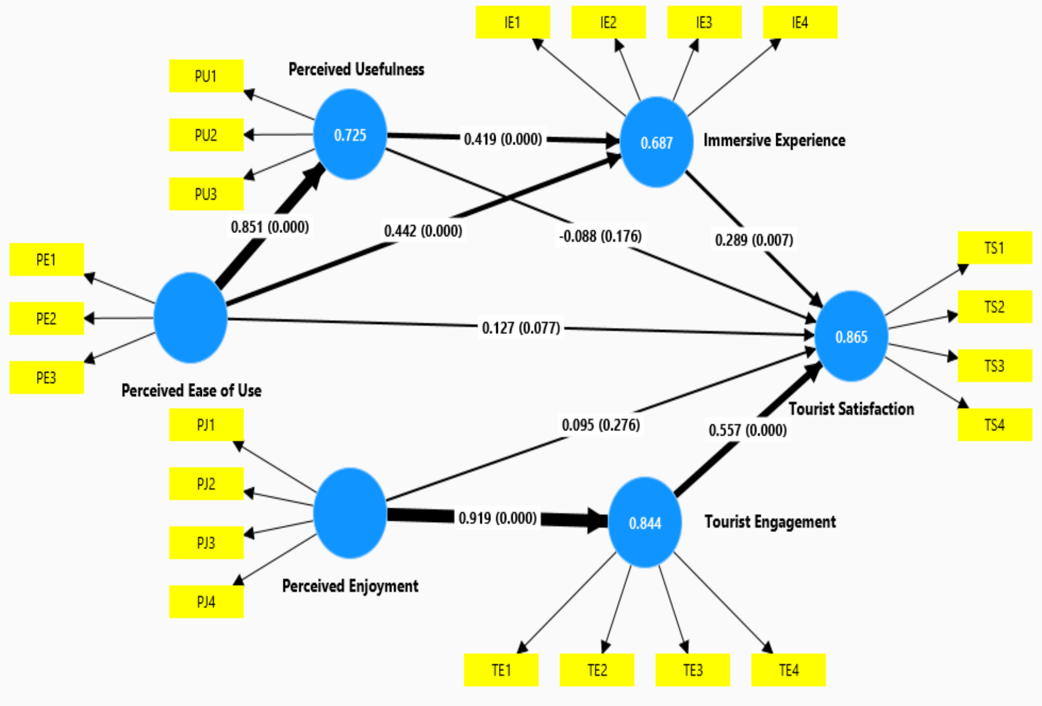


Figure 5. Results of structural analysis

3.2. Indirect effect

The analyzed results of the indirect effect revealed several noteworthy observations as presented in Table 7. The perception of usefulness ($\beta = 0.145$, $p < 0.05$) and ease of use ($\beta = 0.152$, $p < 0.01$) had the indirect influences on tourist satisfaction through immersive experience, meanwhile perception of enjoyment had the indirect influence on tourist satisfaction through tourist engagement. Furthermore, perceived usefulness had an indirect influence on tourist satisfaction through immersive experience ($\beta = 0.579$, $p < 0.001$). Additionally, the perceived ease of use also had an indirect influence on immersive experience through perceived usefulness ($\beta = 0.369$, $p < 0.001$).

Table 7. Results of indirect effects

Relationships	β	Sample Mean	S.D.	T-value	*p*-value	Relationship Sig.
PE -> PU -> IE	.369	.361	.104	3.453	.000	Yes
PE -> PU -> TS	-.075	-.069	.080	.932	.176	No
PJ -> TE -> TS	.579	.570	.089	6.502	.000	Yes
PE -> IE -> TS	.152	.152	.051	2.997	.001	Yes
PU -> IE -> TS	.145	.151	.063	2.324	.010	Yes
PE -> PU -> IE -> TS	.124	.129	.043	2.598	.011	Yes

Specifically, the indirect relationship between perceived ease of use and tourist satisfaction were revealed by mediating perceived usefulness through immersive experience of tourist ($\beta = 0.124$, $p < 0.05$). In contrast, perceived ease of use did not have any influence on tourist satisfaction through perceived usefulness ($\beta = -0.075$, $p > 0.05$).

DISCUSSION

The model presented in the structural equation and indirect effects tables highlights several significant relationships among perceived ease of use (PE), perceived usefulness (PU), perceived enjoyment (PJ), immersive experience (IE), tourist engagement (TE), and tourist satisfaction (TS) in the context of AR based on navigation technology and street art.

Firstly, both PU (H1) and PE (H2) did not have any direct influences on tourist satisfaction, but they had the indirect influence on tourist satisfaction through an immersive experience. These findings were contrast to previous studies in terms of the relationship between PU and tourist satisfaction (Lim et al., 2024; Liu et al., 2023; Nababan et al., 2024), and the relationship between PE and tourist satisfaction (Lim et al., 2024; Nababan et al., 2024; Prakhar et al., 2024). The first possible reason could be the technological differences. Most of the above mentions were not AR technology (website, electric vehicles, and travel application); thus, tourists can perceive usefulness and ease of use directly. Tourists did not want immersive experience in those technologies.

Secondly, this study illustrated that perceived enjoyment was not the direct factor of tourist satisfaction in the context of AR based on navigation (H3). It was contrasted with previous studies in other contexts such as travel applications (Liu et al., 2023) website (Nababan et al., 2024) and Artificial Intelligence (Huang et al., 2024).

Thirdly, the results confirmed that perceived ease of use is related to perceived usefulness (H5). This relationship usually is strong in most technologies such as websites (Nababan et al., 2024) AR and VR in hotels (Lim et al., 2024). Tourists will perceive more usefulness when they can use this technology easily.

Fourthly, the finding indicated the opposite influences between AR technology of this study and the study in electric vehicles (Prakhar et al., 2024). We found perception of usefulness and ease of use (H4 and H6) influenced immersive experiences, meanwhile Prakhar et al. (2024) found immersive experience influenced both perceptions. Possibly, R^2 of this proposed model was higher than those previous studies, thus indicating the better provided constructs and relationships. Further reason, tourists used this AR technology during visiting Songkhla Street Arts which included historical and cultural storytelling. Therefore, the useful contents based on easy of usage can increase tourist's immersion during AR usage.

Fifthly, the role of enjoyment in engagement. This finding confirmed the result of Soltani et al. (2024), which indicated the relationship between PJ and TE (H7). In addition, the pathway from PJ to TE and then to TS highlighted how emotional responses to technology, especially perceived enjoyment, can drive deeper engagement and lead to higher satisfaction. This aligns with the idea that AR technology must appeal to tourists' emotions to create lasting and positive attitudes.

Finally, IE and TE were the key drivers of tourist satisfaction (H8 and H9). Immersive experience is a key factor linking perceived usefulness and ease of use to tourist satisfaction. Likewise, tourist engagement is a key factor linking perceived enjoyment to tourist satisfaction, this finding supported to the results in mobile apps of E-leisure (Soltani et al., 2024). In tourism using AR based on navigation technology, the goal should be to create memorable experiences, and technology needs to offer more than just functionality. It needs to enhance engagement and immersion, transporting tourists into a more enriched experience.

CONCLUSION

The findings supported the notion that in the context of tourism, particularly with the use of AR based on navigation technology in street art, to enhance tourists' experiences and satisfaction, AR technologies should focus on providing immersive platforms including easy-to-use and useful storytelling that engage tourists at both functional and emotional levels. Furthermore, this study revealed the direct and indirect effects in proposed model in the context of AR based on navigation, which will be useful for the other researchers in the similar context.

Finally, the limitations of technology should be considered in future research. As a result of some disagreement between findings and literature reviews, the proposed model may not be explained in some technologies other than AR based on navigation, such as website, travel application, and AR in hotel.

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COOPERATION AS ONE OF THE PILLARS OF TOURISM DESTINATION MANAGEMENT

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Abstract: Cooperation in tourism includes a wide range of relationships, which together shape tourism products and services. Understanding how effective cooperation can improve access to resources, information sharing, risks and opportunities is key to the success and sustainable development of tourism in a destination. Within the Slovak Republic, three levels of destination management have been established. The study focuses on the basic, first level, within which destination management organizations operate at the local level - tourism businesses as well as representatives of cities and municipalities. For destinations, it is important to know the opinions on the cooperation of the entities that operate there. The aim of the presented contribution is to examine and evaluate the opinions and attitudes of members of first-level destination management organizations in the Prešov self-governing region in relation to their cooperation. The main research method was a questionnaire survey followed by verification of established hypotheses using the Kruskal-Wallis's test. 307 members of seven destination management organizations operating in eastern Slovakia, within the Prešov self-governing region, participated in the research. The results showed that the length of membership in a destination management organization has an impact on the perception of trust among cooperating members of destination management organizations, with the most significant impact identified in the long-term membership. Furthermore, the association between the sphere in which members of destination management organisations operate in terms of their willingness to cooperate with each other was demonstrated. An interesting finding is that the sphere of operation of destination management organisation members does not affect the perception of trust in collaboration. Thus, the study provides a real insight into the perception of collaboration through selected factors among the members of a destination management organization, which is an important finding for destination management organizations to work with further. It also points to the need to implement it with a certain temporal frequency and on a larger geographical scale while respecting the territorial units.

Keywords: destination management, stakeholders, destination, cooperation, development

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INTRODUCTION

Tourism is one of the fastest growing and economically most important industries in the world. Its dynamism and complexity require constant adaptation and innovation, which often leads to the need for effective cooperation between different actors in this sector. At the international level, the tourism sector is one of the largest and fastest growing economic sectors in the world (Brilhane & Rocha, 2023), even though it has suffered shocks caused by several crises during the last decades (Gösling et al., 2021; Kosmala, 2021). In 2019, the tourism sector in the Slovak Republic contributed 6.3% to the country's GDP, but due to the impact of the Covid-19 pandemic, it fell by -24% in 2022 compared to 2019, i.e. j. to 4.6%. In 2023, the share of tourism in GDP is expected to increase by 14.7%, i.e. j. to 5.1% of the country's total economy, with a predicted share of tourism in GDP of 6.9% in 2033 (WTTC, 2024). The stated values indicate the ability of tourism to regenerate quickly with a high tendency to return to the original state and tend to continue development. Its adaptive nature is also reflected in the systematic approach to destination management, which includes sustainable development, strategic planning (Gajdošík, 2023), emphasis on quality, as well as the condition of cooperation between interested parties and destination management organizations, further known as DMOs (Michálková et al., 2023). Cooperation in tourism includes a wide range of relationships from local businesses to international

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partnerships that together shape the products and services offered to tourists. Critical to success in tourism is an understanding of how effective cooperation can improve access to resources, the sharing of information, risks and opportunities, and how it can contribute to the growth and development of the entire sector. Thanks to cooperation, destination management organizations can achieve greater efficiency and sustainability (Gracy, 2020).

According to Garbelli (2020), cooperation in tourism is a term that refers to a voluntary and interactive process in which independent stakeholders work together, use their resources and follow agreed rules, norms and structures. Examples of cooperation in tourism may include joint marketing activities, creation of package offers, sharing of information and resources, joint events and actions, as well as cooperation on environmental protection and sustainable development of destinations (Anuar & Marzuki, 2022). Destination management is an important element in the development of tourism, as it ensures the effective management and coordination of various actors and resources in the destination. Its task is to ensure the sustainable development of tourism, improve the competitiveness of the destination and strengthen its position on the market. The impact of destination management on tourism can be very positive when it is used properly. Destinations with effective management have a greater chance of sustainable development and better results in the field of tourism. Quality management can ensure better coordination between different service providers, improve the quality of services and increase visitor satisfaction. The benefits of destination management also include improving infrastructure, promoting cultural heritage and protecting the environment. Proper management can help minimize the negative impacts of tourism, such as overcrowded destinations, pollution, and the disruption of local culture (Castañer & Oliveira, 2020).

We can cite a few examples of successful destination management:

Hawaiian Islands*:* The Hawaii Tourism Authority has implemented a comprehensive destination management plan that prioritizes sustainability, community engagement and quality tourism experiences.

Swiss Alps: The Swiss Alps have implemented a destination management strategy that focuses on sustainability, infrastructure development and community involvement in the management of tourism in this popular mountain region.

Costa Rica: Costa Rica has implemented a sustainable tourism strategy that focuses on ecotourism, community engagement and infrastructure development to promote responsible tourism practices.

Overall, destination management is a key tool for the successful development of tourism and ensures the sustainable and prosperous growth of destination destinations. It is therefore important that destinations invest in quality management and collaborate with all stakeholders to achieve common goals (Jesus &Franco, 2020). The development of the study was motivated by a document of the Government of the Slovak Republic from 2020, which focuses on small and medium-sized enterprises in tourism with an emphasis on the development of the given sector. Barriers in entrepreneurship are identified within the above publication. One of the barriers to the development of the tourism sector is the weak cooperation between tourism enterprises (Ministry of Transport and Construction, 2020). Another incentive for the creation of the study was the interest of DMOs operating in the territory of eastern Slovakia (within the cooperation of an educational institution with a practice), who expressed an interest in independently ascertaining the opinion of their members.

The importance of cooperation for tourism businesses (Perkins et al., 2021; Hartman et al., 2020) as well as for tourism organizations (Beresecká & Svetlíková, 2020; Michálková et al., 2023) are published at the level of the territory of states. The authors agree with practitioners that it is necessary to identify the perception of cooperation even in a smaller area. This is due to existing regional differences in destination potential (Cobán & Sevket, 2019; Miron and Miron, 2023) as well as the economic level of individual destinations (Islahuddin et al., 2021; Crotts et al., 2022). This brings the need to find out opinions on cooperation between members of DMOs in a specific territorial unit, as over time managers of DMOs can better understand the dynamics of relations and the attitude towards cooperation of members of DMOs, which is useful in developing appropriate strategies to manage changes in the direction of the destination in the future (Beresecká & Svetlíková, 2020). The study contributes to the current body of knowledge by pointing out the interconnectedness of cooperation with other activities and systems within the management of the destination (on a theoretical basis), encourages cooperation and identifies the specific perception and activity of cooperation of members of DMOs in a defined area.

LITERATURE REWIEV

Most authors consider destination management organizations to be strategic leaders of tourism development (Calero and Turner, 2020), highlight their position as coordinators of diverse relations between interested parties within the destination and point to the importance of their cooperation (Michálková et al., 2023). In the destination management paradigm, it is an approach to destination management that emphasizes a comprehensive and sustainable approach (Haid et al., 2021) to the development and management of destinations to optimize their economic, cultural-social and environmental contribution (Tourism 2030 Destinet Service, 2024). A tourist destination is the name given to any area, large or small, that attracts and appeals to tourists. Tourist destinations are a source of tourism income for the regions in which they are located. Tourist destinations can be natural areas, historical places or settlements with cultural significance (Philipp & Pechlaner, 2023). Stakeholders can be a community organization, business association, non-governmental organization or entrepreneurs in tourism and related industries. The goal is for the interested parties to agree on the creation of a partnership, acceptance of a common goal and subsequent cooperation (World Bank Group, 2022), ideally if they are also members of DMOs. In the conditions of the Slovak Republic, DMOs are established on the basis of Act No. 91/2010 Coll. on the promotion of tourism. At the regional level, they are the regional tourism organizations (first, basic level), at the regional regional tourism organizations (second level) (Maráková & Medveľová, 2015) and at the state level the Ministry of Tourism and Sports (from 1 February 2024) (third, top level). Specific interactions between interested parties, such as members of DMOs and DMOs themselves, are based on cooperation (Michálková et al., 2023). Van der Zee, Vanneste (2015) emphasize the benefits that should result from cooperation. These are mainly: creation and dissemination of knowledge, digitization and innovation (Medeková & Pompurová, 2024), increasing the quality of the creation and offer of tourist products, increasing the quality of the services provided, streamlining the production process, increasing the sustainability of the destination and an overall more competitive destination (Haid & Albrecht, 2021).

Medeková & Pompurová (2024) point out that DMOs are currently being presented as key entities in destination management that synchronize management and marketing for the purpose of managing and developing the destination. Fernandes et. al. (2020) note that cooperation often requires trust between participants. Without trust, effective cooperation can be difficult to achieve, as individuals (businesses) or organizations (DMOs) may fear that their requests or ideas will be misused or ignored (Czernek-Marszałek, 2020). In an extensive study, Hartman (2023) deals with the time factor and its influence on destination management, but also its influence on cooperating subjects. In recent times, authors turn to the evaluation of cooperation by DMOs members about their sphere of activity (Deladem et al., 2020; Serruto-Perea, 2024), while Cobán & Yildiz (2019) emphasizes the role of DMOs as a key factor in the effective management of the destination, which emphasizes coordination between public and private institutions.

In recent years, several authors have addressed the issue of distance management as a leader of tourism entities in a destination, an actor in the creation of networks and a supporter of cooperation. Mandić & Kennell (2021) focused on the role of destination management as an actor in creating cooperation within a smart destination. The result of their findings is that DMOs do not perceive smart destination management as beneficial unless the local population and cooperating stakeholders are involved in the management. Elvekrok et al. (2022) investigated 51 businesses cooperating within a destination network in a mountain village in Norway. The main findings of the study are: cooperation contributes to business results (increased sales, resistance to market fluctuations, etc.), respondents said that cooperation contributes to destination development and visitor satisfaction. Goffi et al. (2023) deal with destination competitiveness in Italy, from the point of view of DMOs and stakeholders. The results indicated that Italian destinations are competitive in natural and cultural resources, but less competitive in tourism policy and planning and in destination management. Nguyen et al. (2024) conducted research using process tracing to investigate the dynamics of stakeholder relationships in selected destinations in Vietnam. They found that intervention into cooperation in existing competition creates intervention into conflict in the existing state of cooperation. Baggio & Ruggieri (2024) deals with the coordination of joint activities in destinations, which they see as a value creation process and the basis for the attractiveness and development of destinations. According to the authors, destination managers are actors who propose an effective strategy to improve cooperation in the destination, while also measuring the effects of cooperation. The method offered is network analysis.

MATERIALS AND METHODS

The aim of the presented contribution is to examine and evaluate the opinions and attitudes of members of first-level destination management organizations in the Prešov self-governing region in relation to their cooperation. In the presented study, the authors focused on the evaluation of the impact of cooperation within destination management at the basic level in relation to the members of DMOs. As part of the study, the authors took a closer look at the length of cooperation, the attractiveness of cooperation, the trust of members within DMOs and the willingness to cooperate with regard to the sphere of activity of interested parties as members of DMOs.

In relation to the focus of the study and the fulfilment of the goal, the following hypotheses were established.

H1: We hypothesize that trust between cooperating stakeholders is conditioned by the length of membership in DMOs.

H2: We assume that the sphere of activity of interested parties, as members of DMOs, has an impact on the perception of trust within the cooperation.

H3: We assume that there is a relationship between willingness to cooperate and the sphere of activity of DMOs members.

H4: We assume that active participation in cooperation is conditioned by the length of membership in DMOs.

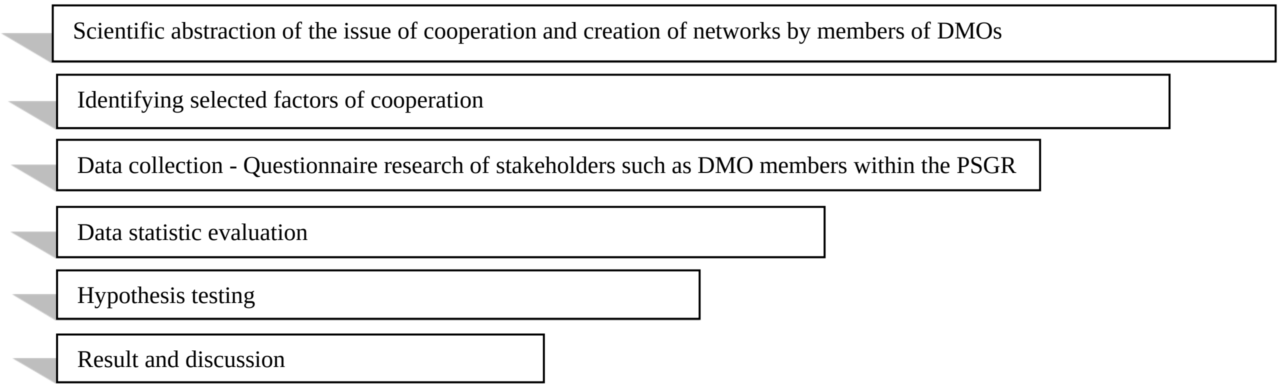

Figure 1. Methodology step scheme

The researched population consisted of DMOs at the first, basic level, i.e. regional tourism organizations in the Prešov self-governing region (next PSGR). The Prešov self-governing region is the largest administrative unit in the Slovak Republic. Within it there are natural gems (for example High Tatras) or cultural gems (for example most UNESCO monuments). Organizing various events is a matter of course. There are also important spas on the territory of PSGR (for example, Bardejov or Ružbachy and others). Figure 1 shows the complete research step scheme, with the main research method was a questionnaire. The questionnaire survey was attended by representatives of interested parties, that is, members of DMOs at the basic level, operating within the framework of the PSGR. Sphere of activity of members:

- public sphere - representatives of VÚC - PSGR, and representatives of local governments (cities and municipalities),
- public-private sphere – managers of cultural institutions (museum, gallery, etc.), and managers of civic associations and non-profit organizations,
- private sector – managers of businesses providing services in tourism (accommodation, catering, rental companies, carriers) and managers of tourist information centres.

Currently, PSGR has 34 tourist information centres, 7 regional tourism organizations, and 1 regional tourism organization. DMOs add strategic, organizational and promotional activities to destination management systems, assist in the development and strategically evaluate the given destination. The highest number of members is represented by municipalities, followed by private companies. It is interesting that non-profit organizations and professional associations are represented only to a minority extent. However, a large membership base does not always lead to a significant market presence, indicating a gap between demand and supply (World Bank Group, 2019). One e-mail for sending the questionnaire was identified for each questioned subject. A total of 337 respondents were approached to participate in the study. The return rate was 91%, which means that 307 respondents took part in the questionnaire research. The distribution of the questionnaire and the collection of data took place between February and May 2024, through the online tool Google Forms.

Descriptive statistics were used for the statistical verification of the hypotheses, then the normality of the data distribution (Shapiro-Wilk test) was tested at the significance level α = 0.05. The survey results did not confirm the normality of the data distribution, so we used the non-parametric Kruskal-Wallis test to verify/falsify the hypotheses.

RESULTS AND DISCUSSION

To answer the first research question and verify the first and second hypotheses, we summarized the statements of the questionnaire for each respondent and divided the data based on the length of membership in DMOs as a differential criterion for the first hypothesis (H1) and the type of member as a differential criterion for the second hypothesis (H2).

As part of the first hypothesis, we assumed that trust between cooperating stakeholders is conditioned by the length of membership in DMOs. Descriptive statistics of the data, as part of hypothesis 1, are presented in Table 1.

Table 1. Descriptive statistics for H1 – length of membership as a factor in cooperative trust (Source: own processing in the Gretl program)

	1 to 3 years	**4 to 6 years**	**6 and more years**
Average	7,5	8,1	6,035714286
Standard error	0,5	0,604611905	0,341847811
Median	7	9	5
Mode	7	9	4
Standard Deviation	1	1,91195072	2,558154773
Variance	1	3,655555	6,544144844
Pointness coefficient	4	1,86999381	0,332883466
Skewness	2	-1,84569369	1,242788887
Range	2	5	8
Minimum	7	4	4
Maximum	9	9	12
Amount	30	81	338

From the values of the averages in Table 1, the trust between cooperating stakeholders is closest to members who have been working in DMOs for 6 years and more, as the average of their resulting values is the lowest. However, this group of respondents achieved the highest dispersion of values as well as the range. To confirm the statistical significance of the length of membership in DMOs, as a differentiating criterion, it is necessary to use other statistical methods.

To verify or falsify H1, we used the non-parametric Kruskal-Wallis test, the results of which are shown in Table 2.

Table 2. Verification of hypothesis 1 – Kruskal-Wallis Test (Source: own processing in the Gretl program)

Krusal-Wallis Test	**1 to 3 years**	**4 to 5 years**	**6 and more years**	
median	7	9	5	
ranksum	193	493,5	1798,5	
r^2/n	9312,25	24354,23	57750,75	91 427,23
H-stat				7,74985
H-ties				8,23466
df				2
p-value				0,016288
alpha				0,05
sig				yes

The p-value is 0.016288, which is lower than the established significance level of α=0.05. This indicates that the first hypothesis (H1) can be considered confirmed. The length of membership in DMOs, long-term cooperation, has been shown to have a statistically significant effect on trust between cooperating members of DOMs (i.e., stakeholders). As part of the second hypothesis, we assumed that the sphere of activity of the members of DMOs has an impact on the perception of trust in cooperation between the members themselves. We present the descriptive statistics of the data of hypothesis 2 in Table 3. From the average values in Table 3, trust, as a selected criterion, between cooperating stakeholders is closest to non-profit organizations, as the average of their resulting values is the lowest.

Table 3. Descriptive statistics for H2 – interested parties (members of DMOs about the sector of their activity) (Source: own processing in the Gretl program)

	public sector (city/village)	private sector (enterprises)	public-private sector (non-profit organization)
Average	6,882352	6,0645162	4,5
Standard error	0,458278	0,4248601	0,2886748
Median	6	5	4,5
Mode	9	4	5
Standard Deviation	2,6713255	2,36552339	0,5773564
Variance	7,137255	5,59569879	0,3333333
Pointness coefficient	-1,13771	0,65631017	-6
Skewness	0,412738	1,19363474	0
Range	8	8	1
Minimum	4	4	4
Maximum	12	12	5
Amount	234	188	18

Table 4. Verification of hypothesis 2 – Kruskal-Wallis Test (Source: own processing in the Gretl program)

Krusal-Wallis Test	**1 to 3 years**	**4 to 5 years**	**6 and more years**	
median	6	5	4,5	
ranksum	1307,4	1024,6	83	
r^2/n	50281,07	33857,06762	1722,4	85871,29
H-stat				3,320122
H-ties				3,527218
df				2
p-value				0,171542
alpha				0,05
sig				no

The p-value is 0.171428, which is higher than the established significance level α=0.05. This indicates that we cannot consider the second hypothesis (H2) to be confirmed. It was shown that the sphere of activity of interested parties, as members of DMOs, does not have a statistically significant influence on the perception of trust among the cooperating members of DMOs. The second research question focused on which sector tourism cooperation is interesting for.

We summarized the points for the statements from the questionnaire for each respondent and divided the data based on the type of membership organization as a differentiating criterion. As part of the third hypothesis (H3), we assumed that there is a relationship between willingness to cooperate and the sphere of activity of DMOs members. Descriptive statistics of these data are presented in Table 5. From the average values in Table 5, it can be seen that cooperation in tourism is more interesting for the private sector of member organizations, since the average of their resulting values is the lowest.

To verify or falsify H3, we used the non-parametric Kruskal-Wallis test, the results of which are shown in Table 4.

Table 5 Descriptive statistics for H3 – willingness to cooperate in relation to the sphere of activity of DMOs members (Source: own processing in the Gretl program)

	public sector (city/village)	private sector (enterprises)	public-private sector (non-profit organization)
Average	8,26471	6,3872	6,5
Standard error	0,55742	0,52814	0,95734
Median	8	5	7
Mode	8	4	8
Standard deviation	3,25062	2,94072	1,91845
Variance	10,5624	8,64561	3,66677
Skewness coefficient	-0,6454	0,91917	-1,2891
Skewness	0,47412	1,27452	-0,85461
Range	10	10	4
Minimum	4	4	4
Maximum	14	14	8
Amount	281	198	26

The p-value is 0.033544, which is higher than the established level of significance α=0.05. This indicates that the fourth hypothesis (H4) can be considered confirmed. It turned out that cooperation in tourism is more interesting for the private sector within the members of DMOs, that is, that there is a relationship between the willingness to cooperate and the sphere of activity of a member of DMOs.

Table 6. Verification of hypothesis 3 – Kruskal-Wallis Test (Source: own processing in the Gretl program)

Krusal-Wallis Test	**1 to 3 years**	**4 to 5 years**	**6 and more years**	
median	8	5	7	
ranksum	1401,4	889,46	124	
r^2/n	57771,23	25521,86	3842	87136,78
H-stat				6,490732
H-ties				6,789675
df				2
p-value				0,033523
alpha				0,05
sig				yes

The third research question (Table 6) examined whether active participation in cooperation is conditioned by the length of membership in DMOs. To answer it and verify the fourth hypothesis (H4), we summarized the statements of the questionnaire for each respondent and divided the data based on the length of membership in DMOs as a differentiating criterion. As part of hypothesis H4, we assumed that active participation in cooperation is conditioned by the length of membership in DMOs. We present the descriptive statistics of the data of hypothesis 4 in Table 7.

Table 7. Descriptive statistics for H4 – attractiveness of cooperation with regard
to the length of membership in DMOs (Source: own processing in the Gretl program)

	1 to 3 years	**4 to 6 years**	**6 and more years**
Average	10,5	10,1	7,957245
Standard error	0,5	0,94819	0,401887
Medan	10	11	7
Mode	10	11	6
Standard deviation	1	2,998231	3,014888
Variance	1	8,989888	9,09815
Pointness coefficient	4	1,375489	-0,56978
Skewness	2	-1,695767	0,781265
Range	2	8	10
Minimum	10	4	4
Maximum	12	12	14
Amount	42	101	446

From the average values in Table 7, it is clear that active participation in cooperation is closest to members who have been in DMOs for 6 years or more, as the average of their resulting values is the lowest. This group of respondents achieved the highest dispersion of values as well as the range.

Table 8. Verification of hypothesis 4 – Kruskal-Wallis Test (Source: own processing in the Gretl program)

Krusal-Wallis Test	**1 to 3 years**	**4 to 5 years**	**6 and more years**	
median	10	11	7	
ranksum	195,4	448,67	1840	
r^2/n	9555,12	20116,78	60523,89	90 193,23
H-stat				4,771201
H-ties				4,860723
df				2
p-value				0,087782
alpha				0,05
sig				no

The p-value is 0.087728, which is higher than the established significance level of α=0.05. This indicates that we cannot consider the fourth hypothesis (H4) to be confirmed (Table 8). It turned out that the length of membership in DMOs (otherwise, the assumed long-term cooperation between DMOs members) does not have a statistically significant effect on active participation in cooperation. Cooperation in tourism refers to the joint efforts of various stakeholders, including governments, local communities, businesses and tourists themselves, to promote and develop tourism in a responsible and sustainable manner. Examples include organizations that bring together local stakeholders to promote and manage tourism in a particular destination. They work together to develop marketing campaigns, improve infrastructure and improve the overall tourist experience. Another example is cooperation between government agencies and private companies, which can lead to the development of new tourist attractions and services. For example, the government may partner with a private company to build an accommodation facility. The main advantages of cooperation in tourism include:

Increased competitiveness - cooperation can help destinations differentiate themselves from the competition and thus attract more tourists.

Efficiency – shared resources and expertise can streamline processes and reduce costs.

Sustainability – working together on sustainable initiatives can help reduce the negative impacts of tourism on the environment and local communities.

Economic benefits – cooperative efforts can lead to increased investment and job creation in the tourism sector (Ma et al., 2020; Mathew & Sreejesh, 2017; Stare & Križaj, 2018).

The aim of the presented contribution is to examine and evaluate the opinions and attitudes of members of first-level destination management organizations in the Prešov self-governing region in relation to their cooperation. The areas of research were based on a comprehensive evaluation of the questionnaire, where, in contrast to a general evaluation, the authors focus more closely on a specific issue, the intention of which is, however, broader than the set hypotheses.

The first research question examined whether long-term cooperation increases trust between stakeholders who are members of DMOs (the first, basic level of destination management), resulting in two hypotheses. As part of the first hypothesis, we assumed that trust between cooperating stakeholders is conditioned by the length of membership in DMOs. The results showed that trust between cooperating stakeholders is closest to members who have been in DMOs for 6 years or more. Their average of the resulting values is the lowest. This group of respondents achieved the highest dispersion of values as well as the range. We statistically confirmed hypothesis 1. As part of the second hypothesis, we assumed that the sphere of activity of interested parties, as members of DMOs, has an impact on the perception of trust within the cooperation. The chosen criterion, among the cooperating interested parties, is the closest to non-profit organizations, since the average of their resulting values is the lowest. We failed to confirm hypothesis 2.

The second research question investigated the interest in cooperation among the members of DMOs with regard to their sphere of activity. From the values of the averages, it can be seen that cooperation within DMOs (for example, in the creation of new tourism products, etc.) is most interesting for the private sector of member organizations (i.e. tourism enterprises and related enterprises), since the average of their resulting values is the lowest. We statistically confirmed hypothesis 3.

The third research question turned into the fourth hypothesis (H4). As part of hypothesis 4, we assumed that active participation in cooperation is conditioned by the length of membership in DMOs. From the values of the averages, it is clear that active participation in cooperation is closest to members who have been in DMOs for 6 years or more. Their average of the resulting values is the lowest. Hypothesis 4 was not statistically confirmed.

CONCLUSION

Based on the results of the study, it is possible to make several recommendations for improving cooperation between interested parties, members of DMOs and thereby improving the processes taking place in the destination as well as its competitiveness and attractiveness on the tourism market.

The first priority is the introduction of programs to support long-term cooperation, where DMOs should create and support initiatives that allow members to work together on joint projects for a long time. These programs could include joint marketing campaigns, member exchanges and joint educational programs.

The next applied step should be education about the importance of trust, which will contribute to the support of cooperation (as shown in tables 1 to 4). DMOs should organize seminars and workshops focused on the importance of trust in cooperation and methods of building it.

Equally important are regular surveys and feedback, if DMOs conduct among members and find out their opinions on the effectiveness and results of cooperative activities, it could help identify areas for improvement.

It is necessary to support the strengthening of cooperation not only between the members, but also among the DMOs themselves. Considering the confirmed differences in active participation in cooperation between individual members of DMOs (Tables 5 and 8), it would be appropriate to intensify mutual cooperation and sharing of best practices, even among DMOs themselves with a higher level of activity.

Furthermore, support is focused on OOCR for optimal conditions for cooperation. DMOs should analyze and address barriers that prevent more effective cooperation. Adapting internal processes and structures can help improve these conditions.

The result of the study is the creation of a platform for sharing knowledge. This could be an online or physical platform where successes, strategies and case studies could be regularly shared among all DMOs. These recommendations could help increase the quality and competitiveness of tourism services in the PSGR, improving the overall experience for both tourists and local residents. In addition, it would benefit the connection of practical experience with the educational activities of secondary schools, but especially universities, which would use the given method of sharing knowledge in the form of e.g. case studies in the preparation of future managers in tourism.

In conclusion, we can cite a few examples of successful cooperation in tourism:

The Japan National Tourism Organization (JNTO) works closely with local governments and private companies to promote Japan as a tourist destination.

The European Tourism Commission (ETC) brings together national tourist boards from European countries with the aim of promoting Europe as a tourism destination.

The African Tourism Board (ATB) is a continental organization that promotes tourism in Africa through collaboration between governments, private companies and local communities.

Cooperation in tourism is essential to support sustainable development, improve the overall experience and increase competitiveness. Effective cooperation requires effective communication, trust building and cooperation between stakeholders with different interests and priorities (Stoffelen & Vanneste, 2017).

The benefit of the study to practice: The presented study focuses on the evaluation of cooperation from the point of view of DMOs and its members (interested parties, stakeholders) within the perception of cooperation in terms of trust between the monitored subjects, with regard to the sphere of activity of DMOs members and in terms of the influence of length on membership in DMOs. The findings resulting from the tested hypotheses provide significant feedback of the current situation for DMOs, as the main leader of the destination and the activator of relations between its members, precisely for the purpose of creating cooperative ties. The fact that cooperation is one of the basic pillars of destination management must be realized by destination management organizations and their members in order for the destination to survive in the highly competitive tourism market.

The benefit of the study in the educational process: As part of the educational process of the study, the perspective brings practical examples of successful cooperation, and also emphasizes and instills in tourism students the importance and necessity of cooperation itself. It points to the facts that cooperation brings, such as contacts, solidarity and trust, understanding of a common vision and, subsequently, by combining the forces of companies in different spheres of activity (i.e. different types of companies) through the creation of attractive tourist products and the prosperity of the destination.

Limitations of the study: It is at the level of research in that not all entities that can be considered stakeholders have been involved. Likewise, the trajectory of time and experience, where due to the implementation of joint projects and the creation of tourist products, opinions and attitudes can change, both in the positive and in the negative sphere, among the monitored subjects. Another limitation of the study is the geographical factor, namely the focus on the largest administrative region of Slovakia, which summarizes the rich natural (High Tatras) and cultural (UNESCO sites) tourism offer. However, the limits do not reduce the quality and importance of the study, rather they point to the necessity of its implementation at a certain time frequency and on a larger geographical scale with respect to territorial entities (for example, Slovakia).

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THE IMPACT OF CLIMATE ON THE COMFORT OF TOURISTS IN THE ALGERIAN DESERT - THE CASE OF ADRAR STATE, ALGERIA

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Abstract: In an effort to address the delays observed within the tourism sector in Algeria, the Algerian government is currently undertaking initiatives to enhance various tourist destinations, with particular emphasis on the desert tourism destination due to the vast area occupied by the desert, which is approximately 87% of the total area of the country, it has enormous and charming tourism potential. Furthermore, the planning necessary for the development of desert tourism necessitates the consideration of multiple factors, including the climatic conditions that influence the degree of comfort experienced by tourists while engaging in diverse tourism activities, this will inevitably determine the length or shortness of the tourist season. This research endeavors to investigate the situation in the state of Adrar Located in the far southwest of Algeria as a representative model for desert tourism in Algeria by measuring the temperature and humidity index (THI) devised by the scientist Thom in 1959 to assess comfort levels, which depends on temperature and relative humidity, alongside the Robaa index (RI) proposed by Robaa Mohamed Abdel Hamid in 1999, which quantifies the level of climatic comfort by integrating three climatic variables: dry heat temperature, wet temperature, and wind velocity, utilizing climate data collected over the period from 1996 to 2008, which was sourced from the National Meteorological Office, and given the vastness of the study area extending over an area of 427.968 km2 (representing 17.98% of the total area of the Algerian state), we used data from the three meteorological stations located there, which are distributed spatially from the north of the state to its south as follows: Timimoun station, Adrar station and Bordj Badji Mokhtar station, This will enable us to identify comfortable and uncomfortable periods, with the aim of planning the various tourist activities that tourists can practice in this state according to those periods. In the present study, the descriptive analytical method was employed. The findings derived from this analysis indicated that the integration of these two indicators facilitated the identification of three distinct levels of climatic comfort within the state: complete comfort, relative comfort, and discomfort. These levels exhibit temporal variations throughout the months of the year, as well as diurnal and nocturnal fluctuations, and they also demonstrate spatial differences across the four regions of the state that extend from north to south.

Keywords: comfort, climate, temperature and humidity index, Robaa index, tourism, Algerian Desert, Adrar State

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INTRODUCTION

In contemporary society, tourism has emerged as a paramount and rapidly expanding economic sector. In 2019, the World Tourism Organization counted nearly one billion tourists in the world, with revenues for that year reaching an impressive 1,700 billion dollars. Consequently, it is reasonable to observe the heightened interest exhibited by numerous nations in the tourism industry and the imperative to enhance its development. Tourism has evolved into a crucial sector that occupies a significant position within the diverse programs and developmental strategies of these nations, aimed at diversifying their revenue streams and economic income. Presently, tourism is recognized as one of the foremost economic activities globally and is acknowledged as a catalyst for advancement (Esparza-Huamanchumo et al., 2024). It has a role in the economic development of cities and in bringing several benefits to the locals. Economists believe that it is one of the most promising industries from which the Third World can benefit to substitute other industries (Yazdanpanah et al., 2016).

Desert tourism represents a specific category of (natural) ecotourism. Its domain encompasses arid regions, including: sand dunes, barren mountain ranges, arid valleys, natural oases, khabari, and depressions. The human dimensions of this tourism type encompass the lifestyle and cultural practices of desert inhabitants, which are deeply intertwined with the characteristics of the desert, thereby creating a unique paradigm of existence in both urban and rural contexts (Ghraiba, 2012), it is also defined as tourism dedicated to exploring the desert, in which oases are used as a point of departure and arrival (Benaissa et al., 2022). In this type of tourism, specific types of people enjoy visiting unusual places, which offer specific attractions or activities (Doreen, 2016). The Algerian state acknowledges the paramount significance of cultivating a multifaceted tourism sector that yields benefits across economic, social, cultural, and political dimensions. Considering its

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diverse natural and anthropogenic tourism assets, which have not yet aligned with prevailing tourism trends, Algeria is classified among the least attractive nations for international tourists. It accounts for a mere 1.1% of the market share in Africa, in stark contrast to 20.8% for South Africa, 19% for Tunisia, and 14.9% for Morocco (Ben Turki & Cherfi, 2019). Accordingly, Algeria is currently endeavoring to rectify the lag experienced in this sector to enhance its tourism image through various tourist destinations, of which desert tourism is a pivotal component.

Algeria's current emphasis on desert tourism is driven by the extensive area occupied by desert landscapes, which constitutes 87% of the country's total land area. This region possesses substantial and enchanting tourism potential. By investing in and developing these resources, Algeria has the capacity to transform its desert areas into appealing tourist destinations for global tourism traffic, especially amidst the current global momentum surrounding competition in attracting visitors. Furthermore, tourism in desert areas contributes effectively to the economic, social, cultural and environmental development of these areas (Bouaicha et al., 2019). In this context, a multitude of strategies and mechanisms have been employed to enhance the tourism sector, with the most significant being the Tourism Development Master Plan for Horizon 2025, which serves as a strategic reference framework for the formulation of tourism policy in Algeria within the paradigm of sustainable development. This plan constitutes an integral component of the National Territorial Planning Scheme for Horizon 2025. The Tourism Development Master Plan posits that the southern regions (specifically, the Sahara) represent a distinctive heritage of exceptional value for Algeria that warrants respect and should be emblematic of Algerian tourism. The Tourism Development Master Plan has categorized the national territory into seven tourism excellence poles, tasked with actualizing “showcases symbols” to foster the emergence of a unique and sustainable tourist destination capable of competition and innovation, thereby facilitating the proliferation of tourism across the national landscape. Notably, four of these poles are situated in the desert (Ministry of territorial Planning, Environment and Tourism, 2008).

In alignment with this endeavor, the planning process for the advancement of desert tourism must consider a plethora of factors, including climate as one of the main factors affecting development in the tourism sector (Goh, 2012), as it affects the timing and length of the tourism seasons (Mahmoud et al., 2019), and is an important consideration in tourists’ choice of destination (Lise & Tol, 2002). A number of studies have found this. According to a study by Lohmann & Kaim in 1999, the climate is the third most important factor influencing the choice of a holiday destination by German travelers. Kozak found in a study conducted in 2002 on German and British tourists in Mallorca and Turkey that “enjoying good weather” was the major factor for travel. Hamilton and Lau in 2005 confirmed that climate is at least the third most common characteristic in the decision-making process of tourists. A field survey conducted by Gossling, Bredberg, Randow, Svensson, and Swedlin in 2006 indicated that 53% of respondents rated climate as a very important factor in destination choice (Goh, 2012). Through the various climatic elements, the level of comfort experienced by tourists during their visits, their stays in desert locales, and their engagement in various tourism activities can be determined, which will inevitably dictate the length or brevity of the tourist season.

Climate comfort is defined as the comfort of a healthy person acting without any self-protection equipment in nature (Liu et al., 2020), it is the condition of thermal equilibrium between the human body and its environment, where The human body sustains a stable temperature (37 degrees Celsius) without resorting to increasing its temperature through shivering in response to cold or enhancing cooling through perspiration in reaction to heat, or by other means (Ammar & Sarah, 2019), which allows individuals to maximize their physical and intellectual capacity (Lucio & Gomes, 2023). Climate elements were used to calculate climatic comfort or environmental stress initially in the study of animal life and then their application gradually extended to sciences focused on the study of humans (Liu et al., 2020), and is affected by air temperature, wind speed, radiation, humidity, clothing and activities performed (Toy et al., 2007), in addition to sex, age, health status and nature of eating. Consequently, the extent of human interaction with climatic variations differs from individual to individual and over time. Achieving a standard of normal comfort for one individual under specified conditions at a particular time may not be attainable for another individual under identical circumstances (Nashwan, 2004). Therefore, the challenge of quantifying the level of climatic comfort through mathematical principles and disseminating those findings to the populace persists. Nevertheless, several initiatives have emerged aiming to assess human comfort levels in diverse environments by proposing various indicators, some of which are predicated on a singular climatic element, while others are based on two or more climatic elements. However, these indicators remain relative and provide estimates and information about human comfort in general (Ghanem, 2010).

The objective of this article is to evaluate the level of climatic comfort within the Algerian desert, utilizing the model of Adrar State, which possesses substantial and diverse tourism potential, both natural and anthropogenic. If optimally harnessed, this potential could significantly contribute to the flourishing of tourism activities and serve as a catalyst for local development within the region. We will employ the Temperature-Humidity Index (THI) devised by the scientist Thom in 1959 to assess comfort levels in the United States, which serves as a pertinent standard for characterizing individuals' perceptions of high temperatures, contingent upon temperature and relative humidity (Zakri, 2005), alongside the Robaa Index (RI) proposed by Robaa Mohamed Abdel Hamid in 1999, which quantifies the level of climatic comfort by integrating three climatic variables: dry heat temperature, wet temperature, and wind velocity (Robaa, 2003), This will enable us to identify comfortable and uncomfortable periods, with the aim of planning the various tourist activities that tourists can practice in this state according to those periods.

STUDY DATA, TOOLS, AND METHODOLOGY

In order to engage with the subject matter effectively, and given the vastness of the study area, we have utilized data from three meteorological stations located there, obtained from the National Meteorological Office, which are distributed spatially from the north of the state to its south as follows: Timimoun station, Adrar station and Bordj Badji Mokhtar station, during the period (1996 - 2008), and the following table (Table 1) highlights the characteristics of these stations.

Table 1. Characteristics of Aerial Monitoring Stations Approved in the Study
(Source: Construction of Authors based on the data of the National Meteorological Office)

Station	Timimoun station	Adrar station	Bordj Badji Mokhtar station
Height (m)	312	279	397
Longitude	00°17′ E	00°11′ W	00°57′ E
Latitude	29°15′ N	27°49′ N	21°20′ N

Through the aforementioned stations, we acquired the subsequent climatic parameters: the mean temperature of the arid heat (°C), the relative humidity percentage (%), and the mean wind velocity (m/s). The data pertinent to the mean temperature of the moist environment (°C) were derived from a table that computes this temperature utilizing the dry temperature and relative humidity, which can be accessed online through the following hyperlink (https://www.thermexcel.com/french/tables/th.htm). The Temperature Humidity Index (THI) shall be computed using the following equation: $THI = T - 0.55 (1 - H) (T - 14.5)$ (Moses, 2017).

In this equation, THI represents the comfort factor, T denotes the temperature in (°C), H signifies the relative humidity/100, and the constants 0.55, 1, and 14.5 are predetermined values. The values derived from this index are interpreted in accordance with the criteria presented in the subsequent table (Table 2) (Mazen, 2012).

Table 2. Temperature and Humidity Index and the corresponding human sensation

Result (numeric value without unit)	less than 10	10 - 15	15 - 18	18 - 21	21 - 24	24 - 27	27 -29	More than 29
Sensation	very cold discomfort	cold discomfort	Cool comfort	Complete comfort	Warm comfort	Hot discomfort	Extreme heat discomfort	High stress and dangerous to health
Symbol of every sensation	C^-	C	P^-	P	P^+	H	H^+	H^{++}

The Robaa Index (RI) shall be computed using the following equation:

$RI = 1.53T_d - 0.32\ T_w - 1.38V + 44.65$ (Robaa, 2003); Where: RI denotes the quarterly index /T_d represents dry temperature (°C) /T_w signifies wet temperature (°C) /V indicates wind velocity (m/s) 44.65 is a constant parameter.The resultant values derived from this index are elucidated as depicted in the subsequent tabulation (Table 3) (Robaa, 2003).

Table 3. The Robaa Index and the corresponding human sensation (source: The symbols in this table are proposed by Authors)

Result (numeric value without unit)	less than 60	60 to less than 65	65 to less than 75	75 to less than 80	80 to less than 85	greater than or equal to 85
Sensation	Everyone feels cold	50% of people feel cold	All people feel comfortable	50% of people feel hot	Everyone feels hot	Everyone feels very hot
Symbol of every sensation	C	P^-	P	P^+	H	H^+

Utilizing the two indicators established in this investigation, we shall ascertain the diurnal and nocturnal climatic comfort intervals pertinent to the diverse regions within the state. For the diurnal assessment, we have relied upon the mean maximum temperatures. Conversely, during the nocturnal phase, we employed the mean minimum temperatures.

Our evaluation of the overall climatic comfort level within the state will be derived from the integration of the outcomes of these two indicators. Moreover, it is imperative to consider that the outcomes obtained from each meteorological station will be applicable to the region in which it is situated or in proximity to it. Consequently, we will attribute the findings from the Timimoun station to the Gourara region (located in the northern part of the state). The results from the Adrar station will correspond to the Touat and Tidikelt regions (central part of the state), whereas the findings from the Bordj Badji Mokhtar station will pertain to the Tanzrouft region (southern part of the state). Regarding the methodological instruments employed in this study, we utilized the Geographic Information Systems (MapInfo Professional 8.0) software to construct cartographic representations. Data processing and graphical representation were conducted using Microsoft Excel (Microsoft Excel). As for the treatment method adopted in this study, it will be according to the descriptive analytical method.

STUDY AREA

The state of Adrar is situated in the extreme southwest of Algeria (Figure 1), approximately 1500 km from the capital city of Algiers, and is geographically positioned between 1 degree east and 3 degrees west longitude, as well as between 20 and 30 degrees north latitude. Consequently, the Greenwich Meridian, also known as the World Time Line, traverses this region.

In accordance with the administrative division of Algeria established in 1987, the state covers a vast area of 427.968 Km^2 (Directorate of Programming and Budgetary Monitoring of Adrar State, 2015), which constitutes 17.98% of Algeria's total landmass (2,381,000 Km^2). Considering the expanse of the Algerian desert, which measures 2,081,000 square kilometers (National Office of Statistics, 2011), the state of Adrar occupies 20.57% of this desert territory, equating to one-fifth of the total area. The state of Adrar shares its boundaries with five other states within the national framework, as well as with two foreign nations. To the north, it is bordered by the state of El Bayadh; to the northwest, by the state of Bechar; to the northeast, by the state of Ghardaia; to the west, by the state of Tindouf; and to the southeast, by the state of Tamanrasset. Additionally, it shares a southern border with the state of Mali, extending approximately 983 kilometers, and a southwestern border with the state of Mauritania, which stretches about 100 kilometers.

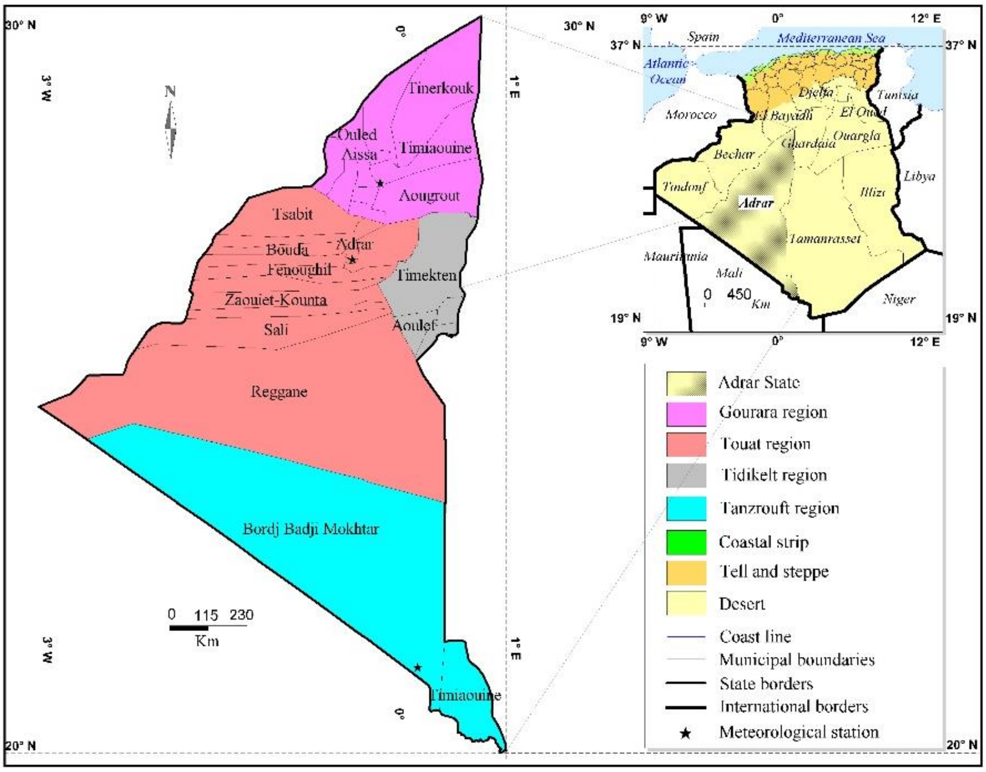

Figure 1. Location of Adrar State and its geographical regions (Source: Authors based on the administrative division of Algeria in 1984 and Statistical collections No. 163/2011, “Urban framework”, ONS 2011)

Administratively, the state is composed of 28 municipalities. Geographically, it is subdivided into four principal regions:

a. The Gourara (Timimoun region): This region is situated in the northern part of the state and comprises 15.24% of its total area.

b. The Touat (Adrar region): Located in the central portion of the state, this region accounts for 48.05% of its overall area.

c. The Tidikelt (Aoulef region): Positioned on the eastern side of the state, this region constitutes 5.73% of its area.

d. The Tanzrouft (Bordj Badji Mokhtar region): This region is found in the southern part of the state and represents 30.98% of its total area.

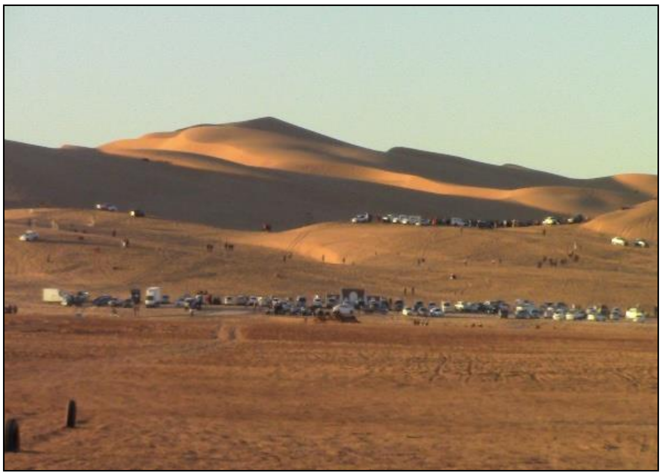

Figure 2. Sand dunes near Timimoun Kasar (Source: Authors, 2014)

Figure 3. Local architectural character - Adrar city center

According to the General Population and Housing Census conducted in 2008, the population of the state was recorded at 399,714 individuals, distributed across the aforementioned regions in the following proportions: 30.53% residing in the Gourara region, 50.50% in the Touat region, 13.74% in the Tidikelt region, and 5.23% in the Tanzrouft region. As per estimates from 2019, the total population has now surged to approximately 528,000 individuals (Ministry of Interior and Local Communities, 2019). The state of Adrar possesses a plethora of both natural and anthropogenic tourism resources (Figures 2 and 3). In terms of its natural attributes, the terrain is marked by a rich diversity. It is predominantly composed of four distinct morphological features: plateaus, plains, sand dunes, and Sabakhat, which collectively contribute to the state's varied landscapes, alongside numerous caves, the most notable being Ighzer in Ouled Saïd. On the anthropogenic front, the region is home to numerous desert palaces (Ksours) distinguished by their architectural uniqueness, constructed using indigenous building materials such as clay and palm components. Furthermore, a significant portion of its palm oases employs the foggara irrigation system, which was designated as a UNESCO World Heritage Site in 2018.

The expertise and methodologies related to water management within this system were recognized as part of the intangible cultural heritage of humanity in the same year, in addition to the inclusion of Tamantit Oasis in the Ramsar List of Wetlands in 2001. The state also boasts a rich repository of folkloric and musical literature, prominently featuring the Ahelil character, which was classified as World Heritage by UNESCO in 2005, along with various religious events, the most notable being the Esboua El-moulid, celebrated on the 18th of Rabie Al-Awaal each year (the Hijri calendar), recognized as a World Heritage by UNESCO in 2015. Additionally, the state is abundant in traditional crafts such as pottery, particularly renowned in the Tamantit area. Complementing these attributes are ancient manuscripts discovered in Zaouias and Quranic schools that safeguard extensive knowledge across various disciplines, as well as sites of inscriptions and rock carvings that date back to ancient epochs. According to the Emberger Index, the climatic conditions of the state are classified as desert, exhibiting two variants of winter: a moderate climate in the northern and central regions (specifically Gourara, Touat, and Tidikelt), and a hot climate in the southern region (notably the Tanzrouft area).

As per the data provided by the Directorate of Tourism and Traditional Industry of Adrar State, the influx of tourism to the state during the period from 2000 to 2019 experienced various fluctuations around an average of 16,372 tourists. The peak tourist influx occurred in 2004, with a total of 26,161 visitors, while the lowest recorded number was 10,771 tourists at the commencement of this period in 2000. Consequently, the overarching trend in the evolution of tourism traffic indicates a slight decrease, approaching a state that can be characterized as stable, as illustrated by the following regression line equation ($y= -16.107x + 16541$), as demonstrated in Figure 4. Concerning the origins of tourism flows to the state during the aforementioned period, domestic tourism predominates, comprising over 86% of total flows across all years, as depicted in Figure 5.

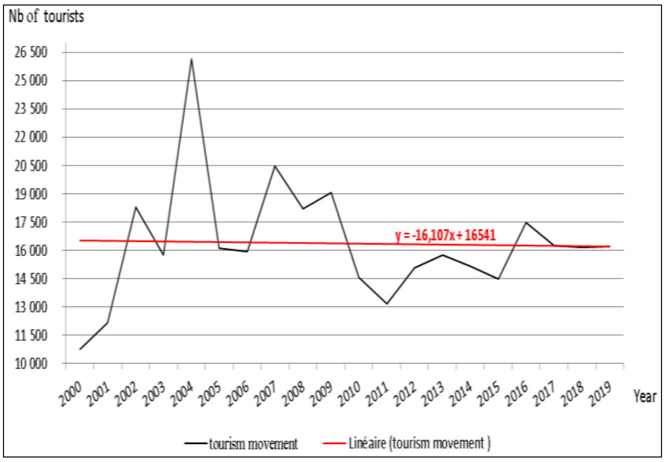

Figure 4. Development of tourism movement coming to Adrar State (2000 - 2019) (Source: Directorate of Tourism and Traditional Industry of Adrar State, 2019)

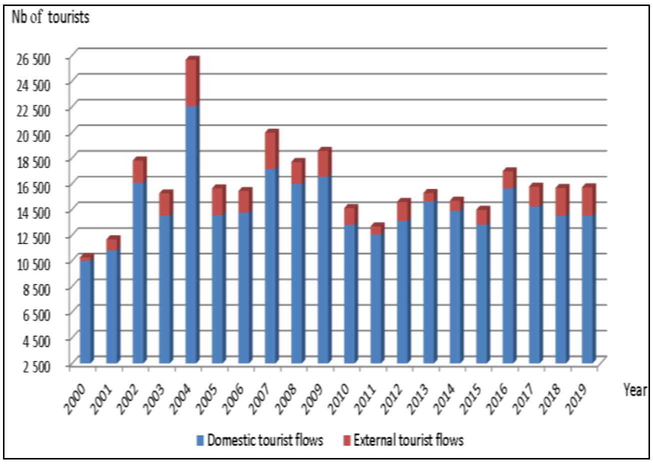

Figure 5. Tourist flows to Adrar State (2000 - 2019) (Source: Directorate of Tourism and Traditional Industry of Adrar State, 2019)

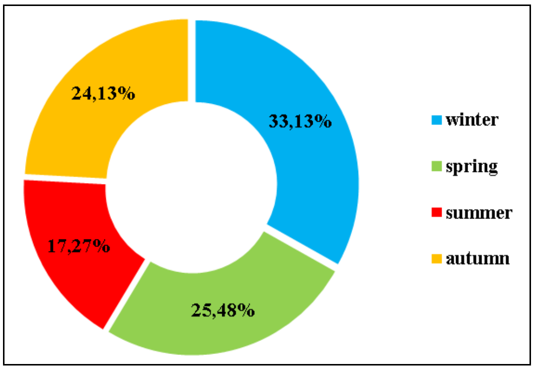

Figure 6. Distribution of tourist flows to Adrar by season in 2017(Source: Directorate of Tourism and Traditional Industry of Adrar State, 2019)

These tourist flows exhibit varying distributions across the seasons of the year. The summer season emerges as the most significant, accounting for 33.13% of all tourists, followed by the spring and autumn seasons, each representing approximately a quarter of the total tourist count, with figures of 25.48% and 24.13% respectively.

The winter season records the least number of tourists, comprising 17.27% of the total arrivals in the state. This distribution is illustrated in Figure 6 for the year 2017.

RESULTS AND DISCUSSION

1. Assessment of Climatic Comfort Utilizing the Temperature Humidity Index (THI)

This analytical indicator has facilitated the acquisition of results, which are detailed in the subsequent Table 4.

Table 4. Temporal Distribution of (THI) Across the Annual Cycle in Adrar State
(Source: Construction of Authors based on the data of the National Meteorological Office)

Months	Timimoun station				Adrar station				Bordj Badji Mokhtar station			
	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification
January	17.80	P^{-}	8.05	C^{-}	19.05	P	8.37	C^{-}	21.00	P^{+}	11.11	C
February	19.32	P	10.07	C	20.46		10.28	C	22.33		12.33	
March	22.14	P^{+}	12.91		22.93	P^{+}	13.14		24.46	H	14.66	
April	24.34	H	15.46	P^{-}	25.20	H	15.72	P^{-}	26.81		17.52	P^{-}
May	26.63	H^{+}	18.01	P	27.38	H^{+}	18.20	P	28.43	H^{+}	19.92	P
June	29.20	H^{++}	20.36		29.57	H^{++}	20.45		30.00	H^{++}	21.85	P^{+}
July	30.77		21.91	P^{+}	30.84		21.85	P^{+}	30.80		22.51	
August	30.37		21.74		30.63		21.83		31.32		22.70	
September	28.86	H^{+}	20.16	P	29.71		20.49	P	30.15		21.64	
October	26.06		16.96	P^{-}	27.05	H^{+}	17.33	P^{-}	27.40	H^{+}	18.40	P
November	21.34	P^{+}	11.97	C	22.27	P^{+}	12.33	C	23.96	P^{+}	14.55	C
December	18.16	P	8.52	C^{-}	19.36	P	8.83	C^{-}	21.72		12.04	

1.1. The Index of Diurnal Comfort

For the north and center of the state (the regions of Gourara, Touat and Tidikelt), the comfort period generally extends for five months of the year, starting from November until March, but the level of this comfort varies between complete, cool and hot, as follows: - The climate of Touat and Tidikelt regions is characterized by a period of complete comfort during the three months (December, January and February), where we recorded in this area a comfort index between 19.05 and 20.46, while in November and March the comfort index reached 22.27 and 22.93 respectively, and thus it is a period of comfort but it tends somewhat towards heat.

- The climatic characteristics of the Gourara region reveal a complete comfort duration during December and February, with comfort indices of 18.16 and 19.32, respectively. Based on the recorded comfort index of 17.80, January can be categorized as a month of comfort, although it inclines towards cooler conditions. In November and March, the indices were noted at 22.14 and 21.34, respectively, indicating a comfort phase that also trends towards warmer conditions.

- In the southern region of the state (Tanzrouft), the four-month interval from November to February represents an optimal timeframe for diverse diurnal Tourist activities. During this period, we have documented a limited comfort range between 21 and 23.96, which attributes the climate with characteristics of warm comfort.

1.2. The Index of Nocturnal Comfort

This comfort period lasts for seven months of the year in the north and center of the state (the regions of Gourara, Touat and Tidikelt), starting from April until October, where the two ends of this period represent a climatic comfort that tends to be cold, as we recorded comfort indexes between 15.46 and 16.96 in the region of Gourara, and between 15.72 and 17.33 in the regions of Touat and Tidikelt. As for the months (May, June and September), they represent a complete comfort period with a comfort index between 18.01 (corresponding to May in the region of Gourara) and 20.49 (corresponding to September in the regions of Touat and Tidikelt). As for the months of July and August, they are comfort months that tend to be hot with a recorded comfort index of 21.91 and 21.91 respectively for the region of Gourara, and almost the same recorded comfort index during these two months for the regions of Touat and Tidikelt. In the southern part of the state, specifically the Tanzrouft region, this period of comfort similarly extends over seven months, initiating in April and concluding in October. The onset of this timeframe signifies a cold climatic comfort, as evidenced by the recorded comfort value in April, which is estimated at 17.52. The months of May and October represent a phase of complete climatic comfort, with recorded comfort values of 18.40 and 19.92, respectively. The remaining four months, spanning June to September, are characterized by a cold comfort period, with recorded comfort values confined to between 21.94 and 22.71.

2. Assessment of Climatic Comfort Utilizing the Robaa Index (RI):

It is imperative to emphasize that among the climatic variables incorporated in the computation of this index are wind patterns, which either amplify the perception of cold during the cooler months or contribute to the alleviation of warmth during the hotter months, particularly when ambient temperatures fall below the human skin temperature, estimated at 33 °C on average. Conversely, during excessively hot months that surpass this threshold, wind conditions exacerbate the sensation of heat (Raad et al., 2016) . This phenomenon will manifest in the propensity for climatic comfort to oscillate between cold and heat during certain months, and our findings, derived from the calculation of this indicator, are delineated in the subsequent table (Table 5).

2.1. The daytime comfort period

The recorded daytime climatic comfort period, as assessed by the Robaa Index (RI), exhibits a decreasing trend from the northern to the southern regions of the state. This phenomenon can be elaborated as follows: - In the northern sector of the state, specifically within the Gourara region, this climatic comfort period extends over six months (half of the annual cycle), commencing in November and concluding in April. The index values during this interval fluctuated between 62.32 and 78.62. Notably, the months of November, February, and March are characterized as a complete climatic comfort period. Conversely, December and January are identified as a phase of cold weather, during which approximately 50% of the population perceives cold conditions. In April, the climatic comfort level transitions to hot, with around 50% of individuals experiencing heat.

Table 5. Distribution of the Robaa Index (RI) Across the Annual Months in Adrar State (Source: Construction of Authors based on the data of the National Meteorological Office and the website: https://www.thermexcel.com/french/tables/th.htm)

Months	Timimoun station				Adrar station				Bordj Badji Mokhtar station			
	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification	Index of Diurnal Comfort	Classification	Index of Nocturnal Comfort	Classification
January	62.32	P^-	44.11	C	65.53	P	44.27	C	72.06	P	49.13	C
February	65.53	P	46.77		68.29		46.92		75.19	P^+	51.05	
March	73.32		52.46		75.82	P^+	52.92		81.70	H	56.82	
April	78.62	P^+	57.91		82.03	H	58.46		87.92	H^+	63.87	P^-
May	84.80	H	64.04	P^-	88.07	H^+	64.66	P^-	92.62		70.14	P
June	94.06	H^+	71.59	P	95.88		72.02	P	96.02		74.62	
July	98.63		75.50	P^+	99.85		75.81	P^+	94.50		74.90	
August	97.23		75.18		98.29		75.64		92.76		73.92	
September	90.34		70.03	P	92.44		70.75	P	93.00		73.24	
October	80.87	H	61.64	P^-	82.86	H	62.33	P^-	87.84		66.01	
November	69.52	P	51.43	C	72.55	P	52.37	C	78.51	P^+	57.20	C
December	62.50	P^-	45.25		65.52		45.66		74.27	P	51.41	

- In the central of the state, encompassing the Touat and Tidikelt regions, the duration of this climatic comfort is five months annually. This period spans from November to March, with index values ranging from 65.52 to 75.82. The first four months of this span are classified as a complete climatic comfort period. The final month is distinguished by a hot climatic comfort, where 50% of the populace reports feeling hot.

- In the southern of the state (Tanzrouft region), the climatic comfort period is recorded as four months, commencing in November and concluding in February, during which index values range from 72.06 to 78.51. This climatic comfort is delineated into two distinct phases. The months of December and January are associated with a complete climate comfort, whereas February is characterized by warmer conditions, with 50% of the population experiencing heat.

2.2. The period of night comfort

- In the northern and central regions of the state (Gourara, Touat, and Tidikelt), the timeframe from May to October (six months) constitutes a climatic comfort period. This interval includes two months marked by cold climatic conditions, during which approximately 50% of individuals perceive cold, with index values ranging from 61.64 to 64.66. June and September are characterized by a complete climate comfort, with index values between 70.03 and 72.02. The index values during July and August range from 75.18 to 75.81, indicating a period of warm climate comfort, wherein 50% of individuals feel hot.

- In the southern region of the state (Tanzrouft), the recorded climatic comfort period is notably extended, encompassing seven full months (exceeding half of the year), commencing in April and concluding in October. Excluding the initial month of this duration, which is marked by cold climatic conditions (where 50% of the population feels cold), the remaining months represent a complete climate comfort period, with index values fluctuating between 66.01 and 74.90.

3. Evaluating the level of climatic comfort across the state's regions through the integration of the two indices (THI and RI)

Table 6. The level of climatic comfort in the state according to the indicators of (THI) and (RI) (Source: Construction of Authors based on the results of Tables 04 and 05)

Months	Gourara region						Touat and Tidikelt regions						Tanzrouft region					
	Daytime comfort level			Night comfort level			Daytime comfort level			Night comfort level			Daytime comfort level			Night comfort level		
	THI	RI	Classification	THI	RI	Classification	THI	RI	Classification	THI	RI	Classification	THI	RI	Classification	THI	RI	Classification
January	P^-	P^-	🟧	C^-	C	🟥	P	P	🟩	C^-	C	🟥	P^+	P	🟩	C	C	🟥
February	P	P	🟩	C						C				P^+	🟧			
March	P^+						P^+	P^+	🟧				H	H	🟥			
April	H	P^+	🟥	P^-			H	H	🟥	P^-				H^+		P^-	P^-	🟧
May	H^+	H		P	P^-	🟧	H^+	H^+		P	P^-	🟧	H^+			P	P	🟩
June	H^{++}	H^+			P	🟩	H^{++}				P	🟩	H^{++}			P^+		
July				P^+	P^+	🟧				P^+	P^+	🟧						
August																		
September	H^+			P	P	🟩				P	P	🟩						
October		H		P^-	P^-	🟧	H^+	H		P^-	P^-	🟧	H^+			P		
November	P^+	P	🟩	C	C	🟥	P^+	P	🟩	C	C	🟥	P^+	P^+	🟧	C	C	🟥
December	P	P^-	🟧	C^-			P			C^-				P	🟩			

🟩 Complete comfort 🟧 Relative comfort 🟥 Discomfort

The findings acquired in this domain are encapsulated in the subsequent Table 6. By integrating the values derived from the two indicators, one can categorize the levels of climatic comfort that tourists may experience during their sojourn in the state into three distinct classifications: complete comfort, relative comfort, and discomfort. This categorization can be elaborated upon as follows:

3.1. The duration of complete climatic comfort within the state

At this level, the state's climate comfort is complete for all tourists during their visit to the state. The differentiation in this level is observable in its temporal distribution between day and night across the four regions as follows:

- The duration of climatic comfort during daylight hours in the Gourara region spans three months, specifically November, February, and March. In contrast, the regions of Touat and Tidikelt exhibit a four-month period, confined to the months of November through February, aligning with the conclusion of autumn and the winter season. In the case of the Tanzrouft region, this period is comfort restricted solely to December and January.
- The duration of complete climatic comfort during nocturnal hours is uniform across the regions of Gourara, Touat, and Tidikelt, occurring in the months of June and September. The Tanzrouft region is distinguished by an extended duration of this period, which persists for a comprehensive six months, from May to October, thereby encompassing the transition from late spring to mid-autumn. All forms of tourism-related activities are feasible during the aforementioned periods within these regions. It is recommended that tourism-related activities, particularly those involving guided tours, be scheduled to maximize enjoyment and engagement with the diverse array of tourist sites available within the state, as the remaining months are less conducive to such practices and may only accommodate a limited segment of tourists.

3.2. The duration of relative climatic comfort within the state

At this level, the climatic conditions in the state exhibit tendencies towards either cold or hot extremes, thereby resulting in a scenario where tourists do not experience complete comfort during their visit, particularly while engaging in various tourism activities, especially those involving excursions between differing tourist sites. The months classified within this period are delineated as follows:

- During the daytime, the months of December and January for the Gourara region, March for the Touat and Tidikelt regions, and February and November for the Tanzrouft region, are characterized by relative climate comfort. With the exception of March, in which comfort tends to be hot, all the other months mentioned tend to be cold.
- During the night, the months of May, June, July and August (corresponding to summer and the beginning of autumn) for the regions of Gourara, Touat and Tidikelt, and April for the region of Tanzrouft, are relatively comfortable for tourists, as they tend to be hot.

3.3. The duration of climatic discomfort within the state

At this level, the climatic conditions throughout the state become entirely uncomfortable for all tourists. The periods characterized by climatic discomfort are distributed across the regions of the state as follows:

- The two periods extending from mid-spring to mid-autumn for the regions of Gourara, Touat, and Tidikelt, and from spring to mid-autumn for the Tanzrouft region, constitute periods of daytime climatic discomfort, attributable to the state's classification as a desert climate. This classification is associated with a significant escalation in maximum temperatures during these intervals, which range from 27.5 °C to 46.5 °C. Consequently, during the aforementioned periods, the execution of tourism-related activities involving excursions amongst natural sites and various locales within the state is rendered infeasible due to the associated risks posed to tourists' health.

The intervals spanning from mid-autumn to mid-spring in the regions of Gourara, Touat, and Tidikelt, as well as from mid-autumn to the spring season in the Tanzrouft region, represent two distinct periods characterized by nocturnal climatic discomfort attributable to the significantly low minimum temperatures prevailing during these intervals, which fluctuate between 5.1°C and 14.8°C. Consequently, during these specified periods, it becomes imperative to organize tourism-related activities within enclosed environments, such as those associated with folkloric celebrations or exhibitions pertaining to traditional industries, for examples. As for tourist activities related to tourist tours, they require tourists to wear winter clothes that protect them from the cold weather and provide them with the required comfort.

CONCLUSION AND RECOMMENDATIONS

In the present study, we endeavored to examine the Impact of Climate on the comfort levels of tourists within the Algerian desert, utilizing the state of Adrar as a representative case study. This state possesses substantial natural and anthropogenic tourism potential across its four geographical regions, thereby facilitating the development of a diverse array of tourist activities. To quantify the degree of comfort experienced by tourists, we employed the Temperature and Humidity Index (THI) alongside the Robaa Index (RI), which we categorized into daytime and nighttime comfort levels.

The findings derived from this study indicate that the values of the two indices exhibit temporal variability throughout the calendar year, as well as spatial discrepancies across the various regions of the state. This variability is manifested in the differing levels of climatic comfort experienced by tourists, which can range from complete comfort to relative comfort and ultimately to discomfort during their visits to distinct tourist locales.

Consequently, in light of the observed climatic impact on tourism activities within the state, it is imperative that any strategic planning for the enhancement of this sector takes into account the full climate comfort periods for scheduling outdoor tourism activities, such as excursions among the various tourist attractions within the state, or organize sports events held in nature, such as running or four-wheel drive car racing in the sand dunes. Simultaneously, it is advisable to organize tourist events in enclosed or sheltered venues during periods of discomfort to safeguard the health of Tourists. Furthermore, this approach will aid in mitigating the challenges associated with seasonal tourism dictated by climatic conditions. The discomfort period can also be used to maintain the tourist facilities in the state.

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BEYOND THE IMAGE: INTERPLAY OF VALUE, INTIMACY, AND LOYALTY IN SHAPING DESTINATION SATISFACTION: INSIGHTS FROM EGYPT AND SAUDI ARABIA

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Abstract: This study looks at the connections between destination image (DI), functional value (FV), emotional value (EV), social value (SV), customer satisfaction (CS), customer intimacy (CI), and customer loyalty (CL) in Egypt and Saudi Arabia from a comparative perspective. The data were collected using a quantitative method from 702 customers in Egypt and Saudi Arabia, and 10 hypotheses about the direct, indirect, and mediating effects of the targeted variables were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) by WarpPLS software version 8. The findings revealed that (1) destination image has positively affected functional value, emotional value, and social value; (2) functional value has positively affected customer satisfaction; emotional value has positively affected customer satisfaction; and social value has affected customer satisfaction; (3) customer satisfaction has positively affected customer loyalty; and (4) the results have also shown that functional value, emotional value, social value, and customer satisfaction act as a partial mediator between destination image and customer loyalty; and (5) customer intimacy is a moderating variable between customer satisfaction and customer loyalty. The findings demonstrated that customers have positive attitudes and intentions toward the destination and anticipate loyalty from their travel arrangements. This research offers destination managers, policymakers, managers, providers, travel agency, and marketing firms' in-depth insights to help maintain competitive positions in the market and ensure their survival in the travel distribution chain that meets tourists' needs and expectations.

Keywords: destination image, functional value, emotional value, social value, customer satisfaction, customer intimacy, Egypt, Saudi Arabia

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INTRODUCTION

The tourism industry is considered one of the fastest-growing economic sectors in the world (Buhalis et al., 2023). In today's consensus, tourism has expanded to include an increasing number of new destinations, such as the New Administrative Capital and New El-Alamein City in Egypt (Ali, 2022) and NEOM City in Saudi Arabia (Farag, 2019), to create a global hub for trade, knowledge, and innovative construction sustainably, including all residential, tourist activities, and international hotels, which act as a driving force for regional growth (Buhalis et al., 2023). In an increasingly crowded market, competitive destinations should redesign their marketing plans and strategies if they choose to increase customer loyalty and forge lasting relationships with their customers (Elgarhy & Abou-Shouk, 2022).

Considering the primary focus of this study (a closer look at destination image: a cross-country national study of Egypt and Saudi Arabia), due to its importance, this study focuses on cognitive destination image because it is directly observable, descriptive, and quantifiable (Zhou et al., 2023); as a result, it may offer more specific and interpretive details about the distinctiveness of a destination, including its capacity to introduce attributes that characterize it (Xie et al., 2020). Atasoy and Eren (2023) define a destination image (DI) as the totality of customers' impressions, beliefs, observations, feelings, knowledge, and notions about a product or a location, including location, visitation, and visitor. Ramseook-Munhurrun et al. (2015) revealed that DI is one of the perceived values (PV) contributors. When assessing a product's attributes, service, effectiveness, and customer experience, PV is extremely important (Zhao et al., 2020).

Prior studies have argued that PV is considered a multidimensional angle in the tourism industry Bonsón Ponte et al. (2015), which emphasizes the functional, emotional, and social perspectives of value dimensions and is built as a post-consumption construct (Zhao et al., 2020). El-Adly (2019) and Atasoy & Eren (2023) revealed that DI is one of the functional value (FV), emotional value (EV), and social value (SV) contributors. In the same vein, (Lee & Han, 2022) highlighted FV, EV, and SV as an enablers of customer satisfaction (CS). CS is characterized as the fulfillment of needs, wants, requests, and hopes by a service, as determined by opinions and visitor assessments of that service (Elgarhy & Mohamed, 2023). In addition, CS as an enabler and increases customer loyalty (CL) (Chuah et al., 2017).

Tourism businesses that work to satisfy visitor needs, wants, and requests to win over more repeat business can anticipate a favorable long-term impact on their capacity to retain repeat customers and create customer intimacy (CI) (Elgarhy &

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Mohamed, 2023). Overall, prior research has emphasized that customers are more likely to develop satisfaction, intimacy, and loyalty if they perceive higher functional, emotional, and social values (P. Liu et al., 2021). It implies that greater expectations on the part of the customer translate into higher perceived value, which ultimately leads to greater CS, CI, and CL (Lei et al., 2023; Uzir et al., 2020). Accordingly, CS, CI, and CL will increase as PV increases (Chen & Chen, 2010; Matsuoka, 2022). Tracing the FV, EV, SV, and CS concepts, there is no integrative model that simultaneously examines the FV, EV, SV, and CS antecedents and links FV, EV, SV, and CS to CL, CI is used as a moderating variable to investigate the effects between CS and CL. The ten categories of prior investigations are as follows: The first, second, and third explore the effect of DI on FV, EV, and SV (Atasoy & Eren, 2023; Chen & Tsai, 2007; Kim et al., 2013; Ramseook-Munhurrun et al., 2015); the fourth, fifth, and sixth examine the impact of FV, EV, and SV on CS (Carlson et al., 2019; El-Adly, 2019; Lee & Han, 2022; Waheed & Hassan, 2016); the seventh analyzes the link between CS and CL (Chuah et al., 2017; Keshavarz & Jamshidi, 2018; Ramseook-Munhurrun et al., 2015); and the eighth and ninth measure the mediating role of FV, EV, SV, and CS (Bonsón Ponte et al., 2015; Chen & Phou, 2013; Kim & Tang, 2020; Zhao et al., 2023); and the tenth examines the moderating role of CI (Garrouch & Ghali, 2023; Jeon & Kim, 2016; Song et al., 2016). The current study integrates the connections between the antecedents of FV, EV, SV, and SC (i.e., DI). Since it explores the mediating role of FV, EV, SV, and SC, it differs from previous studies and develops a thorough research model that offers a deep understanding of FV, EV, SV, SC, and CL. Additionally, it investigates the moderating effect of CI to look into the interactions between CS and CL. As a result, this study aims to fill the knowledge gap concerning the influences of FV, EV, SV, SC, and CL. Therefore, the current approach investigates how Egyptian and Saudi Arabian destinations use FV, EV, SV, and SC to maintain customer intimacy and loyalty. The study offers empirical evidence that investing in promoting customer empowerment through destination image and functional, emotional, and social value will significantly boost customer satisfaction, intimacy, and loyalty.

Perceived Value (PV)

PV is a comprehensive evaluation of the products and services tourists purchase while considering the price and psychological aspects like perceived quality and emotional responses (Ramseook-Munhurrun et al., 2015). In the same vein, PV is an assessment of product attributes, service, performance, and the experience of customers (Parasuraman, 1997). Customer PV is a vital element in determining an organization's growth and a source of competitive advantage (Elgarhy & Abou-Shouk, 2023). El-Adly (2019) divided perceived value into seven dimensions: specifically, self-gratification, aesthetics, price, prestige, transaction, quality, and hedonic. Additionally, Jahn & Kunz (2012), for instance, identified five types of PV: functional, hedonic, social interaction, brand interaction, and self-concept value. Moreover, Yeh et al. (2016) divided PV into four components: functional, emotional, social, and brand identification. Similarly, P. Liu et al. (2021) identified that the dimensions of PV include, functional, emotional, and social values.

Other scholars, Chen & Lee (2023) and Lee et al. (2021), classified it as having utilitarian and hedonic values. Prior research examined the antecedents of functional, emotional, and social value. Kim et al. (2013) revealed a positive link between destination image and three dimensions of perceived value (i.e., functional, emotional, and social); Lee & Han (2022) discovered a link between functional value and customer satisfaction; Carlson et al. (2019) found a significant influence of emotional value on customer satisfaction; and Chuah et al. (2017) revealed a significant effect of social value on customer satisfaction; Elgarhy & Abou-Shouk (2022) revealed a significant effect of customer satisfaction on customer loyalty. The following sections will go over these relationships in more detail.

1. Destination Image (DI), functional value (FV), emotional value (EV), and social value (SV)

DI refers to one's perception of a place, such as its cost, exotic nature, urbanity, climate, or level of development (Woosnam et al., 2020). In the same vein, a DI is the totality of beliefs, ideas, and perceptions that form the opinions that tourists have of a destination (Liu et al., 2021), and it is a multifaceted construct made up of primarily cognitive, affective, and conative aspects in tourism research (Joo et al., 2023; Lee & Jeong, 2023; Wang et al., 2022). The cognitive component deals with beliefs, thoughts, and knowledge regarding a destination's physical attributes (Matsuoka, 2022), whereas the affective component pertains to the assessment of the affective quality of sentiments toward the attributes and the surroundings (Lee & Jeong, 2023). The conative component, which develops from cognitive and affective images, is taken to be analogous to behavior (Chen & Phou, 2013). This study adopts a destination image that plays a crucial role in the three-dimensional structure of perceived value i.e., functional, emotional, and social (Liu et al., 2021).

Functional value, which is the possession of significant professional, financial, or physical attributes (Zhao et al., 2020), as opposed to emotional value, elicits feelings or emotional states (Zhao et al., 2023), while social value is the perceived benefit associated with belonging to one or more particular social groups (Zhao et al., 2020). Hence, perceived value, namely functional, emotional, and social value, is a predictor of satisfaction rather than a one-dimensional construct that only considers quality or value for money (El-Adly, 2019; Matsuoka, 2022; Zhao et al., 2023). Previous studies by Chen & Tsai (2007); Kim et al. (2013); Ramseook-Munhurrun et al. (2015); Atasoy & Eren (2023) revealed a positive link between destination image and perceived value. The first three hypotheses, therefore, would be:

H1. DI significantly affects FV
H2. DI significantly affects EV
H3. DI significantly affects SV

2. Functional value (FV) and customer satisfaction (CS)

FV is the utility derived from the product's perceived lower long-term and short-term costs (Chuah et al., 2017).

Similarly, FV is the utility resulting from the product's perceived quality and anticipated performance (Lee & Han, 2022). When customers assess the quality of a product or service, this viewpoint includes all reasonable and cost-effective evaluations that they make (Carlson et al., 2019). Moreover, FV is also known as price or value for money (Sweeney & Soutar, 2001). According to Kim et al. (2011), FV is the price utility and the function quality for the customer. In the tourism arena, customers' desire for functional gratification is satisfied when they have access to helpful and practical resources based on DI and FV (De Vries & Carlson, 2014; Eid, 2015). In addition, we conclude that satisfaction with leisure services introduced in the destination is an FV for customers (Benkenstein et al., 2003). As a result, customers who perceive a destination's FV positively are more likely to have an impact on CS levels (Eid, 2015). Prior studies by Chuah et al. (2017); El-Adly (2019); Carlson et al. (2019); and Lee & Han (2022) provided evidence to support this claim by confirming the importance of FV in determining CS, which in turn leads to customer loyalty. Hence, the hypothesis is formed as follows:

H4. FV significantly influences CS

3. Emotional value (EV) and customer satisfaction (CS)

Emotions serve as a vital substrate of consumption, and emotional value is of key importance to the customer experience (Sheth et al., 1991). EV is the utility resulting from the feelings or emotional reactions that a product causes and generates (Sweeney & Soutar, 2001). Moreover, EV is also known as the aesthetics and playfulness that a product generates (Kim et al., 2011). Access to enjoyable, amusing, and exciting destinations is necessary for a customer to satisfy a hedonic gratification need (De Vries & Carlson, 2014). Interestingly, tourists are most concerned about their emotional judgment about products and services (Waheed & Hassan, 2016); the results revealed that emotional value is the most powerful factor that influences tourists' satisfaction at the destination (Lee et al., 2018). Customers are more satisfied when they perceive a product or service to have higher emotional value (Waheed & Hassan, 2016), as evidenced by their willingness to pay more (Carlson et al., 2019), plan to make another purchase, and spread positive word-of-mouth (Yeh et al., 2016). The existing research supports the effect of EV on CS with a tourism destination image (Carlson et al., 2019; Chuah et al., 2017; El-Adly, 2019; Lee & Han, 2022). Therefore, the hypothesis is formed:

H5. EV significantly influences CS

4. Social value (SV) and customer satisfaction (CS)

According to Sheth et al. (1991) and Waheed & Hassan (2016), social value describes consumer perceptions of product attributes in light of cultural, political, socioeconomic, and demographic characteristics. SV is the perception of social self-concept, and it reflects social identity or positive feedback from others (Waheed & Hassan, 2016). SV is the benefit that results from a product's capacity to improve social self-concept (Sweeney & Soutar, 2001). When tourists perceive products or services to have a higher social value, they show higher levels of satisfaction behaviors (Elgarhy, 2023), such as disseminating and sharing positive information about a destination's physical attributes (Lee & Han, 2022; Yeh et al., 2016), including its natural environment and climate, attractions, activities, accessibility, friendliness of the locals, and culture, as well as accepting higher prices (Stylidis & Cherifi, 2018). Hence, social value is driven mostly by customer satisfaction (Eid, 2015). Several empirical studies revealed a positive link between SV and CS (Carlson et al., 2019; Chuah et al., 2017; Lee & Han, 2022; Waheed & Hassan, 2016)**.** Therefore, the hypothesis is proposed:

H6. SV significantly influences CS

5. Customer satisfaction (CS) and customer loyalty (CL)

CS refers to a customer's overall emotional reaction to the entire service experience for a single transaction at the point after the sale (Eid, 2015; Song et al., 2019). One of the main objectives of service providers is to satisfy their customers' needs because doing so results in word-of-mouth advertising, customer loyalty, and long-term profitability (Elgarhy & Mohamed, 2023; Matsuoka, 2022). Customer satisfaction has gotten a lot of considerable, in the literature on tourism and hospitality (Elgarhy & Abou-Shouk, 2022), customers' assessments and judgments of a product or service's fulfillment (Ramseook-Munhurrun et al., 2015). When a service provider successfully satisfies visitors, it is probably possible to predict the outcomes of their loyalty (Kim et al., 2013). Tourist satisfaction, which affects destination selection and the decision to return, is one of the essential components of successful destination marketing (Chen & Phou, 2013). Therefore, it is crucial to investigate the idea of image and how satisfaction is related to it in order to ascertain visitors' intentions to return and recommend the place (Ramseook-Munhurrun et al., 2015). Numerous studies in the field of tourism have discovered that customer satisfaction affects travelers' loyalty (Chuah et al., 2017; Elgarhy & Abou-Shouk, 2022; Elgarhy & Mohamed, 2023; Keshavarz & Jamshidi, 2018; Ramseook-Munhurrun et al., 2015). Consequently, the following hypothesis is developed:

H7. CS significantly influences CL

6. The mediating role of functional value, emotional value, and social value

Measuring the mediation effect aids in understanding and interpreting the indirect relationship between the variables. It sheds insight on the results made apparent by the interactions between the variables. Describing the earlier direct relationships between DI and FV, EV, and SV; and the direct connection between FV, EV, SV, CS, and CL provides convincing evidence of the mediating role of functional, emotional, and social value. Existing empirical research uncovered a significant FV, EV, and SV mediation effect between CS and CL (El-Adly, 2019). Atasoy & Eren (2023) verified the FV, EV, and SV mediation roles between perceived authenticity and behavioral intentions. Likewise, P. Liu et al. (2021) found a significant mediation effect of FV, EV, and SV between product interaction, interpersonal interaction, and purchase intentions. Similarly, Kim & Tang (2020) found that FV, EV, and SV mediates the relationship between customer participation behavior, citizenship behavior, and satisfaction. A study by Bonsón Ponte et al. (2015) a significant mediation effect of FV, EV, and SV between trust and purchase intonation. A recent study by Zhao et al. (2023) found a mediation effect between education, esthetic, entertainment, escape, and satisfaction. On the other hand, Chen & Phou (2013) found a significant mediation effect of satisfaction between destination image, trust, and loyalty. Chen & Tsai (2007) verified the CS mediation roles between DI, trip quality, and behavior intonation. Lastly, Elgarhy & Abou-Shouk (2022) fund a mediation effect of CS between co-creation, subjective norms, customer trust, PV, CL.

H8. FV, EV, and SV mediate the association between DI and CS

H9. FV, EV, SV and CS mediate the association between DI and CL

7. The moderating role of customer intimacy

CI is defined as a greater level of partnership between (buyer and seller) partners in terms of organization, customer understanding, and attitudinal congruence (Ahmad & Ahmed, 2019). CI is defined as the degree to which customers and service providers know one another well and foster a sense of belonging that in turn triggers positive contributions (Garrouch & Ghali, 2023). In the same vein, CI is the ongoing collaborative relationship, such as feeling close and showing mutual understanding between a company and its customers, to develop and enhance its product or service offerings to cater to customer needs (Can et al., 2022). CI is vital for creating strong bonds between businesses and their customers based on satisfaction, commitment, trust, and loyalty (Shafiee et al., 2020; Wu et al., 2021) by minimizing any misunderstandings between the two parties and fostering a high level of commitment and a sense of belonging (Bügel et al., 2011). Moreover, CI can elicit positive contributions from both customers and providers (Mulia et al., 2021). A customer's readiness to develop close bonds with service providers depends on how much trust they have in them (Garrouch & Ghali, 2023). Hence, CI is attained when service providers, i.e., travel agencies, policymakers, and trip planners, develop relationships of trust with their customers. Prior studies demonstrated a significant moderating effect of CI on PV and customer citizenship behavior (Garrouch & Ghali, 2023). Song et al. (2016) found a significant moderating effect of CI on personalized e-mail messages and privacy risk. Another study by Jeon and Kim (2016) found a significant moderating effect of CI on service failure and consumer responses across failure types. It follows that, customer intimacy, which interacts with CS, is a vital moderator in enhancing CL and so on. Thus, we propose:

H10. CI moderates the impact of CS on CL

RESEARCH FRAMEWORK

In conclusion, previous related studies were partially adopted and integrated (Atasoy & Eren, 2023; Carlson et al., 2019; Chuah et al., 2017; El-Adly, 2019; Ramseook-Munhurrun et al., 2015). The current study investigates the effects of DI on FV, EV, SV, and CS and the mediation role of FV, EV, SV, and CS on CL. It examines the moderating role of CI between CS and CL.

RESEARCH METHODS

1. Scale

The current study uses seven constructs from earlier studies and adapts and integrates them (Figure 1). Six items are used to measure destination image (Loi et al., 2017; Zhou et al., 2023), four for functional value (Carlson et al., 2019; Lee & Han, 2022; Yeh et al., 2016), four emotional value items from extant studies were used (Carlson et al., 2019; Lee & Han, 2022; Yeh et al., 2016), social value was assessed out of four indicators (Carlson et al., 2019; Eid, 2015; Yeh et al., 2016), customer satisfaction was assessed by five indicators (Elgarhy & Abou-Shouk, 2022; Song et al., 2019), four customer intimacy (Bügel et al., 2011; Garrouch & Ghali, 2023), and four customer loyalty (Chuah et al., 2017; El-Adly, 2019). Before distributing and modifying, and refining the survey was first developed in English and then translated into Arabic by academics fluent in both languages. We then contrasted the original text with a translated version. There were no substantive differences between the two versions.

2. Sampling and collecting data

After designing and refining the survey with both an English and an Arabic survey tool, data was gathered from the target respondents using the quantitative method to test the hypotheses representing customers in Egypt and Saudi Arabia. It took between 10 and 15 minutes for participants to complete the survey. Data was collected from August to October 2023, both online and offline. We created an online survey and then disseminated its URL on social media platforms to obtain more responses. Tourists who appeared at hotels or travel companies received the offline version of face-to-face methods. This study aimed to explore a closer look at the destination image of Egypt and Saudi Arabia and its benefits to customers regarding DI, FV, EV, SV, and SC. In addition, it investigates the effect of customer satisfaction and its antecedents on loyalty to customers in improving business innovation performance. It examines the moderating effect of CI to look into the interactions between CS and CL. To learn more about the tourism and hospitality customers' destination image in both countries, the first section of the survey asked visitors for socio-demographic data (i.e., gender, age, marital status, monthly income, educational background, occupation, nationality, how you prefer to travel, and number of visits in the last year). The second section presented 31 questions on different items focused on examining tourists' perspectives regarding adopting destination images by customers. On a five-point Likert scale, where one means "strongly disagree" and five means "strongly agree," all items assess how tourists perceive their perceived value, customer satisfaction, intimacy, and loyalty towards customers. Out of 800 surveys that were randomly distributed to foreign customers, 702 valid respondents were returned from Egypt and Saudi Arabia tourists, which targeted the study's total community. Egyptian answers accounted for 402 responses, while Saudi Arabia contributed 300 tourists. Friends assisted in sharing the survey links with tourists.

3. Analysis method

PLS-SEM through WarpPLS is used in the study to test its hypotheses. PLS-SEM is suitable for evaluating complex models with direct and indirect causal linkages whose use is common in tourism and hospitality research. The construct validity is assessed (according to the rule of AVEs 0.50), and reliability will be ensured with estimates of 0.7.

FINDINGS

1. Demographic statistics

Looking at Table 1, it shows that out of 702 respondents from Egypt (402 customers) and Saudi Arabia (300 customers), females are the dominant respondents from Egypt (53.5%), while males are dominant from Saudi Arabia (60.3%). The majority of respondents are aged 35–44 years (26.6% for Egypt and 30.7% for Saudi Arabia). Of the respondent's, married customers are 60% from Egypt and 51.7% from Saudi Arabia. Of the respondents, 38.3% of Egypt customers have a monthly income of under 1000 dollars, while 39% of Saudi Arabia customers have 2001–3000 dollars. Most respondents have a bachelor's (44.5% for Egypt and 51.7% for Saudi Arabia).

The majority of respondent's occupations are workers (60.2% for Egypt and 65.3% for Saudi Arabia). Arabs make up 40.8% of Egypt respondents, followed by Americans (27.9%), Europeans (24.1%), and other countries (7.2%). Arabs make up 36.7% of Saudi Arabian respondents, followed by Americans (28.7%), Europeans (27%), and other countries (7.7%). In terms of how you prefer to travel, most respondents prefer to travel with friends (50% for Egypt and 52.7% for Saudi Arabia). Regarding the number of visits in the year, 65.2% of Egypt respondents visited 1 time a year, 19.9% visited 2-3 times a year, 10% visited 4-5 times a year, and 5% visited more than 5 times a year. While 56.7% of Saudi Arabian respondents answered 1 time a year, 29.3% answered 2-3 times a year, 9% answered 4-5 times a year, and 5% answered more than 5 times a year. Table 2 illustrates that Egypt and Saudi Arabia customers agree with the constructs' statements and have positive attitudes and intentions toward destination images (mean values > 4 for all constructs).

Table 1. Profile of respondents

	Attributes	**Egypt (%)**	**Saudi Arabia (%)**
Gender	Male	46.5	60.3
	Female	53.5	39.7
Age	18 – 24	25.6	23.7
	25 – 34	23.1	21.3
	35 - 44	26.6	30.7
	45 - 54	11.2	11
	55 - 64	6.2	6.7
	65 and more	7.2	6.7
Marital status	Single	40	48.3
	Married	60	51.7
Monthly income	Under 1000 $	38.3	25.7
	1001 – 2000 $	26.1	16.3
	2001 – 3000 $	16.2	39
	3001 – 4000 $	9	9
	4001 – 5000 $	7.5	7
	5001 $ and above	3	3
Qualifications	High school	14.7	15.7
	Bachelor's	44.5	51.7
	Postgraduate	40.8	32.7
Occupation	Student	29.9	29.3
	Worker	60.2	65.3
	Unemployed/retired/housewife	10	8.3
Nationality	Europeans	24.1	27
	Americans	27.9	28.7
	Arabs	40.8	36.7
	Other countries	7.2	7.7
How do you prefer to travel?	Alone	17.9	17.7
	With friends	50	52.7
	With family members	21.6	19
	Other	10.4	10.7
Number of visits the last year	1 time a year	65.2	56.7
	2-3 times a year	19.9	29.3
	4-5 times a year	10	9
	More than 5 times a year	5	5

Table 2. Descriptive statistics of the research variables

	Mean		Std. Deviation	
	Egypt	**Saudi Arabia**	**Egypt**	**Saudi Arabia**
DI	4.216	4.450	.678	.510
FV	4.335	4.588	.581	.533
EV	4.384	4.465	.577	.579
SV	4.310	4.406	.594	.546
CS	4.329	4.408	.537	.513
CL	4.371	4.390	.587	.586
CI	4.298	4.498	.688	.631

2. Measurement model

Table 3 shows AVE values above 0.50, demonstrating convergent validity. Where the square root of AVEs exceeds the inter-construct correlations, discriminant validity also exists. Furthermore, Table 4 also displays values less than 0.90 as the discriminant reliability of the HTMT ratio. Concerns about collinearity are addressed by the VIFs for structures below 5 in Table 5 by demonstrating convergent validity. Moreover, Cronbach's alpha indicates that measurements have been accurate with reliability values above the 0.70 model's dependability.

Table 3. The square root of AVEs and inter-variables correlations

Constructs	country	DI	FV	EV	SV	CS	CL	CI
DI	**Egypt**	**(0.856)**						
	Saudi Arabia	**(0.715)**						
FV	**Egypt**	0.791	**(0.832)**					
	Saudi Arabia	0.661	**(0.753)**					
EV	**Egypt**	0.544	0.674	**(0.831)**				
	Saudi Arabia	0.608	0.689	**(0.753)**				
SV	**Egypt**	0.717	0.748	0.602	**(0.832)**			
	Saudi Arabia	0.613	0.628	0.717	**(0.785)**			
CS	**Egypt**	0.612	0.699	0.744	0.660	**(0.772)**		
	Saudi Arabia	0.604	0.672	0.713	0.723	**(0.735)**		
CL	**Egypt**	0.692	0.724	0.789	0.656	0.792	**(0.845)**	
	Saudi Arabia	0.601	0.606	0.650	0.715	0.802	**(0.837)**	
CI	**Egypt**	-0.011	-0.042	-0.055	-0.021	-0.054	-0.032	**(0.922)**
	Saudi Arabia	-0.073	-0.046	-0.067	-0.059	-0.032	-0.029	**(0.934)**

Table 4. HTMT ratios

Constructs	Country	DI	FV	EV	SV	CS	CL
FV	**Egypt**	0.891					
	Saudi Arabia	0.872					
EV	**Egypt**	0.612	0.795				
	Saudi Arabia	0.804	0.839				
SV	**Egypt**	0.806	0.880	0.710			
	Saudi Arabia	0.778	0.833	0.836			
CS	**Egypt**	0.698	0.835	0.886	0.786		
	Saudi Arabia	0.771	0.882	0.831	0.855		
CL	**Egypt**	0.773	0.846	0.820	0.769	0.836	
	Saudi Arabia	0.736	0.767	0.815	0.868	0.878	
CI	**Egypt**	0.045	0.056	0.065	0.050	0.069	0.055
	Saudi Arabia	0.096	0.077	0.080	0.088	0.071	0.073

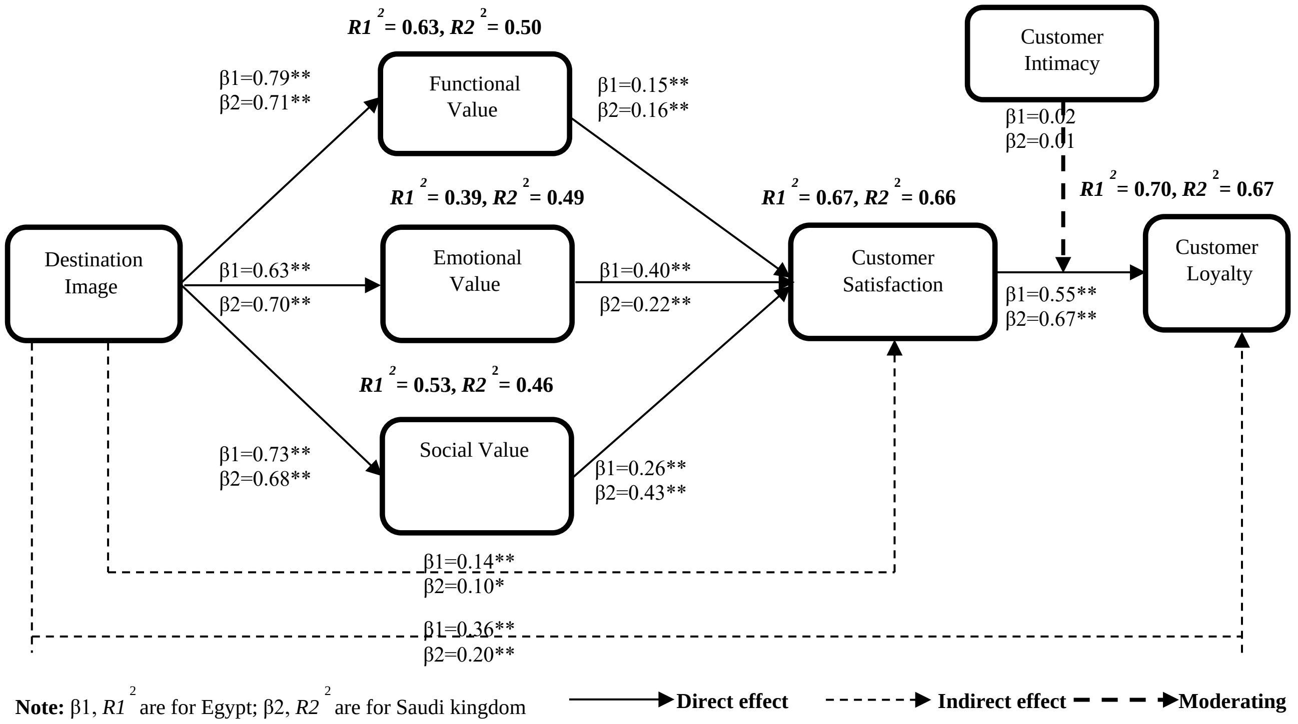
Table 5. Measurement model statistic

Con.	Indicators	Egypt						Saudi Arabia					
		Loading	**CR**	**CA**	**AVE**	**VIF**	**√AVE**	**Loading**	**CR**	**CA**	**AVE**	**VIF**	**√AVE**
DI	The destination is a pleasant place to visit.	0.837	0.942	0.927	0.732	3.260	0.856	0.742	0.861	0.805	0.512	2.123	0.715
	The destination is an exciting place to visit.	0.830						0.629					
	The destination is a relaxing place to visit.	0.894						0.821					
	The destination is a fantastic place to visit.	0.865						0.767					
	The destination is a hospitable place to visit.	0.864						0.712					
	The destination is a safe place to visit.	0.842						0.684					
FV	**In my opinion, the functional value of the destination is:** to have an acceptable standard of quality.	0.759	0.900	0.850	0.692	3.911	0.832	0.743	0.842	0.748	0.575	2.491	0.758
	that it is reliable in its performance.	0.830						0.836					
	good in terms of its overall excellence.	0.868						0.817					
	to possess a degree of quality that is satisfactory.	0.865						0.617					

EV	**In my opinion, the emotional value of the destination is:** delightful and interesting to me. make me feel good. inspire my thoughts. help me generate ideas and gives me pleasure.	0.845 0.801 0.864 0.813	0.899	0.851	0.691	3.164	0.831	0.737 0.758 0.778 0.746	0.839	0.745	0.567	2.783	0.753
SV	**In my opinion, the social value of the destination is:** make a good impression on other people. win the admiration of other people gain the approval of other people enhance my social relationships with others.	0.855 0.753 0.854 0.863	0.900	0.851	0.693	2.719	0.832	0.783 0.812 0.777 0.767	0.865	0.792	0.616	2.975	0.785
CS	The destination would meet my needs, I think. I made a wise decision by choosing to buy from this destination. I believe that making a purchase from this destination was the right choice. I would say that I have enjoyed experiencing this destination. Overall, I am satisfied with visiting the destination.	0.792 0.783 0.784 0.745 0.757	0.881	0.831	0.597	3.267	0.772	0.783 0.750 0.722 0.698 0.721	0.855	0.787	0.541	3.880	0.735
CL	The destination provides excellent service quality. I think the destination is the best choice for me. I like the destination more than other destinations. I recommend this destination to others who seek my advice.	0.851 0.841 0.882 0.806	0.909	0.866	0.715	4.230	0.845	0.828 0.858 0.837 0.827	0.904	0.858	0.701	3.167	0.837
CI	I get the impression that this destination genuinely cares about my intimacy. I feel as though I fully comprehend this destination. I feel as though I have known this destination for a long time. I feel like this destination has a deep understanding of who I am.	0.902 0.926 0.932 0.928	0.958	0.941	0.850	1.007	0.922	0.931 0.932 0.946 0.937	0.965	0.951	0.873	1.009	0.934

3. Structural model

These models examine the connections between the building blocks of research model constructs. Figure 1 shows that DI significantly affects the FV (β1 = 0.79 for Egypt and β2 = 0.71 for Saudi Arabia, and H1 is approved).



Note: β1, $R1^2$ are for Egypt; β2, $R2^2$ are for Saudi kingdom

Figure 1. The structure model

Moreover, 63% of the variance in DI toward FV is for Egypt ($R1^2 = 0.63$) versus 49% for Saudi Arabia ($R2^2 = 0.50$). Similarly, DI significantly affects the EV (β1 = 0.63 for Egypt and β2 = 0.70 for Saudi Arabia, and H2 is confirmed). In addition, 39% of the variance in DI toward EV was for Egypt ($R1^2 = 0.39$) versus 49% for Saudi Arabia ($R2^2 = 0.49$). Additionally, DI significantly affects the SV (β1 = 0.73 for Egypt and β2 = 0.68 for Saudi Arabia, and H3 is accepted). In addition, 53% of the variance in DI toward SV was for Egypt ($R1^2 = 0.53$) versus 46% for Saudi Arabia ($R2^2 = 0.46$).

Furthermore, it is found that customer satisfaction is influenced by three factors, including the functional value (β1 = 0.15 for Egypt and β2 = 0.16 for Saudi Arabia, and H4 is accepted), the emotional value (β1 = 0.40 for Egypt and β2 = 0.22 for Saudi Arabia, and H5 is accepted), and the social value (β1 = 0.26 for Egypt and β2 = 0.43 for Saudi Arabia, and H6 is accepted). The three abovementioned variables explain 67% and 66% of the variance in customer satisfaction for Egypt and Saudi Arabia, respectively. Besides, the findings revealed that CS contributes significantly to CL (β1 = 0.55 for Egypt and β2 = 0.67 for Saudi Arabia, and H7 is confirmed). Moreover, 70% of the variance in DI toward FV is for Egypt ($R1^2 = 0.70$) versus 67% for Saudi Arabia ($R2^2 = 0.67$).

The mediating effects are as follows: Likely, FV, EV, and SV mediate the association between DI and CS. Customer satisfaction is significantly impacted by destination image (β1 = 0.14 for Egypt and β2 = 0.10 for Saudi Arabia, and H8 is confirmed). In addition, FV, EV, SV, and CS mediate the association between DI and CL. Customer loyalty is significantly impacted by destination image (β1 = 0.36 for Egypt and β2 = 0.20 for Saudi Arabia, and H9 is confirmed). Regarding the significance of direct interactions in hypotheses 8 and 9, it is conceivable that, firstly, FV, EV, and SV partially mediate the relationships between DI and CS, explaining 67% and 66% of the variance in DI and CS for Egypt and Saudi Arabia, respectively. Secondly, FV, EV, SV, and CS partially mediate the relationships between DI and CL; FV, EV, SV, and CS explain 70% and 67% of the variance in CS and CL for Egypt and Saudi Arabia, respectively.

The moderating effect is as follows: The WarpPLS analysis showed that CI has a significant negative influence on CS and CL (β1 = 0.02 for Egypt and β2 = 0.01 for Saudi Arabia, and indicating no support for H10). Table 6 summarizes the hypotheses tested. Estimates of direct effects, effect sizes, and interactions from the moderated mediation in Table 7.

Table 6. Examining the hypotheses

		β Value		***t*-Value**		***p*-Value**		**Result**
No.	Hypotheses	**Egypt**	**Saudi Arabia**	**Egypt**	**Saudi Arabia**	**Egypt**	**Saudi Arabia**	
H1	**DI - FV**	0.79	0.71	17.701	13.607	P<.01	P<.01	**Supported**
H2	**DI - EV**	0.63	0.70	13.704	13.494	P<.01	P<.01	**Supported**
H3	**DI - SV**	0.73	0.68	16.183	13.080	P<.01	P<.01	**Supported**
H4	**FV - CS**	0.15	0.16	2.986	2.641	P<.01	P<.01	**Supported**
H5	**EV - CS**	0.40	0.22	8.524	3.857	P<.01	P<.01	**Supported**
H6	**SV - CS**	0.26	0.43	2.782	7.954	P<.01	P<.01	**Supported**
H7	**CS - CL**	0.55	0.67	11.811	12.831	P<.01	P<.01	**Supported**
H8	**DI – (FV-EV-SV) – CS**	0.14	0.10	5.316	1.736	P<.01	P<.01	**Supported**
H9	**DI – (FV-EV-SV- CS) - CL**	0.36	0.20	7.588	3.606	P<.01	P<.01	**Supported**
H10	**CI*CS-CL**	0.02	0.01	-0.375	-0.203	P=0.35	P=0.42	**No Supported**

Table 7. Estimates of direct effects, effect sizes, and interactions from the moderated mediation

Hypotheses	**Path Coefficients**		**Standard Errors**		**Effect sizes**		**95 % Confidence Interval Egypt**		**95 % Confidence Interval Saudi Arabia**	
	Egypt	**Saudi Arabia**	**Egypt**	**Saudi Arabia**	**Egypt**	**Saudi Arabia**	**Upper Limits**	**Lower Limits**	**Upper Limits**	**Lower Limits**
Direct effect										
DI - FV	0.793	0.703	0.045	0.52	0.629	0.495	0.705	0.881	0.602	0.805
DI - EV	0.628	0.698	0.046	0.052	0.394	0.488	0.538	0.718	0.597	0.800
DI - SV	0.731	0.679	0.045	0.052	0.534	0.461	0.642	0.820	0.577	0.781
FV - CS	0.146	0.149	0.049	0.056	0.103	0.103	0.050	0.242	0.038	0.260
EV - CS	0.403	0.215	0.047	0.056	0.300	0.159	0.310	0.495	0.106	0.325
SV - CS	0.136	0.429	0.049	0.054	0.090	0.334	0.040	0.232	0.324	0.535
CS - CL	0.547	0.667	0.049	0.052	0.438	0.538	0.456	0.638	0.565	0.769
Mediating paths										
DI – (FV-EV-SV) – CS	0.256	0.099	0.048	0.057	0.180	0.067	0.162	0.351	-0.013	0.210
DI – (FV-EV-SV- CS) - CL	0.360	0.202	0.047	0.056	0.270	0.131	0.267	0.453	0.092	0.311
Moderating paths										
CI*CS-CL	-0.019	-0.012	0.050	0.058	0.005	0.003	-0.116	0.079	-0.125	0.101

DISCUSSION OF FINDINGS

This study looks into the impacts of DI on CL directly and indirectly via FV, EV, SV, and CS. Moreover, the CI is employed as a moderating variable to investigate the effects of CS and CL among Egypt and Saudi Arabia customers. The results showed that customers expect loyalty from their travel plans and have positive attitudes and intentions toward the destination. One main factor that attracts customer satisfaction and loyalty is the destination image. Following the literature review, no integrative model seems to have the in-depth knowledge and understanding to recommend an investigative model fully explaining these effects of DI on CL, both directly and indirectly, through FV, EV, SV, and CS. In addition, CI is a moderating variable used to examine the interactions between CS and CL. Findings characterized travelers' experiences as a fun tool that gives them fun gives them vital insights and enjoyment. In order to meet customer expectations and ensure their continued existence in the travel supply chain, destinations in Egypt and the Arabia of Saudi Arabia can afford to provide services and products to their customers that aid policymakers, travel agency managers, trip planners, and travel marketers in maintaining competitive positions in those markets. They must adopt cutting-edge technologies and tactics for marketing, production, and operational processes. In light of the results, it is clear that it is conceivable that, firstly, FV, EV, and SV partially mediate the relationships between DI and CS, explaining 67% and 66% of the variance in DI and CS for Egypt and Saudi Arabia, respectively. Secondly, FV, EV, SV, and CS partially mediate the relationships between DI and CL; FV, EV, SV, and CS explain 70% and 67% of the variance in CS and CL for Egypt and Saudi Arabia, respectively. The indirect relationships show how destination image develops loyal customers who support them. Destination image is the totality of beliefs, ideas, and perceptions about a destination. We used a multidimensional scale to assess PV, which included FV, EV, and SV. Destination managers and marketers must constantly improve the DI in terms of the quality of the travel environment, attractions, infrastructure, events, and sports in order to increase the perceived value of the destination and ensure that tourists are satisfied. Destination managers should recognize the importance of image and value in stimulating tourist satisfaction and loyalty, which prompts tourists to return to the destination and recommend it to others, improving and sustaining the destination's competitiveness. Additionally, destination managers must develop more efficient and effective marketing strategies and service delivery to meet tourists' expectations and needs, with the goal of improving tourists' travel experiences.

The results are consistent with prior studies Ramseook-Munhurrun et al. (2015) and Atasoy & Eren (2023), revealed a positive link between DI and FV, EV, and SV. Furthermore, the study discovered a link between FV and SC. As a result, one of the main reasons for adopting FV is to enable CS. While value and satisfaction are the essential building blocks of CL, managers should focus on maximizing FV by developing marketing strategies that seek to empower customers with the knowledge and ability to derive the most functional utility from the destination offerings by focusing on satisfying their knowledge requirements. This finding is endorsed by Carlson et al. (2019) and Lee & Han (2022), who confirmed the link between FV and CS. Adding to that, EV is also influencing CS. This means that EV adoption is critical to improving destination CS. Adopting EVs will aid in meeting demand-side needs and the enjoyment obtained from the tourism product. The elements of play, fun, pleasure, delightfulness, inspiration, relaxation, and escapism that a consumer derives from a consumption experience for its own sake make up emotional value. This result is concurrent with El-Adly (2019) and Lee & Han (2022), who endorsed that EV is a significant driver of CS. Moreover, SV is positively affecting CS. SV can aid in developing a social self-concept and reflecting positive feedback from others, i.e., disseminating and sharing positive information about a destination's physical attributes, such as its natural environment and climate, culture, attractions, activities, accessibility, and friendliness with the locals. As a result, SV enables CS. This finding is endorsed by Waheed & Hassan (2016) and Carlson et al. (2019), which found significant links between SV and CS. If customers are satisfied with the service provided at their destination, we will recommend it positively to other service suppliers again the next time when planning their trips. One of the main goals of service providers is to satisfy their customers' needs because doing so results in word-of-mouth advertising, trust, loyalty, and long-term profitability. Moreover, it is one of the essential components of successful destination marketing. In response to CS, CL is a successful strategy for service providers to keep their customers. This result is concurrent with Ramseook-Munhurrun et al. (2015); Keshavarz & Jamshidi (2018), which found significant links between CS and CL. Regarding the moderating effect of intimacy on loyalty and satisfaction, the moderating hypothesis was rejected.

This finding suggests that regardless of a customer's emotional connection to a destination (i.e., service suppliers), the effect of customer intimacy on customer satisfaction and loyalty (i.e., service providers) is similar. This consistency is comforting because it shows that customer intimacy effectively increases customer satisfaction and loyalty among new and infrequent customers. In fact, they can serve as a springboard for improving the perception of customer intimacy with these customers (Garrouch & Ghali, 2023). Additionally, Egyptian and Saudi society is influenced by Eastern traditions and customs, and an intimate relationship can be viewed as one based on feelings such as love and affection. These findings are unique and provide fresh insights because they have not been found in previous research on the immediate effects of intimacy. Additionally, because new customers lack an emotional connection to a destination, the customer satisfaction and loyalty used by high customer intimacy may be more consistent and less reliant on perceptions of improved customer intimacy from transactions.

CONCLUSIONS AND RESEARCH IMPLICATIONS

1. Conclusions

This study addresses several gaps in the literature review, such as the mechanism of the relationship between destination image and customer loyalty. The study offers empirical evidence that investing in promoting customer empowerment will significantly boost customer satisfaction, trust, and loyalty in Egypt and Saudi Arabia. The findings revealed that (1) DI has positively affected FV, EV, and SV; (2) FV, EV, and SV have positively affected CS; (3) CS has positively affected CL; and (4) the finding shows that FV, EV, SV, and CS act as a partial mediator between DI and CL; and (5) CI is a moderating variable between CS and CL.

2. Theoretical implications

Concerning the theoretical implications, the current study has produced a precise, coherent model that combines and quantifies the direct and indirect relationships among the research model constructs. It investigates ten hypotheses that provide convincing evidence and justification for FV, EV, SV, and CS to act as a partial mediator between DI and CL. Moreover, CI is a moderating variable between CS and CL for customers in Egypt and Saudi Arabia. It advances and adds to our current knowledge of the causes, effects, and implications of FV, EV, SV, CS, and CI in the context of tourism and travel in developing nations. The rigorous study model could be applied to other providers i.e., hotels, restaurants, villages, airlines, catering services, museums, events, and other providers to generalize the findings. The findings of the proposed research model contribute to a better understanding of the factors that affect EV, SV, CS, and CI in hospitality and tourism destinations, with a focus particular on Egypt and Saudi Arabia, which must carefully improve their FV, EV, SV, CS, and CI to remain competitive in the customer's supply chain that is undergoing rapid change, technology, and innovation. The findings offer evidence of convenience that destinations in Egypt and Saudi Arabian Arabia can achieve and promote high CL in terms of customer satisfaction, intimacy, and loyalty by adopting DI and CL. This work closes the research gap identified by (Atasoy & Eren, 2023; Carlson et al., 2019; Chuah et al., 2017; El-Adly, 2019; Ramseook-Munhurrun et al., 2015), regarding the critical requirement to thoroughly analyze factors influencing service enterprises to adopt DI. How much do these methods influence destination managers' attitudes about FV, EV, SV, CS, and CI and high CL in their destinations? The overall interpretation of the factors affecting DI and CL in both destinations in Egypt and Saudi Arabia, will be improved by having a better understanding of the direct and indirect effects of the causal relationships between the research constructs. Additionally, scholars are also urged to expand on the research model that has been proposed to reveal global and multi-national evidence about customer and destination managers' perspectives on developing DI and CL in the tourism and hospitality arenas.

3. Practical implications

This research offers numerous managerial implications for destination managers and service providers. The present study revealed that the destination image significantly contributes to customer loyalty. First, it presents an opportunity for manager destinations to reevaluate their development priorities to achieve the three dimensions of perceived value, i.e., functional, emotional, and social value, as well as customer satisfaction, which is a vital factor in contributing to customer loyalty. Findings invite destination managers to review their plans and competitive development strategies. Therefore, the destination image concept is a multifaceted construct made up of primarily cognitive, affective, and conative aspects in tourism research, destination managers, policymakers, governments, and planners have to integrate these aspects to make the destination image competitive. It is revealed that DI is a significant enabler of FV, EV, SV, and CS. This illustrates the necessity for destination managers to keep a close eye on their destinations and analyze data to take advantage of opportunities for growth and competitiveness. Enabling business environments, such as the business environment, destination safety and security, health, and human resources, should be carefully improved to put the destination in a competitive position and stay ahead of its competitors. Monitoring technological advancements in their industry and seriously implementing innovative ideas will boost their competitiveness and enhance their performance. In addition, combining marketing data with contemporary technologies to meet demand needs will keep their customers interested, engaged, and satisfied with their services and products.

Moreover, the findings indicate the importance of paying attention to how FV, EV, and SV affect CS. CS also plays a vital role in enhancing CL. Functional, emotional, and social values are significant contributors to customer satisfaction. Hence, policymakers and planners should cautiously consider these facets to strengthen customer satisfaction. When customers are satisfied and have access to enjoyable, amusing, and exciting destinations, they feel loyalty and hedonic gratification toward their destinations. Countries seeking increased and significant growth in tourism should examine the competitive characteristics of their destinations. Managers need to support their destination's image, identify the core issues, and make improvements to stay competitive and achieve the destination's intended growth in the tourism market.

8. Limitations and future research

Conceptual and practical advancements notwithstanding, there are a number of limitations that must be acknowledged. First, because the study's population was restricted to travelers who had been to Egypt and Saudi Arabia, the findings cannot be definitively applied to other destinations. The results of this study can be generalized by conducting comparable research in other destinations. Second, the scales used for measurements might not be sufficient when using them for Egypt and Saudi Arabia. Consequently, this area requires an exploratory analysis. Future research may examine how both first-time customers and repeat visitors perceive the destination, the impact of first-time and previous travel experiences on tourists' perceptions of a destination's image, as well as their impact on that image's functional, emotional, and social value, as well as their effects on customer satisfaction, intimacy, and loyalty Given that the travel market's demographics are shifting and may have an impact on the perception of a destination and visitors' behavior, tourist demographics are receiving more attention in destination literature. As a result, future research could focus on creating a more valid, reliable, and broadly applicable destination scale for use in tourism studies.

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HERITAGE VALUE DIMENSIONS AND TOURIST INTENTION TOWARDS SUSTAINABLE HERITAGE CONSERVATION: A MEDIATING ROLE OF DESTINATION ATTACHMENT

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Abstract: Heritage sites serve as vital cultural assets, embodying historical significance, architectural beauty, and socio-cultural traditions. Most researches of sustainable heritage tourism have primarily emphasized the perspectives of governments and local communities. This study aims to empirically explore the influence of heritage values on sustainable heritage conservation intention (SHCI) among the tourists visiting historical sites in Murshidabad, India. Using a mixed-methods approach combining online and offline surveys, data was collected from 468 domestic tourists. The research investigates how historical value, aesthetic value, and socio-cultural value influence their intentions to support sustainable conservation efforts. Additionally, it examines the mediating role of destination attachment in shaping these intentions. The research employed structural equation modelling to test the proposed hypotheses. A comprehensive mediation approach was also utilized to assess the intermediary effect of destination attachment between heritage values and SHCI. The findings demonstrate that various dimensions of historical heritage values significantly influence tourists' willingness to visit heritage sites and engage in SHCI. Destination attachment was identified as a crucial mediator, highlighting its role in strengthening the relationship between heritage values and sustainable heritage conservation intentions. This study offers valuable insights for designing strategies that align tourists' perceptions with sustainable heritage conservation goals. This research has made a profound impact in enhancing the understanding of heritage tourism and conservation. It dives deep into various critical aspects such as the historical value, socio-cultural value, aesthetic value, destination attachment, and SHCI. By delving into these areas, the study enriches the existing theoretical frameworks and provides a comprehensive perspective on how these elements intertwine in the realm of heritage tourism. This research is a significant stride forward in understanding sustainable practices within the tourism sector. Its implications are far-reaching, offering valuable insights for policymakers and stakeholders in the realm of sustainable heritage conservation. Beyond its immediate application to Murshidabad, the study offers broader insights applicable to other historically significant destinations.

Keywords: Heritage values, Sustainable heritage conservation, Destination attachment, Heritage tourism, Mediation analysis

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INTRODUCTION

Tourism, especially in the realms of culture and heritage, has become an increasingly vital player in driving economic growth and fostering the exchange of cultural values worldwide (Zhang & Lo, 2024; Rausell-Köster et al., 2022). At the heart of this phenomenon lies the crucial role of understanding how historical significance intertwines with tourist motivations, particularly within the context of sustainable heritage conservation intention (SHCI). Heritage sites, it should be noted, are far more than mere relics of the past (Knapp, 2024). They are dynamic cultural landscapes, continuously evolving and influencing contemporary society. Protecting these sites involves not just the conservation of their physical structures but also the safeguarding of the intangible cultural values they embody (Mekonnen et al., 2022; Wu et al., 2022).

Understanding heritage value is a complex task, encompassing various aspects like historical, aesthetic, and socio-cultural attributes. Each of these factors contributes to enhancing a site's historical significance and its appeal to visitors (Arumugam et al., 2023). This multifaceted nature of heritage value plays a pivotal role in attributing meaning and importance to the sites for different stakeholders (Bowal & Ghosh, 2023). Recognizing and defining the appropriate heritage value is a key step for stakeholders in initiating sustainable conservation efforts for cultural sites (Wulandari et al., 2024; Trinh et al., 2016). Historical value (HV) focuses on a site's importance in terms of its historical context and the narratives it presents. Aesthetic value (AV) covers the visual and artistic appeal of heritage locations, while socio-cultural value (SCV) encompasses a site's role in reflecting and preserving the cultural and social practices of a community (Chang et al., 2022; Wu et al., 2014). The concept of SHCI has gained prominence in recent years, aiming to strike a balance

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between protecting cultural heritage and fulfilling the needs and desires of both local communities and visitors. This approach underlines the importance of considering various stakeholder perspectives, including tourists, who can significantly impact cultural heritage (Rahman et al., 2020; Ghosh & Sofique, 2012). Responding to rapid urbanization and growth of tourism industry, there's a need to balance the preservation of historical sites, cultural assets, and environmental integrity (Trinh et al., 2016). Previous research indicates that tourism can contribute to the preservation and revitalization of historic sites, counteracting their deterioration (Wulandari et al., 2024; Nocca, 2017). Effective conservation planning, involving the active participation of various stakeholders, including government bodies and local communities, is crucial in achieving this goal (Xiao et al., 2024; Wu et al., 2022). This research delves into the relationship between different aspects of heritage values (HV, AV and SCV) and tourists' SHCI.

The framework suggests that these elements positively influence tourists' attitudes and behaviours regarding the conservation of cultural sites. Additionally, the study introduces destination attachment (DA) as a mediating factor, positing that visitors' emotional and cognitive connections to a site influence how they perceive its heritage values and their conservation intentions. The focus of this study is Murshidabad, once the capital of Bengal province in India. In the mid-eighteenth century, Murshidabad experienced considerable growth due to its political significance and flourishing economy, emerging as a hub of trade, commerce, and cultural activities. The city is home to numerous heritage sites, each with its unique heritage values: HV assessing historical significance, AV detailing architectural features, and SCV highlighting the connection between heritage sites and the identity of individuals or communities. While many studies have explored the heritage values linked to SHCI, they have primarily focused on the perspectives of governments and community (Brooks et al., 2023; Rahman et al., 2020). There has been a shortfall in examining the viewpoint of tourists and their SHCI. Therefore, to address the gap, this research aims to assess the impact of HV, AV, and SCV on tourists' SHCI, mediated by DA. The study aims to develop testable ideas to understand how tourists' views on heritage values and their attachment to a destination can influence sustainable conservation efforts. It seeks to improve conservation practices by considering the unique value of heritage sites and the needs of various stakeholders.

LITERATURE REVIEW

In recent times, there has been a growing focus on sustainable cultural tourism, which prioritises cultural heritage and local people in the decision-making processes (Zhao et al., 2023). The trend towards sustainable cultural tourism acknowledges the complex and diverse nature of historical value and its impact on conservation endeavours. Preserving and promoting heritage assets have emerged as a crucial component of sustainable tourism growth. The integration of heritage conservation and tourism addresses the economic, ecological, cultural, and institutional aspects of sustainability (Zhao et al., 2023). Sustainable cultural tourism aims to achieve a balance between preserving heritage and considering the interests of tourist policymakers, stakeholders, and the overall development agenda by prioritising cultural heritage and local communities in decision-making processes (Bowal & Ghosh, 2023). Furthermore, heritage tourism can provide economic advantages that contribute to the preservation initiatives and improve the general infrastructure and standard of living for local populations (Brooks et al., 2023). Several research have examined the relationship between different aspects of historic value and tourists' intention to support sustainable conservation of heritage (Rahman et al., 2020).

These studies emphasise the significance of conserving the authenticity and local significance of heritage locations, while also mitigating the adverse effects of tourist expansion on cultural and social aspects (Hasyimi & Azizalrahman, 2021). Traditionally, the effects of historic tourism have primarily been evaluated from ecological, economic, cultural, or political perspectives (Brooks et al., 2023). The assessment of heritage value relies heavily on the critical component of historical value. The historical value component considers the historical importance and contributions of a heritage site or artefact to evaluate its total heritage value. The preservation of historical sites and artefacts in heritage conservation is crucial for maintaining their originality and local importance (Wang et al., 2024; Liburd & Becken, 2017). The aesthetic value dimension encompasses the visual appeal, allure, and artistic attributes of a heritage place or artefact. This dimension acknowledges that individuals are attracted to heritage sites not alone due to their historical importance, but also because of their aesthetic charm and the sentiments they elicit. The preservation of the visual aspects of heritage sites and artefacts is crucial in order to enhance their total heritage value and improve the experience of tourists (Permatasari et al., 2020; Ghosh & Sofique, 2012). The study explores the influence of heritage on the formation of identity, the cultivation of a feeling of belonging, and the encouragement of cultural variety.

This component acknowledges that heritage sites frequently function as significant representations of cultural identity and have a vital impact on the social structure of communities (Xu et al., 2021). The statement underscores the importance of safeguarding heritage places and artefacts, recognising their significance not just in terms of historical and aesthetic worth but also in its capacity to enrich the social and cultural fabric of society (Christofi et al., 2018).

In order to comprehend the correlation between the dimensions of heritage value and the intention of tourists in sustainable heritage conservation, it is crucial to initially conceptualise the notion of tourist intention. Tourist intention pertains to the predisposition or readiness of persons to come and interact with a heritage site or location (Liburd & Becken, 2017). Several variables may influence this, such as the perceived worth of the heritage site and its cultural, artistic, historical, and socio-cultural components (Cai & Cheng, 2024; Nocca, 2017).

Destination attachment pertains to the affective relationship or affiliation that individuals form with a specific destination. The attachment to a destination is frequently shaped by the personal experiences, memories, and relationships that individuals have with it (Ren et al., 2021). It includes both the emotional and intellectual aspects of individuals' relationship with a destination, encompassing their feelings of attachment to the place, development of identity, and level of satisfaction with the destination. The concept of destination attachment posits that the emotional attachment and connection that tourists have towards a heritage site or destination can impact their desire to participate in sustainable heritage conservation endeavours (Brooks et al., 2023). The interaction between the aspects of heritage value and the tourists SHCI is an intricate and multifaceted process (Chen et al., 2016; Prosenjit & Sofique, 2012). The elements of heritage value, such as historical relevance, cultural authenticity, and aesthetic appeal, might influence how tourists perceive and feel about a heritage site. The aspects mentioned above enhance the overall heritage significance of the site, which might subsequently impact tourists' inclination to visit and actively participate in the site's conservation efforts. According to Gannon et al. (2020), tourists who view a heritage site as having significant historical value, genuine cultural representation, and attractive visual qualities are more inclined to form favourable opinions about the place and show a stronger commitment to preserving and maintaining its existence. The inclination of tourists to participate in sustainable heritage preservation can be impacted by various aspects, including their degree of recognition and understanding of the heritage significance, their own affinity or emotional bond with the location, and their purpose for visiting the place (Ren et al., 2021).

Tourists form a more profound emotional connection and attachment to a heritage site or location through destination attachment (DA). The establishment of an emotional connection might heighten tourists' drive to participate in sustainable conservation efforts and actively contribute to the enduring preservation of the heritage site (Brooks et al., 2023). The individuals experience a strong emotional attachment to the site and comprehend the significance of safeguarding its cultural and historical worth for future generations (Bacsi & Tóth, 2019). Tourists who have a strong emotional connection to a destination are more inclined to raise awareness about the significance of conservation and motivate others to adopt sustainable behaviours (Prados-Pena et al., 2019). Prior research has indicated that only having a desire to explore one's heritage does not have a direct impact on the level of satisfaction experienced by tourists or the overall appeal of a destination (Zhang et al., 2023). Heritage motivation acts as a mediator in the evaluation of destination qualities and the emotional connection that tourists develop with a location. Moreover, research has shown that the level of emotional connection to a cultural site has a substantial impact on tourists' level of happiness with their trip (Wang et al., 2019). Heritage destination attachment, which refers to the emotional relationship and identification with a heritage location, is a crucial factor in sustainable heritage protection (Andriotis et al., 2020).

This literature study offers useful insights into the correlation between characteristics of heritage value, tourism intention, and sustainable heritage conservation (Figure 1). These findings have important ramifications for the preservation and administration of historical monuments, since they indicate that cultivating a powerful emotional bond between tourists and the location can enhance their overall pleasure and willingness to support conservation endeavours.

1. Framing up hypotheses

Visitors are more likely to understand the value of conservation efforts and support sustainable practices if they are aware of the historical significance of heritage sites (Pandey & Sahu, 2020; Alexandrakis et al., 2019). Historical significance also helps to ensure the long-term financial viability of heritage preservation. The long-term preservation of the cultural features of tourism locations is also facilitated by the economic stability that comes from tourism (Parra-Requena et al., 2023). Historical places that are preserved draw tourists, who boost local economies by spending money on travel, lodging, food, and souvenirs. Researcher investigated how visitors behave in a heritage site that has been renovated and how they see the sustainability measures put in place there (Lee et al., 2021). The study highlights how crucial it is to comprehend how visitors view sustainability and how that affects their opinions on historic tourism. This knowledge can increase tourists' willingness to preserve tourist sites and aid in the creation of a sustainable interpretation of tourism. A heritage site's Historical Value (HV), which includes its historical significance, authenticity, and ties to historical events and personalities, is essential to drawing and retaining visitors (Labadi, 2024; Richards et al., 2018). According to the literature, visitors' admiration for HV might promote a more profound comprehension and reverence for the necessity of preserving these locations for upcoming generations. Thus, it is hypothesised that tourists' sustainable heritage conservation intention (SHCI) is positively influenced by HV.

H1: HV positively influences tourists SHCI.

The inclusion of aesthetic value in historical conservation initiatives increases the likelihood that visitors will be positively impacted and endorsing sustainable practices. This is demonstrated by the way heritage is evaluated and promoted as a tourism destination using aesthetic quality and visual integrity. Through the use of cultural heritage's aesthetic appeal, practitioners can improve tourist experiences and encourage a sense of responsibility for conservation (Richards et al., 2018). Moreover, the potential advantages of cultural heritage tourism for environmental, aesthetics and cultural heritage preservation should not be eclipsed by its economic and social benefits.

The aesthetic value and natural beauty of world heritage sites are thoroughly examined with a focus on the implications for the development and protection of tourism attractions (Zhang et al., 2023). They offer effective research methods for estimating the aesthetic value of landscapes, which could aid in the development of cultural protection regulations and give tourism-related endeavours a strong scientific basis. Studies show how tourists' attitudes, behaviours, and intentions towards long-term heritage preservation are significantly influenced by aesthetic value (Rajapakse, 2017). By recognising and promoting the aesthetic worth, areas with cultural and natural heritage can be preserved and developed sustainably. This leads to the second hypothesis, which states that AV influences tourists' SHCI.

H2: AV positively influence tourist SHCI.

Tourists are more inclined to support conservation efforts when they perceive a substantial socio-cultural value associated to the heritage site, according to research on the relationship between socio-cultural value and sustainable heritage conservation (Gannon et al., 2020). Tourism development may support sustainable heritage conservation by acknowledging the value of cultural identity and self-esteem and by encouraging a sense of cultural belonging among locals. As long as tourist development is crucial to maintaining the sustainability and preservation of the site, locals with strong cultural and environmental attitudes are more likely to view tourism's effects favourably and be in favour of it (Brooks et al., 2023). This can be accomplished by including the neighbourhood in historical tourism projects and preserving cultural traditions, practices, and values (Rajapakse, 2017). A key component in determining the identity and significance of a heritage site is Socio-Cultural Value (SCV), which is a reflection of the social and cultural practices connected to the site. As point out, visitors' cultural interaction at these locations can result in a greater understanding of their significance. Prior research has demonstrated that the socio-cultural features of heritage sites have a major impact on visitor behaviour, which can result in a favourable attitude towards heritage conservation (Gayeta & Ylagan, 2022). Therefore, the third hypothesis is that tourists' SHCI are positively influenced by SCV.

H3: SCV positively influence tourist SHCI.

According to Ram et al. (2016) authenticity and destination attachment are correlated. The tourist destinations located in locations with a high historical experience value are viewed as having a higher level of authenticity (Zhou & Pu, 2022; Nian et al., 2019). According to Andriotis et al. (2020), a visitor's affection for a heritage site is influenced by their attachment to it. Moreover, emotional attachment to the heritage destination and the evaluation of destination qualities are both mediated by destination attachment, which also improves tourist experiences and satisfaction (Orgaz-Agüera et al., 2022). Research indicates that travellers are more likely to recognise a destination's worth and advocate for its preservation when they develop a deep relationship to it (Nian et al., 2023). It is thought that tourists' emotional and cognitive attachment to a heritage site, known as destination attachment (DA), mediates the relationship between heritage values and their intentions to conserve (Bacsi & Toth, 2019). Thus, DA is hypothesised to act as a mediator in the interaction between tourists' SHCI and the heritage value aspects (HV, AV, and SCV).

H4a - c: DA mediates the relationship between the dimensions of Heritage Values and SHCI.

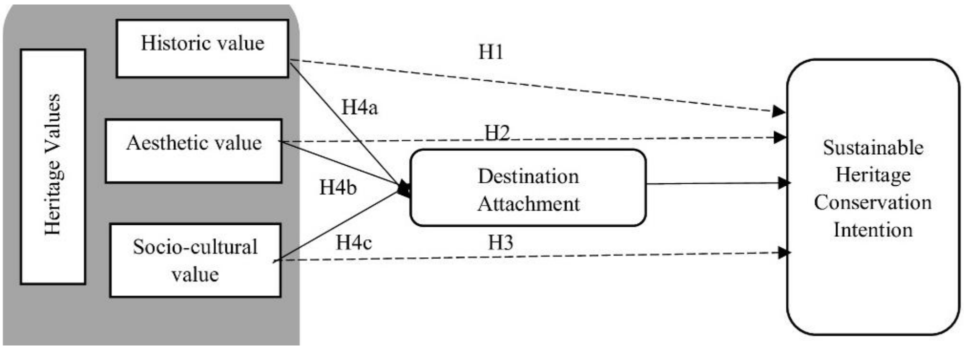

Figure 1. Theoretical framework

RESEARCH METHOD

1. Sample and survey administration

In the months of June and July 2024, information was gathered from domestic visitors to India using structured questionnaires at the major historical sites in Murshidabad. The surveys were carried out using both offline and online techniques. The information for the online survey was obtained from several OTAs and other local travel companies, and the survey was disseminated to the email addresses of individuals who had visited the historical sites in Murshidabad and had made posts on social media platforms like as Facebook and Instagram. There were 500 online questionnaires in all, and 257 persons answered to them. After the inadequate surveys were taken out of the research, 211 valid questionnaires remained. The offline survey was conducted in a few of Murshidabad's well-known historical landmarks, including the Katra Masjid, Jafarganj Cemetery, Motijhil, and Kathgola. 500 surveys were completed offline, and 334 respondents gave their responses. The research utilised a total of 257 legitimate questionnaires after excluding any surveys that were deemed invalid. A total of 468 replies were included in this inquiry. Table 1 presents the demographic distribution of the respondents.

Table 1. Respondent's demographic profile

Category	***N***	**%**	**Category**	***N***	**%**
Gender			Income		
Male	256	54.71	Below 5 Lac	253	54.05
Female	212	45.29	5 Lac to 8 Lac	164	35.04
Age (years)			8 Lac to 12 Lac	42	08.97
Below 21	42	08.97	Above 12 Lac	9	01.92
22-40	220	47.00	Education qualification		
41-55	157	33.54	Secondary	153	32.69
56-70	49	10.47	Graduate	268	57.26
			Postgraduate	36	07.69
			Others	11	02.35

Note: n = 468

2. Measures and instrument development

The survey questionnaire was partitioned into three sections. A preliminary question is presented in the initial part. The second section encompasses elements related to study constructs. The final segment of the survey collects the demographic data of the participants. The research constructs were evaluated using items sourced from previously validated scales. However, as necessary, the scales were adjusted to align with the dimensions of heritage value and the perspective of sustainable heritage protection. Historical value (HV) was assessed for three items obtained from Richard et al. (2018). The socio-cultural value (SCV) was assessed using three metrics sourced from Rajapakse (2017) and Xu et al. (2021). The aesthetic value (AV) was measured using three items, one of which was sourced from Richard et al. (2018) while the remaining two were sourced from Rajapakse (2017). Three instruments for assessing destination attachment (DA) derived from Nian et al. (2023). Three indicators were employed to assess sustainable heritage conservation intention (SHCI) as per Nian et al. (2019). The objects that incorporated all the structures were evaluated using a scale ranging from -2 to +2. The demographic characteristics of tourists, such as gender, age, education, and economic level, are utilised to promote sustainable heritage protection. They were excluded from the hypothesis development process and instead designated as control variables in the study. The survey instrument was also utilised to gather data on these control variables.

RESULT

1. Measurement model

In order to assess the accuracy, consistency, and structure of the components, a confirmatory factor analysis (CFA) was conducted using AMOS version 23. The results indicated that all the constructs' factor loadings above the minimum threshold value of 0.7 and were statistically significant ($p < 0.001$). The AVE values for all constructs are above 0.5, indicating a high level of average variance extracted. Similarly, the construct reliability values are above 0.7, indicating a high level of dependability (Table 2). The metrics employed to assess the constructs demonstrate convergent validity (Hair & Anderson, 2010). The discriminant validity of the research constructs was assessed following the guidance provided by Fornell & Larcker (1981). The square roots of the AVE values for each construct, as displayed in the top diagonal of Table 3, were greater than the construct's correlation coefficients with other constructs. Fornell & Larcker (1981) demonstrate discriminant validity among conceptions. Furthermore, the Cronbach's alpha value for each construct exceeded 0.7, indicating the reliability of the measures for the constructs (Table 2). The goodness-of-fit indices provide evidence for the measurement model's unidimensionality. The CMIN/DF is 2.260 ($p < 0.001$), indicating a good fit. Other indices, such as CFI (0.986), GFI (0.952), AGFI (0.927), NFI (0.976), TLI (0.982), and RMSEA (0.052), also support the model's appropriateness. Based on the results presented in Table 3, it can be observed that the majority of the constructs exhibit significant correlations with each other, as indicated by correlation regression coefficients ranging from 0.17 to 0.47. There is no presence of multicollinearity among these concepts, as all correlations are below 0.9 (Tabachnick & Fidell, 2012).

Table 2. Measurement model's summary

Construct	Statements	FL
Historical Value (HV) AVE (0.921), CR (0.972), α = 0.973	I am visiting this place mainly for knowing the history of this place.	.978
	I can relate and witness the fact and information which I have read.	.963
	I believe this history of the place is the valuable asset for the tourists of Murshidabad.	.939
Socio-Cultural Value (SCV) AVE (0.776), CR (0.912), α = 0.908	I visit this place mainly for cultural reason.	.820
	The fairs and festivals of this place is promoted as the socio-cultural values of Murshidabad.	.912
	I can relate this place as the socio-cultural identity of Murshidabad.	.909
Aesthetic Value (AV) AVE (0.904), CR (0.966), α = 0.966	The aesthetic value of this place motivates me visit here.	.983
	I find the place's architecture to be particularly fascinating because of its distinct qualities.	.930
	The monument architecture showcases the beauty of Murshidabad's legacy.	.940
Destination Attachment (DA) AVE (0.886), CR (0.959), α = 0.959	I feel much attached with this place while I visit here.	.910
	I have identified the Heritage Values (historical value, aesthetic value &socio-cultural value) at this place.	.969
	I am satisfied with my decision to visit here.	.945
Sustainable Heritage Conservation Intention (SHCI) AVE (0.698), CR (0.873), α = 0.870	I will abide by the management regulation of heritage protection.	.789
	I will actively participate in various heritage protection activities.	.870
	I am strongly condemning and will take legal action to protection of heritage sites.	.846

Notes: FL refers to factor loading, α represents Cronbach's α, CR stands for construct reliability, AVE denotes average variance extracted, CFI stands for comparative fit index, GFI represents goodness-of-fit index, AGFI refers to adjusted goodness-of-fit index, NFI stands for normed fit index, TLI represents Tucker-Lewis index, and RMSEA denotes root mean square error of approximation. The fit indices are as follows: CMIN/DF= 2.260 ($p<0.001$), CFI= 0.986, GFI= 0.952, AGFI= 0.927, NFI= 0.976, TLI= 0.982, and RMSEA= 0.052

Table 3. Correlation matrix for study constructs

	DA	HV	SCV	AV	SHCI
Destination Attachment (DA)	**0.94**				
Historical Value (HV)	0.25	**0.95**			
Socio-Cultural Value (SCV)	0.39	0.21	**0.88**		
Aesthetic Value (AV)	0.26	0.17	0.20	**0.95**	
Sustainable Heritage Conservation Intention (SHCI)	0.47	0.28	0.41	0.22	0.83

Notes: The diagonal value denotes the square root of each latent construct's individual AVE. **Correlation is significant at $p <0.01$, *Correlation is significant at $p < 0.05$

2. Common method bias (CMB)

Due to the fact that the data about both independent and dependent variables were collected from the same respondents, they might possess the ability to predict the connection between these components that could result in a CMB. Several methodologies were employed to search for the CMB. The questionnaire included items that evaluated a marker variable, which were conceptually independent from other factors (Malhotra et al., 2006). The correlation matrix between the marker variable and the other variables remained statistically significant even after accounting for CMB, despite the marker variable having a relatively weak connection with the other constructs in the study. Therefore, the findings cannot be accounted for by CMB (Lindell & Whitney, 2001). The Harman one-factor test was employed to investigate this potential concern (Podsakoff & Organ, 1986). The factor analysis utilised five main components, and the resulting five-factor solution accounted for 89.31 percent of the variance. Specifically, factor one contributed to 19.01 percent of the variation. The presence of a CMB is unlikely to be an issue in this dataset, as no distinct component was identified and the primary factor did not account for the majority of the variability (Ghosh & Jha, 2024).

3. Hypothesis testing

The testing process consisted of two phases: the examination of direct effects (H1-H3) and the assessment of mediation effects (H4a-c). A structural equation model was conducted using AMOS version 20 to analyse both the direct effects (H1-H3) and mediation effects (H4a-c). The fit statistics of the model are included at the bottom of Table 4. The absence of multicollinearity in the model was demonstrated by the VIF value being lower than the predetermined threshold of 5.0. Findings demonstrate that SHCI is significantly influenced positively by all three aspects of heritage values: HV (**β** =0.129***), SCV (**β** =0.196***), and AV (**β** =0.08*). Therefore, H1, H2, and H3 were all accepted. Effects of mediation were then looked at. We started by looking at the prerequisites for the appearance of mediation effects. According to Schneider et al. (2005), the prerequisites for mediation are met when the mediator and the result variable have substantial relationships with both the predictor and the mediator. Consequently, the direct impacts of each heritage value dimension on DA were investigated. The findings revealed that all dimensions, including HV (**β** = 0.159), SCV (**β** = 0.334), and AV (**β** = 0.176), had noteworthy effects on DA. Additionally, DA significantly affected SHCI (**β** = 0.480***).

Table 4. The Structural model result

Path relationships	β	SE
Direct effect		
Historical Value (HV) → Sustainable Heritage Conservation Intention (SHCI)	0.129***	.032
Socio-Cultural Value (SCV) → Sustainable Heritage Conservation Intention (SHCI)	0.196***	.036
Aesthetic Value (AV) → Sustainable Heritage Conservation Intention (SHCI)	0.080*	.033
Destination Attachment (DA) → Sustainable Heritage Conservation Intention (SHCI)	0.480***	.040
Historical Value (HV) → Destination Attachment (DA)	0.159***	.038
Socio-Cultural Value (SCV) → Destination Attachment (DA)	0.334***	.050
Aesthetic Value (AV) → Destination Attachment (DA)	0.176***	.039
Indirect effect	0.071***	.016
HV → DA → SHCI	0.113***	.019
SCV → DA → SHCI	0.084***	.017
AV → DA → SHCI		

Notes: Fit indices CMIN/DF= 2.68 (p<0.001); CFI = 0.98; GFI = 0.94; AGFI = 0.91; NFI = 0.97; TLI = 0.97; RMSEA = 0.06. ns = not significant; *p<0.05; **p<0.01; ***p<0.001; HV= Historical Value; SCV = Socio-Cultural Value, AV= Aesthetic Value, DA= Destination Attachment, SHCI= Sustainable Cultural Heritage Intention

Following Byrne's (2009) guidelines, we conducted an analysis to determine the indirect effects and their statistical significance using the bootstrapping method. The purpose was to examine the mediation effects on customer loyalty. We performed bias-corrected bootstrapping with 2,000 resamples and a 95% confidence interval. The AMOS version 20 bootstrap process was utilised for this analysis. The results of this examination are presented in Table 5. There are two types of mediation effects: partial and complete. Partial mediation is assumed when both the direct and indirect effects are substantial. On the other hand, complete mediation is assumed when the direct impact is significant, but the indirect effect is not (Cheung & Lau, 2008). The findings demonstrated that DA mediates the effect of HV (direct impact = 0.129***; indirect effect = 0.071***), AV (direct effect = 0.080*; indirect effect = 0.084***), and SCV (direct effect = 0.196***; indirect effect = 0.113***) on SHCI to a certain extent.

Table 5. The summary of the mediation effects

Hypothesis	Direct effect	Indirect effect	Result
→ HV → DA SHCI	0.129***	0.071***	Partial mediation
→ SCV→ DA SHCI	0.196***	0.113***	Partial mediation
→ AV → DA SHCI	0.080*	0.084***	Partial mediation

DISCUSSION

This research provides important insights into the field of heritage tourism, with a particular emphasis on how different values related to heritage, including historical values (HV), social-cultural values (SCV), and aesthetic values (AV), influence destination attachment (DA) and sustainable heritage conservation intention (SHCI). One of the key findings of this study is the strong direct impact of HV on DA. This suggests that the historical significance of heritage sites plays a crucial role in forming deep connections with visitors. This idea aligns with the study (Rajapakse, 2017), which revealed how historical stories can deepen visitors' emotional ties with historical locations. Similarly, the influences of AV and SCV on DA corroborate the research (Ram et al., 2016; Andriotis et al., 2020), who underscored the importance of aesthetic and socio-cultural factors in heightening visitors' engagement with heritage sites.

Another significant finding is the substantial mediating role of DA in the relationship between SHCI and historical values. This indicates that the emotional and cognitive attachment which a tourist develop with heritage places are essential in driving their willingness to support SHCI. This finding echoes the discussion by Wang & Bramwell (2022) about the importance of destination attachment (DA) in promoting eco-friendly travel behaviours. Murshidabad, with its plethora of historical sites, provides an excellent backdrop for this study. The research findings from other heritage-rich locations support the idea that visitors develop a strong sense of connection due to the historical and cultural values associated with these sites. This connection motivates visitors to actively participate in SHCI activities, reinforcing Zhao & Ritchie's (2019) argument about the critical role of tourists in sustainable heritage conservation.

The interconnectedness of heritage values, DA, and SHCI underscores the importance of conservation programs that not only focus on the physical preservation of heritage sites but also enhance and communicate their historical, aesthetic, and sociocultural significance to foster deeper visitor engagement. This research enhances our comprehension of the intricate relationships among various heritage value facets and tourists' conservation intentions. According to the study, approaches like storytelling, preserving authentic experiences, and integrating with local culture can significantly boost DA, thereby supporting SHCI. By providing concrete data on the mediating role of DA in the context of heritage tourism and conservation, particularly in the historically and culturally rich setting of Murshidabad, this study makes a notable contribution to existing literature. It highlights the importance of building a strong bond between tourists and heritage sites and offers valuable suggestions for enhancing tourist involvement in SHCI.

Implications

This research has made a profound impact in enhancing our understanding of heritage tourism and conservation. It dives deep into various critical aspects such as the historical value (HV), socio-cultural value (SCV), aesthetic value (AV), destination attachment (DA), and sustainable heritage conservation intention (SHCI). By delving into these areas, the study enriches the existing theoretical frameworks and provides a comprehensive perspective on how these elements intertwine in the realm of heritage tourism. One of the important theoretical contributions of this research is its exploration of how destination attachment (DA) plays a mediating role in the nexus between heritage values and sustainable heritage conservation intention (SHCI). This exploration is crucial in shedding light on the influence of tourists' emotional and psychological bonds with cultural sites on their proclivity towards conservation activities. The study, by focusing on this intermediary role, presents nuanced insights into the complexities of preserving heritage sites, putting a spotlight on the perspective of the visitors.

Moreover, the research pushes the boundaries of our understanding of what drives tourists to support conservation efforts. It delves into various factors such as the aesthetic beauty, social and cultural importance, and historical significance of heritage sites. By analysing these elements in the context of renowned cultural landmarks like Murshidabad, the study not only enhances our knowledge but also broadens the applicability of its findings. It suggests that the theoretical insights gained could be relevant to other historical sites as well, thereby extending the scope and practicality of its contributions to the field. This rich tapestry of theoretical advancements ultimately strengthens the foundation of heritage tourism and conservation studies, offering fresh perspectives and valuable insights for future research and practical applications in the field.

The insights from this research offer a wealth of benefits for those in charge of site management and experts working in the field of conservation. Understanding the various factors that influence visitors' support for conservation efforts gives site managers the ability to tailor their strategies effectively. They can modify conservation plans to focus on aspects like history, social-cultural importance, or aesthetics, which are most appealing to tourists. Such customization ensures that the conservation efforts resonate more strongly with visitors.

Additionally, the demographic data gathered from the survey is a valuables resource for site managers and local travel businesses. By getting to know their audience better - their age, gender, income, educational background - they can fine-tune their marketing tactics. This means creating targeted strategies that appeal to specific groups, leading to enhanced engagement and support from visitors. The use of both online and offline survey methods in this study sets a practical precedent for future research and data collection in heritage tourism. This blended approach broadens the scope of the target demographic, offering a valuable model for researchers and organizations involved in survey-based studies.

Moreover, the study highlights the crucial role of destination attachment as a key factor. Site managers in heritage locations can now focus on methods that deepen visitors' emotional ties to the sites. By offering immersive experiences, engaging storytelling, and educational programs, they can foster a sense of belonging and responsibility among tourists. This approach does more than just enhance the visitor experience; it's a significant step towards achieving sustainable heritage conservation. By connecting visitors emotionally to the sites, it ensures they feel a part of the conservation process, encouraging their support and involvement in preserving these precious heritage sites for future generations.

Limitations and Future Research Directions

This study has certainly shed some light on how heritage values link into sustainable conservation efforts. However, it's important to acknowledge a few limitations that were encountered, which also pave the way for future exploration in this field.

Firstly, let's talk about the scope of the study. Unfortunately, due to time constraints, we couldn't dive as deep as we wanted into all the historical sites in Murshidabad. This limitation means that our findings, while valuable, don't paint the full picture of Murshidabad's rich heritage landscape. We focused primarily on the historical, aesthetic, and socio-cultural values of these sites. Future research can take this baton and run further with it. It would be beneficial to carry out a more detailed study over a longer period, possibly expanding the research to include more sites in Murshidabad or even similar locations elsewhere. And by extending this research to various geographical areas, we can start to draw comparisons and develop a deeper, more nuanced understanding of the interplay between heritage values, people's attachment to these destinations, and how we can sustainably conserve them. It's like putting together a jigsaw puzzle; the more pieces we have, the clearer the picture becomes.

CONCLUSION

The recent research delves into how deeply heritage values impact tourists' connections with travel destinations. It shines a light on the profound effects these elements have in forming the way tourists perceive and emotionally connect with places rich in cultural heritage. Murshidabad city, nestled in West Bengal, India, is steeped in history and culture, making it a prime example of the study's findings. What's remarkable is the collaborative effort that has gone into maintaining these heritage sites. Organizations like the Archaeological Survey of India and the Murshidabad Heritage Development Society, alongside private owners of heritage properties, have joined forces to ensure these historical sites are preserved for future generations. Their dedication underscores the vital role of sustainable conservation.

The study underlines a key insight: tourists are integral to the success of sustainable heritage conservation intention (SHCI). It's not just about visiting these sites; how tourists interact with and respect these places plays a pivotal role in keeping the heritage alive and thriving. The findings are more than academic; they offer practical knowledge for those involved in SHCI. They underscore the necessity of visitor participation in keeping historic sites not just standing but meaningful. This research is a significant stride forward in understanding sustainable practices within the tourism sector. Its implications are far-reaching, offering valuable insights for policymakers and stakeholders in the realm of heritage conservation. It's a call to action for everyone involved in this field to rethink and reinvigorate their approaches to preserving our shared cultural legacies.

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NAVIGATING HERITAGE: THE DYNAMIC ROLES OF TOUR GUIDES IN KUALA LUMPUR'S HERITAGE WALKING TOURS

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Abstract: Heritage walking tours have gained popularity as tourism offerings, signifying a growing demand for authentic and experiential experiences. The success of these tours depends not only on the historical importance of the sites visited, but also on the tour guides' competence and skills in facilitating the experience. Despite their crucial role in the tourism industry, tour guides often lack recognition in many tourism plans and initiatives. This study explored tour guides' perceptions of their roles in heritage walking tours in Kuala Lumpur, Malaysia. Data were collected from 11 certified tour guides through in-depth interviews. Thematic analysis was then performed and revealed four primary themes - an image maker, a cultural interpreter, a tour coordinator, and an influencer. As image makers, tour guides shape visitors' perceptions on the image formation of Kuala Lumpur and Malaysia as a tourism destination. In their capacity as cultural interpreters, guides facilitate deeper understanding of the cultural and historical contexts of the sites. The third role, tour coordinator, revolves around managing and monitoring group dynamics to ensure the tour proceeds smoothly within the allocated time and location. The final role, influencer, emphasises the guides' commitment to imparting their knowledge and experiences to junior guides, particularly by senior guides with over ten years of experience. While the first three roles focus on the mediation functions between the guide, visitors, and the destination, the influencer role highlights the importance of guide-to-guide interaction as an emerging component of the tour guide role structure. Senior guides serve as role models, helping to improve the skills, and competency of their fellow and junior guides in conducting heritage walking tours. These findings highlight the multifaceted roles of tour guides, demonstrating that their tasks extend beyond facilitating visitor experiences to include fostering a collaborative and knowledgeable community of guides. The implications for tour guide associations and training institutes suggest the need for tailored training modules that address these diverse roles and support the ongoing professional development of guides in this rapidly evolving industry.

Keywords: heritage tourism, tour guide role, heritage walking tour, visitor experience, Kuala Lumpur

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INTRODUCTION

Heritage and cultural tourism is deemed one of the biggest and most significant segments of the global tourism industry. According to the United Nations World Tourism Organisation (UNWTO) report, international tourism in the first quarter of 2023 reached 80% of its pre-pandemic levels, attracting approximately 235 million visitors worldwide during this period. This impressive growth of more than double the figure recorded during the corresponding period of 2022 marks a significant recovery in the tourism industry, including heritage and cultural tourism.

The increasing number of tourists visiting heritage sites is often driven by a desire to immerse themselves in the local culture and history of their destinations (Timothy, 2017). Fuelled by curiosity and a passion for authentic engagement, these tourists increasingly pursue meaningful experiences that extend beyond ordinary sightseeing (Poria et al., 2009).

For many, visiting historical landmarks, museums, and cultural sites provides a more profound and engaging travel experience than traditional leisure tourism. This quest for knowledge and understanding has driven the growing demand for tours that provide in-depth historical and cultural context of a specific destination. Capitalising on this trend, heritage walking tours have garnered significant attention in several cities worldwide as a prominent offering within the heritage and cultural tourism sector (Barber, 2018; Saiyed et al., 2017; Tomlinson, 2020).

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Led by knowledgeable tour guides, these tours integrate historical narratives with visits to culturally significant sites. Tour guides act as cultural interpreters offering narratives to bridge the past and the present (Kalyoncu & Yüksek, 2020; Weber, 2018), mediating social interactions within the group and between various destination hosts (Weiler & Yu, 2007) and eventually creating more sustainable tourism that benefits both host communities and visitors (Francis et al., 2019; Weiler & Kim, 2011). This personalised approach allows tourists to connect with a place on a more emotional level, fostering a richer understanding and appreciation for the destination's unique heritage and culture (Chauhan & Anand, 2023; Gao et al., 2020). Owing to their communicative ability, tour guides are viewed as ambassadors who present positive information and images of the destination to tourists (Látková et al., 2018; Pereira, 2015). Another essential aspect of guides is to foster empathy or emotional access by way of explaining cultural heritage sites, especially those related to contested and challenging histories (Quinn & Ryan, 2015; Voshage & Gamerith, 2024). In this respect, the increasing interest in heritage walking tours reflects a broader trend towards experiential travel, where tourists seek to engage deeply with local culture and history, thus making the role of tour guides essential in these tours.

In the context of Kuala Lumpur, the Kuala Lumpur City Hall (KLCH) has taken proactive measures to preserve cultural heritage resources as part of the city's tourism plans. For instance, a project aimed to narrate the story of Kuala Lumpur to the public by enhancing city walks within the Kuala Lumpur Heritage Zone was launched under the Kuala Lumpur City Plan 2020 (KLCP2020) to attract international tourists (Kuala Lumpur City Hall, 2018). This initiative is consistently emphasised in the Kuala Lumpur Structure Plan 2040 (KLSP2040), specifically focusing on promoting the implementation of the Kuala Lumpur Heritage Trail (Kuala Lumpur City Hall, 2023). However, this strategic framework lacks the recognition and integration of the roles of tour guides despite their significant contributions to heritage tourism. Instead, the initiative prioritises the provision of self-guided trails accompanied only by information panels and markers to guide tourists.

Although the demand for tour guides exists in Malaysia (Mustafa et al., 2021), their roles within the context of heritage walking tours remain limited and unclear. Previous studies on tour guides in the local context have primarily focused on their communication competency (Mohamed Rosli et al., 2013; Tan et al., 2011), the use of humour in cross-cultural communication (Abdul Rashid et al., 2017), service performance quality (Syakier & Hanafiah, 2021), and issues related to their profession (Mustafa et al., 2021). The growing popularity of heritage and cultural tourism, marked by a broader shift in tourist preferences towards culturally enriching and historically significant experiences, highlights the pivotal role of tour guides within the tourism industry. Given Kuala Lumpur's wealthy multicultural background, it is hypothesised that direct interaction between tourists and tour guides is essential for effectively conveying the city's diverse historical and cultural narratives. Considering this critical aspect, this study explores the dynamic roles of tour guides in Kuala Lumpur's heritage walking tours through an in-depth qualitative analysis.

LITERATURE REVIEW

The crucial roles of tour guides in shaping the tourist experience have long been recognised in the tourism industry. Historically, Holloway (1981) suggested that a tour guide effectively performs as an 'information giver' and a 'mediator' responsible for giving visitors meaningful information. Later, Cohen (1985) identified the traditional roles of guides as the 'pathfinder' and 'mentor.' The pathfinder guides visitors through unfamiliar environments, while the mentor's main role is to enlighten them about their destination. Subsequently, Weiler & Black (2015) advocate that tour guides serve as experience mediators by facilitating physical access, interactions, understanding, and empathy. This progression highlights the dynamic evolution of the tour guide's role in adapting to evolving tourist expectations and industry trends.

Within the context of heritage walking tours, various roles of tour guides in facilitating favourable tourist experiences have been adequately discussed with a focus on the roles of educators and interpreters (Chauhan & Anand, 2023; de Guzman et al., 2019; Gao et al., 2020; Weng et al., 2020). Both roles underscore the duty of guides in communicating the history, culture, and significance of heritage sites to tourists. However, de Guzman et al. (2019) and Chauhan & Anand (2023) emphasize a more inclusive and co-creative approach to recreational learning during the tours. In contrast, Weng et al. (2020) and Gao et al. (2020) concentrate on the transmission of historical information, highlighting the customary interpretive function of tour guides. This difference reflects that tourists' expectations vary, making it essential to prioritize a balance between education and engagement for meaningful experiences.

The dual role of tour guides as educators and entertainers has been consistently highlighted in previous studies where they are tasked to fulfil their educational roles and at the same time entertain tourists and facilitate an enjoyable walking tour environment (Hansen & Mossberg, 2017; Kalyoncu & Yüksek, 2020; Zhu & Xu, 2021). As seen in the works by Zhu & Xu (2021), the local Chinese tour guides skilfully switched between roles, such as a Chinese sibling, a local expert, and a cultural interpreter, while subtly concealing their concurrent role as shopping promoters during interactions with Chinese outbound tourists. This approach was utilised to balance their educational responsibilities and the need for entertainment for positive impressions during the tour. In another study, Hansen & Mossberg (2017) asserted the significant role of tour guides in maintaining careful coordination between their basic role and the 'guide plus' role.

This includes serving as a storyteller, social mediator, and instructor. This can be accomplished by integrating humour, local legends, and personal stories into their storytelling, allowing tourists to connect with the destination on a more profound emotional level (Quinn & Ryan, 2015). These studies demonstrate that individual guides must skillfully perform multiple roles within a single tour to complement the tour environment and provide high-quality experiences. Recent studies indicate that the role of a tour guide as an agent of social change is increasingly significant on tours addressing contested histories or politically sensitive subjects. For instance, guides on postcolonial city walks perform an activist role by deconstructing official city narratives to raise awareness about the impacts of colonialism (Voshage & Gamerith, 2024) while simultaneously accommodating tourists who may favour lighter or more leisurely tour (Schlegel & Pfoser, 2023). Both studies underscore the adaptability of tour guides in customising narratives to satisfy the audience. Nevertheless, the challenge lies in balancing their roles as entertainers with the necessity of delivering educational content that may evoke discomfort or ideological contention. Additionally, tour guides are also seen as sustainability advocates by promoting awareness of local heritage and its preservation (Güzel et al., 2020), as well as supporting local economies (Kalyoncu & Yüksek, 2020). In this capacity, they adopt roles that not only inform but also shape tourists' attitudes toward conservation and sustainable travel behaviours (Rugkhapan, 2023).

The roles of tour guides extend beyond shaping visitors' experiences. They serve several responsibilities towards other tourism stakeholders. For instance, past studies revealed that tour guides function as agents to implement government policies aimed at creating a favourable destination image (Dahles, 2002; Látková et al., 2018). To avoid any misconduct and maintain professionalism, tour guides must comply with the code of ethics issued by tour guide associations or tourism authorities (Mak et al., 2011), as well as adhere to the destination's regulations to support sustainability goals (Francis et al., 2019). Tour guides may, in specific instances, act as representatives of local communities, conveying their historical narratives and social values to tourists (Jensen, 2010). Additionally, Mak et al. (2011) reported that tour guides employed by tour operators are anticipated to perform a marketing role by delivering high-quality service and fostering positive word-of-mouth to draw in prospective clients.

This literature review presents the evolving roles of tour guides across different individuals and tour groups. As contended by Weiler & Black (2015), no two guides are the same since their roles are determined by their background, the setting, the type of tour, and the audience. This topic remains an active area of research owing to the complexity of their roles and the dynamic nature of walking tours (Zhu & Xu, 2021). Recognising the inherent complexity, this study provides an in-depth exploration of the essential roles performed by tour guides in heritage walking tours.

This study is both relevant and timely concerning the ongoing discourse in this field, as it is driven by the concerted efforts that have been made to plan and develop heritage trails in Kuala Lumpur.

MATERIALS AND METHODS

Sampling and Data Collection

This study employed a qualitative approach to explore the roles of tour guides in heritage walking tours. This approach was considered appropriate to discover detailed insights related to the research inquiry. Comprehensive data were collected through in-depth interviews, which is an effective method for gaining insights into specific phenomena from the perspective of those directly involved (Seidman, 2006). The participants are certified Malaysian tour guides who were selected using purposive sampling based on the following criteria: (1) at least three years of professional guiding experience and (2) experience in organising walking tours within the Kuala Lumpur heritage zone.

Table 1. The Profile of the Participants Interviewed (Source: Authors' own data)

Participant's ID	Gender	Age	Education	Origin	Years of experience	Training institute
P01	Female	63	Undergraduate	Kuala Lumpur	33	Ministry of Tourism
P02	Male	51	Undergraduate	Kuala Lumpur	8	Karisma International College
P03	Female	50	Some Academy	Sibu	7	Green City
P04	Male	53	Undergraduate	Johor	8	Green City
P05	Male	58	High School	Kuala Lumpur	12	Global Institute of Tourism (GIT)
P06	Male	39	Undergraduate	Kuala Lumpur	10	JPK (Jabatan Pembangunan Kemahiran)
P07	Female	65	Certificate	Klang	27	Reliance Training Centre
P08	Male	40	Undergraduate	Petaling Jaya	10	Karisma International College
P09	Female	36	Undergraduate	Kuala Lumpur	5	Travex
P10	Male	43	Undergraduate	Subang Jaya	6	Perfect Tourism Management Centre (PTMC)
P11	Male	52	Undergraduate	Kuala Lumpur	11	Sunway Business College

They were recruited through internet searching via the Google search engine, with key terms associated with heritage walk tourism operators (such as heritage walk, heritage city tours, and heritage trail). Additionally, snowball sampling was utilised, where interviewed participants were asked to recommend other guides relevant to the study. Potential participants were then contacted via email to brief them about the study details and their potential involvement. Upon agreeing to participate, interviews were promptly scheduled. As a result, 11 tour guides were interviewed between January and April 2022 (Table 1).

The interview questions were developed based on the current literature, with emphasis on addressing the following key research question: How do tour guides describe their role in heritage walking tours? Various probing questions were employed to gather detailed responses. The analysis in this qualitative study focused on the explanations and meanings given by the participants rather than on quantifying phenomena. After obtaining the participants' informed consent, each interview session was digitally recorded. The transcription process commenced immediately after each interview to guarantee the highest level of accuracy and trustworthiness to the participants' responses. This rigorous technique aims to capture the complexities of the roles of tour guides in heritage walking tours and contribute valuable insights to the existing body of knowledge. The methods of data collection are illustrated in Figure 1.

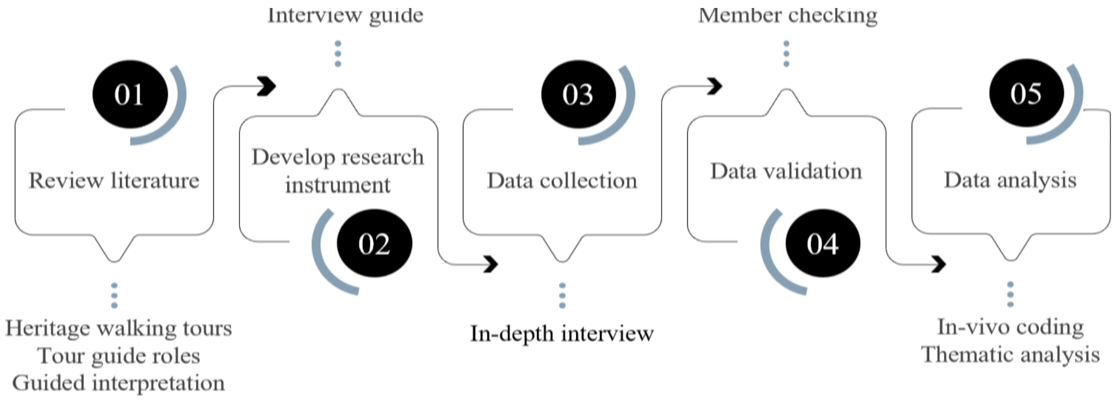

Figure 1. Research Methods Flowchart (Source: Authors' illustration)

Data Analysis

The data collected was managed and analysed using ATLAS.ti 9 software. In particular, thematic analysis was employed to identify emerging ideas and themes from the data (Braun & Clarke, 2006). The '*in vivo* coding' method was adopted from Creswell & Poth (2018), in which the code term was selected from the participants' original words. For lengthy words, the authors renamed the quote that best encapsulates their meaning. Table 2 provides the Thematic Analysis Matrix (TAM), which lists a concise summary of the codes, code groups, and final themes related to the perception of tour guides regarding their roles. A total of 93 *in vivo* codes were identified from 11 individual tour guide interviews (n = 11). Identical *in vivo* codes were combined into 27 codes. The codes with similar meanings or characteristics were further grouped into 15 code groups or categories to enhance clarity in interpretation. The code groups were constantly compared to determine the final themes. Selected participants were tasked with reviewing the summary of key themes and points to ensure the reliability of the findings (Merriam & Tisdell, 2016). This member-checking process also ensures that the data interpretation aligns with the participants' intended meanings, thereby enhancing the overall validity and reliability of the study.

Table 2. Thematic Analysis Matrix (Source: Authors' own data)

Codes	Code groups	Final themes
1) A frontliner; 2) Bound to ethics 3) Deliver accurate information 4) Deliver information 5) Good first impression 6) Highlight positive images 7) Mini ambassadors 8) Promote the country 9) Representative of the country	1) Good first impression 2) Mini ambassador 3) Accuracy of information 4) Highlight positive images	1) Image maker
10) Communicate with visitors 11) Educate visitors 12) Knowledgeable and updated 13) Language interpreter 14) Telling stories 15) The role of entertainer	5) Interpret the site's significance 6) Storytelling 7) Entertain visitors 8) Language interpreter	2) Cultural interpreter
16) A leader 17) A facilitator for travel arrangements 18) To build friendship 19) Take them to places not on the itinerary 20) Determine tourists' needs and interests 21) To be a student 22) To be very attentive	9) Being attentive 10) Facilitate travel arrangements 11) Value friendship 12) Go beyond the itinerary	3) Tour coordinator
23) A role model 24) An influencer 25) Passing knowledge 26) Raising the profile of the tour guides 27) Setting up the standards for tour guides	13) Raising the profile of the tour guide 14) Sharing expertise and experiences 15) Setting up standards or best practices	4) Influencer

RESULTS AND DISCUSSION

Tour Guide Roles

Participants were asked to describe their roles in the heritage walking tour. Based on the results in Table 3, four broad themes emerged from the analysis: (1) image maker, (2) cultural interpreter, (3) tour coordinator, and (4) influencer.

Table 3. List of Themes and Sub-Themes related to Tour Guides' Roles (Source: Authors' analysis)

Themes	Sub-themes	Participants
Image maker	Good first impression; Mini ambassador; Accuracy of information; Highlight positive images	P01, P02, P03, P04, P05, P06, P07, P08, P09, P11
Cultural interpreter	Interpret the site's significance; Storytelling; Entertain visitors; Language interpreter;	P01, P02, P03, P04, P06, P07, P09, P10
Tour coordinator	Being attentive; Facilitate travel arrangements; Value friendship; Go beyond the itinerary	P01, P03, P04, P05, P06, P09, P10, P11
Influencer	Raising profile of the tour guide; Sharing expertise and experiences; Setting up standards or best practices	P01, P05, P07, P011

Role 1: Image Maker

Firstly, the participants perceived themselves as image makers and were responsible for establishing initial contact with tourists upon their arrival to this country. Being a frontline employee in the tourism industry, they are accountable for making good first impressions in terms of greetings and appearances. As one of the participants explained, "*I consider myself a frontliner. In some ways, I'm the first person to meet the tourist visiting my country. The way I dress and speak represents my country*" (P07). Since tourists highly regard a positive first impression (Huang et al., 2010), upholding this aspect sets the right tone for the entire tour and establishes a foundation for building rapport with tourists.

As image makers, the participants were also aware of their role as "*mini ambassadors*" (P05, P09) or "*representatives of the country*" (P02, P04, P06) to showcase the site's attractions. These roles, which are among the most cited from the interviews, align with established scholarly recognition of tour guides as ambassadors who host, accommodate, and represent the country and its image (Látková et al., 2018; Pereira, 2015). They also highlighted the responsibility of tour guides to enlighten tourists about Kuala Lumpur's tourism offerings, including its attractions, cultures, and heritage. In this regard, tour guides must also be knowledgeable about the latest information, as the accuracy of the information provided to visitors is critical to avoid misrepresentation, which could influence their perceptions of Malaysia, particularly Kuala Lumpur, as a received image. The Tourism Industry Act 1992 (Section 28) also emphasises this responsibility, which stipulates that inaccuracies can result in the suspension or revocation of a guide's license.

Tour guides also play a significant role in correcting preconceived misunderstandings that tourists may have about Malaysia, especially related to sensitive topics, such as its multi-racial community, cultural norms, and religious practices. This educational role is vital in facilitating tourists to navigate and comprehend cross-cultural tourism settings, as mentioned by P02: "*I emphasise on the matter that we are multi-racial country. This is very important because they assumed that this is Islamic country that strictly followed Islamic law.*" As image makers, tour guides must also adhere to the code of conduct or ethics by demonstrating positive aspects of the country. In fact, tour guide associations in various countries have introduced their standards of practice to regulate their members' actions and ensure the delivery of professional service (Mak, 2011). This role requires tour guides to maintain neutrality and deter from engaging in political discussions. However, one participant (P04) pointed out his concern over the behaviour of some tourists who provoke the guide by asking unexpected questions. He shared several strategies for handling such situations, such as providing carefully taught answers to avoid potential tensions, emphasising the importance of maintaining a neutral stance and redirecting discussions toward attractions, culture, and heritage.

Likewise, another participant emphasised the roles of tour guides in supporting the government agenda, "*It is the tour guide's duty to present the country to tourists in the way that the government wants*" (P11). This statement underlines the dutiful role of tour guides in shaping the desired image of Kuala Lumpur as a tourism destination according to the vision of the city authorities. As mentioned by Dahles (2002) and Látková et al. (2018), this situation highlights the political role of tour guides in mediating and regulating the flow of information about the country to support the government's objectives.

The results also reveal the significant influence of tour guides as image makers on positive outcomes. One participant (P05) stated that these outcomes include enriching visitors' understanding of the destination, which inspired them to visit again, as well as fostering tour guides to be proud of their job and motivating them to provide better services. Another participant (P08) describes these outcomes as "*chain reactions,*" impacted by the spread of positive word-of-mouth about their services. Eventually, this encouragement contributed to boosting the country's economy and other sectors of the tourism industry. These findings underscore the crucial role of tour guides in shaping the destination image and influencing visitors' satisfaction and experience quality. Thus, the tour guide's expertise in creating an ideal destination image by providing engaging and accurate information is vital to accomplishing a positive experience.

Role 2: Cultural Interpreter

Tour guides serve as cultural interpreters by aiding comprehension and understanding across varying topics and cultural contexts. Their ultimate role on most tours is to convey understanding and deliver a meaningful and memorable experience for all visitors, regardless of their initial reasons for participating in the tour. One participant described this commitment: "*It is important to me that every visitor who joins my tour, for whatever reason, leaves with new knowledge. I believe they have learned something*" (P01). Besides, tour guides are responsible for building connections with what visitors encounter during the tour, thus promoting understanding, enjoyment, and appreciation (Chauhan & Anand, 2023; de Guzman et al., 2019; Kalyoncu & Yüksek, 2020).

Furthermore, they indicated that the learning outcomes rely on the visitor's interest and motivation for joining the tour. The findings reveal visitors join the tour for various reasons, including a desire "*to experience it*" or to gain a "*better understanding of the area,*" while some are unsure about their *"learning curve"*, suggesting an openness to unexpected discoveries and personal growth during the tour. Therefore, those who seek to gain knowledge are likely to learn more than those who participate in the tour for leisure. Regardless of their reasons, one participant suggested that tour guides should "*just educate people the best we can*" (P10).

The role of a cultural interpreter underscores the importance of a tour guide's knowledge and interpretation in informing the historical narrative and significance of the sites, thus enhancing visitors' understanding. Majority of the participants employed storytelling as an essential interpretive technique for nurturing cognitive and emotive connections with the destination via captivating and appealing stories. They believed that this interpretive skill was crucial to gaining visitors' interest and attention during the tour. As storytellers, the roles of tour guides go beyond simply reciting facts, such as names and dates. Their ability to keep visitors entertained and avoid them "*getting bored*" (P04, P10) is a crucial aspect of storytelling that can contribute positively to meaningful learning experiences. In fact, education and entertainment are integral to one another as essential elements of on-site interpretation. This finding is consistent with previous studies (Bryon, 2012; Weiler & Black, 2015; Weng et al., 2020), which implies the significance of interpretive and communicative skills in guiding for facilitating visitors' meaning-making processes.

In nurturing an understanding of the cultural context, tour guides act as language interpreters, especially for visitors with poor command of Bahasa Melayu and English. Language proficiency is vital as guides must localise information about the site, ensure accurate communication, and enhance visitor comprehension. This dual role aids in bridging language gaps and addresses visitors' misconceptions about the country, if any. Effective interpreting languages helps tour guides assist visitors in understanding complex information and cultural nuances, fostering better knowledge dissemination of the sites they visit. This role is crucial to the educational mission of tour guiding, ensuring that all tourists, regardless of their language proficiency, depart with a clear and accurate comprehension of the country and its cultural heritage. This result highlights the role of tour guides in bridging the gap between foreign and local cultures, presenting the destination in a culturally sensitive manner that resonates with a diverse audience (Scherle & Nonnenmann, 2008).

Role 3: Tour Coordinator

The analysis highlights the tour coordinator as the third role of tour guides, which involves overseeing the tour group and managing the activities throughout the walking tour. This role allows guides to determine visitors' needs through their responses during the walk and enables them to attend to visitors' well-being, maintaining a smooth progression of the walk. These attentive actions, which include informing visitors about tour preparations, adjusting walking paces, ensuring safety, and continuously monitoring their condition, allow guides to effectively address any arising issues that may affect visitors' experience during the walking tour. This finding highlights the importance of being caring and attentive to visitors' needs and cultivating problem-solving skills. Previous studies have also demonstrated problem-solving skills as a key quality for professional tour guides (Huang et al., 2010; Zhang & Chow, 2004).

The duty of tour guides also involves assisting visitors with their travel arrangements. Excluding the handling of hotel check-ins and check-outs, their tasks focus on managing the progression of the walk from one point of attraction to another so that visitors can explore the sites in an authentic local manner and avoid any potential inconveniences, such as being overcharged or denied entry. One participant explained this point, "*We act as a facilitator where we guide them on travel arrangements and to prevent them from being taken advantage of*" (P06). This finding underlines the tour guide's vital responsibility in ensuring a safe and enriching experience during walking tours. Previous studies also mentioned that a tour coordinator is tasked with planning, organising, managing, and leading the group to foster positive group dynamics and create memorable experiences for visitors (Çetinkaya & Öter, 2016; Crespi-Vallbona, 2020; de Guzman et al., 2019).

In addition, participants highlighted the importance they place on cultivating positive relationships with clients, as stated by several participants, "*I always treat my clients as my friend*" (P05); "*I want to share few information with them like a friend*" (P09). They noted that this positive relationship is crucial for encouraging active engagement between tour guides and visitors. This approach promotes visitors from passively listening to commentary to active interaction in the walking tour experience. Through relationship building, tour guides create favourable impressions, thereby enhancing dynamic two-way interactions with tourists and encouraging an inviting tour environment (Zhu & Xu, 2021).

As tour coordinators, the findings suggest that tour guides are willing to make extra efforts by adding more stops beyond the initial plan, provided it is within their capability. Given the nature of walking tours, visitors are exposed to potentially various encounters along the route. Hence, it is always possible to add more stops throughout the tour. These additional efforts made by tour guides are referred to as the "guide plus" role by Hansen and Mossberg (2017), which underscores the willingness of a guide to provide better service beyond their typical role through more encounters and fostering active visitor engagement. These efforts are motivated by intrinsic rewards, such as visitors' smiles, satisfaction, and appreciation. Ultimately, tour guides feel a sense of fulfilment when the tours they have coordinated are favourably received, thus motivating them to improve their performance further in future tours (de Guzman et al., 2019).

Role 4: Influencer

This study revealed the significant role of the tour guide as an influencer, particularly among senior tour guides with extensive professional experience in the industry. They noted that their role in improving public understanding of the tour guide profession extends beyond their functionary roles in enhancing the visitor experience.

They seek to challenge the prevailing stereotype of tour guides as individuals who follow itineraries motivated solely by commissions or profits. In contrast, their goal is to elevate the profession's visibility by establishing proper standards and best practices for conducting heritage walking tours. This approach has been considered influential in shaping public perceptions and correcting the negative stereotypes associated with the tour guide profession (Li et al., 2021). One participant explained in detail this proactive stance in the following:

"*I consider myself today as an inspirer, an influencer to set the standards and raise the profile of the tour guide, which the public often has a very negative perception of. Perhaps they don't understand our job. I'm still doing my functionary job as a tour guide. But I think I'm consciously setting a trend and raising the profile of guides in the country.*" (P01)

Another participant (P07) who shared a similar goal, expressed her willingness to impart knowledge to junior guides. This voluntary knowledge sharing helps novices polish their skills by observing and learning the way to conduct walking tours by senior guides. They also highlighted the challenging nature of conducting heritage walking tours, where tour guides require proper guidance on best practices. This attention to detail differentiates walking tours from bus tours, as every stopping point and the content of the walk must be well-planned to ensure visitors experience a structured and meaningful tour. For junior guides, accumulating sufficient experience and participating in or conducting numerous tours is essential to achieving the same depth in heritage walking tours as senior tour guides. This finding verifies the importance of shadowing and observing senior tour guides to acquire knowledge about best practices (Tsai et al., 2016).

As influencers, senior tour guides play a critical role within their professional community. This role incorporates guide-to-guide interaction as the new component in the tour guide role structure (Figure 2). Senior tour guides with extensive knowledge and experience serve as role models by sharing their best guiding practices with fellow and junior guides to help improve their skills, experiences, and expertise in conducting heritage walking tours.

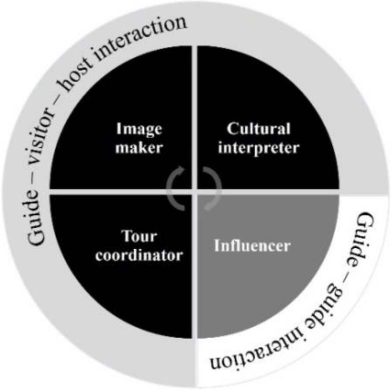

Figure 2. Four Major Roles of Tour Guides in Kuala Lumpur Heritage Walking Tours (Source: Authors' own illustration)

CONCLUSION

The findings conclude that tour guides are optimistic about their roles in enhancing the city's heritage tourism assets through walking tours. Four primary roles were identified: image maker, cultural interpreter, tour coordinator, and influencer. The first three roles highlight the mediatory roles played by tour guides during interactions with visitors and the host destination. In comparison, the final role as an influencer underlines the tour guides' commitment to mentoring and sharing their accumulated knowledge and experiences with less experienced colleagues. Their goal is to ensure the steady improvement of heritage walking tour experiences and contribute to the professional development of the guiding community as a whole. This role was particularly emphasised by senior guides with over ten years of experience.

The outcome of this study contributes to the existing body of knowledge regarding the multifaceted roles of tour guides in heritage walking tours. In particular, the roles of tour guides in providing positive visitor experiences were highlighted, which enhanced the image of the destination and fostered visitor engagement in the destination's narrative. Moreover, their roles extend beyond facilitating interactions with visitors and the host community, encompassing the roles involving other tourism stakeholders and, notably in this study, their fellow guides. This highlights the significance of integrating this distinct role into the broader framework of tour guide performance. On the other hand, the practical implication of this study is relevant to tourism authorities and tour guide associations.

The findings provide some insights into the recognition of tour guide performance in narrating the city's history through heritage walking tours, thus upholding the city as an international tourist spot. The findings also serve as guidelines for tailoring more relevant training courses related to heritage walking tours to enhance tour guides' performance. Such courses may include interpretation, storytelling, communication competency, and problem-solving skills with special attention to developing skills and training on-site.

Notwithstanding its valuable contributions, this study is not without limitations. Firstly, the findings are context-specific, concentrating on heritage walking tours in Kuala Lumpur, which may restrict the generalisability and transferability of the findings to other locations. Therefore, future research should expand the scope to include diverse geographical contexts and types of walking tours with varying cultural, historical, and social dynamics.

Next, the study primarily represents the viewpoints of experienced tour guides, especially those with over a decade of experience, perhaps excluding views from novice or mid-career guides whose experiences and challenges might differ. Comparative studies between novice, mid-career, and senior tour guides could offer a more nuanced understanding of how roles evolve over time and the specific training needs at different career stages.

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SPATIAL DISTRIBUTION OF THE BUDDHISM FAITH-BASED CULTURAL TOURISM ATTRACTIONS IN NAKHON SI THAMMARAT, THAILAND

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Abstract: Cultural tourism in the form of faith-based tourism is becoming very popular among both Thai and foreign tourists. This can be seen from the religious activities that occur almost all year round. This type of tourism often creates encouragement for tourists who come to experience it. Nakhon Si Thammarat is an ancient city with cultural and artistic significance. With its potential in tourism, Nakhon Si Thammarat has become a city that tourists have continuously traveled to experience up until now. The objective of this research is to find the spatial distribution of cultural tourism sites of the type of faith-based tourism in Buddhism in Nakhon Si Thammarat Province, Thailand, and to create a map of the cultural tourism route of faith-based tourism in Buddhism using geographic information technology. The methodology was obtained from field surveys by recording the coordinates of faith-based cultural tourism attractions with Global Positioning System (GPS) and using geographic information systems for mapping. It also adopts the principle of analyzing the density of attractions with Kernel Density. The results of the study found that the Kernel Density showed a high level of density in the eastern coastal plain region of the study area. It can be divided into 3 zones: the northern zone, the central zone, and the urban zone. The northern zone showed that the density of cultural tourist attractions is between 0.002-0.006 km^2. The central zone showed that the density of cultural tourist attractions was between 0.006-0.014 km^2. And the urban zone showed that the density of cultural tourist attractions was more than 0.014 km^2. In addition, there are as many as 16 Buddhist faith-based cultural tourist attractions, including temples, ancient sites, antiques, government offices, and naturally occurring sites. The tourism planning map can be organized within 4 days and 3 nights for tourism in 3 zones in Nakhon Si Thammarat Province. For planning each day's tourism, it can be seen that on the first day, it is recommended to finish touring the northern zone first, because it takes time to travel to various places because they are far apart. On the second day, it will be touring the central part of the study area, mostly ancient cities, important historical sites. On the third day, it will be touring the Nakhon Si Thammarat city area, where each tourist attraction is close to each other. This research is useful for tourism agencies, local communities, local tour guides, and both Thai and foreign tourists.

Keywords: cultural tourism attraction, spatial distribution, faith-based cultural tourism, Nakhon Si Thammarat, Buddhism faith-based cultural

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INTRODUCTION

Currently, faith-based cultural tourism is becoming popular in the tourism industry in Thailand (Maneenetr & Tran, 2014; Anuwichanont et al., 2020; Ruengmak & Dejpawuttikul, 2024). Such tourism forms are often based on religion and personal beliefs that are linked to the motivation to travel (Sharpley & Sundaram, 2005; Wang et al., 2016, Durán-Sánchez et al., 2018). This results in the physical and mental development of travelers, as well as religious activities related to beliefs and faith in the sacred objects in that place. In some cases, tourists who visit sacred places are motivated by religious reasons, astrology, fortune, and the worship of amulets to enhance stability in life and fulfillment (Das et al., 2024; Zhang & He, 2024). In addition, tourists also gain knowledge about history, local arts and culture, traditional festivals, and the cultural heritage and wisdom of the community. Therefore, faith-based tourism is an activity and relationship that arises from the occasional leisure trip of tourists, motivated primarily by religion and belief.

In Thailand, there are many different forms of tourism. In 2023, the Tourism Authority of Thailand conducted a survey of foreign tourists traveling to Thailand. It was found that tourists from 5 countries are popular for faith-based tourism: China, Singapore, Malaysia, Hong Kong, India, and countries with Chinese descent (Fakfare et al., 2022; Adebayo et al., 2023; Khemthong et al., 2024). This shows that faith-based tourism is gaining interest in the global market, and Thailand itself is a tourist destination with a distinctive culture and unique identity. According to the Ministry of Commerce, in 2022, pilgrimage tourism was able to generate income in the system as high as 10,800 million baht. It was also found that faith-based tourism has a tendency to grow exponentially, expected to create a three-fold increase in global economic value within the next 10 years, from a value of more than 13.7 billion US dollars in 2022, and is expected to increase to US$40.9 billion by 2033 (Ministry of Tourism and Sports, 2023). In 2023, faith-based tourism was pushed to be more tangible by the Tourism Authority of Thailand,

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which has created a project “Enhance the power of merit, support the power of mind” presented under the concept of “Amazing Mutiverse” from June 30 – July 2, 2023. 12 major routes have been designated (Sawasdee Thailand, 2023). The North has 3 routes, the Central 3 routes, 2 routes in the Northeast, 2 routes in the East, and 2 routes in the South. Especially these 2 southern routes, there are routes in Phuket and Trang provinces only. Mutiverse comes from the words Mutelu and Universe. Mutelu is a Thai word meaning a person who believes, has faith, and is interested in supernatural things (Eamvijit, 2024). Therefore, this research selected Nakhon Si Thammarat Province as one of the options. Because Nakhon Si Thammarat is an ancient city with a history of more than 1,800 years, it is a place rich in ancient sites, beliefs, religions, arts, cultures and traditions.

Nakhon Si Thammarat is an ancient city with cultural and artistic significance. It was the center of politics and administration during the 12th-14th centuries as it was an important port city in Southeast Asia (Munro-Hay, 2000; Noonsuk, 2013; Patnukao et al., 2024). During that period, there was a strong ruling king, the Sri Dharma Sokaraja dynasty. His important royal duties were to establish the Sri Lankan Buddhism in this land, which became the center of culture, religion, politics, administration, and economy (Guy, 2014; Ling, 2023). As a result, cultural heritage has been passed down to the present in the form of lifestyle, traditions, and culture. There is also archaeological evidence in various forms, such as antiques and historical sites, which show that Nakhon Si Thammarat has been known and has had contact with other nations since ancient times. Nakhon Si Thammarat is currently promoted as one of the 12 must-see cities, which appears in the 2nd Tourism Development Plan 2017-2021 by the Ministry of Tourism and Sports (Taengkliang et al., 2022; Arporn et al., 2024). This is because Nakhon Si Thammarat is a province with potential for tourism in all aspects, whether it is natural resources, traditions, culture, food, and interesting local lifestyles. With these factors, the number of tourists has continuously increased. From January to December 2022, there were a total of 242,870 Thai and foreign tourists traveling to Nakhon Si Thammarat. With its potential in tourism, Nakhon Si Thammarat has become a city that tourists have continuously traveled to experience up until now.

From the review of research on faith-based cultural tourism, it was found that such tourism generates millions of US dollars from foreign tourists. It not only creates local jobs, but also promotes industrial growth in other sectors (Soh et al., 2024). As can be seen from the research of Woodward (2004), it was mentioned that faith-based tourism in many religions is a catalyst for economic development, creating jobs and supporting local businesses. Therefore, proper planning and management of the use of tourist attractions should be carried out, for example, several cathedrals in the United Kingdom, Kandy in Sri Lanka, and Makkah in Saudi Arabia. Huang et al. (2019) explored the spiritual values and factors influencing faith tourism in China, and showed that tourists seek a balance in life by finding their identity through rituals, traditions, temples or places of worship. Sarker (2021) showed that Bangladesh has opportunities for growth from faith-based tourism due to its rich religious, cultural and archaeological heritage. Iliev (2020) said that the evolution of religious tourism has been gradual in development and change over the years. Such developments are reflected in the tourism market share, with the development of new identities of faith-based tourist attractions, which provide more choices for tourists.

In summary, it can be seen that faith-based cultural tourism is based on beliefs, and currently there has been development of such tourist attractions with various techniques to attract tourists to visit. This research aims to find the spatial distribution of faith-based cultural tourism in Buddhism in Nakhon Si Thammarat Province, Thailand, and create a map of cultural tourism routes in the category of faith-based tourism in Buddhism by applying geographic information technology. For the creation of such a map, the location, planning, and spatial development were determined using geographic information systems to enhance local communities to have tools for planning and managing areas. The Buddhism faith-based cultural tourist attractions map in Nakhon Si Thammarat Province will be able to help tourists travel to tourist attractions conveniently, and can also be a navigation tool for tour guides in the community and tourists to use. The map will be able to enhance the potential of the local area and support the tourism development that will occur in the future.

MATERIALS AND METHODS

1. Study area

Nakhon Si Thammarat is a province in the southern region of Thailand. It has an area of 9,942.502 km^2. It is the second largest province in the South after Surat Thani. Nakhon Si Thammarat is approximately 780 kilometers from Bangkok. Nakhon Si Thammarat is located between latitudes 7°45' N to 9°30' N and longitudes 98°00' E to 100°30' E (Figure 1). The topography of Nakhon Si Thammarat can be divided into 3 regions: the central mountain range region, the eastern coastal plain region, and the western plain region. The central mountain range is the Nakhon Si Thammarat Mountain range. This mountain range is laid out in a north-south direction. The geological characteristics of the mountain range are mostly Triassic Granite. Some areas have Permian Limestone mountains in the northern part of Nakhon Si Thammarat Province in Khanom District. The highest point of the Nakhon Si Thammarat Mountain range is Khao Luang, with an elevation of 1,835 meters (mean sea level) in Phipun District. This mountain range is important because it is an important watershed mountain range. It is the source of the headwaters of canals that flow into the Gulf of Thailand and the Andaman Sea. In particular, the Tapi River, an important river in the South, originates from this mountain range. In addition, at the foothill of the mountain range, there are colluvial and residual deposits that run north-south. The area is characterized by alluvial fan morphology that was carried from the Nakhon Si Thammarat Mountain range. The Eastern Coastal Plain is a plain area in the east that extends from north to south. Geological features are various types of alluvial plains, including Fluviatile deposits, Lagoonal deposits, Tidal flat deposits, Old beach ridged deposits, and Beach deposits. This region has the most settlements, as the flat land is suitable for agriculture. It is also the location of the old city of Nakhon Si Thammarat, Tambralinga Kingdom or Tanmaling (in Chinese). At present, the Eastern Coastal Plain is an area for agriculture, fisheries, tourism, and is an important commercial area of Nakhon Si Thammarat Province. The Western Plains region is an area of plains alternating with undulating plains. This region is covered with Alluvial deposits and Terrace deposits. The sedimentary mountains in the southern part of this region are from the Upper Jurassic to Lower Cretaceous periods. This area is mostly agricultural land for field crops such as rubber and oil palm.

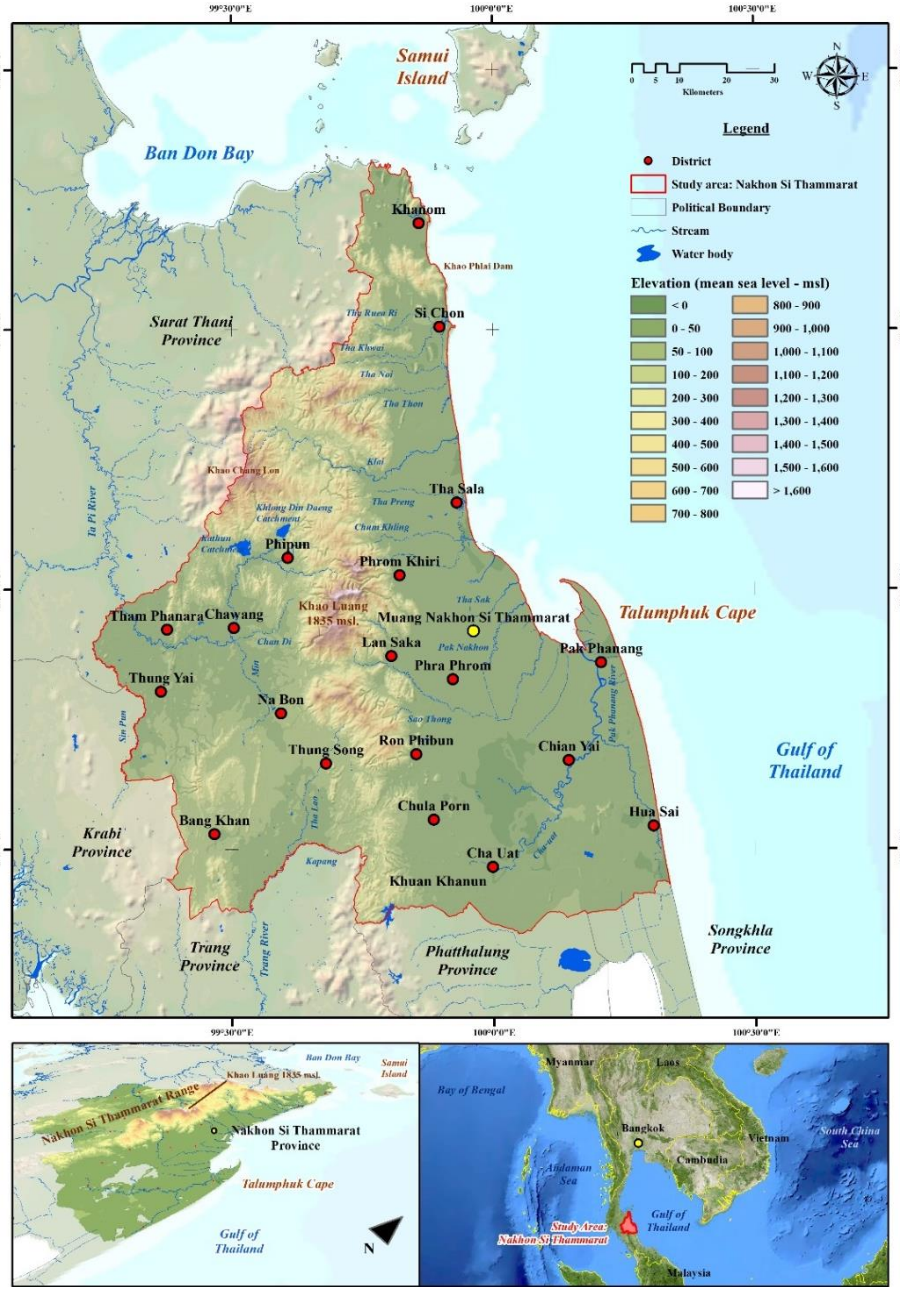

Figure 1. Location of Nakhon Si Thammarat Province, Thailand (Source: collected and processed by authors)

2. Data Preparation and Methodology

This research collected data on cultural tourist attractions of the Buddhism faith-based tourism in Nakhon Si Thammarat Province. The data was compiled into a digital database in GIS format, with reference data from Topographic Map scale 1:50000 from the Royal Thai Survey Department and data from field surveys by measuring and recording the coordinates of cultural tourist attractions with the Global Positioning System (GPS) (Mou et al., 2022; Schmücker & Reif, 2022). Data from field surveys included temples, ancient sites, antiques, government offices, and naturally occurring places.

Cartographic method or the purpose of design (choice of the coordinate system and map projection), generalization (reduction of the content according to the selected scale), and visualization (depiction of point, linear and area objects) (Waiyasusri & Tananonchai, 2022; Seidualin et al., 2024). Spatial and statistical analysis related to cartography, ArcMap 10.2 software will be used to collect and analyze numerical data, including data editing, validation and visualization in digital map format. Data analysis in terms of the distribution of cultural tourist attractions in Nakhon Si Thammarat can be analyzed using the Kernel Density (Equation 1). This principle can be analyzed from GIS, which is part of the mathematical functions in ArcMap 10.2 software. The results indicate the density of tourist attractions and use these results to plan cultural tourism. The Kernel Density (Silverman, 1986) is calculated from the following equation (Nistor & Nicula, 2021):

$$\int_{h} (x) = \frac{1}{n}\sum\nolimits_{i=1}^{n} \binom{n}{k} K_h(x - x_1)$$

where f is density f; K is the kernel — a non-negative function; h > 0 is a smoothing parameter called the bandwidth; $x_1, x_2, \ldots, x_n$ is univariate independent and identically distributed sample.

RESULTS AND DISCUSSION

From the field survey from measuring and recording the geographic coordinates of the Buddhism faith-based cultural tourist attractions with GPS between October 16-19, 2024, the location and details of the tourist attractions were recorded, as shown in Table 1 and Figure 2. After that, the location data was imported into the Geographic Information System to map and analyze the distribution pattern of the data using the Kernel Density principle, as shown in Figure 3.

Table 1. Coordinates of the Buddhism faith-based cultural tourist attractions in Nakhon Si Thammarat Province

No.	Location	District	Northing	Easting
1	Footsteps of Luang Pu Thuat on Fresh Sea Water	Khanom	9° 18' 54″	99° 47' 30″
2	Coral Pagoda	Khanom	9° 16' 51″	99° 48' 56″
3	Khanom City Pillar Shrine	Khanom	9° 10' 57″	99° 51' 6″
4	Vessavana (Suchon Temple)	Si Chon	9° 1' 56″	99° 54' 17″
5	Ai Kai (Chedi Temple)	Si Chon	8° 54' 40″	99° 50' 44″
6	Ta Pran Boon (Yang Yai Temple)	Tha Sala	8° 43' 1″	99° 54' 41″
7	Khao Khun Phanom Temple	Phrom Khiri	8° 32' 37″	99° 50' 39″
8	Nakhon Si Thammarat City Pillar Shrine	Muang Nakhon Si Thammarat	8° 25' 49″	99° 57' 44″
9	King Sri Thammasokrat Monument	Muang Nakhon Si Thammarat	8° 25' 38″	99° 57' 45″
10	Phra Phutthasihing Hall	Muang Nakhon Si Thammarat	8° 25' 8″	99° 57' 49″
11	Phra Borommathat Chedi	Muang Nakhon Si Thammarat	8° 24' 39″	99° 57' 58″
12	Phra Wihan Sung	Muang Nakhon Si Thammarat	8° 25' 49″	99° 57' 42″
13	Phaisan Sathit Temple	Muang Nakhon Si Thammarat	8° 35' 38″	99° 57' 21″
14	Tumpang Archeoloical Site	Tha Sala	8° 38' 46″	99° 52' 24″
15	Wat Khun Khlong Historic Site	Tha Sala	8° 36' 30″	99° 53' 57″
16	Wat Moklan Archaeological Site	Tha Sala	8° 34' 50″	99° 55' 50″

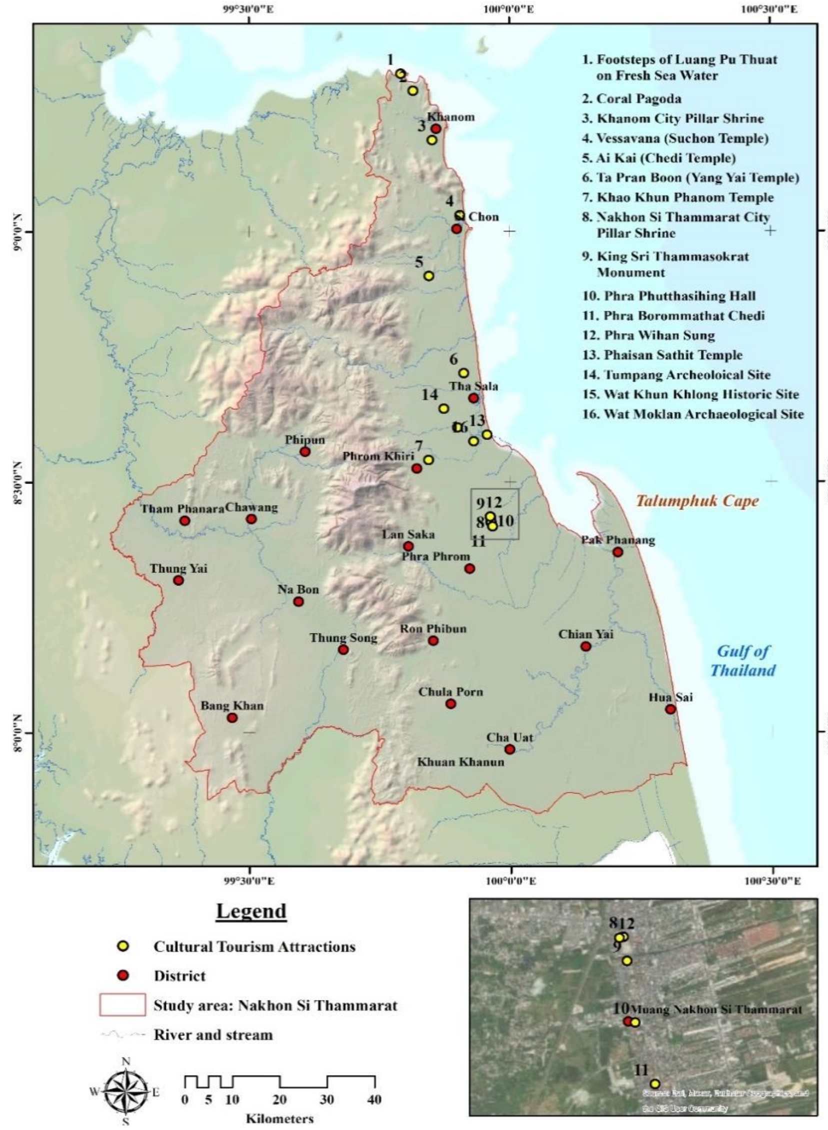

Figure 2. Spatial distribution of the Buddhism faith-based cultural tourist attractions in Nakhon Si Thammarat Province
(Source: collected and processed by authors)

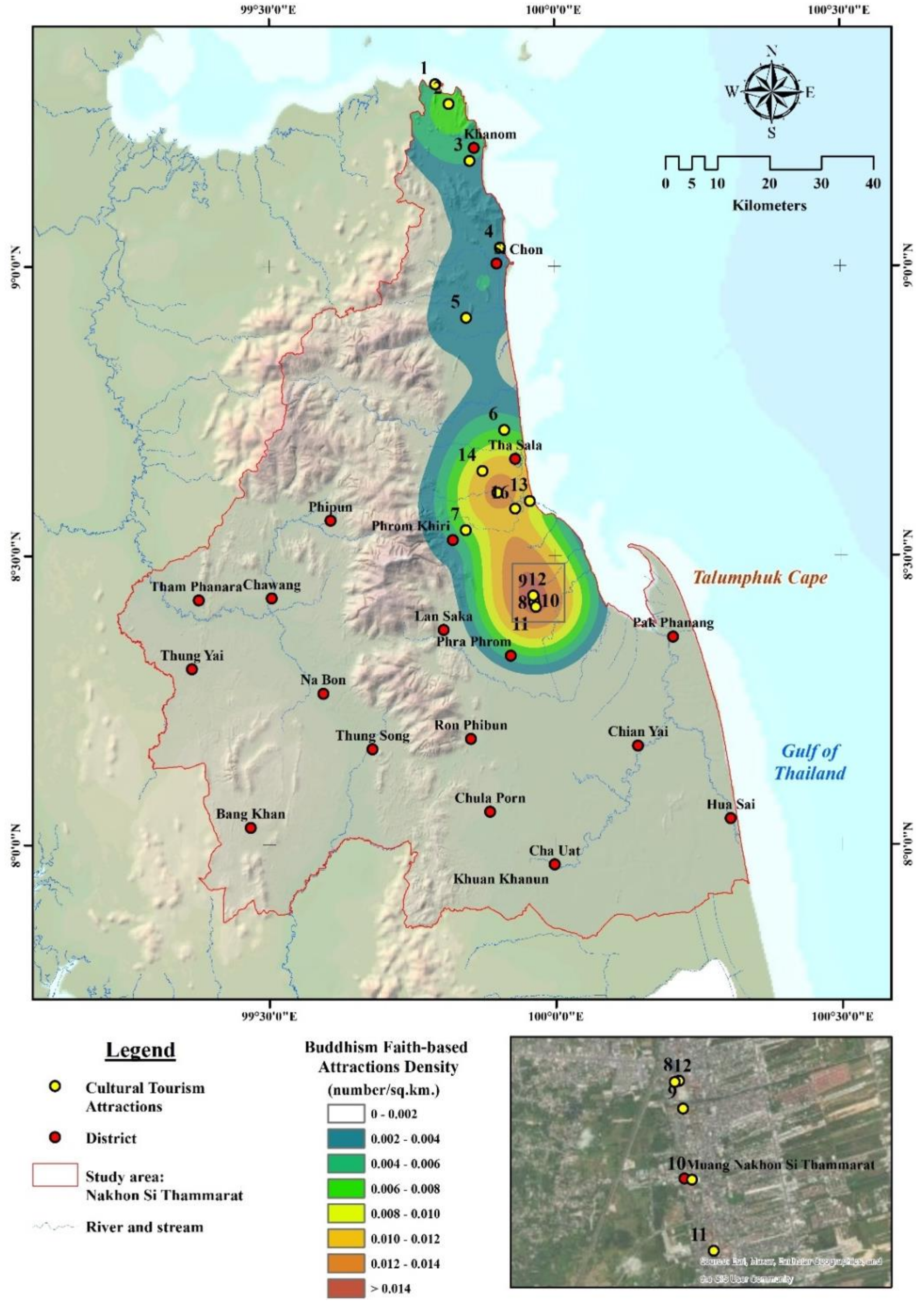

Figure 3. Buddhism Faith-based Cultural Attractions Density Map in Nakhon Si Thammarat Province
(Source: collected and processed by authors)

The results of the study on the location of Buddhist faith-based cultural tourist attractions in Nakhon Si Thammarat Province, found that the distribution of tourist attractions is mostly in the coastal plain region on the eastern side of the study area. It can be divided into 3 zones: the northern zone, the central zone, and the urban zone.

Northern Zone found a total of 5 tourist attractions, 3 of which are in Khanom District: Footsteps of Luang Pu Thuat on Fresh Sea Water, Coral Pagoda, and Khanom City Pillar Shrine. And, 2 of which are in Sichon District: Vessavana (Suchon Temple) and Ai Kai (Chedi Temple). The study results show that the density of cultural tourist attractions is between 0.002-0.006 km^2, which is quite low because each tourist attraction is more than 20-30 kilometers away.

Footsteps of Luang Pu Thuat on Fresh Sea Water is located on Nui Island, a small island in the Khanom Sea. It is special because there is a freshwater well that looks like a human footprint on this island. But when the tide is high, the sea will flood this well. Therefore, during March-April, which is the low tide, it is recommended to go. This island has a Buddhist belief related to the legend of Luang Pu Thuat stepping on fresh sea water (Maud, 2016). Therefore, on the island, there are things to worship Luang Pu Thuat with the belief that if you come to pay homage and chant his mantra, you will receive blessings for safe travel and escape from all dangers. In terms of trade, you will be successful in trade negotiations. In addition, nearby there are also programs for boat trips to see pink dolphins and Pancake Rock (or Permian Limestone rock) (Figure 4a). Coral Pagoda, an ancient site in Khanom Province, is believed to be over 1,000 years old. It is located on top of Khao That in Jantatutaram temple. The pagoda is in the shape of an inverted bowl with a diameter of about 5-6 meters. It was built using coral stones to create the entire pagoda. Around the pagoda, there are

Buddha images carved from red sandstone, showing that this place used to be a center of Buddhist civilization. It is possible to see the view of Ao Thong Nian from the top of Khao That (Figure 4b).

Vessavana in Suchon Temple is located in Sichon District. It is an ancient temple that enshrines the image of Vessavana in the posture of Dhanabodi Setthi Champhon, which is more than 1,200 years old. The deity is characterized by being plump, with a big belly, a big face, and a strong body. He is serious but also has compassion. His upper body is bare, decorated with necklaces, diamonds, and bracelets. The whole body is full of precious gems, indicating wealth and countless properties. Local people like to ask for blessings for good luck, money, increasing wealth, and eliminating bad luck. The worship consists of incense sticks, a red cloth to write the name; surname; and date of birth before tying it to the statue of Vessavana, along with a tray of fake roses for worship, and gold leaf to cover the statue of Thao Wessuwan (Figure 4c). Ai Kai of Chedi Temple is located in Sichon District. Ai Kai is a legend related to Luang Pu Thuat. The current location of Chedi Temple, Luang Pu Thuat, a famous monk in the southern region, went on a pilgrimage and set up a tent in that area. As for Ai Kai, it is believed that he is the spirit of a child about 9-10 years old, a disciple who followed Luang Pu Thuat. When Luang Pu Thuat arrived at the said place, he found a lot of valuable assets and important religious places.

So he let Ai Kai reside and guard the treasures. This spirit guarded and protected the country's assets and has been at this temple ever since. From the belief that people believe that "Always get the blessing", there are many people who come to pay homage to Ai Kai or Ta Kai to ask for blessings and fortune, and popularly come to pay their vows with images of fighting cocks, military uniforms, slingshots, various toys, etc. (Ruengmak & Dejpawuttikul, 2024) (Figure 4d).

Figure 4. Tourist attractions in the northern part of Nakhon Si Thammarat (a) Footsteps of Luang Pu Thuat on Fresh Sea Water, (b) Coral Pagoda, (c) Vessavana in Suchon Temple, and (d) Ai Kai of Chedi Temple (Source: collected and processed by authors)

Central Zone found a total of 6 tourist attractions, 4 of which were in Tha Sala District: Ta Pran Boon (Yang Yai Temple), Tumpang Archeoloical Site, Wat Khun Khlong Historic Site, and Wat Moklan Archaeological Site. In Muang Nakhon Si Thammarat District, 1 site was found: Phaisan Sathit Temple, and in Phrom Khiri District, 1 site was found: Khao Khun Phanom Temple. The results of the study showed that the density of cultural tourist attractions was between 0.006-0.014 km^2, which was at a high to very high level because each tourist attraction was close to each other, no more than 10 kilometers apart. Ta Pran Boon (Pran Boon the Hunter) of Yang Yai Temple is located in Thasala District. “Pran Boon” is considered the best hunter. According to the legend, Pran Boon is a person with great magical knowledge. He can travel in the Himavanta forest. Once, Pran Boon used his knowledge to help the Naga King named Thao Chompoo Chit to escape death. Thao Chompoo Chit then took Phran Boon to the Naga realm for 7 days and gave him a magic glass with a promise that if Pran Boon wanted anything in the future, he would come to him. He would give anything he asked for in return to save Thao Chompoo Chit’s life. People therefore respect Pran Boon’s abilities as being very powerful and outstanding in terms of fortune and wealth. Therefore, in terms of belief, people respect Pran Boon. It is believed that when worshipped, one will receive benefits such as good business, charm to people around, be kind and popular, and anyone who sees him will love and care for him. It also helps protect from dangers and various black magic spells (Figure 5a).

Wat Moklan Archaeological Site is located in Thasala District. The ancient city of Moklan has excavated temples, ancient sites, ancient objects, and ancient ponds in the Brahman religion, which shows the prosperity of the Shaivite Brahman religion in this area before. Later, with the influence of Buddhism that spread and flourished in this area, the Moklan community converted to Buddhism as well. It is assumed that in the beginning, it was probably Theravada Buddhism or Hinayana Buddhism, which flourished in this area after around 1250-1350 AD during the Sukhothai Kingdom (Figure 5b).

Khao Khun Phanom Temple is a small limestone hill located in Phrom Khiri District. This is an ancient temple that has been around since the Ayutthaya period. It is important in terms of history and archaeology. There is a cave with a brick wall and sema stone, similar to the city wall. The front wall has stucco decorations decorated with Chinese porcelain. This temple is believed to be the residence of King Taksin, who came to stay and observe the precepts in this cave. In front of the temple is an ancient holy well, believed to be a sacred well, offered to King Taksin for his personal use. Interesting things inside include the monument of King Taksin the Great. The temple has a brick wall and mortar and sema stones, similar to the city wall. The front wall has stucco decorations decorated with Chinese porcelain. Inside the cave, which is on the top and requires walking up about 250 steps, there are about 30 bronze Buddha statues and a bronze footprint of the Buddha. Regarding the history of this temple, it is assumed that it was the residence of King Taksin the Great (King Taksin fled to become a monk until his death). However, some say that it was a resting place for Princess Kesini, daughter of Prince Narasuriyawong (King Taksin's granddaughter), ruler of Nakhon Si Thammarat during 1769-1776 (Figure 5c).

Figure 5. Tourist attractions in the central part of Nakhon Si Thammarat (a) Ta Pran Boon (Pran boon the hunter) of Yang Yai Temple (b) Wat Moklan Archaeological Site, and (c) Khao Khun Phanom Temple(Source: collected and processed by authors)

In the urban area, there were 5 tourist attractions in total, all in Muang Nakhon Si Thammarat District: Nakhon Si Thammarat City Pillar Shrine, King Sri Thammasokrat Monument, Phra Phutthasihing Hall, Phra Borommathat Chedi, and Phra Wihan Sung. The results of the study showed that the density of cultural tourist attractions was more than 0.014 km^2, which is at a very high level, because each tourist attraction is very close to each other, no more than 5 km apart. The City Pillar Shrine is Nakhon Si Thammarat City Pillar Shrine located in the center of Nakhon Si Thammarat city. Its design art is similar to Srivijaya art. There are four small buildings, which are considered as the four directions, called Chatulokthep Shrine, consisting of Phra Suea Mueang Shrine, Phra Song Mueang Shrine, Phra Phrom Mueang Shrine, and Phra Bandan Mueang Shrine. The city pillar is made of golden teak wood, which came from Phu Yot Luang in Nakhon Si Thammarat. The top of the pillar is in the shape of Chatukham Ramathep (four faces) or the guardian angel of the city. At the top is a flame on the top of the head, which is the city pillar's victory point. The carving style is imaginative from the belief in Mahayana Buddhism, which has had an influence on the art in the South and Nakhon Si Thammarat since ancient times (Figure 6a).

King Sri Thammasokrat Monument is located in Sri Thammasokrat Public Park in the center of Nakhon Si Thammarat. King Sri Thammasokrat was the king who ruled the ancient city of Nakhon Si Thammarat during the time when it was still called “Tambralinga”. He was the first king of the Sri Thammasokrat dynasty or Padmawong dynasty of Siam that used to have power to rule the Sri Thammarat Kingdom, which ruled 12 major cities in the Malay Peninsula, called the twelve zodiac cities. When Sukhothai was powerful, it was a Thai kingdom in the north and central regions. The Sri Thammarat Kingdom also had power in the south. The Sri Thammarat Kingdom was a good friend of the Sukhothai Kingdom. There was an exchange of cultures, especially Buddhism. Monks were sent to the Sukhothai Kingdom to spread Buddhism. There is clear evidence that the Sri Dharmaraja Kingdom agreed to join the Ayutthaya Kingdom during the Suphannabhumi Dynasty with the capital city of Ayutthaya Sri Ramthep Nakhon (Patnukao et al., 2024) (Figure 6b).

Phra Phutthasihing Hall is located in the Nakhon Si Thammarat Provincial Hall. Phra Phuttha Sihing is considered an important Buddha image and a symbol of Nakhon Si Thammarat. It is believed that the Buddha image was created by the King of Sri Lanka in 157 AD from Sri Lanka. Phra Phuttha Sihing is a Buddha image in the Mara-Vijaya posture, sitting in the diamond meditation posture, cast in bronze, with a lap width of 32 cm and a height of 42 cm, covered with a gold-plated metal umbrella with a perforated pattern. It is believed that worshiping Phra Phuttha Sihing is suitable for praying for blessings regarding legal cases, or for those who have obstacles in their work (Figure 6c).

Phra Borommathat Chedi is located in Phra Mahathat Woramahawihan Temple, a temple that is a symbol of Nakhon Si Thammarat. It is not clear when it was built, but it has been widely known for at least 1,800 years. The Phra Borommathat Chedi enshrines the relics of the Lord Buddha. The architecture of the Phra Borommathat Chedi is in the shape of an inverted bell, with a highlight at the top of the chedi, which is covered with pure gold. In addition, there is a tradition of bringing a long piece of cloth up to cover the Phra Borommathat Chedi on important religious days. The people of Nakhon have joined hands to donate money according to their faith. The money they received was used to buy cloth, sew it together into a long row of thousands of yards, and then organize a procession to bring the cloth up to cover the Phra Borommathat Chedi. The cloth that is used to cover the Phra Borommathat Chedi is called “Phra Bod”. The colors are usually white, yellow, and red. It is believed that whoever brings the cloth up to the chedi will have their wish come true (Figure 6d).

Figure 6. Tourist attractions in the urban area of Nakhon Si Thammarat (a) Nakhon Si Thammarat City Pillar Shrine, (b) King Sri Thammasokrat Monument, (c) Phra Phutthasihing Hall, and (d) Phra Borommathat Chedi(Source: collected and processed by authors)

Distribution of Buddhism faith-based cultural tourism attractions in Nakhon Si Thammarat, this research has created a 4-day, 3-night tourism planning map in Nakhon Si Thammarat Province, to provide information to tourism agencies, local communities, local tour guides, and both Thai and foreign tourists, especially foreign tourists from China, Hong Kong, Taiwan, Singapore, etc., who are starting to be more interested in Buddhist faith tourism. For planning each day's tourism, it can be seen that on the first day, it is recommended to finish touring the northern zone first, because it takes time to travel to various places because they are far apart. On the second day, it will be touring the central part of the study area, mostly ancient cities, important historical sites. On the third day, it will be touring the Nakhon Si Thammarat city area, where each tourist attraction is close to each other. The tourism in each area has been made into a map, as shown in Figure 7.

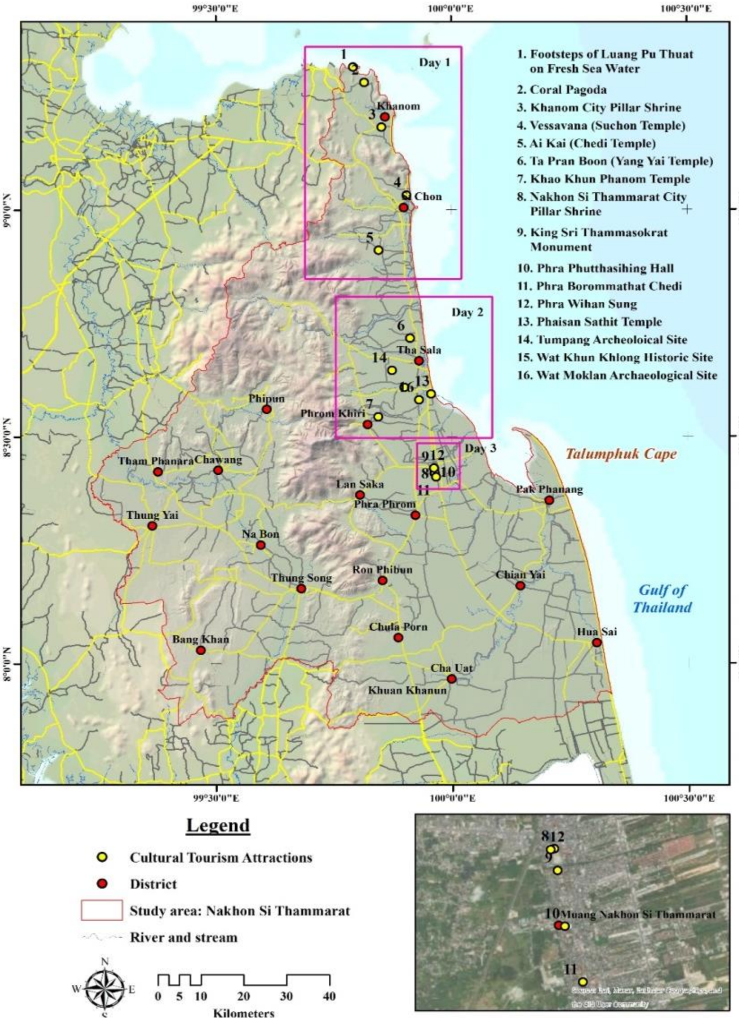

Figure 7. Map of the tourist route for all 3 zones for a 4-day, 3-night trip in Nakhon Si Thammarat Province
(Source: collected and processed by authors)

CONCLUSION

Faith-based cultural tourism is an ancient form of tourism that has become increasingly popular again. In this research, data were collected and analyzed spatially using GIS by simulating the density of tourist attractions with the Kernel Density. It can be seen that the density of such places is mostly in the coastal plains to the east of the study area. The Kernel Density analysis shows the efficiency of the research results very well. The reason for the distribution of faith-based tourist attractions in the area is because the area used to be an ancient city and an ancient community since before the Christian era. For this reason, Nakhon Si Thammarat has a great potential for faith-based tourism. Both Thai and foreign tourists, especially Asians, travel to find the meaning of life according to their beliefs. The limitation of this research is the spatial analysis of faith-based cultural tourism attractions only. Other types of tourist attractions were not included due to budget constraints for research that affected the survey in collecting data of these tourist attractions. This research has created a 4-day, 3-night tourism planning map in Nakhon Si Thammarat Province to enhance the community to use it in planning and spatial development. In addition, local people have tools for planning cultural tourist attractions to enhance their potential in terms of living, loving and cherishing their hometown, and increasing income for local people, leading to the development of tourism that will occur in the future.

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A QUALITATIVE EXPLORATION OF ECOTOURISM DEVELOPMENT AND SUSTAINABILITY PRACTICES IN BORDER AREAS OF THE GREATER MEKONG SUBREGION

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Abstract: This study aims to explore and compare the current state of tourism and its associated challenges in the border areas of the Greater Mekong Subregion (GMS) and develop comprehensive sustainable ecotourism recommendations that integrate political, environmental, socio-cultural, and economic considerations, particularly within the context of rapid tourism growth and cross-border collaboration in the GMS with a particular focus on Xishuangbanna, China, and Luang Namtha, Laos. A qualitative approach was employed, utilizing documentary research, field observations, and in-depth interviews with 40 key informants from the government, community, and private sectors. The collected data were analyzed through content analysis using the Atlas.ti program. The findings reveal that while large-scale ecotourism initiatives in Xishuangbanna have promoted the conservation of natural and cultural resources, challenges remain regarding unequal economic distribution and the dominance of external operators. This has led to concerns about the marginalization of local communities, who often have limited decision-making power in tourism planning and development. In contrast, Luang Namtha's community-based tourism (CBT) model has successfully engaged local residents in cultural preservation and environmental conservation, fostering a sense of ownership and empowerment among the community. This approach has not only supported sustainable livelihoods but also strengthened local identity and cultural heritage. Both regions face shared challenges in achieving sustainable tourism development amidst rapid growth, including environmental degradation, pressure on local resources, and balancing economic benefits with cultural and ecological preservation. Moreover, the need for stronger cross-border cooperation and harmonized policies has emerged as a critical factor in addressing these challenges and promoting a more integrated and resilient ecotourism framework in the GMS. Stakeholders in both regions have emphasized the importance of capacity-building programs to equip local communities with the skills necessary for effective tourism management. The role of government support and clear regulatory frameworks has also been highlighted as essential for fostering sustainable practices and mitigating negative impacts. Ecotourism marketing strategies tailored to promote authentic cultural experiences while respecting local traditions have shown potential in attracting responsible travelers.

Keywords: Ecotourism, Greater Mekong Subregion, cross-border region, sustainable tourism, sustainability

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INTRODUCTION

Tourism has long been recognized as a significant economic engine globally. According to the Annual Research Report of the World Travel & Tourism Council, 2023 the travel and tourism sector contributed USD 9.9 trillion to the global economy, representing 9.1% of the world's GDP. In Southeast Asia, tourism contributed 8.3% to the region's economy, with significant growth in tourism arrivals post-pandemic, reaching USD 314.0 billion by the end of 2023 (World Travel & Tourism Council, 2024). The Greater Mekong Subregion (GMS), comprising Yunnan province and Guangxi province of China, Myanmar, Laos, Thailand, Cambodia, and Vietnam, is witnessing this surge. In Laos alone, tourism generated LAK 25.25 trillion (USD 1.5 billion) in 2023, highlighting its importance as a central pillar of economic development. The region's border areas are particularly significant as they benefit from cross-border tourism and trade, making them focal points for tourism growth. Ecotourism, which emphasizes environmental conservation, cultural preservation, and community benefits, has been increasingly promoted across the GMS as a sustainable alternative to mass tourism. However, rapid and unmanaged tourism growth in this region has also presented complex environmental and socio-economic challenges (Busbarat et al., 2021). These challenges demand new management approaches that ensure tourism growth aligns with sustainability objectives. Several critical issues specific to the GMS border areas need to be addressed to ensure that tourism development is both sustainable and equitable. These issues can be analyzed through three interconnected lenses: instrumental, political, and normative, which provide insights into practical solutions, regional cooperation, and sustainable tourism practices (Liu & Chamaratana, 2024a).

At the Instrumental Level, the practical question of "how" to manage tourism sustainably is paramount. In places like Luang Namtha, Lao PDR, community-based tourism (CBT) has shown success, but more structured approaches to tourism management are still needed. For example, in Laos, where tourism grows at 7.3% annually, increased

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infrastructure development, including hotels and transportation networks, is straining local ecosystems. Similarly, tourism infrastructure expansion in Myanmar has led to a 78.3% decline in environmental quality (Scopin et al., 2019). In China, rapid tourism growth and infrastructure expansion have also put immense pressure on the natural environment, making implementing Nature-Based Solutions (NbS) crucial to balancing tourism growth with environmental conservation. NbS, which leverages natural ecosystems to manage tourism pressures, can help preserve biodiversity and mitigate development impacts on local ecosystems (Scott et al., 2016).

At the Political Level, the focus shifts to “who” is involved in managing tourism and the importance of cross-border cooperation. Regional collaboration is essential for addressing GMS’s shared environmental and cultural challenges. Regionalism highlights the role of political relationships and governance structures in shaping tourism development across borders. For example, in Yunnan province, China, cross-border cooperation with neighboring countries like Laos and Myanmar is crucial for managing shared ecosystems and ensuring that tourism development aligns with broader regional goals (Sofie et al., 2015). Similarly, in Luang Namtha, Lao PDR, coordination with neighboring regions in China and Thailand is essential for facilitating sustainable tourism growth by sharing resources and best practices.

At the Normative Level, the focus turns to “why” sustainable tourism is vital. The ethical foundation of Sustainable Tourism Development ensures that tourism growth does not come at the expense of environmental degradation or cultural commodification (Cheshmehzangi et al., 2021). For instance, while tourism has brought significant revenue to Laos, generating LAK 25.25 trillion (USD 1.5 billion), much of the revenue does not stay within local communities due to economic leakages, with larger operators capturing the bulk of the benefits (Germaine et al., 2022).

In Thailand, tourism generated THB 1.86 trillion (USD 53.5 billion) in 2023, but similar patterns of economic inequality persist (Fu et al., 2023). In Vietnam, for example, cultural tourism generated VND 682.65 trillion (USD 28.5 billion) in 2023, but the risk of cultural erosion remains a concern as traditions are modified to cater to tourist expectations (Dang, 2023). By aligning tourism practices with the principles of sustainable development, the GMS can ensure that tourism promotes economic growth and cultural heritage preservation.

If these challenges are not addressed, the long-term sustainability of tourism in the GMS will be compromised. Environmental degradation will erode the natural assets that form the foundation of ecotourism, leading to biodiversity loss. Economic inequalities may prevent local communities from fully benefiting from tourism growth, and unchecked cultural commodification will diminish the unique heritage that attracts tourists (Liu & Chamaratana, 2024b). While the GMS has experienced rapid tourism growth, particularly in border areas, a significant gap exists in understanding how this growth can be managed sustainably. Existing studies have often focused on the economic benefits of tourism, but few have comprehensively addressed the environmental and socio-cultural challenges accompanying this growth. Specifically, there is limited research on how NbS can be practically applied to mitigate the environmental impacts of tourism and how cross-border collaboration, guided by Regionalism, can enhance the sustainability of shared ecosystems.

This study addresses the research question: How can sustainable ecotourism be developed for the GMS’s border areas, considering the region’s unique environmental and socio-cultural contexts in the context of rapid tourism growth and cross-border collaboration? Research Objective: This research aims to assess the current state of tourism and its associated challenges in the GMS’s border areas and develop comprehensive sustainable ecotourism recommendations that integrate political, environmental, socio-cultural, and economic considerations, particularly within the context of rapid tourism growth and cross-border collaboration in the GMS.

THEORETICAL FRAMEWORK

The theoretical framework for this study is constructed around three complementary perspectives: Nature-Based Solutions (NbS), Regionalism Theory, and Sustainable Tourism Development. These are chosen for their ability to collectively address the complex environmental, political, and ethical dimensions of ecotourism development in the GMS. NbS, a concept formalized by the International Union for Conservation of Nature (IUCN) in the early 2000s, provides a practical framework for using natural processes and ecosystems to tackle societal challenges, including those posed by tourism infrastructure and environmental degradation (Dorst et al., 2019). This approach aligns closely with the goals of ecotourism, which seeks to minimize ecological impact while enhancing biodiversity. In regions like the GMS, where rapid tourism growth places increasing pressure on natural resources, NbS offers valuable strategies for balancing development with conservation. At the political level, Regionalism Theory, as developed by scholars like Andrew Hurrell and Björn Hettne, provides a lens through which to analyze the governance structures and cross-border cooperation needed to manage shared environmental and cultural resources (Sitikarn & Kankaew, 2021).

Given the GMS’s geographical and socio-political complexity, where countries like Laos, China, and Thailand share ecosystems and tourist flows, this theory helps understand the necessity of regional coordination in tourism planning and environmental conservation (Jamil & Puad, 2010). Regionalism highlights the importance of multi-state partnerships in fostering sustainable development across borders, especially in regions where ecosystems and tourist activities do not adhere to political boundaries (Kunavut et al., 2018). Sustainable Tourism Development offers the ethical foundation for this framework. Originating from Jost Krippendorf’s work in the 1980s and later expanded by the World Tourism Organization (UNWTO), this theory emphasizes tourism’s responsibility to balance economic growth with the preservation of environmental and cultural integrity (Cheshmehzangi et al., 2021).

This perspective is particularly relevant to the GMS, where the risk of cultural commodification and environmental degradation poses significant challenges. By integrating the principles of sustainable tourism, this study aims to ensure that tourism development does not sacrifice long-term ecological and socio-cultural health for short-term economic gain.

Together, these three theoretical perspectives, 1) NbS for practical environmental management, 2) Regionalism for political cooperation, and 3) Sustainable Tourism Development for ethical considerations, provide a comprehensive framework for examining the challenges and opportunities of ecotourism development in the GMS by addressing the “how,” “who,” and “why” of sustainable tourism, this framework offers a holistic approach to managing the region’s unique environmental and socio-economic contexts, see as Figure 1.

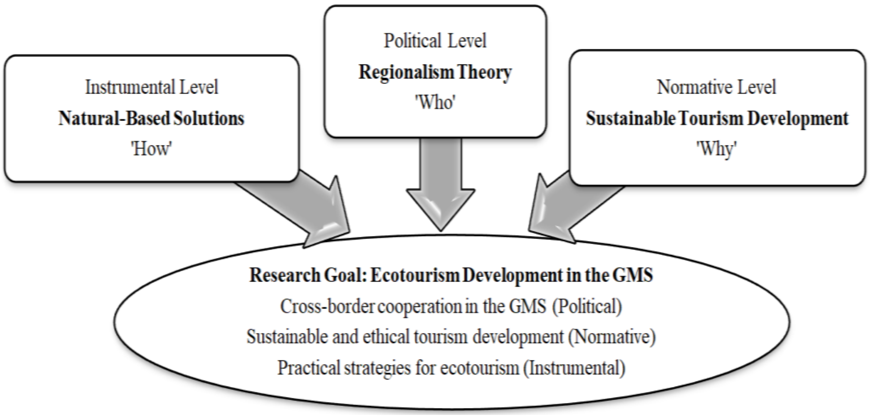

Figure 1. Integrated Structure of Theories and Research Goal

1. Instrumental level: nature-based solutions (nbs) in the gms

At the Instrumental Level, NbS provides a framework for addressing the environmental challenges associated with tourism growth. Combining into the tourism industry, NbS focuses on using natural processes and ecosystems to manage human-induced issues, habitat degradation, loss of biodiversity, and the strain placed on local ecosystems by tourism (Dorst et al., 2019; Scott et al., 2016). According to the International Union for Conservation of Nature, NbS is not a substitute for traditional conservation efforts but a complementary approach that integrates natural solutions with human development needs. In the GMS, where rapid tourism growth and infrastructure expansion pose a significant threat to local ecosystems, the principles of NbS provide a practical guide for managing tourism in ways that sustain both the environment and local communities.

According to Cohen-Shacham (2019), the key to the success of NbS is the adherence to eight principles that frame its operationalization can guide ecotourism development: 1) Conservation Alignment; 2) Integration with Other Solutions; 3) Context-Specific Design; 4) Societal Benefits and Equity; 5) Support for Biological and Cultural Diversity; 6) Landscape-Scale Implementation; 7) Balancing Economic Trade-offs; 8) Policy Integration and Adaptation. The eight principles of NbS provide a structured and flexible approach (Cohen-Shacham et al., 2019). In the context of ecotourism development in the GMS, these principles guide the sustainable integration of tourism with environmental conservation.

2. Political level: regionalism theory in the GMS

At the Political Level, Regionalism Theory provides a framework to understand the “who” of ecotourism management, especially in a region as politically interconnected in the GMS, for understanding the governance structures necessary to manage cross-border tourism development. As Toan Thanh Bui (2023) argues, regionalism emphasizes the importance of cooperation between neighboring nations in addressing shared environmental and socio-economic challenges. ASEAN’s example shows regionalism is about increasing intra-regional trade or integration and using regional frameworks to support global connections and sustainable development strategies (Toan, 2023).

Also, to achieve a win-win practice, Cao (2024) advances regional governance structures that must enable seamless cooperation across borders, particularly for managing shared ecosystems like forests and rivers. In the context of the GMS, regionalism is crucial because the natural ecosystems that support ecotourism, such as forests and waterways, extend across national boundaries (GIAO et al., 2021). This necessitates collaborative governance to consistently implement sustainable practices across the region. Ji (2024) notes that regionalism allows countries to manage resources more effectively by pooling expertise, resources, and political will, thus creating a more coherent and efficient strategy for ecotourism management. Political collaboration between countries like China, Laos, and Thailand, within the context of China’s Belt and Road Initiative (BRI), the infrastructure and trade cooperation are developing, essential for addressing transboundary issues exacerbated by tourism infrastructure projects (Beškovnik & Golnar, 2020).

According to Le and Ho (2024), regional cooperation is key to mitigating the environmental impacts of tourism while ensuring that economic benefits are distributed equitably across borders. Regional governance structures facilitate sustainable development and ensure that the cultural and environmental assets driving tourism are preserved for future generations (Le & Ho, 2024). Thus, combining successful regionalism practices in ecotourism development must adhere to several key principles: 1) Cross-Border Cooperation; 2) Resource Sharing and Integration; 3) Collaborative Governance; 4) Ensuring Economic Equity; 5) Preserving Cultural and Environmental Assets; 6) Regional Coordination of Infrastructure Projects (Cao et al., 2024; Ji, 2024). These principles ensure that tourism growth does not lead to environmental degradation or socio-economic inequality. In the GMS, applying these principles to developing ecotourism can help achieve a balanced approach to tourism that benefits all nations involved while preserving the region’s natural and cultural heritage.

3. Normative Level: Sustainable Tourism Development (STD) in the GMS

At the Normative Level, STD offers a framework that addresses the ethical dimensions of tourism by emphasizing why sustainability must be prioritized. This perspective was first articulated by Jost Krippendorf (1982), who argued that tourism should serve economic interests and prioritize the well-being of host communities and the preservation of natural and cultural resources. His ideas have since been expanded by the United Nations World Tourism Organization (UNWTO, 2018), which formalized a global approach to STD, advocating for the balance between economic benefits and environmental and socio-cultural preservation (Hoang et al., 2022). In the GMS, applying sustainable tourism principles is critical, given the region's fragile ecosystems and rich cultural diversity. As Cheshmehzangi et al. (2021) emphasize, sustainable tourism development must protect local communities' cultural identities and environmental assets while fostering economic growth. Without careful management, tourism development risks commodifying culture and exploiting natural resources for short-term economic gain, leading to long-term harm to the environment and cultural integrity (Baros & Dávid, 2007). STD emphasizes several interconnected principles. Central to these is the need for community participation and empowerment in tourism-related decisions. As Mak et al. (2017) argue, involving local communities ensures they have control over the cultural and environmental assets upon which tourism relies.

Furthermore, resource efficiency is crucial in regions like the GMS, where the overuse of resources due to tourism infrastructure can lead to ecological degradation. Yoopetch et al. (2022) highlight that resource-efficient practices can help minimize the negative externalities of tourism, such as pollution and habitat destruction. Tourism can exacerbate inequalities without inclusivity in economic benefits, with large-scale operators capturing the most gains (Klinsrisuk & Pechdin, 2022). This principle of inclusivity aligns with environmental preservation, as development must not harm the ecosystems on which tourism depends. Equally important is preserving cultural integrity, a concern raised by Krippendorf, who noted that cultural commodification can undermine the authentic tourism experience.

This idea is echoed by Thipsingh (2015), who stresses the importance of respecting local cultures, especially in regions like the GMS, where ethnic minority traditions are integral to tourism (Thipsingh, 2015). Key Principles of STD in the GMS: 1) Community Participation and Empowerment; 2) Resource Efficiency; 3) Economic Inclusivity; 4) Environmental Preservation; 5) Cultural Integrity; 6) Long-Term Sustainability (Cheshmehzangi et al., 2021; Eshoo et al., 2018; Klinsrisuk & Pechdin, 2022; Mak et al., 2017; Yoopetch et al., 2022).

4. Interrelationship between the levels and theoretical framework

The three levels of this theoretical framework are interconnected, providing a holistic approach to managing the challenges of ecotourism development in the GMS. **NbS,** at the **Instrumental Level,** offers practical tools for minimizing ecotourism's environmental impacts. At the same time, **Regionalism Theory,** at the **Political Level,** emphasizes the importance of cross-border governance in managing shared ecosystems. **STD**, at the **Normative Level**, ensures that tourism growth is guided by ethical principles prioritizing long-term sustainability and local communities' well-being. The main principles of the three levels are shown in Table 1.

Table 1. Key Principles of NbS, Regionalism Theory, and STD in the GMS
NbS = Nature-Based Solutions, R = Regionalism Theory, STD = Sustainable Tourism Development

Instrumental Level - NbS	**Political Level** - Regionalism Theory	**Normative Level** - STD
NbS1, Conservation Alignment	**R1**, Cross-Border Cooperation	**STD1**, Community Participation and Empowerment
NbS2, Integration with Other Solutions	**R2**, Resource Sharing and Integration	**STD2**, Resource Efficiency
NbS3, Context-Specific Design	**R3**, Collaborative Governance	**STD3**, Economic Inclusivity
NbS4, Societal Benefits and Equity	**R4**, Ensuring Economic Equity	**STD4**, Environmental Preservation
NbS5, Support for Biological and Cultural Diversity	**R5**, Preserving Cultural and Environmental Assets	**STD5**, Cultural Integrity
NbS6, Landscape-Scale Implementation	**R6**, Regional Coordination of Infrastructure Projects	**STD6**, Long-Term Sustainability
NbS7, Balancing Economic Trade-offs		
NbS8, Policy Integration and Adaptation		

To form a cohesive theoretical framework for ecotourism development in border areas of the GMS, the principles from the NbS, Regionalism Theory, and STD are into the domains of Political**,** Economic**,** Socio-cultural, and Environmental dimensions, merging similar principles from each level. In the political dimension, cross-border cooperation and collaborative governance are essential for managing shared resources like forests, rivers, and cultural heritage that span national borders (Duy et al., 2020). Integrating policies at multiple governance levels ensures that sustainability strategies are implemented across all GMS countries, promoting joint efforts for ecotourism management (Jawabreh et al., 2023). In the economic dimension, the framework emphasizes the need for equitable distribution of tourism benefits across local communities and nations (Nigatu & Tegegne, 2021). Resource-sharing frameworks and economic inclusivity should guide policies to ensure that the benefits of tourism do not disproportionately favor larger operators or specific regions. Balancing economic trade-offs ensures long-term viability, allowing tourism to grow without harming the underlying ecosystems or cultural heritages (Bunruamkaew & Murayama, 2012).

From a socio-cultural perspective, involving local communities in decision-making is paramount. This dimension focuses on empowering local populations, ensuring their cultures are not commodified but preserved, and encouraging tourism that reflects and respects cultural integrity. The environmental dimension emphasizes aligning tourism development with broader conservation efforts. Tourism strategies should be designed based on the specific environmental contexts of each region, ensuring that ecosystems are not disrupted (Adinolfi et al., 2023).

The landscape-scale implementation of environmental protection measures and long-term sustainability strategies ensure that natural resources are protected and maintained for future generations.

METHODOLOGY

The study employs a qualitative research approach to deeply understand the context of the current state of tourism and its associated challenges in the GMS's border areas and develop comprehensive sustainable ecotourism recommendations for this region.

1. Research Design

The study employs a qualitative research approach. Qualitative methods are particularly suited for this research, as they allow for the in-depth exploration of complex social, cultural, and environmental dynamics (Denzin & Lincoln, 2018). The specific methods used include documentary research, in-depth interviews, and field observations, with data triangulation ensuring the findings' reliability and depth (Patton, 2002).

1) Documentary Research: The study uses documentary research to contextualize the primary data collected from interviews and observations. This involves a systematic review of peer-reviewed journals, governmental reports, case studies, and relevant policy documents published between 2000 and 2024. This provides a theoretical foundation and historical context for the study, highlighting long-term trends in ecotourism development in border areas.

2) In-depth Interviews: Purposive sampling is employed to select 20 key informants in each location, for a total of 40 informants across Xishuangbanna and Luang Namtha. These interviews aim to capture detailed perspectives on the impacts and challenges of ecotourism development. As Yin (2019) notes, in-depth interviews allow for the collection of rich, qualitative data, revealing insights into the experiences of individuals directly involved in or affected by tourism development (Yin et al., 2019).

3) Field Observations: Field observations are systematically conducted at selected ecotourism sites in both Xishuangbanna and Luang Namtha to capture real-time data on environmental conditions and socio-cultural practices. These observations supplement the interview and documentary research data, ensuring a comprehensive understanding of the on-the-ground realities of the (Kiatkawsin et al., 2021).

2. Key Informants

A total of 40 key informants are selected across the two research areas, 20 from Xishuangbanna and 20 from Luang Namtha, to ensure a diverse representation of perspectives. Informants are divided into three main sectors: community, government, and private sectors, based on purposive sampling techniques (Babbie, 2010; Marshall, 1996). This selection strategy ensures the study captures a well-rounded view of ecotourism development in both locations (Xishuangbanna, China, and Luang Namtha, Lao PDR).

1) Community Sector: Four residents who have lived near ecotourism sites for over two years and within 10 kilometers of an ecotourism site are selected in both locations. Each location selects one community leader who has held leadership positions for at least two years and is involved in ecotourism projects. These individuals provide insights into the socio-cultural impacts of tourism and the long-term effects of ecotourism on the local community (Mitchell & Reid, 2001).

2) Government Sector: Each location includes one central government tourism official with at least two years of experience in tourism policy or management and has been involved in at least one major sustainable tourism project. Four local government officials have at least two years of involvement in local tourism development and have participated in cross-border tourism initiatives or other relevant projects. The central officials provide a top-down perspective on national tourism strategies, while local government officials offer insights into implementing these strategies at the regional and local levels (Hall, 1999).

3) Private Sector: In both Xishuangbanna and Luang Namtha, five tour operators with at least five years of experience that operate on both local and international scales and five repeat tourists have visited at least one ecotourism site or the same destination within the GMS at least twice in the last 12 months are selected. The tour operators provide professional insights into market trends and best practices in ecotourism, while the tourists offer feedback on the sustainability and quality of their experiences (Vimoltip & Krit, 2018). This selection of informants ensures a comprehensive understanding of the tourism ecosystem in both locations.

3. Research Areas

The research is conducted in two key areas, shown as Figure 2.

1) Xishuangbanna Dai Autonomous Prefecture in Yunnan Province, China, is known for its rich ethnic diversity and biological resources, making it an ideal location for studying the integration of ecotourism into urban planning. The region's tropical rainforests are recognized as a UNESCO Man and Biosphere Reserve, enhancing its status as an ecotourism destination (Jianchu, 2006). The prefecture covers an area of 19,124.5 square kilometers with a population of 1.196 million, including two counties (Menghai county and Mengla county) and one county-level city (Jinghong). Xishuangbanna's position as a border region adds complexity to its tourism dynamics, particularly regarding cross-border collaboration and cultural preservation (Jin et al., 2022).

2) Luang Namtha Province in northern Laos is another critical area for this study. Known for its protected natural areas, particularly the Nam Ha National Biodiversity Conservation Area, Luang Namtha is a critical site for ecotourism development in Laos. The region is home to various ethnic minority communities whose sustainable living practices are closely tied to their natural surroundings (Habito et al., 2024). As a border province, Luang Namtha plays a pivotal role in cross-border tourism between Laos and China, making it an ideal case for exploring how ecotourism can contribute to sustainable development while preserving cultural and environmental heritage (Lonn et al., 2018).

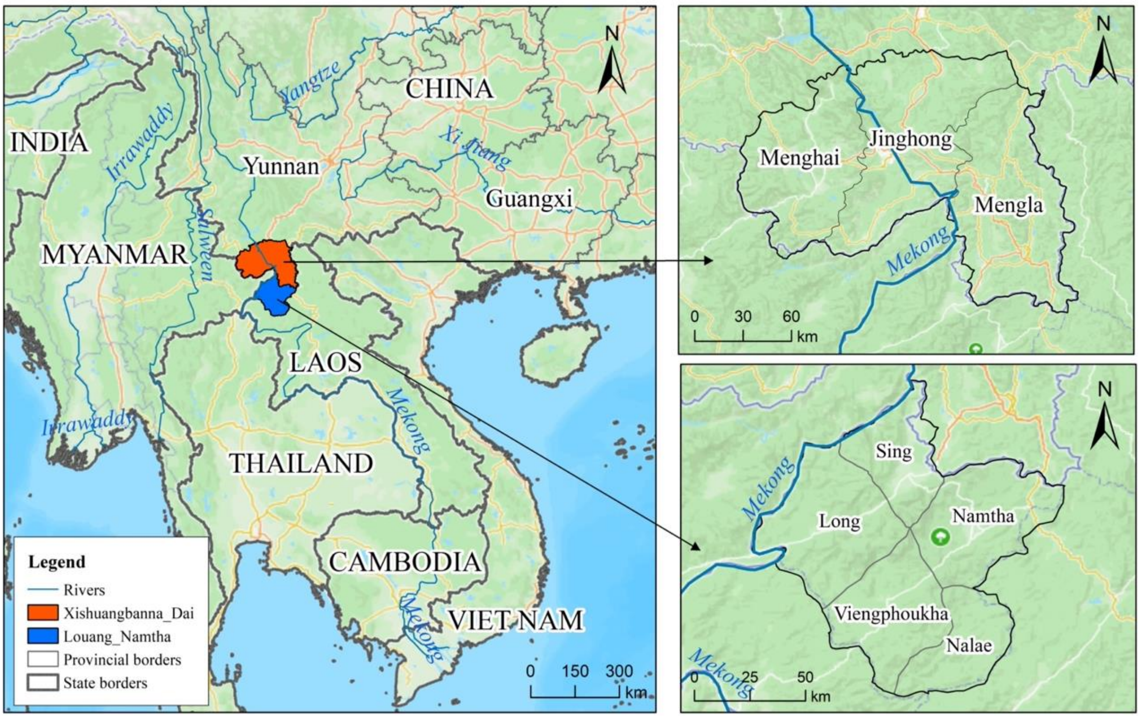

Figure 2. The GMS and Geographical Relationship between Xishuangbanna and Luang Namtha (Datasource: Baidu Map)

4. Data Collection

The data collection process includes the following methods:

1) Documentary Research: This study reviews relevant governmental reports, peer-reviewed journals, and case studies on ecotourism development published between 2000 and 2024.

2) In-depth Interviews: From April 2024 to October 2024, 40 in-depth interviews were conducted with key informants in Xishuangbanna and Luang Namtha. The research tool was in-depth interview guidelines, which focused on gathering qualitative data on the informants' experiences and perceptions of ecotourism development in the regions.

3) Field Observations: Systematic observations are carried out in both research areas to capture real-time data on tourism development's environmental and socio-cultural impacts. The research tool is an observation guideline. These observations complement the documentary research and interview data.

5. Data Analysis

Content analysis is employed to analyze the collected data, systematically organize it, and give deeper insights into the challenges and opportunities in ecotourism development in Xishuangbanna and Luang Namtha. The combination of documentary research, interviews, and field observations ensures the data is triangulated for greater reliability and validity.

RESULTS AND DISCUSSIONS

1. Current State of Tourism in the GMS Border Areas

The data collected from interviews, field observations, and documentary research revealed several trends in the current state of tourism in Xishuangbanna and Luang Namtha. Both regions have experienced rapid tourism growth, spurred by cross-border infrastructure development and increasing international tourism flows. However, this growth has not been uniform, and challenges remain in ensuring that tourism contributes to long-term sustainability.

Tourism growth in Xishuangbanna and Luang Namtha has been notably influenced by infrastructure improvements, particularly the introduction of the high-speed train linking the two regions as part of China's BRI. This development has resulted in a significant surge in tourist arrivals in Xishuangbanna. A tourism official who has five years of work experience from Xishuangbanna stated on 17th May 2024:

"The high-speed train has significantly expanded our tourism reach, bringing in visitors from across China and internationally. This has greatly benefited local businesses, especially in the hospitality and service industries. However, the rapid increase in visitors has also put immense pressure on our infrastructure. We are struggling to manage waste, transport, and maintain the cultural integrity of our sites amidst this growth."

Conversely, Luang Namtha has experienced growth primarily within the ecotourism sector, focusing on preserving its natural and cultural resources. A tourism officer from Luang Namtha highlighted 21st May 2024:

"Thanks to the train, we have seen more visitors, but our approach is focused on small-scale, sustainable tourism. We aim to preserve our natural beauty and cultural heritage, ensuring that tourism benefits local communities without compromising what makes Luang Namtha special. The visitor increase has been advantageous, especially for small businesses and community-based initiatives."

While tourism has contributed positively to the local economies, the rapid growth has exposed significant weaknesses in the infrastructure of both regions. Responses in Luang Namtha reported deficiencies in tourism-related infrastructure, particularly in accommodation and transportation. A resident who opened a shop in the tourism site of Luang Namtha observed on 25th June 2024:

"Our roads are poorly maintained, and we lack sufficient accommodations to meet the growing number of tourists. Tourism numbers fluctuate, and while it helps the economy, we worry about becoming overly dependent on tourism. If we don't address these issues with long-term solutions, we might end up worse off."

Environmental degradation emerged as one of the most pressing concerns. In both regions, the rapid expansion of tourism infrastructure, particularly hotels, roads, and recreational facilities, has contributed to habitat fragmentation and biodiversity loss. An environmental officer in Xishuangbanna noted on 27th Sep 2024:

"Tourism has led to a 78.3% decline in certain species of flora and fauna in areas of high tourist activity… We've noticed the impact on wildlife and forest areas as more tourists visit the conservation area".

Similarly, in Luang Namtha, the Nam Ha National Biodiversity Conservation Area has faced challenges, with concerns about unregulated tourism disrupting local ecosystems.

The reliance on natural resources to support tourism activities places unsustainable pressures on local ecosystems. For instance, the demand for fresh water in tourist resorts has led to resource shortages for local communities during peak tourism seasons in Xishuangbanna.

"Tourists take priority when it comes to water usage, which leaves locals struggling during the dry season," one resident who works as a driver and lives in the suburban community expressed on 29th July 2024.

Similar concerns were raised in Luang Namtha, where a local farmer commented that the expansion of tourism-related agriculture uses up water resources they rely on for their crops. Both regions are rich in ethnic diversity, and tourism has increasingly capitalized on these cultural resources. However, the interviews revealed concerns about the commodification of culture. In Xishuangbanna, respondents noted that the traditional Dai culture is under pressure, with one elder local stating that in April 2024, Dai village,

"Tourists expect a certain version of our culture, so we feel forced to adapt our practices to meet their expectations… Our traditional dances and customs are changing to fit what tourists want to see, which is not how they were meant to be."

The findings also indicate a gap in community participation in tourism planning. Despite tourism's growth, local communities in both regions feel marginalized in decision-making processes. In Xishuangbanna, only 20% of respondents felt they had any say in tourism planning and development, while in Luang Namtha, this figure was slightly higher, at 35%. This lack of participation undermines tourism's sustainability, as local communities are not empowered to manage their cultural and natural resources effectively (Mak et al., 2017)

While tourism has undoubtedly brought economic benefits, these gains are not evenly distributed. Large-scale tourism operators, often based outside the region, capture most of the profits in both Xishuangbanna and Luang Namtha. Local small-scale businesses and community-based tourism initiatives struggle to compete. A local vendor in Xishuangbanna expressed frustration on 8th August 2024,

"We are left with the scraps while the big hotels and tour companies make most of the money." Similarly, a homestay owner in Luang Namtha remarked, "We work hard to attract tourists, but the big operators get most of the business… We see tourists coming, but we don't see the money staying here. It goes back to the big cities or even overseas."

Economic leakages are a significant problem in both regions, particularly Luang Namtha, where up to 40% of tourism revenue leaves the local economy (Germaine et al., 2022). In Xishuangbanna, the figure is slightly lower but still significant, with 25% of tourism revenue flowing out of the region.

2. Integration of NbS with Ecotourism Development in the GMS Border Areas

The application of NbS in the tourism sector is still in its infancy in both regions. However, some positive examples emerged from the interviews. In Xishuangbanna, pilot projects focusing on the restoration of wetlands and the use of sustainable tourism infrastructure have shown promise. A government tourism official noted on 10th August 2024,

"We have started using eco-friendly materials in new tourism facilities, and the wetland restoration project is helping to mitigate some of the environmental damage caused by tourism."

In Luang Namtha, community-based tourism projects incorporating NbS, such as sustainable water management and reforestation, are gaining traction, although they remain limited in scale. Stronger policy frameworks are also needed to support the broader implementation of NbS in the tourism sector. Interviews with government officials revealed that while NbS is gaining recognition, it has yet to fully integrate into national tourism policies.

"We are aware of NbS, but we don't have the policy support or resources to implement it effectively," on 7th June 2024, said a policymaker who worked in the provincial tourism department in Xishuangbanna.

Cross-border cooperation on NbS remains weak, with respondents noting that political tensions between GMS countries often impede collaborative environmental efforts.

3. Cross-Border Cooperation and Regionalism in the GMS Border Areas

Cross-border cooperation remains challenging at the political level. Respondents from government sectors in China and Laos pointed to the need for more robust regional frameworks that facilitate collaboration on shared environmental and cultural resources. However, bureaucratic hurdles and differing political priorities often slow progress. Despite these challenges, there are promising signs of regional cooperation. In Luang Namtha, collaborative projects with Yunnan province, China, on sustainable tourism and environmental preservation are beginning to yield positive results. A Luang Namtha local tourism official who joined the local CBT project two years ago mentioned that on 23rd May 2024,

“We have agreements in place, but they take a long time to implement because of the different laws and regulations in each country… We want to collaborate more, but political obstacles are always in the way…Our joint projects with China are helping us manage tourism better, especially regarding conservation efforts.”

These projects highlight the potential for regionalism to enhance tourism sustainability by pooling resources and expertise across borders (Ji, 2024).

4. Long-Term Sustainability in Sustainable Tourism Development STD

The findings highlight the need for more robust ethical guidelines in tourism development. Respondents emphasized the importance of ensuring that tourism aligns with STD principles, particularly those regarding environmental preservation and the protection of cultural integrity. A local leader in Xishuangbanna stated, “We want tourism that respects our culture and environment, not one that exploits it for short-term gain.” Similarly, a community leader in Luang Namtha emphasized, “Tourism must benefit everyone, not just the big businesses.”

The long-term sustainability of tourism in the GMS will depend on the successful integration of NbS, regional cooperation, and STD. These findings underscore the importance of developing policies that address the GMS’s unique environmental, socio-cultural, and political contexts while fostering economic growth and protecting the region’s rich natural and cultural resources.

CONCLUSIONS

This study explored the ecotourism development in the border areas of GMS, focusing on Xishuangbanna, China, and Luang Namtha, Laos. Analyzing both regions through a qualitative lens revealed that while tourism growth has brought economic opportunities, it has also posted significant political, environmental, socio-cultural, and economic challenges. The large-scale ecotourism initiatives in Xishuangbanna have spurred rapid growth, but unequal economic benefits and cultural commodification remain significant concerns. On the other hand, Luang Namtha’s CBT model has successfully engaged residents in preserving cultural heritage and supporting environmental conservation. However, issues like waste management and over-reliance on external operators persist.

Both regions benefit from cross-border cooperation under the BRI, but greater policy integration and community involvement are needed to ensure sustainable growth. The implementation of NbS is still nascent, and more robust frameworks must be developed to balance tourism growth with environmental preservation and cultural integrity. Regional cooperation, while promising, requires more robust frameworks to overcome political and bureaucratic obstacles. Long-term sustainability will depend on the successful integration of NbS, STD, and regionalism, ensuring that tourism benefits are equitably shared across local communities without compromising the region’s environmental and cultural assets.

Recommendations

According to the results and discussions, these recommendations are directed towards ecotourism management authorities, policymakers, local communities, and ecotourism operators to improve the model of ecotourism development in the border areas of the GMS:

- Local governments should improve infrastructure planning to address waste management, transportation, and the protection of cultural heritage sites to cope with tourism growth.
- Community involvement in tourism planning should be increased to ensure residents have a say in the development process and reduce cultural commodification.
- Policies should be created to support local small businesses and community-based tourism initiatives, ensuring that economic benefits are distributed more equitably.
- NbS should be integrated into tourism development to mitigate environmental degradation and protect local ecosystems.
- Regional cooperation in the GMS should be strengthened to address shared environmental and cultural challenges and facilitate cross-border tourism management.
- Policies should focus on aligning tourism with environmental preservation and cultural integrity to ensure long-term sustainability.

Implementing these recommendations can make ecotourism in the GMS a model for sustainable development, fostering economic growth while protecting the environment and preserving the region’s unique cultural heritage. Collaboration among governments, local communities, and ecotourism operators is essential to achieving a balanced and sustainable ecotourism framework that benefits all stakeholders.

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preparation, T.C. and M.L.; writing - review and editing, T.C. and M.L.; visualization, T.C.; supervision, T.C.; project administration, T.C. and M.L. All authors have read and agreed to the published version of the manuscript.

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A COMPREHENSIVE REVIEW OF SEASONAL VERTICAL CRUSTAL MOVEMENTS FROM GPS OBSERVATIONS

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Abstract: This review focuses on understanding the factors and processes affecting Global Positioning System (GPS) vertical annual cycles and the use of GPS data for monitoring drought. Instead, through GPS techniques, annual oscillations of the Earth's crust due to hydrological, climatic and or environmental factors that affect surface deformation can be identified. In order to analyze seasonal vertical crustal movements using GPS observations, assessing patterns, causes, and implications for geophysical processes. These vertical displacements have been recently employed in hydrological contexts like Total Water Storage (TWS) inversion, and the indices from these vertical seasonal shifts seem effective for drought severity assessment. In recent years, extensive research and considerable scientific efforts have been dedicated to leveraging GPS technology as a tool for systematically recording and analyzing various natural processses, including extreme environmental events such as prolonged droughts and sudden, high magnitude earthquakes. However, despite these advancements, the intricate characteristics and underlying mechanisms governing the annual oscillatory movements of the Earth's crust remain largely elusive and not yet fully comprehended. Further, while GPS-based data analysis models have made significant progress in improving the accuracy of geodetic measurements, but still exhibit notable limitations, and precision imperfect, necessitating further refinements, methodological advancements, and the integration of complementary observational datasets to enhance their reliability and effectiveness for geophysical applications. This review also discusses the variation in these movements occurring at the regional level and reasons that finer models for such movements based on specific regional characteristics need to be developed. Future research will have to cause upgrades in the data models, including multi-source data, specifically GRACE satellite observation, and effective computational methods for exacting geodetic applications. By improving the precision of the GPS data analysis and integrating multi-source datasets, this research paves the way for more accurate and real-time environmental monitoring, offering valuable insights for disaster preparedness, water resource management, and climate resilience strategies. Also, these findings will provide a better understanding and guidance for future research in this scope of studies.

Keywords: vertical seasonalmovement; water resource management; drought monitoring; earthreference frame

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INTRODUCTION

Non-linear seasonal movements of the crust refer to the phenomenon where the Earth's crust exhibits non-linear characteristics during seasonal changes, such as varying amplitudes, irregular trajectories, and inconsistent velocity of movement. These movements are typically caused by seasonal climate changes, hydrological cycles, and geophysical processes (Heki & Jin, 2023). For example, winter ice and snow loads and summer precipitation can lead to elastic deformation of the crust, resulting in different modes and magnitudes of movement.

With the rapid development of Global Positioning System (GPS) observation technology and significant improvements in positioning accuracy, the information on crustal motion obtained from GPS observations plays an increasingly important role in the study of geodynamics. However, the crustal motion information derived from GPS observations is often influenced by non-linear seasonal movements, particularly prominent in vertical motion (Tsai, 2011; Yang et al., 2023). Currently, many researchers have applied GPS vertical seasonal motion information to water resource management, seismic activity monitoring, and the establishment of high-precision terrestrial reference frames (Azhari, 2020; Li et al., 2022; She et al., 2024). Nevertheless, there is still a lack of comprehensive studies systematically describing its related applications, and few studies have systematically summarized the current state of research on drought monitoring based on

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GPS vertical seasonal motion. Therefore, to gain a more comprehensive understanding of vertical seasonal movements based on GPS observations and their applications, we first use the bibliometric analysis method to analyze outlines of the causes and mechanisms of crustal seasonal movements. Secondly, it summarizes various related applications, particularly emphasizing those in drought monitoring, an area that has received comparatively less attention in prior research. Finally, the study concludes by synthesizing the research content and proposing future directions for studies related to vertical seasonal movements.The aim of this study is to conduct a comprehensive analysis of non-linear seasonal vertical crustal movements derived from GPS observations, exploring their causes, mechanisms, and applications, with a particular focus on drought monitoring. The study aims to synthesize current research and propose future directions for related studies.

LITERATURE REVIEW

The study of seasonal vertical crustal movements has gained prominence with the advancement of GPS technology. These movements exhibit non-linear characteristics, influenced by seasonal climatic changes, hydrological cycles, and geophysical processes. As climate-related phenomena such as snow and ice accumulation in winter, and seasonal precipitation, impact the crust, they induce elastic deformation. This results in varying amplitudes, irregular trajectories, and inconsistent velocity patterns of vertical crustal movements (Heki & Jin, 2023).

Causes and Mechanisms

Several studies have identified the primary causes behind these seasonal vertical movements. For example, Heki & Jin (2023) argue that the Earth's crust responds elastically to seasonal loading and unloading, such as the melting of ice or seasonal rainfall. This results in periodic upward or downward movements of the crust, which are often difficult to predict due to their non-linear nature. Additionally, Tsai (2011) and Yang et al. (2023) describe how the seasonal redistribution of water in the form of snow, rainfall, and groundwater contributes significantly to crustal deformation. These studies emphasize the need to differentiate between elastic deformation caused by climate variables and other forms of long-term geological movement.

Applications

Recent studies have focused on the application of GPS-derived vertical seasonal movements in various fields, including water resource management, seismic monitoring, and the establishment of high-precision terrestrial reference frames. Li et al. (2022) and She et al. (2024) highlight the utility of GPS data in accurately monitoring vertical displacement and its implications for earthquake prediction and water management. These findings are crucial for hydrological studies and flood control, where seasonal movements affect groundwater storage and surface water levels. However, a relatively underexplored application is the use of GPS-derived vertical seasonal movements for drought monitoring. Azhari (2020) suggests that seasonal vertical movements, such as those observed during periods of drought, can be used as an indicator of groundwater depletion. This could serve as an early warning system for water scarcity, particularly in regions with limited groundwater data. Despite the promising application of GPS in drought monitoring, there is a lack of comprehensive studies that systematize the relationship between vertical crustal movements and drought conditions.

Critical Analysis

The findings from the reviewed studies reveal significant progress in understanding the mechanisms driving seasonal vertical crustal movements. However, limitations exist in the research. Firstly, while the application of GPS technology has improved the precision of measurements, discrepancies between different GPS stations remain, especially in regions with complex geological structures. Tsai (2011) points out that local geological factors can distort vertical displacement measurements, making it difficult to generalize findings across different regions.

Moreover, while studies such as those by Li et al. (2022) and She et al. (2024) emphasize the potential of GPS for applications like seismic monitoring, the integration of GPS data with other geophysical data sets remains a challenge. The need for multi-source data fusion is critical to enhance the accuracy and reliability of GPS-derived measurements. Additionally, Azhari (2020) notes that while vertical movements provide valuable insights into drought conditions, there is insufficient research on the temporal relationship between vertical displacement and drought severity.

METHODS

In the Scopus database, using the advanced search query: `TITLE-ABS-KEY (GPS AND vertical AND displacement) AND SUBJAREA (eart) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO ( EXACTKEYWORD, "Seasonal Variation" ) OR LIMIT-TO ( EXACTKEYWORD, "GPS") )`, a total of 334 English papers on Seasonal Crustal Vertical Movements Based on GPS Observations were retrieved (as of the search date, September 20, 2024). After reviewing the abstracts of these papers, 67 non-review English papers were selected (Figure 1). The number of papers on Seasonal Crustal Vertical Movements Based on GPS Observations shows an increasing trend, with related English papers primarily published in journals such as Journal of Geophysical Research-Solid Earth, Acta Geophysica Sinica, Geophysical Journal International, Geophysical Research Letters, Geodesy and Geodynamics, and Journal of Hydrology (Figure 2).

Seasonal Variation based on geodetic perspective

In the physical mechanisms causing seasonal changes in station displacements, accurate correction formulas for many geophysical factors have been provided, such as annual and semi-annual solid Earth tides, annual effects of polar tides, and tidal models (Lyard et al., 2006; Petit & Luzum, 2010). The influences of these annual effects have been incorporated into precise theoretical models allowing for their correction at the processing stage of GPS carrier phase data (functions are available in software packages like GAMIT, GIPSY, and Bernese). However, the effects generated by more subtle geophysical factors, due to their small magnitudes and reliance on geophysical models, are often overlooked. Through the analysis and speculation of some scholars in recent years, it is suggested that the non-linear changes in GPS station coordinate residuals may also be related to factors such as surface mass loading effects, seasonal temperature effects, and high-order ionospheric delays (Jiang et al., 2018; Li et al., 2024; Yehun et al., 2020).

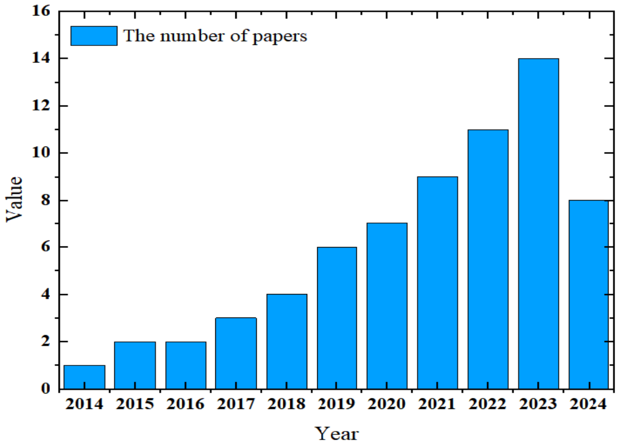

Figure1. Number of articles on seasonal crustal vertical movements based on GPS observations

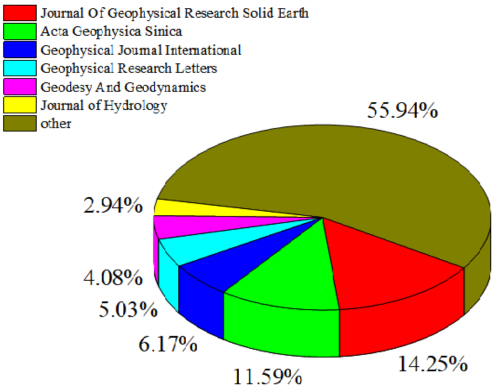

Figure 2. Proportion of journals publishing articles on seasonal crustal vertical movements based on GPS observations

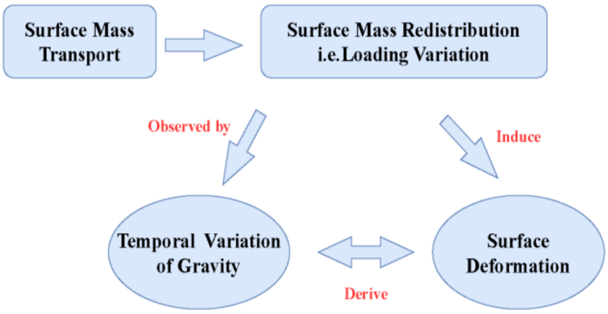

Figure 3. Process of mass transport and loading variation (Zhang, 2014)

Surface mass loading effects

As a large amount of material is transferred within the Earth's system over time, the redistribution of this material on the Earth's surface leads to changes in surface loading, resulting in temporal variations in gravity. Since the geoid of the Earth is defined as a surface of equal gravitational potential, changes in gravity affect height displacements. Therefore, changes in surface load due to mass redistribution ultimately result in elastic displacements of the Earth's surface (White et al., 2022; Zhang, 2014), as illustrated in Figure 3. Early studies have indicated that the surface load effect of materials is one of the significant factors contributing to the seasonal vertical displacements observed at GPS stations. Common types of surface load effects include atmospheric loading effects, non-tidal ocean loading effects, and terrestrial water loading effects. Seasonal variations in atmospheric pressure can lead to elastic deformation of the crust, resulting in periodic vertical changes of several millimetres to tens of millimetres at GPS stations, particularly pronounced in high-latitude and mountainous regions (Dong et al., 2002; Zhang et al., 2018). Non-tidal ocean loading mainly comprises changes in ocean water mass brought about by wind-driven effects, atmospheric pressure effects, and variations in seawater density. Studies have shown that non-tidal ocean loading primarily impacts coastal cities, with the response diminishing as the distance from the coastline increases (Van & Wahr, 1998; Zerbini et al., 2004). Variations in terrestrial water storage, encompassing changes in snowfall, soil moisture, groundwater, and surface water such as lakes and reservoirs, exert loads on the crust, leading to changes in GPS station displacements. The influence of terrestrial water loading on the vertical displacements of GPS stations ranges from millimetres to centimeters, exhibiting variations across different regions and seasons (Argus et al., 2017).

With the continuous advancement of related research and the further development of corresponding spatial geodetic technologies in recent years, the conclusion that material gravitational loading can stimulate non-tectonic seasonal surface movements has been further corroborated and refined. Chuanyin et al. (2018) identified that variations in atmospheric loading, non-tidal ocean loading, and terrestrial water mass loading are the primary factors triggering seasonal vertical deformations of the crust, contributing over 97%. Zhao et al. (2023), comparing the statistical distributions of continuous GPS time series, sought the optimal regional surface mass loading model to correct these GPS time series, thereby reducing their dispersion and enhancing the accuracy of uplift rate estimates. In summary, the impact of surface load effects on the vertical displacements of GPS stations is significant and exhibits marked seasonal variation. However, it is crucial to recognize that surface loading effects may differ across regions due to variations in geography, climate, and human activities. Existing studies may lack regional applicability, failing to account for the characteristics and disparities of different areas adequately. Consequently, future research should emphasize data sharing and collaboration, develop higher-precision models, and prioritize real-time monitoring of regional variability and dynamic changes.

Seasonal temperature effects

The thermal elastic deformation caused by changes in surface temperature also has an inducing effect on the annual displacement observed by GPS stations. Due to the Earth's revolution around the sun, there is a significant annual variation in surface temperature, which can also induce seasonal deformations on the surface. In the field of Earth science, related research on thermal elastic deformation Berger et al. (1975) proposed the first thermal elastic deformation model on a semi-infinite space. Ben-Zion and Leary (1986) extended the model and then established a decoupled layer semi-infinite space model.

Subsequently, some scholars used this model to estimate the thermal expansion effect caused by changes in surface temperature and its effect on the radial displacement of GPS stations. Dong et al. (2002), based on the half-plane analytical model, concluded that temperature change influences the annual amplitude variation of GPS station bedrock vertical displacement by less than 0.5mm. It is also suggested that temperature change is one of the factors causing periodic displacement changes in GPS stations. Yan et al. (2010) analyzed the effect of temperature changes on the vertical displacement of GNSS stations based on 23 GNSS reference stations in the Chinese Crustal Movement Observation Network, revealing that the maximum annual amplitude of its effect is 2.8mm. Lulu et al. (2018) discussed the influence of the thermal expansion effect on GNSS vertical displacement. They showed that the annual amplitude of thermal expansion vertical displacement for more than 50% of GNSS stations in mainland China is at least 1mm. Lu et al. (2024) demonstrated that by employing an improved comprehensive thermal expansion model (TEVD FSD), it is possible to assess better the non-linear variations of GNSS height products, particularly across different data processing strategies, thus significantly enhancing the explanatory power regarding the effects of surface temperature changes on thermal expansion.

While prevailing research affirms the impact of temperature on the seasonal movements of GPS, certain limitations persist in the research process. Firstly, the accuracy of the adopted thermal expansion model remains a concern, leading to periodic issues in the final results. Secondly, disparities in the materials utilized in the observation piles at diverse GPS stations in the research locale may yield significant deviations in the analysis outcomes across sites. Lastly, the intricate bedrock composition beneath GNSS stations may render a single thermal expansion model unsuitable for all stations, potentially affecting observation accuracy. Therefore, developing a new and refined thermal expansion effect model is crucial for more accurately mitigating temperature-induced influences on GNSS vertical displacement.

High-order ionospheric delays

Alongside load effects and temperature considerations, the non-linear alterations in GPS station coordinates may also be subject to influence from high-order ionospheric delays. Recent scholarly focus on precise GPS positioning has underscored the escalating emphasis on and exploration of high-order ionospheric delays' impact on GPS data processing precision. Kedar et al. (2003) highlighted that high-order ionospheric errors can introduce distinctive semi-annual signals in the north component of GPS sites. Expanding on this observation Yuan et al. (2008) posited that high-order ionospheric delays might engender semi-annual signals in the vertical domain. Petrie et al. (2010) elucidated the role of high-order ionospheric delays in instigating non-linear seasonal movements in GPS coordinate time series. Zhu Xin-hui et al. (2020) conducted a collective study implementing high-order ionospheric delays to evaluate their impact on GNSS station coordinate time series, delving into the influence of these delays on the non-linear alterations in GNSS station coordinates and quantifying their effects in scholarly discourse. To date, investigations into the influence of high-order ionospheric delays on non-linear seasonal changes affecting global GPS sites are relatively limited. Hence, a deeper exploration of high-order ionospheric delays' effects on non-linear seasonal displacements at global GPS sites stands to unveil a new pathway toward establishing a refined, high-precision global Earth framework.

Applications of Seasonal Deformation

As the exploration of the seasonal movement of the Earth's crust advances, a clearer understanding of crustal seasonal movements is emerging. Consequently, applications related to the seasonal movement of the Earth's crust are progressively maturing. In the ensuing discourse, we delve into the utilization of crustal nodal movement in water resource monitoring and management, earthquake activity analysis, regional crustal structure inversion, and bolstering the stability of the Earth reference framework.

Monitoring and management of water resources

GPS technology exemplifies remarkable capability in accurately documenting surface responses to seasonal changes in water content and other Earth crust loads, denoted as seasonal displacements. Conversely, through meticulous separation of other non-hydrological signal components (encompassing non-tidal atmospheric and oceanic loads, tectonic deformations, and post-glacial rebound effects), GPS can effectively facilitate the inversion of regional Total Water Storage (TWS) alterations. Analogous to insights from GRACE/GFO missions, GPS-derived TWS changes encapsulate diverse hydrological components like surface water, groundwater, and soil moisture. As a result, GPS-inferred TWS alterations find utility in hydrology, extreme climate change, and related research domains.

The novel application of GPS observations in hydrogeology, specifically inverting regional Total Water Storage (TWS) changes, warrants a comprehensive evaluation of its efficacy and potential. Argus et al. (2014) harnessed GPS vertical displacement to invert changes in land water storage in California, yielding inversion results congruent with GRACE data. Fu et al. (2015) employed GPS vertical displacement to assess alterations in land water storage in Washington and Oregon, showcasing a solid correlation between GPS-derived results and those from GRACE and hydrological model inversions. Comprehensive comparison and analysis of Yunnan's land water storage inversion results with GRACE, GLDAS, and TRMM data indicate the capability of current GPS stations in Yunnan as autonomous observation data for tracking land water storage changes during the GRACE and GRACE/GFO interconnecting periods (Siyuan et al., 2018). A method proposed by integrating independent component analysis (ICA) with GPS vertical coordinate time series facilitated the estimation of land water storage (TWS) changes in the Sichuan-Yunnan region of China, exhibiting high consistency with GRACE-derived water storage outcomes (Liu et al., 2022).Illustrating Yunnan Province in China as a case study for Total Water Storage (TWS) inversion, Figure 4 delineates the spatial distribution of the annual amplitude of TWS changes from December 2010 to February 2021 as inverted by GPS, GRACE/GFO, and the Global Land Data Assimilation System (GLDAS) land surface model. Notably, the GPS-inferred results align with GRACE/GFO and GLDAS estimates, disclosing a gradual waning trend of TWS alterations in Yunnan Province from southwest to northeast. The slightly larger overall amplitude of the GPS signal is ascribed to its heightened sensitivity to local hydrological load signals relative to GRACE/GFO.

GNSS (Figure 4a) shows the annual amplitudes of TWS changes in Yunnan Province as derived from GNSS observations. The color scale represents the magnitude of TWS changes, with red indicating the highest amplitudes and blue indicating the lowest. The spatial distribution suggests that the highest amplitudes are concentrated in the central and northern parts of the province. GRACE/GFO shows the annual amplitudes of TWS changes obtained from the GRACE/GFO mission. The color scale is similar to the GNSS diagram, with red representing high amplitudes and blue representing low amplitudes. The spatial pattern is generally consistent with the GNSS results, but with some differences in the magnitude and distribution of high-amplitude areas. GLDAS shows the annual amplitudes of TWS changes as simulated by the GLDAS model. The color scale remains the same, with red indicating high amplitudes and blue indicating low amplitudes. The spatial pattern shows a more uniform distribution of amplitudes compared to the GNSS and GRACE/GFO results, with higher amplitudes concentrated in the central and southern parts of the province. The investigations above underscore the pivotal role of GPS deformation time series accuracy and emphasize the significance of monitoring station density and distribution in optimizing GPS-inferred outcomes. While GRACE/GFO and GPS are instrumental tools in modern geodesy, harmonizing the inversion of Total Water Storage (TWS) alterations through cross-validation of these complementary technologies holds promise for enhancing the precision of terrestrial water storage change assessments. However, notable disparities stemming from methodological and scale differences necessitate a strategic fusion of these technologies to exploit their combined strengths, heralding an innovative research pathway toward attaining more precise changes in terrestrial water storage.

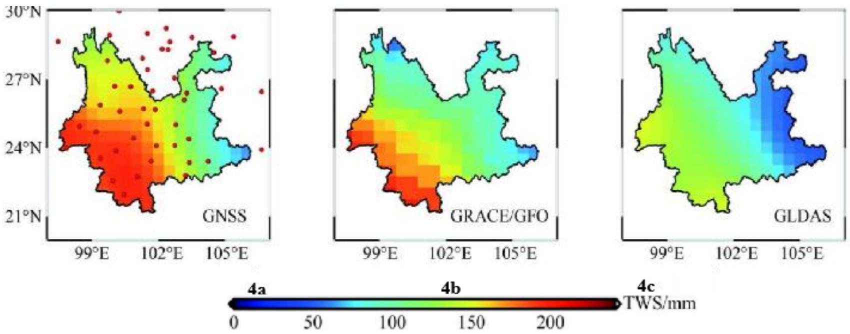

Figure 4. Annual Amplitudes of TWS Changes in Yunnan Province derived from different inversion strategies from Dec. 2010 to Feb. 2021, Heat map (Li et al., 2023)

Drought monitoring

The escalating prevalence of drought globally poses a significant threat to water resources and hydrological cycles, accentuating the need for robust monitoring strategies (He et al., 2021). Drought, typified through hydrological, meteorological, or agricultural lenses, encompasses various indices designed to effectively gauge and contrast drought severity and duration (Shi et al., 2023).Recent ground-based GPS observations furnishing vertical seasonal displacement data pertinent to hydrological cycles have been leveraged to fashion novel drought indices, underscoring the utility of GPS in monitoring drought intensity. For instance, Chew and Small (2014) devised a site-specific drought index (DIGPS) at each GPS station predicated on vertical surface seasonal displacement time series, serving as a pivotal indicator for hydrological drought surveillance. Ferreira et al. (2018) conducted a comparative analysis of drought indices derived from GRACE (DITWS) and vertical land deformations measured by GPS (DIVCD) for nationwide drought classification in Brazil over a relatively short period (7 years). While congruence between GRACE TWS and GPS displacement exceeded 90% at most sites, the correlation between DITWS and DIVCD stood at 82% of sites. Yao et al. (2019) devised a GPS drought index for the Yunnan region grounded on vertical seasonal motion coordinate time series, effectively capturing the region's drought characteristics. Jiang et al. (2022) pioneered a dynamic GPS imaging approach based on principal component analysis of vertical crustal displacements sensed by GPS from 2006 to 2020, amalgamated with climatological methods, culminating in a GPS-based Drought Severity Index (GPS-DSI).Figure 5 illustrates U.S. drought monitoring from 2006 to 2020 using vertical seasonal displacements from GPS data. It elucidates the spatial distribution features of the GPS-DIS derived from GPS and the GRACE-derived hydrological drought index (GRACE-DSI) (Figure 5 a), alongside the correlation coefficients between these indices and the meteorological drought index sc-PDSI (Figure 5 b). The depiction affirms robust correlations between GPS-DIS based on GPS and both GRACE-DSI and sc-PDSI indices across most U.S. regions.

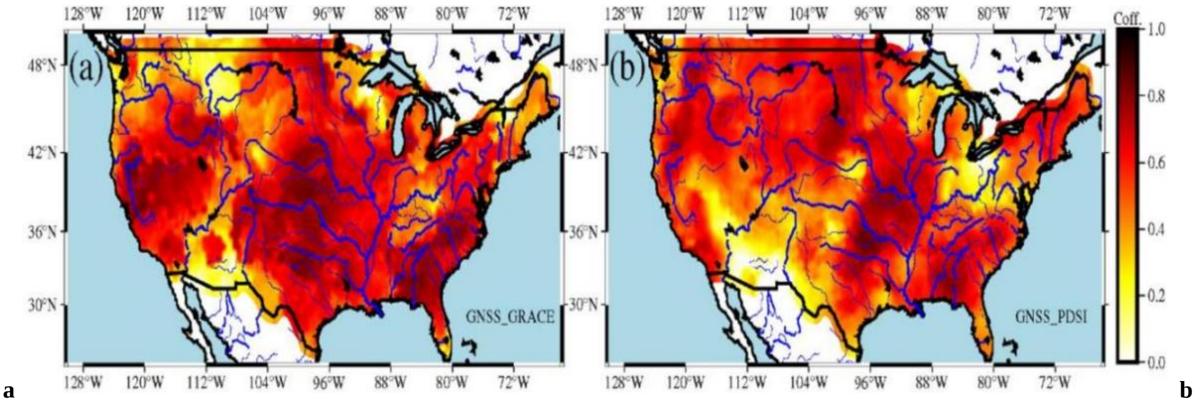

Figure 5. Spatiotemporal correlation between GPS-DSI, GRACE-DSI, and scPDSI time series. Panels (a) and (b) show the map of correlation coefficients for GPS-GRACE and GPS-scPDSI, respectively, Heat Map (Jiang et al., 2022)

Table 1 encapsulates the correlation analysis between the hydrological drought index GPS-DSI fashioned from vertical seasonal displacements using GPS, the hydrological drought index GRACE-DSI derived from GRACE, and the meteorological drought index sc-PDSI time series across 18 basins in the United States. Displaying correlation coefficients denoted as R1 for GPS-DSI and GRACE-DSI correlation and R2 for GPS-DSI and sc-PDSI correlation, the table underscores robust correlations among the three indices in a majority of U.S. basins, highlighting the viability and efficacy of leveraging GPS-detected vertical seasonal changes to probe extreme climate occurrences like drought.

Table 1. The correlation coefficient between the GPS-DSI, GRACE-DSI, and sc-PDSI in 18 basins in the United States

Region	R1	R2	Region	R1	R2
the New England	0.52	0.65	Missouri	0.65	0.75
Mid-Atlantic	0.72	0.47	Arkansas-White-Red	0.81	0.66
South Atlantic-Gulf	0.81	0.7	Texas-Gulf	0.70	0.57
Great Lakes	0.64	0.45	Rio Grande	0.60	0.32
Ohio	0.58	0.42	Upper Colorado	0.61	0.54
Tennessee	0.59	0.66	Lower Colorado	0.40	0.19
Upper Mississippi	0.74	0.72	Great Basin	0.78	0.53
Lower Mississippi	0.70	0.60	Pacific Northwest	0.57	0.72
Souris-Red-Rainy	0.71	0.69	California	0.81	0.67

The studies mentioned above underscore the significance of utilizing globally accessible GPS vertical seasonal deformations for drought severity monitoring. However, given the nuanced factors influencing GPS seasonal displacements, the accuracy of our constructed drought index hinges on the effective extraction of vertical seasonal displacements triggered by hydrological loads. Consequently, future research will pivot towards enhancing the precision and efficacy of extracting hydrological load displacements entwined with drought from GPS seasonal displacements to craft meticulous GPS drought indices.

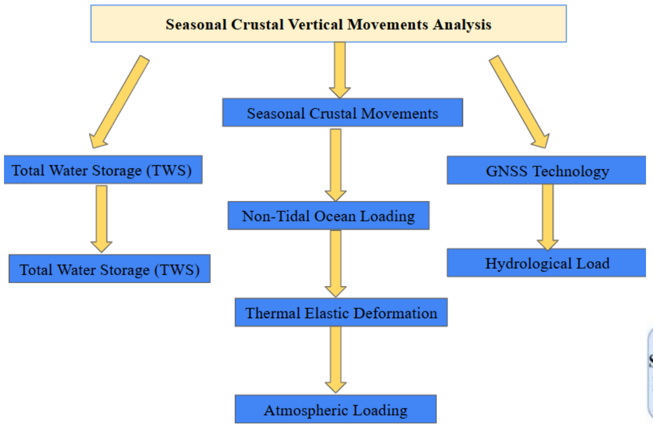

Figure 6. Seasonal crustal vertical movements analysis (Zhang, 2014)

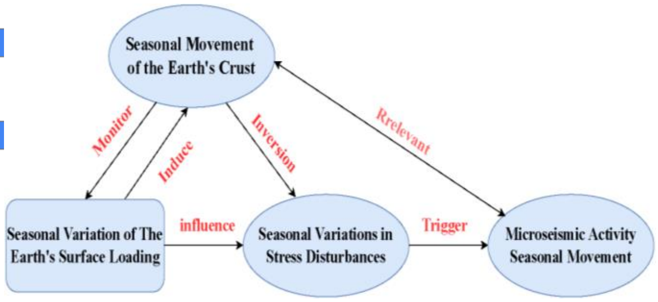

Figure 7. Relationship between seasonal vertical crustal deformation and seasonal variations of mass loading, crustal stress perturbation (Jiang et al., 2022)

Analysis of earthquake activity

The investigation into stress disturbances on seismic activity induced by diverse physical processes underscores the pivotal role of stress fluctuations arising from seasonal mass-loading variations. The magnitude of stress perturbations triggered by these seasonal mass loading changes is of sufficient scale to influence seismic events (Johnson et al., 2017). Simultaneously, the seasonal oscillation in crustal mass loading emerges as the primary catalyst for seasonal crustal motion, hinting at a potential correlation between seasonal crustal motion and regional seismic events, as elucidated in Figure 7.

Geophysicists have recently witnessed a burgeoning interest in unravelling the modulatory impact of seasonal crustal motion on seismicity. Heki (2003) scrutinized the seasonal crustal deformations instigated by snow load in the Japanese archipelago, positing that snow load interferes with strain accumulation amidst earthquakes, potentially precipitating seasonal seismic events in the region. Compared to pore pressure explanations, the snow load mechanism leans towards exerting a regional influence on seismic activity Bettinelli et al. (2008) elucidated the linkage between the seasonal fluctuation of hydrological load, the seasonal displacement of GPS stations, and seismic event traits in the Nepal region, shedding light on the intricate interplay between earthquake nucleation processes, stress accrual, and seismic activity. Drawing insights from California, USA, Kreemer & Zaliapin (2018) computed the seasonal signals of GPS stations, unveiling a robust correlation between the seasonal vertical displacement of regional GPS stations and seasonal surface strain. In conjunction with seismic event data, their analysis alludes to seasonal strain potentially catalyzing main shock episodes, amplifying earthquake magnitudes, and mitigating aftershocks. Nagale et al. (2022) leveraged data from GRACE and GPS to appraise the influence of seasonal loading on deformation amidst seismic episodes in Nepal, revealing a discernible correlation between seasonal water loading and seismic activity, whereby escalating hydrological loading mitigated seismic occurrences.

The findings underscore a significant association between water load variations and earthquake frequency, primarily attributed to the repercussions of seasonal pressure fluctuations. The dominant pressure exerted by water load alterations aligns with the background tectonic stress direction, potentially instigating a 10% surge in seismic events. This analytical framework serves as a viable model for elucidating the periodicity of earthquakes in the southeastern periphery of the Qinghai-Tibet Plateau. Collectively, these studies underline the correlation between seasonal motion and seismic activity, offering a novel angle for comprehending the triggers and intricate mechanisms governing earthquakes in the research domain.

Enhancing the stability of the earth reference frame

The technology of spatial geodesy possesses the capability for high-precision measurement of surface deformations and the Earth's gravitational field while also defining and maintaining the geodetic reference framework. It has made significant contributions to the fields of geoscience, particularly in monitoring crustal movements, the migration of surface fluid materials, and atmospheric delays (Bock & Melgar, 2016). A high-precision reference framework serves as a fundamental reference for the aforementioned geoscientific observations (Weiping et al., 2022). Research indicates that vertical seasonal movements of the crust can influence the stability of station coordinates within the Earth reference framework, resulting in periodic fluctuations in long-term coordinate time series. These fluctuations may affect the accuracy and long-term stability of the ITRF, particularly in geodesy applications that demand extremely high precision (Ferre, 2018). Specifically, failing to account for vertical seasonal movements in the ITRF solutions may lead to frame displacements, consequently impacting the accurate interpretation of global surface movements and variations in the Earth's gravitational field (Ming et al., 2023).

Thus, simulating and analyzing the non-linear changes of GPS stations has become a crucial task for refining the International Terrestrial Reference Frame (ITRF). Establishing a millimetre-level terrestrial reference frame has emerged as a new objective within the international geodetic community. In 2016, the International Earth Rotation and Reference Systems Service (IERS) released the ITRF 2014 (Altamimi et al., 2016). This framework has begun utilizing the characteristics of non-linear crustal motion as a fundamental model for expressing the crustal dynamics of GPS baseline stations. This approach incorporates post-seismic deformation modelling and the estimation of seasonal annual and semi-annual signals into the model of linear crustal movement while traditionally overlooking station non-linear movements.

Consequently, ITRF2014 represents significant advancements and improvements over previous iterations of the ITRF series, offering strong guidance and holding substantial significance for future research on millimetre-level terrestrial reference frames. The latest iteration, ITRF2020, was unveiled in April 2022. Compared to ITRF2014, this enhanced version not only includes station positions and velocities but also provides parameters for post-seismic deformation (PSD) and seasonal signals. ITRF2020 further refines the modelling of station non-linear movements, thereby enhancing the quality, consistency, and accuracy of the new framework (Altamimi et al., 2023). Given the current limited understanding of the factors inducing vertical seasonal movements in GPS, future research must focus on enhancing the correction accuracy for these vertical seasonal movements, particularly in high-latitude regions and areas experiencing significant load variations. Furthermore, integrating multi-source data, such as gravity field data from GRACE satellite observations, with advanced machine learning algorithms can more effectively capture and predict the complex characteristics of vertical seasonal movements, thereby further improving the performance of the ITRF reference framework.

CONCLUSION AND PROSPECTS

This review critically examines the causes and applications of GPS vertical seasonal movements, particularly emphasizing their emerging yet underexplored potential in drought monitoring. By elucidating the non-linear behaviour of crustal seasonal movements driven by climatic and hydrological factors, the study provides a foundational understanding of the intricate links between these geodetic observations and environmental changes. Although GPS-based surface deformation monitoring has enriched our insights into natural calamities like droughts and earthquakes, inherent constraints persist owing to incomplete elucidation of factors driving seasonal crustal movements and imperfections in GPS data processing models. Moving forward, refining data processing models, streamlining calculation procedures, and ameliorating error margins in computed results is imperative. Additionally, the mechanisms driving seasonal crustal movements exhibit regional variability, necessitating meticulous examination and in-depth exploration of the drivers of seasonal crustal motion in each specific geographic area. Such detailed analysis promises to provide a richer perspective on the complexities of seasonal crustal dynamics and enhance the robustness of geodetic applications across diverse regions, thereby advancing the use of GPS in environmental monitoring, resource management, and disaster mitigation efforts globally.

This study reported limitations by highlighting the inevitable challenges in accurate modeling of vertical crustal movements due to different regional environmental influences, which complicate GPS data interpretation. While seasonal displacements are detected very well with GPS observations, model data analysis per se, regarding percentages of today's analytical data, proves to be a limiting factor. Although the multi-source data availability such as the GRACE satellite observations may improve reliability, technical challenges in integrating these data sets still exist. But the complexity of the hydrological, climatic, and environmental processes affecting the Earth's crust is such that today the knowledge about how these processes influence each other is still incomplete. Moreover, although GPS has been observed to hold promise in drought severity monitoring, the differences in local conditions together with the resolution of available data may result in conflicting outcomes for the same across different regions. Addressing these concerns is a promising avenue for future research with improved computational methodologies to boost the reliability and applicability of GPS in monitoring natural processes.

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THE SYNERGY OF PSYCHOLOGICAL CAPITAL AND JOB EMBEDDEDNESS: EXTENDING THE CONSERVATION OF RESOURCES THEORY IN HOSPITALITY EMPLOYEE RETENTION

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Abstract: Psychological capital (PsyCap), comprising hope, self-efficacy, resilience, and optimism, is a critical psychological resource that enhances employee retention (ER) in the hospitality industry. Grounded in the Conservation of Resources (COR) theory, this study examines the direct impact of PsyCap on ER and explores job embeddedness (JE) as a mediating factor. JE represents the psychological and social forces that keep employees attached to their organization, reducing turnover intentions. The study surveyed 429 frontline employees working in five-star hotels across Saudi Arabia, and the data were analyzed using partial least squares structural equation modeling (PLS-SEM). The findings reveal that PsyCap significantly enhances JE by strengthening employees' alignment with organizational values, relationships, and career opportunities. Employees with higher PsyCap demonstrate greater job satisfaction and a stronger sense of belonging, leading to reduced turnover intentions. Additionally, JE positively influences ER, confirming its crucial role in hospitality workforce stability. Importantly, JE partially mediates the relationship between PsyCap and ER, illustrating its role in transforming psychological resources into actual retention outcomes. These insights provide practical implications for hospitality managers aiming to mitigate high turnover rates. Investing in PsyCap-enhancing initiatives—such as resilience training, career development programs, and mentoring—can cultivate stronger employee embeddedness. Similarly, strengthening JE through organizational strategies, including fostering social connections, aligning company values with employee expectations, and improving career progression pathways, can further reduce attrition and enhance organizational performance. The study contributes to COR theory by integrating PsyCap and JE into the context of the hospitality industry, offering a more comprehensive understanding of their influence on ER. Future research should explore the long-term effects of PsyCap on ER through longitudinal studies and examine additional moderating variables, such as organizational culture and leadership styles, to provide a deeper understanding of employee retention dynamics.

Keywords: PsyCap, COR theory, hospitality industry, retention, job embeddedness

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INTRODUCTION

Retaining employees remains a continual concern within the hospitality sector, often depicted by the high turnover rates and stressful work environments (Yam et al., 2018; Abdou et al., 2024; Dwesini, 2019). The industry's reliance on personal interactions, demanding hours, and customer service complexities make it hard for organizations to keep a stable workforce (Cho et al., 2009; Abdou et al., 2022; Salama et al., 2022). Despite numerous studies focusing on factors like wages, working conditions, and job satisfaction, the psychological resources of employees and how they impact their retention are the areas that require deeper exploration. One framework that offers a promising lens for understanding this aspect is psychological capital (PsyCap), a positive mental state defined by resources like hope, optimism, resilience, and self-efficacy as mentioned by Luthans et al. (2007). Employees with higher PsyCap will likely experience greater job satisfaction, cope better with challenges, and exhibit stronger motivation to remain with their employer (Jung & Yoon, 2015; Yam et al., 2018). PsyCap fosters positive emotions and constructive behavior, improving job performance and enhancing employees' likelihood of staying at their positions (Flinkman et al., 2023; Chaleoykitti & Thaiudom, 2017). PsyCap has been widely recognized as a driver of employee engagement and satisfaction, but its potential influence on retention, primarily when mediated by job embeddedness (JE), has been underexplored.

In the setting of the hospitality industry, which is labor-intensive, ER is a serious issue, making job embeddedness crucial. As per Mitchell et al. (2001), JE denotes the combined forces that motivate employees to remain attached to their current employment. It comprises three components: links (describing the relationships employees have with their family, society, and organization), fit (referring to how compatible employees are with their jobs, values, and environment), and sacrifice (the perceived loss when someone decides to leave his/her job). Earlier studies suggested that to build a more sustainable workforce that enhances customer satisfaction in this competitive industry, hospitality establishments should focus on job embeddedness to reduce turnover, lower attrition, and improve retention (Chan et al., 2019; Khattak et al., 2022).

While earlier research highlighted a significant direct effect of PsyCap on several important workplace outcomes—like employee performance, employee satisfaction, and turnover intentions, a distinguished gap exists in empirical studies specifically investigating the intermediating role of JE within this context. This gap is especially significant within the hospitality industry, where employee turnover rates are extremely high. Moreover, a considerable portion of the existing literature tends to focus on individual resources of PsyCap, i.e. optimism, self-efficacy, hope, and resilience. Moreover, it examines JE as a standalone construct. However, there has been a dearth of examining how these constructs interact to influence employee retention. Understanding these interactions is critical, as it may reveal underlying mechanisms contributing to employees' decisions to stay with their employers. Therefore, the primary aim of this study is to investigate the relationship amid PsyCap and employee retention, specifically inside the hospitality industry, analyzing the extent to which JE is an intermediary factor in this relationship. To achieve this aim, the study intends to explore the under-mentioned key questions:

1. How do PsyCap resources, such as "hope, self-efficacy, resilience, and optimism," influence JE and ER in the hospitality sector?
2. How does PsyCap, with its dimensions of hope, efficacy, resilience, and optimism, influence employees' job embeddedness?
3. How significantly does JE act as a mediator in the link between PsyCap and ER?

This study is grounded in the Conservation of Resources (COR) theory, which explores the PsyCap-JE-ER relationship and answers the key questions mentioned above. The COR theory, developed by Hobfoll (1989), posited that individuals are enthused to acquire, protect, and conserve valuable resources. These resources can be psychological (i.e., PsyCap including self-efficacy, optimism, hope, and resilience), or organizational (i.e., job embeddedness including links, fit, and sacrifices). In the context of ER, COR theory posits that employees are apt to continue with their employers once they sense that their psychological resources, such as self-efficacy and resilience, and organizational resources, such as links and fit, are secure and expanding. By exploring the association between these variables, this research offers a more nuanced and holistic perspective of the factors contributing to retaining employees in a sector marked by high turnover rates such as the hospitality sector. While much of the literature has examined these factors separately, this research takes a holistic approach to understanding how psychological and organizational resources impact an employee's decision to retain his/her employer. Ultimately, the findings are expected to provide valuable perceptions of hospitality management practitioners seeking to enhance ER strategies and foster a more stable workforce. The present research is divided into eight sections. Following the Introduction, Section 2: Review of Literature outlines the theoretical background, focusing on the relationship between Psychological Capital (PsyCap) and Job Embeddedness (JE), and their relevance to employee retention. Section 3, Materials and Methods, describes the research design, measurement tools, sampling strategy, and data collection procedures utilized in the study. Section 4, Results, provides a detailed analysis of the study's findings. Section 5, Discussion, interprets the study's results in the light of existing literature, offering a comprehensive understanding of the findings. Section 6, theoretical and practical implications, highlights the study's contributions to both theory and practice. Section 7, Conclusion, summarizes the key findings, emphasizing their significance in understanding the relationships among PsyCap, JE, and employee retention in the hospitality sector. Finally, Section 8, Limitations and Future Research discusses the study's limitations and proposes directions for further research.

REVIEW OF LITERATURE

1. Psychological capital (PsyCap) and employee retention (ER)

PsyCap denotes an optimistic mental state describing the confidence of an individual in his/her capacity to achieve and handle obstacles/challenges. Luthans et al. (2007: 3) described PsyCap as "*an individual's positive psychological state of* *development characterized by: (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success*."

ER is a key aspect of human resource management, emphasizing strategies to keep employees in an organization for extended periods (Das & Baruah, 2013). Effective ER can be achieved through training, development, financial rewards, management support, positive work environments, career growth opportunities, and job satisfaction (Hausknecht et al., 2009; Dewi et al., 2021; Ramachandran & Prasad, 2022; Frye et al., 2020; Islam et al., 2024). These strategies are crucial in reducing turnover, saving costs associated with recruitment and training, and enhancing organizational productivity, sustainability, and success—especially in high-turnover sectors like hospitality (AL-Makhadmah et al., 2020; Vasquez, 2014; Ghani et al., 2022).

Research highlights the significant role of psychological capital (PsyCap), with its components—self-efficacy, resilience, hope, and optimism, in predicting ER. Self-efficacy fosters employees' belief in their ability to succeed, enhancing their commitment to stay (Ellett, 2014). Resilient employees are better equipped to handle workplace challenges, contributing to higher retention rates, particularly in organizations that promote resilience through training and recognition (Rangachari & Woods, 2020; Yang & Lee, 2023). Hope, another PsyCap component, influences how employees perceive their future growth and success within an organization, thereby encouraging retention (Fazal-e-Hasan et al., 2023). Similarly, optimism, which reflects employees' expectations of positive outcomes and opportunities within their organization, has been linked to stronger retention intentions (Kim & Hyun, 2017). Grounded in the Conservation of Resources (COR) theory, PsyCap is viewed as a critical personal resource that employees strive to conserve and develop. When employees possess high PsyCap, they are more probable to continue working in the organization. Taking these insights into account, the following hypothesis is suggested.

H1: PsyCap is significantly associated with ER in the context of the hospitality industry.

2. Psychological capital (PsyCAp) and job embeddedness (JE)

Job embeddedness is a notion that has gained considerable attention in organizational studies, particularly within the hospitality industry (Ampofo & Karatepe, 2022; Robinson et al., 2014; Yam & Raybould, 2018). JE denotes the forces that let workers get attached to their jobs, encompassing both on-the-job (organization) and off-the-job (community) aspects (Mitchell et al., 2001). Job embeddedness is typically divided into three main elements: links, fit, and sacrifice. *Links* denote the connections of an employee with other people or activities. These links can include relationships with colleagues, managers, and guests. *Fit* describes how employees perceive their job and organizational culture align with their values as well as professional objectives. The dynamic plus diverse environment of the hospitality industry often requires a solid fit to ensure job satisfaction and performance. *Sacrifice* involves the professed cost of saying goodbye to a job, encompassing monetary plus non-financial aspects. These aspects may include loss of benefits, career progression opportunities, and societal connections (Mitchell et al., 2001; Yam et al., 2018).

Several studies have probed the interplay between PsyCap and JE (Sun et al., 2012; Ali et al., 2022; Joo & Shin, 2023). Sun et al. (2012) conducted research involving 1000 nurses from Chinese university hospitals, which revealed that PsyCap significantly correlates to nurses' JE. The study suggested that nurses who experience a positive psychological condition tend to build more vital connections with their organization, making them more deeply embedded in their work. This positive mindset also enhances their adaptability and competence in fulfilling their responsibilities. Similarly, Ali et al. (2022) found that PsyCap significantly influences JE ($\beta = 0.361$, $p < 0.05$), suggesting that improving nurses' psychological state will positively impact their JE. Nurses with strong connections within the organization, like positive associations with their colleagues, often possess higher levels of PsyCap. Their ability to foster these meaningful relationships reflects their resilience, optimism, and positive mindset. Additionally, in the banking industry setting, Pillay et al. (2020) suggested that employees possessing high levels of PsyCap are additionally inclined to become closely connected to their organizations. This is largely because they tend to foster their links with colleagues, allowing them to experience a stronger sense of fit and deeper connections within the organization. Hence, the following hypothesis is suggested.

H2: PsyCap is significantly associated with JE in the context of the hospitality industry.

3. Job embeddedness (JE) and employee retention (ER)

Through its links, fit, and sacrifice dimensions, JE undertakes a crucial part in retaining employees (Hassan et al., 2024). Considering the broader organizational and social factors that anchor individuals to their jobs, JE provides an in-depth perspective on ER. Researchers have shown that JE is a crucial determinant of ER. For example, in the hospitality sector context, Yam et al. (2018) established that workers possessing extraordinary levels of embeddedness, particularly in terms of social connections and alignment with organizational values, are less inclined to vacate their positions when faced with external opportunities. Furthermore, in their empirical investigation involving 143 novice teachers, Watson and Olson-Buchanan, (2016) demonstrated that novice educators who feel that their values are closely tied to the organization's vision report higher retention rates and demonstrate stronger loyalty to their schools. Additionally, Holtom and Darabi (2018) confirmed that when employees feel that the potential sacrifices of leaving, including losing professional connections, financial benefits, or career advancement—are too great, they tend to remain with their current employer. Finally, underpinning the COR theory, JE acts as a crucial organizational resource that employees seek to maintain, leading to higher retention rates among those deeply connected to their roles. Bearing in mind the previous insights, the following hypothesis is suggested.

H3: JE is significantly associated with boosting ER in the context of the hospitality industry.

4. The mediating effect of JE in the link between PsyCap and ER

Previous research has identified PsyCap as a critical determinant of JE. Earlier research has presented that workers with positive PsyCap are more entrenched in their roles due to stronger connections with colleagues and greater adaptability to their work setting (Sun et al., 2012; Ali et al., 2022; Joo & Shin, 2023). Furthermore, the prior research concluded a substantial optimistic interplay amid PsyCap and ER, suggesting that employees with high PsyCap are more probable to continue working with their business (Flinkman et al., 2023; Chaleoykitti & Thaiudom, 2017; Schulz et al., 2014). Similarly, according to (Robinson et al., 2014; Lim et al., 2022; Yam et al., 2018), JE significantly fosters the ER in various contexts. Hence, following COR theory which views JE as a valuable organizational resource that employees seek to protect and grow, the authors of this research assumed that JE will possibly play an intervening role in the PsyCap-ER relationship acting as the mechanism through which employees' psychological resources can significantly enhance their retention rate. Accordingly, the next hypothesis is introduced.

H4: JE has a significant positive effect as a mediating variable in the PsyCap-ER relationship in the context of the hospitality industry.

As depicted in Figure 1, this study's framework defines PsyCap as an independent factor and ER functions as the dependent one. Further, JE acts as an intervening variable, shedding light on the indirect connection between PsyCap and ER.

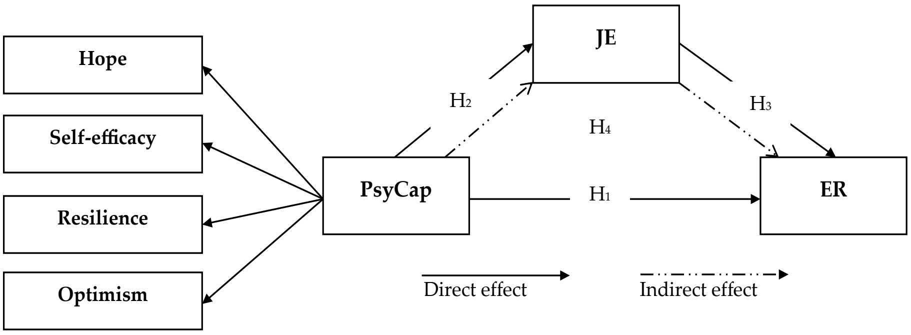

Figure 1. Study's theoretical framework

MATERIALS AND METHODS

1. Development of Instruments and Measures of the Study

A cross-sectional survey was implemented to empirically examine the relationships among PsyCap, JE, and ER. Data collection was conducted through a self-administered questionnaire, designed keeping in view an extensive literature review to incorporate dependable and commonly utilized measures. The survey contained four sections. The first section collected demographic details comprising age, gender, education, current department, and experience in the hotel, while the second section evaluated participants' perceptions of PsyCap. The third section focused on JE, and the fourth section measured employee retention. Two experts in psychology and two experts in hospitality management were consulted for feedback on the questionnaire's content to confirm that it accurately measures the targeted variables. Furthermore, a pilot test with 35 individuals not part of the main study sample was conducted to evaluate the survey's clarity, simplicity, and consistency as well as to spot any unclear terms or meanings. Regarding the study's measures, psychological capital was assessed through the Compound PsyCap Scale (CPC-12), created by Lorenz et al. (2016) and later revised by Lorenz et al. (2022), including four subscales. Each one out of the four subscales -"hope", "self-efficacy", "resilience", and "optimism"- was evaluated with three items, using a 5-point scale from 1 ("strongly disagree") to 5 ("strongly agree"). A higher score reflects a higher level of psychological capital. Samples of these items are "If I should find myself in a jam, I could think of many ways to get out of it.", "Overall, I expect more good things to happen to me than bad.", and "I am confident that I could deal efficiently with unexpected events." One of the most widely used and validated scales, the global JE scale, established by Crossley et al. (2007), was utilized to evaluate JE. This 7-item scale focuses on employees' overall perceptions of being embedded. It provides a holistic view of embeddedness without separating into distinct dimensions (links, fit, and scarifies). One statement of this scale is "I am tightly connected to this organization." Like the previous scale, participants were requested to assign a rating to their perceptions of JE on a 5-point scale. Concerning employee retention, a 3-item scale initially prepared by Seashore et al. (1982) and modified and utilized by Kundu and Lata (2017) was employed to assess the extent to which employees will likely remain with their organizations over time. Participants were also invited to assess their agreement level on a 5-point scale, as was done with the earlier questions. One item of this scale is "I plan to stay in this organization for the next five years."

2. Sampling and data collection

The sample of the current study focuses on frontline staff working in 5-star hotels in Saudi Arabia who interact directly with guests, including roles such as receptionists, concierges, housekeepers, and food and beverage staff. The study focused on this category (frontline employees) for two reasons. First, frontline employees, such as those in the front office, housekeeping, and food and beverage departments, are directly responsible for customer interactions and overall guest satisfaction. In the luxury hospitality sector, particularly 5-star hotels, the quality of service and customer experience is of paramount importance, making employee retention a critical factor for maintaining high service standards and guest loyalty. Second, frontline employees in 5-star hotels often face unique job demands, high expectations, and stress from maintaining excellent service standards. The ability to manage these stressors, foster resilience, and remain engaged in their work is critical for their retention (Afsar et al., 2018). Examining PsyCap and JE in this context can reveal how employees' psychological and organizational resources influence their ability to stay with the organization.

To achieve a representative sample, a stratified random sampling technique was utilized to ensure that various hotel departments, such as front desk, housekeeping, and food and beverage, are represented. To participate, employees must be frontline staff and have worked in their current hotel for at least six months to ensure sufficient experience with their jobs, organizations, and working conditions. They must be full-time employees, as retention factors for part-time staff might differ.

Hotels were chosen across various regions of Saudi Arabia (e.g., Riyadh, Jeddah, and Dammam), where most five-star hotels are located. An invitation letter revealing the objective of the research was sent through official e-mails to get formal permission to conduct a survey. Twelve hotels agreed to participate, supported by the researchers' established connections with HR managers through their collaboration on student internship placements for summer training programs. Self-administrated questionnaires were distributed during employees’ break periods. The required sample size was calculated under the suggestions made by Hair et al. (2019), which recommend that for PLS-SEM, a minimum of 155 respondents is necessary when the expected minimum path coefficients (*Pmin*) range from 0.11 to 0.20 and the significance level is set at 0.05. To ensure ethical standards, all the respondents investigated were made cognizant of the study's objectives, voluntary participation, and the privacy of their replies. Consent forms were signed before starting the survey. Of 480 questionnaires distributed, 445 were returned, with 429 (89.4%) fully completed and suitable for analysis. Incomplete forms (11 forms) and straight-lining answers (5 forms) were excluded. The participants' demographic details are presented in Table 1.

Table 1. Participants' demographic details (N= 429)

1	Baseline characteristics	**2**	No.	**3**	%
4	Gender	**5**		**6**	
7	Male	**8**	321	**9**	74.8
10	Female	**11**	108	**12**	25.2
13	Age	**14**		**15**	
16	From 20 to 30 years	**17**	272	**18**	63.4
19	From 31 to 40 years	**20**	126	**21**	29.4
22	From 41 to 50 years	**23**	31	**24**	7.2
25	More than 50 years	**26**	-	**27**	-
28	Level of education	**29**		**30**	
31	High school diploma or equivalent	**32**	79	**33**	18.4
34	Bachelor’s degree	**35**	298	**36**	69.5
37	Postgraduate degree	**38**	52	**39**	12.1
40	Department	**41**		**42**	
43	Front Office	**44**	92	**45**	21.5
46	Housekeeping	**47**	172	**48**	40.1
49	Food & beverage	**50**	155	**51**	36.1
52	Other	**53**	10	**54**	2.3
55	Experience in this hotel	**56**		**57**	
58	Less than 1 year	**59**	17	**60**	4.0
61	From 1 to less than 3 years	**62**	176	**63**	41.0
64	From 3 to 5 years	**65**	138	**66**	32.2
67	More than 5 years	**68**	98	**69**	22.8

3. Data analysis

For data analysis, the study utilized SPSS 25 and Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was chosen for several reasons (Hair et al., 2019). First, it is well-suited for exploring complex relationships between latent constructs. Given that this study investigates the impact of PsyCap on ER through the mediating role of JE, PLS-SEM offered the flexibility needed to model these intricate, multi-dimensional relationships. Second, PLS-SEM is advantageous for studies where data may not follow a normal distribution—an issue often encountered in survey-based research involving human behavior. This characteristic makes it particularly appropriate for this study's context. Third, unlike covariance-based structural equation modeling (CB-SEM), PLS-SEM does not require a large sample size to yield reliable results (Usakli & Rasoolimanesh, 2023). While our sample size was adequate, the larger number of respondents further enhanced the statistical power of the analysis, ensuring more robust and stable parameter estimates. Finally, PLS-SEM is known for its predictive capabilities, making it ideal for research focused on providing practical insights and actionable strategies. This aligns well with the objectives of our study, which aims to inform management practices in the hospitality industry.

RESULTS

1. Common method bias (CMB)

In the current study, where self-reported data was gathered through a self-administrated survey, CMB has been mitigated by various methods. First, anonymity and confidentiality were ensured. Participants' information and responses were kept confidential and anonymous, solely for research purposes, which helps reduce response bias (Randall & Fernandes, 1991; Nancarrow et al., 2001). Participants were also encouraged to provide honest answers, where no right or wrong answers, to further minimize bias (Phillips & Clancy, 2002). Statistically, following Podsakoff et al. (2003)

suggestions, CMB is a concern if one factor explains over 50% of the variance. Based on the findings of the exploratory factor analysis (EFA), a single factor accounted for 36.8% of the variance, indicating that CMB is not an issue.

2. Constructs' reliability and validity

After completing data collection, the constructs' reliability, convergent, and discriminant validities were assessed via the PLS-SEM algorithm. Table 2 demonstrated good psychometric characteristics. All latent variables showed that Cronbach's α and composite reliability (CR) values surpassed the 0.70 threshold mentioned by Hair et al. (2019), with α values between 0.798 and 0.959 and CR values between 0.833 and 0.964, confirming excellent reliability. In terms of convergent validity, following Hair et al. (2019), acceptable validity requires factor loadings to be above 0.70 and latent variables' AVE higher than 0.50. In Table 2, all variables showed factor loadings exceeding 0.70, with AVE values amid 0.637 and 0.754, indicating that convergent validity has been achieved. To determine the discriminant validity, the evaluation of the Heterotrait-monotrait ratio (HTMT) was conducted, as shown in Table 3, following the recommended threshold of 0.85 suggested by Henseler et al. (2015). As a result, all HTMT ratios in this study were below the established threshold, supporting the existence of discriminant validity amid the examined latent variables.

Table 2. Constructs' Reliability and Convergent Validity Measures (Note: PsyCap= Psychological capital, JE= job embeddedness, ER= employee retention, α^1= Cronbach's alpha, CR^2= composite reliability, and AVE^3= average variance extracted. *** p < .001)

Construct	Item	Outer Loading	α	CR	AVE
Psychological capital (PsyCap)			0.959	0.964	0.689
Hope	PsyCap1	0.948***	0.907	0.942	0.843
	PsyCap2	0.892***			
	PsyCap3	0.915***			
Self-efficacy	PsyCap4	0.878***	0.922	0.951	0.867
	PsyCap5	0.941***			
	PsyCap6	0.971***			
Resilience	PsyCap7	0.961***	0.969	0.980	0.942
	PsyCap8	0.965***			
	PsyCap9	0.986***			
Optimism	PsyCap10	0.963***	0.939	0.961	0.892
	PsyCap11	0.929***			
	PsyCap12	0.942***			
Job embeddedness (JE)	JE1	0.905***	0.945	0.955	0.754
	JE2	0.869***			
	JE3	0.737***			
	JE4	0.925***			
	JE5	0.909***			
	JE6	0.885***			
	JE7	0.835***			
Employee retention (ER)	ER1	0.817***	0.798	0.833	0.637
	ER2	0.849***			
	ER3	0.702***			

Table 3. Discriminant Validity via HTMT (Note: HTMT scores are lower than 0.85)

Construct	1	2	3
1- Psychological Capital			
2- Job Embeddedness	0.539		
3- Employee Retention	0.705	0.841	

Table 4. Structural Parameter Estimates (Note: PsyCap= psychological capital; JE= job embeddedness; ER= employee retention; STDEV= standard deviation; CI= confidence interval; UL= upper limit; LL= lower limit, *** *p* < .001)

Hypothesized Path	Path coefficient	STDEV	T statistics	95% CI		Result
				LL	*UL*	
Direct effect						
PsyCap -> ER	0.344	0.050	6.897***	0.245	0.441	Accepted
PsyCap -> JE	0.515	0.042	12.299***	0.429	0.595	Accepted
JE -> ER	0.603	0.044	13.748***	0.516	0.689	Accepted
Indirect effect						
PsyCap -> JE -> ER	0.310	0.032	9.708***	0.249	0.375	Accepted

3. Testing hypotheses of the study

In this study, the proposed hypotheses were tested via PLS-SEM. To evaluate the strength and significance of the path coefficients, the bootstrapping technique was applied, running 5,000 iterations to ensure robust and reliable results. As shown in Figure 2 and Table 4, the results indicate that all the proposed paths were found to be significant and positive, confirming support for all the proposed hypotheses. Results in Table 4 showed that PsyCap is significantly associated with ER (β = 0.3.44, P < 0.001), confirming H1, suggesting that PsyCap resources significantly contributed to predicting ER. Furthermore, the significant association between PsyCap and JE was also confirmed ($\beta = 0.3.44$, $P < 0.001$), indicating that H2 is supported. In addition, the results aligned with Hypothesis 3, show that JE is significantly associated with ER in the hospitality industry context ($\beta = 0.537$, $P < 0.001$). Hence, H3 is accepted. To explore the mediating role of JE in the relationship between PsyCap and ER, the researchers followed the guidelines of Baron and Kenny (1986) and Latan and Noonan (2017) for demonstrating full and partial mediation. Full mediation is established when the direct effect (PsyCap → ER) is insignificant, while the indirect effect (PsyCap → JE → ER) is significant. Partial mediation occurs when both the direct and indirect effects are significant. Based on these criteria, the results in Table 4 indicate that JE significantly partially mediates the positive relationship between PsyCap and ER. Therefore, H4 is supported. The results in Figure 2 also reflect that PsyCap undertakes a significant role in predicting JE. R^2 value 0.265 signifies that PsyCap explains 26.5% of the variance in JE, including hope, self-efficacy, resilience, and optimism. The remaining 73.5% is affected by other variables not captured by PsyCap in this model. Furthermore, the R^2 value of 0.696 reveals that the combined effects of PsyCap and JE can explain a significant 69.6% of the variance in ER. This highlights how vital these resources are for predicting retention among hospitality sector employees.

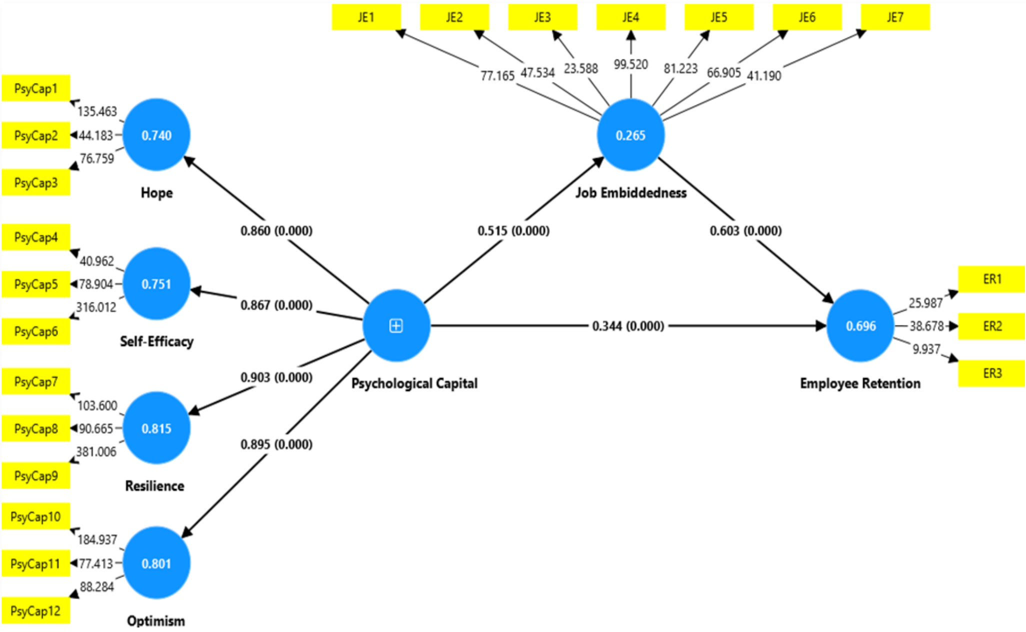

Figure 2. The study's structural model R² values are highlighted inside the blue circles

DISCUSSION

This research primarily aimed at recognizing the impact of psychological capital on ER besides probing the possible intervening effect of job embeddedness in this association in the hospitality industry perspective. The findings of PLS-SEM concluded that all the projected paths were significant and positive, supporting all the proposed hypotheses. First, in the PsyCap-ER relationship, the findings confirmed hypothesis 1, suggesting that PsyCap resources, i.e. hope, self-efficacy, resilience, and optimism, play an important role in predicting ER in the hospitality industry context. This finding supports the conclusions of earlier researchers (i.e., Flinkman et al., 2023; Chaleoykitti & Thaiudom, 2017; Schulz et al., 2014), affirming that the higher the perceived PsyCap resources, the higher the job retained in the hospitality organization.

Second, this study's findings supported H_2, confirming that PsyCap resources are significantly associated with JE in the hospitality industry setting. This finding corresponds with previous research findings concluding that the higher the perceived PsyCap, the greater the professed JE (Sun et al., 2012; Ali et al., 2022; Joo & Shin, 2023). For instance, Joo & Shin (2023) concluded that the positive PsyCap of clinical nurses is the key predictive of their JE, recommending that to promote JE, it is essential to develop, implement, and utilize targeted intervention programs aimed at strengthening positive PsyCap. Accordingly, this finding demonstrates, more specifically, that hotel employees with higher levels of PsyCap resources are more likely to be embedded in their jobs and establishments.

Third, the results support H_3, highlighting the significant role of JE as a key factor in determining ER. These findings emphasize the significant impacts that job embeddedness can have on ER. The study's findings have shown that JE significantly promotes employee retention in their roles and organizations. This finding corresponds with prior research, which frequently demonstrated a clear, positive association between JE and ER, and endorsed that employees who experience strong JE tend to stay with their organization, even when facing challenges or dissatisfaction, as they feel a deep connection to their current workplace (Robinson et al., 2014; Yam et al., 2018; Holtom & Darabi, 2018; Lim et al., 2022).

Fourth, the findings of the study endorsed JE's significant, partial intermediary part in the link amid PsyCap and ER in the hospitality industry. This finding advocates that JE is a crucial mechanism that helps explain how PsyCap influences whether employees choose to stay with their organizations. Although PsyCap has a direct positive impact on ER, improving JE has enhanced this relationship. More specifically, when employees own higher levels of PsyCap, they are probable to feel more embedded in their roles, facilitating them to be more inclined to stay in their organizations.

Theoretical and practical implications

1. Theoretical implications: This study provides various theoretical contributions specifically related to the context of the hospitality industry. Firstly, this study's findings enrich the body of knowledge on psychological capital (PsyCap) by demonstrating its significant positive impact on ER and JE in the hospitality sector. These outcomes extend the use of COR theory in the framework of the hospitality industry. Through the lens of COR, PsyCap resources, i.e. hope, self-efficacy, resilience, and optimism, are perceived to be vital personal resources that significantly boost ER and foster JE. Secondly, reviewing the exciting literature, this is a pioneering study analyzing how job embeddedness functions as an arbitrator in the relationship amid psychological capital and staff retention within the hospitality sector, especially in developing nations like Saudi Arabia. Based on the COR theory, a novel theoretical framework has been developed and validated to explore the direct and indirect effect (via JE) of PsyCap on ER, which has not been examined before. The proposed model contributes to a deeper understanding of to what extent personal (PsyCap) and organizational (JE) resources affect employees' retention in their jobs and organizations. Thirdly, the study's outcomes emphasize the substantial character of JE in predicting employee retention. Furthermore, the study adds value to resource-oriented frameworks, particularly COR theory, by JE as a mediating variable in the hospitality context. JE acts as a resource-conserving mechanism, suggesting that employee retention can be enhanced not just through individual psychological resources (PsyCap), but also by fostering organizational environments where employees feel socially and professionally embedded.

2. Practical implications: Based on the study's findings, some recommendations emerge for hospitality organizations to improve employee retention (ER). Firstly, investing in employees' psychological capital (PsyCap), comprising hope, self-efficacy, resilience, and optimism, can undertake a significant role in augmenting job embeddedness (JE) and ER. Organizations must, therefore, implement training and development programs that promote these resources. For example, programs that encourage goal setting, provide skill-building sessions, and foster a growth mindset equip employees to handle workplace challenges effectively, thereby reducing turnover. Additionally, since JE significantly predicts ER, hospitality organizations should create a work setting which aligns with the values of the workers and promotes social connections. This might be realized via initiatives like mentorship programs, team-building activities, and structured career development, all of which facilitate the workers to sense more linked to the business. Cultivating a positive organizational culture is also essential; a workplace that values collaboration, open communication, and positive social interactions strengthens employees' sense of belonging and boosts their PsyCap. Finally, since JE partially mediates the PsyCap-ER relationship, hospitality organizations should adopt integrated strategies that simultaneously strengthen PsyCap and JE. Managers should be trained to lead in a way that inspires and supports employees by fostering optimism, resilience, hope, and self-efficacy, besides creating a cohesive, supportive environment. Together, these approaches reinforce employees' psychological and organizational resources, ultimately leading to higher retention in the hospitality industry.

CONCLUSION

This study aimed to examine the impact of Psychological Capital (PsyCap)—comprising hope, self-efficacy, resilience, and optimism—on employee retention (ER) in the hospitality sector, with job embeddedness (JE) as a mediating variable. Grounded in the Conservation of Resources (COR) theory, the study explored how PsyCap influences ER directly and indirectly through JE. Data were collected from 429 frontline employees in five-star hotels in Saudi Arabia using a cross-sectional survey. The relationships between variables were analyzed through PLS-SEM. The findings revealed that PsyCap significantly enhances both JE and ER, with JE partially mediating the relationship between PsyCap and ER. These results underscore the importance of both psychological (PsyCap) and organizational (JE) resources in retaining employees in the demanding hospitality industry. Theoretically, the study extends COR theory by integrating PsyCap and JE into the context of the hospitality industry. Practically, it highlights the need for hospitality organizations to invest in PsyCap-enhancing programs, such as resilience training, and foster environments that strengthen JE through initiatives like mentorship and team building.

Limitations of the study and further research

The present study has certain limitations, outlined as follows. (1) This research involved only frontline workers in 5-star hotels in Saudi Arabia, which may reduce the generalizability of the outcomes to other areas or industries where the work environment and employee dynamics are different. (2) This study employed a cross-sectional approach, implying that data collection was done at a single time, which does not allow for establishing the causal relationship between PsyCap, JE, and ER. A more in-depth, long-term study would help better understand how PsyCap affects job embeddedness and employee retention over time, providing a clearer picture of these relationships. (3) The focus on frontline employees excludes insights from other roles in the hospitality industry (e.g., managers and back-office staff). Their retention dynamics might differ, limiting the broader applicability of the findings. Further research, including these categories, would suggest a deeper understanding of this study's outcomes. (4) The unique circumstances of the hospitality industry, especially in five-star hotels, may not fully apply to other sectors or even different hospitality segments (i.e., budget hotels and restaurants), which may limit the study's relevance on a broader scale. Consideration should be given to exploring these relationships in different hospitality sectors. (5) Job embeddedness is found to have a partial mediating role, which suggests that other variables, possibly unexamined, could also play an essential role in mediating and moderating the interplay between PsyCap and ER. For example, hospitality scholars may explore the role of career satisfaction, work meaningfulness, stress reduction, and adaptability to change as mediators. In addition, demographic factors, perceived organizational support, work autonomy, and workplace flexibility as moderators.

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EVALUATION AND VALORIZATION OF GEOMORPHOSITES IN SUSTAINABLE TOURISM ACTIVITIES, FĂGĂRAȘ MASSIF (SOUTHERN CARPATHIANS, ROMÂNIA)

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Abstract: The relief is the one that is the basis for the development of a certain type of tourism in an area, it being the one that provides the natural tourist objectives, so, the present work brings to the fore the interde-pendence relationship that forms between relief and tourist activities. The present work proposes an updated and improved geomorphosites evaluation method based only on their scientific and touristic values. The attractiveness of geomorphosites generates the boomerang effect (degradation of geomorphosites through tourist exploitation). For this purpose, the following evaluation criteria were taken into account: for the scientific value: integrity, uniqueness, dynamics, vulnerability, ecological interest and for the touristic value: tourist revelation, accessibility, attractiveness, tourist infrastructure, tourist activities practiced. The study area is the central sector of the main ridge of the Făgăraș Massif, Romania. This space is an unique, characterized by the highest peaks (Moldoveanu 2544 m), deep valleys (Bâlea) and spectacular landforms (many of these being geomorphosites, Custura Sărății, Strunga Ciobanului). We chose this area because is an unique area, it is characterized by the highest peaks, deep valleys, and spectacular landforms, which have been shaped due to glacial modeling, over millions of years and is rich in geomorphosites. These geomorphological features not only have scientific importance but also attract a large number of tourists and play an important role in the ecological sustainability of the region. This work addresses the issue of environmental sustainability of geomorphosites and their inclusion in tourist activity. By applying the proposed method, the highest values were obtained for Bâlea glacial cirque and the lowest values for Strunga Dracului. The changes associated with the integration of geomorphosites into sustainability strategies have been explored, emphasizing the need for careful management to prevent the overuse or deterioration to these fragile natural features.

Keywords: Geotourism, Geoheritage, Geomorphosites, Făgăraș Massif, România

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INTRODUCTION

The relief is the most important element when talking about the tourist potential of an area and it becomes a tourist attraction when it has attractive morphological features and motivates tourists to consume the tourism product. From a tourism perspective, attractiveness in geomorphology refers to the extent to which a landform feature is perceived as appealing or desirable by visitors. This can be measured using various methods, including surveys, visitor counts, and economic indicators, as tourism revenue (Zhang et al., 2017). Touristic attractiveness is influenced by a range of factors, such as infrastructure, accessibility, cultural and historical significance and the availability of recreational activities (Sinambela, 2021).

When the relief-tourism relationship is analyzed, a double meaning of the interaction between the two elements is identified. Since the relief influences and generates tourism by supporting the basic elements, tourism also exerts a certain impact on the relief through the activities practised and the facilities developed (Ovreiu et al., 2019a, 2019b). So, an interdependence relationship is established between the two components and due to the morphometric and morphographic characteristics, the tourist attractiveness can increase significantly in a certain area (Barbălată & Comănescu, 2021).

Geotourism was initially seen as a transmission of scientific details so that tourists could understand and know the geology and geomorphology of a site beyond its aesthetic appreciation (Hose, 1995). Specialized works (Dowling & Newsome, 2006, 2008, 2010, 2018) state that the concept of geotourism aims to understand and appreciate the environment, especially the abiotic elements. When interpreting geotourism, it's crucial to describe its geological (abiotic) aspect in a manner that informs visitors about the area's plant and animal (biotic) components. Subsequently, integrating information from both the abiotic and biotic aspects helps explain the historical and contemporary human presence in the area (Dowling & Newsome, 2018). The development of geotourism involves reducing the negative impact of mass tourism in tourist spaces that focus on geological and gomorphological attractions. The essential

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components of a territory's natural heritage encompass its significant geomorphological features. They are valuable assets that can be utilized to promote socio-economic development (Carrión-Mero et al., 2020). From a geocultural perspective, geotourism offers an innovative approach to fostering the development of rural and less developed communities due to its economic benefits (Banik & Mukhopadhyay, 2020). The implementation of geotourism on geomorphosites requires, first and foremost, their evaluation within a touristic context (Tamang et al., 2023).

In order to promote the geological heritage of a territory and for the scientific information related to the complexity of the relief to be understood, geotouristic maps were created. Geotouristic maps can promote geomorphological and geological geomorphosites existing in a certain area as well as providing geoscientific information (Coratza et al., 2021; Castaldini et al., 2005). Thus, the geotouristic maps contain information about the relief processes and forms, but also the links established between the relief and the tourist activities (Comănescu et al., 2013).

The evaluation of geomorphosites has been the focus of specialists in the field (Coratza & Giusti, 2005; Bruschi & Cendrero, 2005; Pereira, 2007; Reynard et al., 2007; Serrano, 2005) from the beginning. It was necessary to develop various assessment methods, which were used for different geographical spaces. Geological resources are fundamental components that have influenced the course of human history and the attributes of human society. The preservation of their influence on our landscape highlights the domain of nature conservation referred to as geoconservation (Németh et al., 2021).

One of the primary tasks in geoconservation involves identifying sites for legal protection or establishing a network of significant sites. Geotourism involves the sustainable tourism of geological sites and landscapes, emphasizing education, conservation and community involvement. This approach not only fosters economic benefits but also contributes to the protection and preservation of geoheritage sites for future generations (Brilha, 2018). Brilha (2016), suggest that a geoconservation strategy should follow two stages: inventory and quantitative assesments of sites. The sequential process for geosite inventory varies based on the area size, focusing solely on scientific value. Yet, once geosites are identified, their potential for educational and touristic purposes can also be evaluated. Interest in geoconservation has been on the rise since the 1990s, with the IUCN advocating for initiatives that incorporate geodiversity and geoheritage (Mucivuna, 2022). The scientific community has concentrated its efforts on developing diverse qualitative and quantitative methods to assess geosites for conservation purposes (Mucivuna, 2022). As part of the inventory and evaluation methods, the stages are presented through which the landforms that have the ability to become geomorphosites are identified (Németh et al., 2021; Bruschi & Cendrero, 2005). The practice of conservation of geological heritage of a location, which involves its protection, management, promotion and regular monitoring to ensure ongoing preservation and accessibility as reference sites for the future, is commonly referred to as "geoconservation" (Evelpidou et al., 2021, Comănescu & Nedelea, 2020).

In recent years, the demand for tourism products linked to the exploitation of geoheritage in Nationally Protected Areas and the interest in studying the geotouristic potential of geomorphosites have increased, and a wide range of assessment methodologies have been developed to determine this potential and improve their management and conservation (Ruiz-Pedrosa et al., 2024). Recent studies (Barbălată & Comănescu, 2021; Tamang et al., 2023; Kubalíková & Balková, 2023; Kubalikova, 2024; Ruiz-Pedrosa et al., 2024) in an increasing number, highlight the importance that geomorphosites have gained in recent years as essential resources for the conservation of natural heritage, as well as for the development of sustainable tourism. Geomorphosites inventory is regarded as a fundamental aspect of geoconservation strategies. These inventories serve as a tool to facilitate management by assessing the values, potential uses, and risks of degradation associated with these sites (Comănescu & Nedelea, 2016). The significance of geoconservation has been increasing within the framework of environmental management (Herrera-Franco et al., 2020).

To evaluate geomorphosites, there are generally two approaches: the first approach is based on qualitative and specialized procedures, while the second approach involves the classification of geomorphosites through numerical evaluation and the identification of its potential value (Navarette et al., 2022; Santos et al., 2020). Our research show that the analyzed area contains significant number of geomorphosites with high scientific and touristic value. The scientific value is mainly derived from their geomorphology, geology and natural processes, which are of great interest to scientists and researchers. The touristic value is based on the accessibility, cultural and aesthetic significance of the geomorphosites.

The purpose of the article is to identify the main geomorphosites, formed in the alpine area of the central sector of the main ridge of the Făgăraș Massif, to evaluate them according to our own method, by highlighting the importance of assessing the value of geomorphosites both from a scientific and tourist perspective as well as the identification of vulnerable geomorphosites and the proposal of suggestions for their protection, as well as the valorization and promotion of all identified geomorphosites. We suggest that the inclusion of these geomorphosites in sustainable tourism and environmental management plans can have many benefits, including increased awareness of the importance of the area.

Considering that these sites are extremely fragile and vulnerable to both human activities and natural processes, it is essential to also consider the potential impacts that activities outside the site may have on the features of interest. Therefore, in the future a research about the evaluation of degradation risks and risk analysis should be an integral component of any geoconservation effort (Kubalíková & Balková, 2023; Kubalíková, 2024).

MATERIALS AND METHODS

1. Study area

The Făgăraș Massif is located in the central part of România, within the eastern half of the Southern Carpathians, with an area of approximately 1500 km2, having an east-west orientation. The study area is located in the Făgăraș Massif (Figure 1), the sector between the peaks of Negoiu and Moldoveanu at an altitude of over 1800 m, respectively the alpine sector. These peaks reach the highest altitudes in the country, and the ridge that lies between them were shaped by glaciers, thus it have the most complex and impressive forms of glacial and periglacial relief. The main ridge has an uninterrupted length of 70 km. Distinctive for the crystalline series in the Făgăraş Massif is the distribution of the petrographic complexes in parallel strips in the east-west direction (Mutihac, 1990).

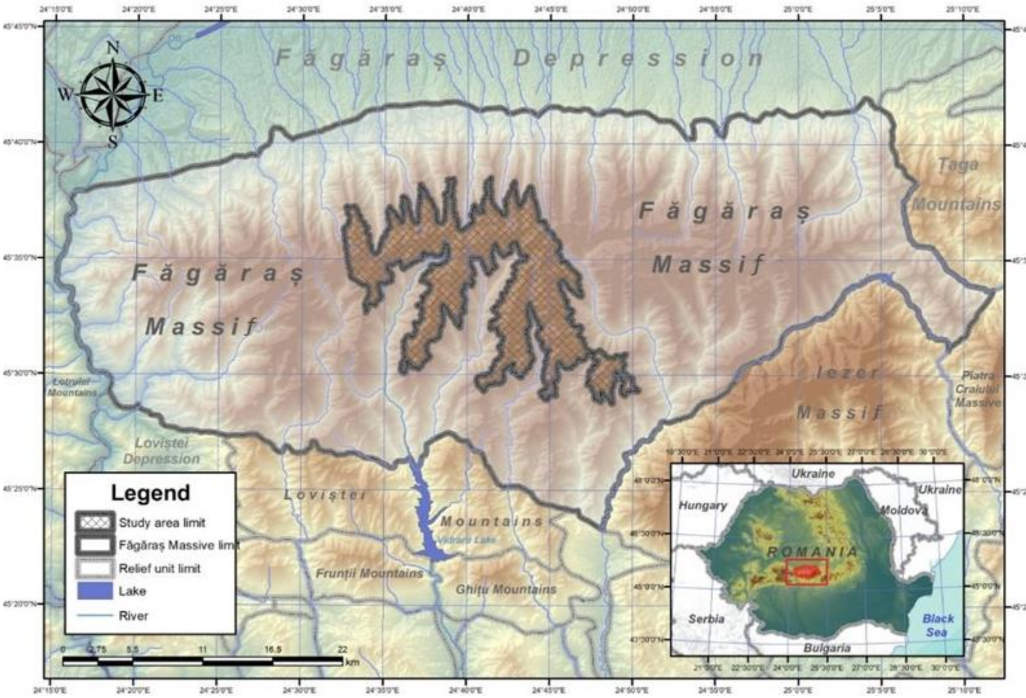

Figure 1. The map of the researched area

METHODOLOGY

The relationship between the geomorphological environment and tourism (Figure 2) is explained by Cannillo & Panizza (1994). The two main elements: the geomorphological environment and tourism pass one by one to the stage of active or passive factor depending on the dominant characteristics.

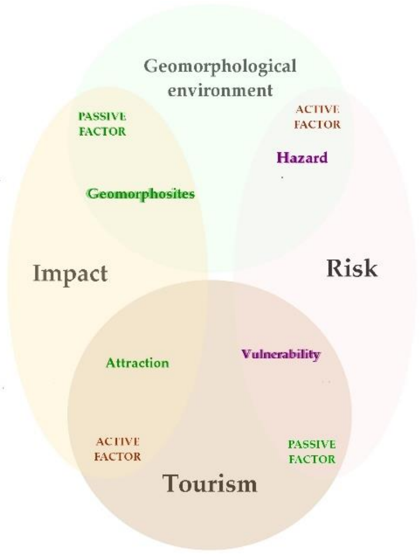

Figure 2. Conceptual scheme of the EIA (Environmental Impact Assessment)
model – the relationship between geomorphology and tourism (Source: Cannillo & Panizza, 1994)

The geomorphological environment is the active factor when a hazard occurs that turns into a risk, where human society exists and can be affected. In this situation, tourism (tourists) become the passive factor. The geomorphological environment is the passive factor when represents a source of attractiveness for tourists who, through the tourist activities carried out, produce a positive or negative impact on the environment. Over time, the relationship between the two components is constantly changing (Cannillo & Panizza, 1994; Serrano, 2005). This idea was applied in Romania for the Bucegi Massif, the two terms geotourism and geo-landscape being approached from a geographical perspective, in which the major components of geo-landscapes are biodiversity, geodiversity and cultural value (Necheș & Erdeli, 2015). Geomorphological sites are classified according to their scientific, aesthetic, cultural and economic values (Raeisi et al., 2022).

Method for the geomorphosites inventory

The methodology for evaluating geomorphosites includes several stages. The first stage is represented by the study of specialized materials, analyzing both those of national and international interest. Subsequently, for the studied area, the existing geomorphosites are identified and located, following a classification and an inventory of them as a basis for the evaluation stage. For the purpose of evaluation, in countless studies the criteria were grouped into different sets of values, however, sometimes the value sets overlap (Navarette et al., 2022). The inventory and selection of geomorphosites was focused on their geomorphological characteristics. We specify that the choice of geomorphosites was focused only on their geomorphological features and not on aesthetic, cultural, economic features, since the previously mentioned have a role in increasing the value of the geomorphosites. From a morphological point of view, the selected geomorphosites are part of the category of the following landforms: peaks, ridges, glacial cirques, passes, transfluency saddles, seam.

All the geomorphosites were chosen according to the altitude criterion, at over 1800 meters (except for the peaks), located between the Negoiu and Moldoveanu peaks. This altitude was chosen as the limit because due to the glaciers involvement in shaping the landforms. For the peaks category, only those above 2500 m were chosen, because they are among the highest altitudes in România, 2544 meters maximum in Moldveanu peak. The geomorphosite inventory has the following objectives: protecting vulnerable geomorphosites, identifying the most optimal solutions for the conservation of geomorphosites and the sustainable exploitation of geomorphosites from a tourist point of view (Figure 3). The inventory consisted of the identification and documentation of important geological features for the achievement of the proposed goal, namely the inventory of geomorphosites for their promoting in environmental sustainability (Pereira & Pereira, 2010).

Figure 3. Capra Lake Basin (Source: Personal archive)

The inventory of geomorphosites aims to: protect vulnerable geomorphosites, identify and select the most optimal solutions for their conservation and exploit them for tourism purposes. The inventory process involved collecting vital information to achieve the intended goal, which is the evaluation of geomorphosites for their utilization in tourism.

The Assessment of Geomorphosites. In the present study the scientific and touristic values of geomorphosites were determined. The focus is on the analysis of the criteria of tourist interest, both from a scientific point of view, as well as the main characteristics of tourist interest. According to the method carried out by Pereira (2007) the central component in the evaluation process of geomorphosites is represented by their scientific particularities, on the basis of which the other values can be developed according to the interests of the evaluator.

The methodological approach includes going through several stages, which entailed the research of the specialized literature at national and international level, the realization of a critical and comparative analysis of the evaluation methods of the existing geomorphosites in order to identify and select the criteria that are adapted to the studied area (Herrera-Franco et al., 2020). The next stage consists in the establishment of new criteria necessary for the evaluation, for each criterion being given appropriate points. The last stage consists in determining the calculation formula, used to quantify the total value of a geomorphosite. The proposed method offers the possibility of evaluating the scientific characteristics as well as the tourist characteristics, which are determining factors in increasing their degree of attractiveness. Following the comparison of evaluation methods from the specialized literature, we took a series of criteria such as for the scientific value: according to the University of Valladolid – dynamics (Reynard et al., 2007), the University of Lausanne – ecological interest (Pereira, 2007) the University of Modena – the rarity and the degree of preservation for the tourist side (Coratza & Giusti, 2005) the University of Cantabria targets the number of recreational activities within the site and its accessibility (Bruschi & Cendrero, 2005). The designed method includes two main values, namely, the scientific value (Vs), (which analyzes the relief potential, and the tourist value (Vt), (which analyzes the tourist potential), thus being able to relate the involved elements. Each of the two values were divided into 5 sub-criteria, to evaluate the important characteristics of each value, (some being retained from previously studied methods and others being newly introduced criteria). Each evaluation criterion was assigned result indicators that receive values between 0 and 1, each criterion having 5 indicators.

The formula for calculating the scientific value (Equation 1) is as follows (Bruschi & Cendrero, 2005; Reynard et al., 2007; Pralong & Reynard, 2005; Selmi et al., 2022, with modifications):

$$Sv = (In+Un+Dy+Vu+Ei)/5 \quad \text{(Equation1)}$$

Where: Sv – scientific value; In – integrity; Un – unicity; Dy – dynamics/frequency of natural risks; Vu – vulnerability; Ei - ecological interest; The formula for calculating the tourist value (Equation 2) is as follows (Bruschi & Cendrero, 2005; Pralong & Reynard, 2005; Mucivuna, 2019, with modifications):

$$Tv = (Tr+Ac+At+Ti+Tap)/5 \quad \text{(Equation 2)}$$

Where: Tv – tourist value; Tr – tourist relevance; Ac – accessibility; At - attractiveness; Inf - infrastructure; Tap - tourist activities practiced; The inventory and analysis of geomorphosites were initially other and processing the cartographic material (topographical map of Romania, scale 1:25,000, aerial images), then verifying the information and completing it in the field. Field research aimed at the identification and recognition of geomorphosites in the field, associated with bibliographic documentation and detailed mapping of relief forms and geomorphological processes existing in the researched area. The documentation regarding the morphology of the area allowed the recognition and selection of those landforms that have the attribute of geomorphosite.

RESULTS AND INTERPRETATION

The classification of geomorphosites

Following the inventory of geomorphosites within the chosen area, we selected this number to ensure a significant representativeness of the geomorphological diversity in this area, as it could reflect a sufficiently wide range of its geological and geomorphological characteristics. We conducted an online and on-site questionnaire with all the geomorphosites in the area and the 22 selected for assessment were the most widely recognized by visitors to the area. Starting from the 22 inventoried geomorphosites, a brief analysis of the main taxonomies that were identified in the researched area was carried out. Their ranking was made according to the geomorphological complexity, genesis and dynamics of the generative processes. The morphological complexity is characterized in the studied area by: simple geomorphosites (characterized by singular forms or a complex of forms created by a single process, Moldoveanu Peak, Fereastra Zmeilor) and system geomorphosites, where are included those geomorphosites that include other smaller geomorphosites: the Bâlea glacial cirque which includes, the lake basin of Bâlea lake, Șaua Capra, the main ridge of Făgăraş Massif that includes the peaks as independent geomorphosites, with touristic and scientific values. Depending on their dynamics, passive geomorphosites and active geomorphosites can be identified (Németh, 2022).

Passive geomorphosites are those that change their morphological character following very slow dynamic processes in the current climate, regime and represent landmarks of the geomorphological evolution of the respective space (peaks, glacial cirques). Active geomorphosites are those that have a strong dynamic and undergo frequent changes. It represents an element of scientific interest and tourist attraction. In this category are included narrows geomorphosites (such as Strunga Dracului).

Geomorphosites Scientific Value Assessment

Each geomorphosite selected has been subjected to the evaluation process (Table 1), which analyzed the scientific value for the first time. The scientific value is made up of 5 criteria: "integrity", "uniqueness", "dynamics", "vulnerability" and "ecological interest", with 5 evaluation sub-criteria being identified for each one.

Table 1. Geomorphosites scientific value assessment

No.	Geomorphosite	Integrity	Uniqueness	Dynamics	Vulnerability	Ecological interest	Total
1	Călțun glacial cirque	1	0.25	0.50	0.50	0.25	0.50
2	Buda glacial cirque	1	0.25	0.50	0.50	0.25	0.50
3	Bâlea glacial cirque	0.75	0.25	0.75	0.25	0.25	0.45
4	Capra glacial cirque	1	0.25	0.50	0.50	0.25	0.50
5	Doamnei glacial cirque	1	0.25	0.50	0.50	0.25	0.50
6	Iezer Triunghiular glacial cirque	1	0.25	0.50	0.50	0.75	0.60
7	Podul Giurgiului glacial cirque	1	0.25	0.50	0.50	0.25	0.50
8	Galbena glacial cirque	1	0.25	0.50	0.50	0.25	0.50
9	Moldoveanu Peak	1	1	0.25	0.75	0	0.60
10	Viștea Mare Peak	1	0.75	0.25	0.75	0	0.55
11	Negoiu Peak	1	0.75	0.25	0.75	0	0.55
12	Vânătoarea lui Buteanu Peak	1	0.75	0.50	0.75	0	0.60
13	Călțun Peak	1	0.75	0.50	0.75	0	0.60
14	Fereastra Zmeilor	1	1	0.50	0.50	0	0.60
15	Custura Sărății, ridge	1	1	0.75	0.75	0	0.70
16	Paltinului Saddle	1	0.25	0.50	0.75	0	0.50
17	Caprei Saddle	1	0.25	0.50	0.75	0	0.50
18	Podragu Saddle	1	0.25	0.50	0.75	0	0.50
19	Portița Viștei Saddle	1	0.25	0.50	0.75	0	0.50
20	Turnu Paltinu	1	1	0.50	0.75	0	0.65
21	Strunga Ciobanului	0.50	0.75	0.25	0.50	0	0.50
22	Strunga Dracului	0.25	0.75	0.25	0.25	0	0.30

They were chosen in relation to their importance for tourism activity. Each geomorphosite was given a score between 0 and 1 for each criterion, obtaining the total scientific value through the arithmetic mean of the 5 criteria.

The lowest score for scientific value is 0.30 and was obtained by the Strunga Dracului. It is a geological formation, it is a narrow and deep gorge. This geomorphosite was created over time through the erosion of flowing water and the effects of wind and snow on the rocks, creating dramatic and spectacular sights. It is part of the tourist route for crossing the Făgăraș Ridge. It is currently closed, being inaccessible due to the high risk of injury caused by the rock-falls that occur in this sector. The highest score from a scientific point of view is 0.70 was obtained by Custura Sărăţii geomorphosite, is a narrow ridge with jagged appearance, rough and exposed, which connects Vârful Şerbota and Cleopatra's Saddle and represents one of the access routes to Negoiu Peak, the second highest altitude (2535 m) in the country. It obtained the maximum score for integrity and uniqueness, 0.75 for dynamics, as the route can be affected by dangerous weather phenomena such as storms and snow cover, and 0.75 for vulnerability being a 1.3 km rock ridge sector, the resistance of the geomorphosite is high.

Geomorphosites Touristic Value Assessment

The second value analyzed is the tourist value (Table 2). Within the tourist value, 5 criteria were chosen, with 5 sub-criteria each, important for the evaluation of tourists perception of the geomorphosites they visit.

Table 2. Geomorphosites tourist value assessment

No	Geomorphosite	Tourist relevance	Accessibility	Attractiveness	Infrastructure	Tourist activities practiced	Total
1	Călțun glacial cirque	0.50	0.25	0.75	0.75	0.25	0.50
2	Buda glacial cirque	0.25	0.25	0.75	0.75	0.25	0.45
3	Bâlea glacial cirque	1	1	1	1	0.50	0.90
4	Capra glacial cirque	0.75	0.25	0.75	0.75	0.25	0.55
5	Doamnei glacial cirque	0.25	0.25	0.50	0.75	0.25	0.40
6	Iezer Triunghiular glacial cirque	0.25	0.25	0.50	0.50	0.25	0.35
7	Podul Giurgiului glacial cirque	0.50	0.25	0.50	0.75	0.25	0.45
8	Galbena glacial cirque	0.25	0.25	0.25	0.25	0.25	0.25
9	Moldoveanu Peak	1	0.25	1	0.50	0.25	0.60
10	Viștea Mare Peak	0.50	0.25	0.75	0.25	0.25	0.40
11	Negoiu Peak	1	0.25	0.75	0.25	0.25	0.50
12	Vânătoarea lui Buteanu Peak	0.50	0.25	0.75	0.25	0.25	0.40
13	Călțun Peak	0.50	0.25	0.50	0.50	0.25	0.40
14	Fereastra Zmeilor	0.50	0.25	0.50	0.50	0.25	0.40
15	Custura Sărăţii, ridge	0.50	0.25	0.50	0.25	0.25	0.35
16	Paltinului Saddle	0.25	0.25	0.25	0.25	0.25	0.25
17	Caprei Saddle	0.50	0.25	0.50	0.50	0.25	0.40
18	Podragu Saddle	0.50	0.25	0.50	0.50	0.25	0.40
19	Portița Viștei Saddle	0.50	0.25	0.50	0.50	0.25	0.40
20	Turnu Paltinu	0.25	0	0.75	0.25	0.25	0.20
21	Strunga Ciobanului	0.50	0.25	0.50	0.25	0.25	0.35
22	Strunga Dracului	0.75	0.50	0.75	0.50	0.25	0.55

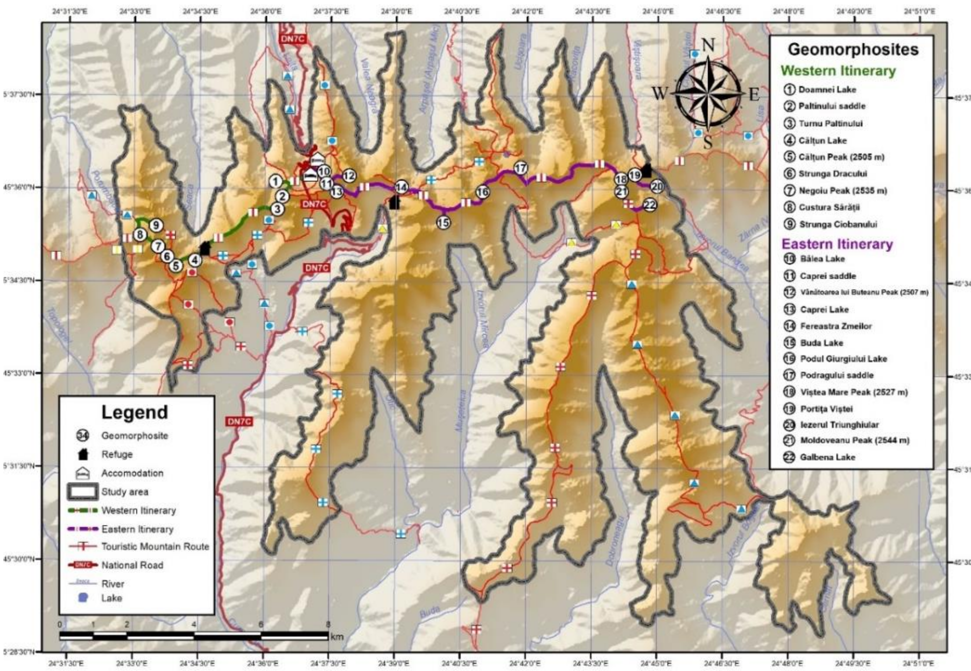

Figure 4. The geotouristic map

The highest tourist value is recorded by the geomorphosite represented by the Bâlea glacial cirque in which Bâlea lake is found, with a score of 0.90. The highest popularity among tourists is due to a very good position, having a direct connection with an easy access provided by the Transfăgărășan road. It is used as a starting point for many tourist routes in the area. Within the tourist value, the lowest score was obtained by the Turnu Paltinu geomorphosite with a score of 0.20.

It has no tourist relevance, being known by a small number of visitors. It is also quite inaccessible to tourists, being a rock wall that requires special equipment and training. The geomorphosites identified and analyzed were marked on the geotouristic map (Figure 4). The proposal of geotourist braids aims to capitalize on the geomorphosites identified in the area by presenting some elements that highlight their value (first of all, the scientific one). Two geotouristic routes are proposed which aim to capitalize on the most important geomorphosites. These were researched from a qualitative and quantitative point of view, including the necessary information for their implementation: The western route is the difficult one, it is shorter but with a large difference in level, but also steep going through the Custura Sărății ridge segment.

The Eastern route is longer, has a smaller difference in level and reaches the highest peak in the country, Moldoveanu (2544 m). Many of these geomorphosites are unknown to the tourists who visit the area. Also, the proposed evaluation method helps to identify the perception that tourists have about the development of tourist attractions in this area and to identify its strengths and weaknesses. As a result of the study, limitations were also identified due to the lack of information and statistics. In the field there is no information about identified geomorphosites or about geotourism.

At the end of the analysis (Table 3), the glacial cirque where Bâlea Lake is located is the one that obtained the highest score 0.675p. Following the application of the method, it was found that the Bâlea glacial cirque area is the most famous and sought after for camping, breaks and hiking. It is the most accessible of the entire massif for tourists, even for the most comfortable, who prefer to go by means of transport to their destination. There are accommodation, camping and food facilities and it is the starting point for numerous routes along the Făgărașului Ridge and offers impressive views.

On the opposite side, the lowest score is obtained by the Strunga Dracului with 0.325, geomorphosite, with a complex genesis, which combines the role of microtectonics, gravitational displacements and differential erosion. Considered a sector with great difficulty and high risk of accidents, it is avoided by many tourists, there are even restrictions on its passage. Strunga Dracului geomorphosite is currently closed for tourist activity due to existing rock fall processes.

Table 3. The total value of the evaluation of geomorphosites

No.	**Geomorphosite**	**Scientific Value**	**Touristic Value**	**Total**
1	Călțun glacial cirque	0.50	0.50	0.50
2	Buda glacial cirque	0.50	0.45	0.47
3	Bâlea glacial cirque	0.45	0.90	0.68
4	Capra glacial cirque	0.50	0.55	0.52
5	Doamnei glacial cirque	0.50	0.40	0.45
6	Iezer Triunghiular glacial cirque	0.60	0.30	0.45
7	Podul Giurgiului glacial cirque	0.50	0.45	0.47
8	Galbena glacial cirque	0.50	0.25	0.38
9	Moldoveanu Peak	0.60	0.60	0.60
10	Viștea Mare Peak	0.55	0.40	0.47
11	Negoiu Peak	0.55	0.50	0.52
12	Vânătoarea lui Buteanu Peak	0.60	0.40	0.50
13	Călțun Peak	0.60	0.40	0.50
14	Fereastra Zmeilor	0.60	0.40	0.50
15	Custura Sărății, ridge	0.65	0.35	0.50
16	Paltinului Saddle	0.50	0.25	0.37
17	Caprei Saddle	0.50	0.40	0.45
18	Podragu Saddle	0.50	0.40	0.45
19	Portița Viștei Saddle	0.50	0.40	0.45
20	Turnu Paltinu	0.65	0.20	0.42
21	Strunga Ciobanului	0.50	0.35	0.42
22	Strunga Dracului	0.30	0.35	0.33

At the end of the evaluation we have some specific proposals for conservation and geotourism:

The proposed evaluation method helps to identify the perception that tourists have about the presence of tourist attractions related to the relief in this area and to identify its strengths and weaknesses. Thus, to improve the geotourism activity, we propose the following: setting up panels where all the geomorphosites in the area are located and presented (this way tourists know what they can visit, even if they don't know about the existence of a certain geomorphosite); realization of some geotouristic routes; the development of arrangements necessary for the good performance of the activity; limiting access to degraded areas that can endanger the lives of tourists (especially due to collapses and avalanches).

The following measures can be taken into account for the conservation and protection of geomorphosites: limitation of constructions and development of tourist infrastructure to preserve the integrity and natural beauty of the lake and the mountain landscape; monitoring and managing the water quality of Lake Bâlea to ensure a healthy environment for aquatic species and to prevent pollution; promoting sustainable tourism practices, such as recycling, waste minimization and the use of renewable energy in tourism infrastructure; for the Strunga Dracului geomorphosite, specialized studies must be carried out, as limited travel with certain rules of passage is necessary, as most of the ridge routes, as well as the via ferrata, are carried out under the same conditions as those crossing the Strunga Dracului. Such as, it is necessary to install information boards related to the crossed segment (the beginning of the route and during its course) and the risk of crossing it, as well as keeping a safe distance between tourists to avoid an accident when you cross the lathe and using appropriate equipment (gloves, helmet). It is necessary to clearly and visibly signal the danger of falling stones and to inform tourists about the measures necessary to cross this geomorphosite. Carrying out a periodic monitoring and evaluation of the state of the geomorphosite in order to identify potential risks and take timely preventive measures. This could involve periodic inspections of the area, assessment of rock stability to detect the possibility of instability processes.

Our study highlights the importance of assessing the value of geomorphosites in terms of both their scientific and touristic significance and promoting their inclusion in sustainable tourism and environmental management plans. The Făgăraș Massif is a unique area that contains a significant number of geomorphosites with high scientific and touristic value, which can contribute to the sustainable economic development of the area.

CONCLUSION

The area studied in this research is analyzed for the first time from the perspective of the evaluation and valorization of geomorphosites. This study helps in understanding the complexity of the landscape and its geomorphological wealth, reflected in the large number of geomorphosites identified in a restricted area.

In order to fully validate this method, the criteria for the assigned values should be tested in different physical-geographical units and tourist areas (mass tourism, individual tourism, etc.) to adapt the evaluation scale. This approach can later be used to define the capacity of geomorphosites to sustain tourism functions, as well as their evolution based on exploitation.

Focusing on a specific category of geotourism forms, known as geomorphosites, prompted us to give special consideration to the methodological approaches employed in their analysis (inventory, evaluation, mapping). Consequently, we aimed to establish a systematic sequence of steps for mapping landforms with the potential to be classified as geomorphosites. The inventory process of geomorphosites was grounded in the initial scientific documentation phase. During this stage, we conducted a comprehensive review of geological and geomorphological literature, along with the examination of cartographic materials, specifically focusing on the topography of the Făgăraș Massif.

The primary challenges faced during the study revolved around the absence of information and prior research pertaining to the subject, none of which directly addressed the researched area. This research entailed on-site data collection and information gathering. Additionally, other difficulties included the absence of clear markers, as there were days when dense fog posed an imminent risk of accidents and significantly hindered accessibility.

The present investigation reveals the assessment and valorization of geomorphosites in sustainable tourism activities provide valuable insights into their scientific and touristic values. In this case study conducted in the Făgăraș Massif, 22 geomorphosites were inventoried and evaluated based on their scientific and touristic significance. Also the method can be adapted depending on the evaluator and the specifics of the analyzed area. It is also important to note that the formulas provided can be improved with more detailed research. The findings contribute to a better understanding of the potential of these sites for tourism development. The research also emphasized the importance of geotourism, geoconservation and environmental sustainability in the context of tourism development. Geotourism focuses on promoting responsible tourism practices that respect and appreciate the geological and geomorphological features of an area.

The study highlights the potential of geomorphosites as valuable assets for sustainable tourism, combining the preservation of natural heritage with the economic benefits generated by tourism activities. The findings can inform decision-making processes, guiding the development of tourism strategies that maximize the benefits while minimizing potential risks and negative impacts on the environment. By integrating scientific knowledge, tourism promotion, and conservation efforts, geomorphosites can contribute to the sustainable development of this tourist destination.

The limitations encountered during the research are of a statistical nature (lack of concrete information on the annual number of visitors, overnight stays, as the National Institute of Statistics has a limited and incomplete data volume), academic (lack of research on this area from the geomorphosite perspective), legal (there is no legal framework regarding geomorphosites, as they are not specifically regulated by a dedicated law), and tourism-related (there are numerous unknown geomorphosites that have not been brought to the public’s attention, which could lead to further research and a better understanding of the genesis of the visited area by tourists). The limitations encountered during the research can contribute to the development of further studies and to the identification of applicable solutions.

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CORPORATE SOCIAL RESPONSIBILITY IN HOSPITALITY: A BIBLIOMETRIC OVERVIEW AND ANALYSIS

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Abstract: This study aims to systematically review the literature on Corporate Social Responsibility (CSR) in the hospitality sector over the period 2013–2023. To achieve this objective, the research employs a Systematic Literature Review (SLR) method combined with bibliometric analysis to synthesize and evaluate studies related to CSR in the hospitality industry. The data for this study were collected from two major academic databases, Scopus and Web of Science (WOS), resulting in a total of 64 selected articles for detailed analysis. The findings indicate a significant increase in CSR-related research in the hospitality sector over the past five years. Geographically, the most active research areas include Spain, China, the United States, the United Kingdom, and several Asian countries. Additionally, quantitative research methods dominate the field. Bibliometric analysis identifies seven research clusters grouped into four major themes: (1) CSR related to employees; (2) CSR related to customers; (3) CSR communication; and (4) CSR and sustainability. Among these themes, CSR related to employees has garnered the most attention from researchers, reflecting its importance in the hospitality sector. Finally, most of the research focuses on the high-end hotel segment and ignores the small-scale hotel segment. This can be explained by the fact that upscale hotels prioritize corporate image, reputation diffusion, and business performance when implementing CSR strategies. However, small-scale hotels account for a significant proportion of the industry and play an essential role in economic, social, and environmental sustainability. Given their impact on various stakeholders, future research should pay more attention to small-scale hotels to assess their willingness to engage in CSR, the effectiveness of CSR initiatives on business performance, and the broader implications of CSR in this segment. This study not only synthesizes CSR-related research in the hotel industry over the past decade but also highlights research gaps and future directions. The findings provide valuable insights for researchers in identifying key areas for further exploration. Notably, this study is the first to apply a systematic literature review (SLR) combined with bibliometric analysis to identify key literature sources and research themes in the domain of CSR in hospitality. By doing so, it offers significant contributions to both academia and industry practitioners, providing a comprehensive overview of the current state of CSR research in hospitality and its potential future developments.

Keywords: corporate social responsibility (CSR), hotel, systematic literature review (SLR), bibliometric

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INTRODUCTION

In recent decades, the CSR topic has received great attention from firms and researchers. Because firms are aware that CSR activities not only have positive social effects but are also financially effective, they help businesses achieve legitimate goals and gain competitive advantages in the market (Serra-Cantallops et al., 2017). CSR is considered a way to legally increase economic profits for firms, along with moral responsibility and charity (Carroll, 1979). Businesses make voluntary contributions to a cleaner environment and a better society through CSR efforts (Michael, 2003).

The main purpose of CSR activities is to maximize positive effects on the company and minimize negative effects on society (Su & Swanson, 2019). Globally, CSR is used in many different businesses, one of which is the hotel sector. Studies on CSR in the hotel sector have shown that CSR is an important factor contributing to success and sustainable performance (Guzzo et al., 2020; Madanaguli et al., 2023; Serra-Cantallops et al., 2017). In addition to being the world's largest industry, the hotels sector also cause issues like the environmental catastrophes (global warming and depletion of water resources) and other global issues (Bohdanowicz, 2007). The impact of hotel business activities on environmental and social issues is becoming increasingly serious, so hotel leaders are paying more attention to CSR initiatives to reduce negative impacts and bring benefits to society as a whole (Hervani et al., 2005). Previous studies have shown the benefits that CSR practices in the hospitality sector bring to hotels. The benefits can be listed as follows: First, CSR brings intangible values to hotels; for example, CSR creates goodwill, increases brand awareness, provides reputation, creates

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satisfaction, and improves customer loyalty (Ahn et al., 2020; Akbari et al., 2021; Boronat-Navarro & Pérez-Aranda, 2020; Lo, 2020; Jiddi et al., 2023). Second, CSR activities improve employee behavior, enhance satisfaction, and promote engagement with the business (Bibi et al., 2022; Farmaki et al., 2022; González-De-la-Rosa et al., 2023; Kim et al., 2020). Third, CSR activities bring sustainable efficiency and competitive advantage to businesses (Guzzo et al., 2020; Ishaq et al., 2023; Sarwar et al., 2022), while improving company performance. employee work (Ishaq et al., 2023; Moin et al., 2023; Nazir et al., 2021; Ubeda et al., 2021; Wood et al., 2021), positively affects identification and organizational commitment while promoting organizational citizenship behavior among employees (Guzzo et al., 2020; Wong & Kim., 2023).

CSR awareness in the hotel sector has received great attention from researchers (Madanaguli et al., 2023). However, research on CSR in the hotel industry is considered to be slower than other industries and has not been fully researched (Eid et al., 2021; Opoku-Dakwa et al., 2018). Additionally, there are few studies that comprehensively review the literature on the topic of CSR in the hotel sector (Kaur et al., 2022). Some comprehensive studies on CSR in the hotel sector have been conducted in recent years, but there are some limitations. For example, Serra-Cantallops et al. (2017) reviewed the literature on CSR in the hotel sector from 2006 to 2015, but the research framework was not clearly stated. Wut et al. (2022) synthesized research on CSR both in the hotel and tourism sectors from 2004 to 2019. This research has not focused primarily on the hotel industry. Kaur et al. (2022) reviewed studies on CSR in the restaurant industry. Most recently, Madanaguli et al. (2023) conducted a review of studies on CSR initiatives in the hotel sector between 2009 and 2022; however, the study excluded some “responsible practices” concepts, "green practice," and "sustainability" from the search list, so there may be an undercount of published studies. Previous studies mainly used the SLR method in document analysis. Therefore, this study will focus on a comprehensive review of the research literature on CRS in the hotel sector using the SLR method combined with bibliometric methods to get more objective results.

To achieve the above goal, the research questions are posed as follows: (RQ1): What is the distribution of the number of articles, research locations, and main research methods for research on CSR in the hotel industry in 2013–2023? (RQ2): What are the main themes related to CSR activities in the hospitality sector over the past 10 years? (RQ3): What are the current research gaps in the field of hotel CSR?

METHOD

Systematic literature review method

This study uses the systematic literature review (SLR) method to comprehensively review the research literature on the CSR topic in the hotel sector. SLR is a widely used method for finding, evaluating, and examining earlier studies on a specific topic (Liberati et al., 2009; Talwar et al., 2023). It is effectively used in the hotel sector (Dhir et al., 2020; Kaur et al., 2022; Madanaguli et al., 2023). This method uses a clearly outlined process to identify and evaluate proposed documents (Bavik, 2019). The SLR process includes four steps, as follows:

Step 1: Plan your review including finding databases and keywords.
Step 2: Determine selection criteria
Step 3: Extract data
Step 4: Present data

Bibliometric methods

Following data extraction, CSR issues in the documents were reviewed using bibliometric approaches. The bibliometric method relies on objective quantitative techniques to derive results (Donthu et al., 2021; Kraus et al., 2022; Kifworo & Dube, 2024). Bibliometric analysis recommends the use of scientific mapping analysis techniques that reveal the main themes of the research field (Mukherjee et al., 2022; Ayaviri-Nina et al., 2024). The bibliometric method allows us to explore the nomological network of the main topics in the research field (Kraus et al., 2022).

The broad source of data will form clusters that can represent common themes. Articles with similar reference patterns can form a cluster, and keywords that the research authors assign to represent the nature of the article can form different clusters when they appear together. According to Lee et al. (2023), analyzing the occurrence of keywords is the most practical, so this study uses keywords to draw out the main research topics in the field of hotel CSR. Methods for cluster analysis are essential to bibliometric research (Eck & Waltman, 2017). Cluster solutions can be aggregated and analyzed using visualizations that are supported by VOSviewer. Important visualizations may be created with VOSviewer, including term map visualizations that draw attention to the themes that each cluster covers and the cluster visualizations themselves. Term relationships are commonly used in bibliometric approaches to evaluate the importance of publications that are shared in the title, abstract, or full text.

Identify keywords and databases

The initial list of identified keywords included “corporate social responsibility” or “CSR” and “hotel” or “hospitality”. To determine the completeness of keywords, the study examined the first 100 articles appearing on the Google Scholar page. The results showed that the article titles appearing on this page were mainly “corporate social responsibility (CSR)”, “hotel” or “hotel industry”, “hospitality” or “hospitality industry”. Therefore, this study retains the initially identified keywords. Next, the study consulted two experts, a researcher and a management in the tourism field to refine keywords and test the popularity of keywords. Two sizable databases, Scopus and Web of Science (WOS), were chosen for the literature search because the majority of the literature on this subject can be found in these two databases, as shown by several earlier studies on CSR in the hotel sector (Madanaguli et al., 2023; Pahlevan-Sharif et al., 2019; Wut et al., 2022). We chose the research period from 2013 to December 2023 to update the latest research documents on CSR activities in the hotel sector.

Extract data

This study applied boolean operators to search data such as "OR" and "AND". The search syntax is as follows: (“Corporate social responsibility” OR “CSR”) AND (“hotel” OR “hotel”). The study used several screening criteria. We only accept articles in English and open access; articles published in peer-reviewed and highly reputable journals (only articles belonging to Q1, Q2, or SSCI, ESCI, or SCI-Expanded were selected). In the opinion of experts, some articles that do not focus on the hotel sector will be eliminated such as articles about CSR in the restaurant, food, real estate, and tourism sectors. Although these sectors are closely related to the hotel industry, they do not have all the unique characteristics of this sector. We remove CSR articles with content related to disability, pandemic, or COVID-19 disasters because CSR activities in this situation are special and urgent. They may not be suitable in all cases.

The total number of articles from the 2 databases is 433, of which 279 are from WOS and 154 are from Scopus. By using Excel software, we removed 295 duplicate articles. 74 articles did not meet the criteria, so we retained 64 for in-depth analysis. A summary of the research process is shown in Figure 1.

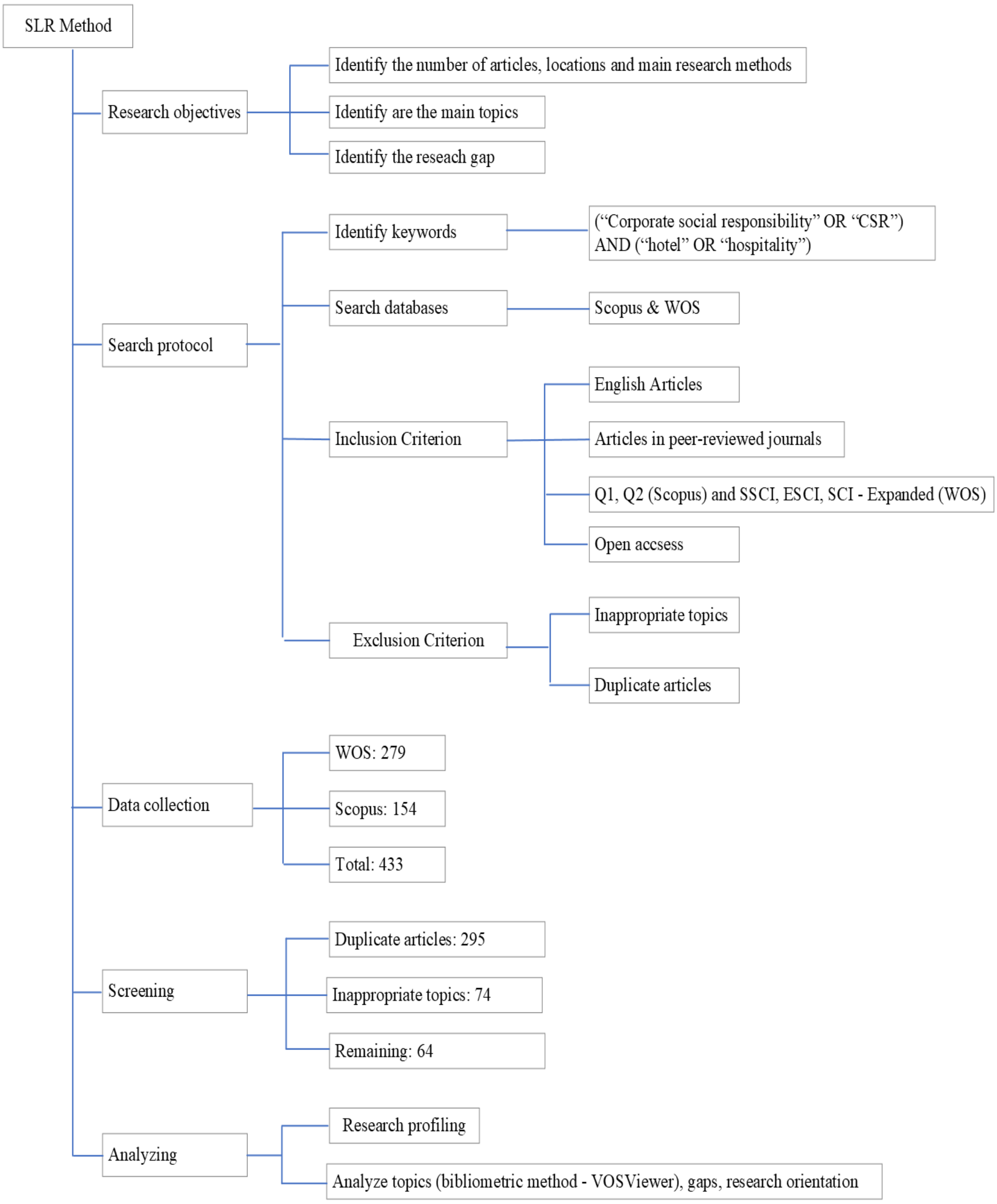

Figure 1. A summary of the research process

RESULTS

The quantity of publications

We notice that the number of publications has increased in the past 10 years; there were 3 articles in 2013 and 2 articles in 2014. Publications increased rapidly in 2019 (n = 10), 2020 (n = 13), 2021 (n = 11), 2023 (n=10) (Figure 2). This shows that CSR in the hotel sector is receiving great attention from researchers. However, we did not find any studies published in 2015 and 2016, which may be due to criteria limitations in our study.

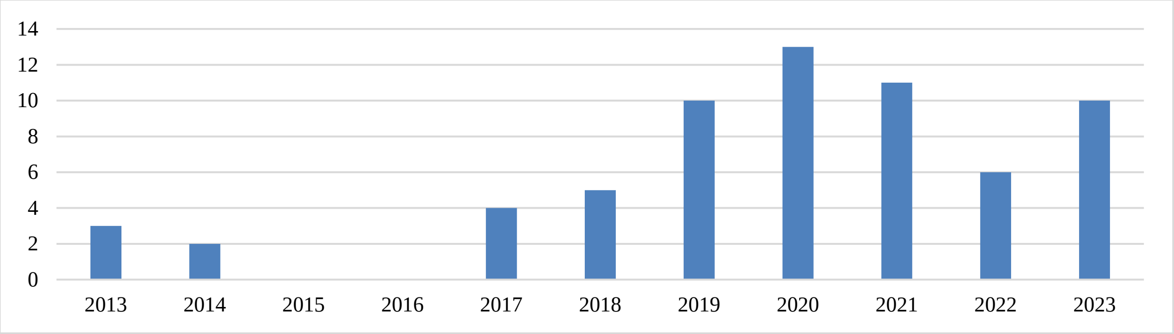

Figure 2. Publishing trends by year

The magazines mainly publish publications on CSR in hotels. The International Journal of Hospitality Management and the International Journal of Contemporary Hospitality Management have the highest number of articles published (8 articles each), followed by Tourism Management with 6 articles, and the remaining are other journals in the field of tourism (Figure 3).

Figure 3. The magazines mainly publish publications on CSR in hotels

Regarding research location allocation. The most researched location is in Spain (9 articles). The next areas are China (8 articles), the United Kingdom (7 articles), the United States (6 articles), and other Asian countries such as Pakistan, India, and Hong Kong. In general, research on CSR in the hotel sector focuses on Europe, the United States, and Asian countries (Figure 4).

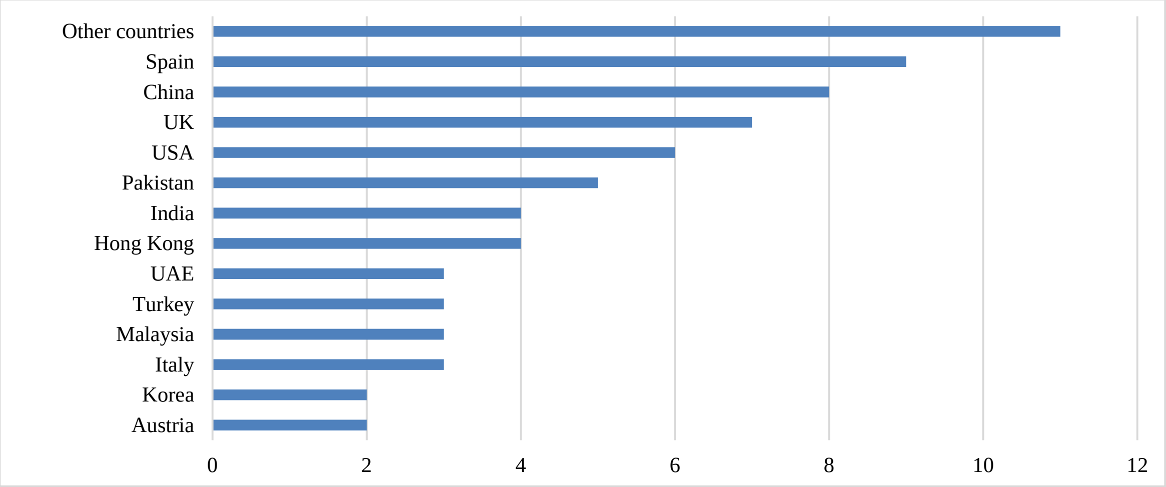

Figure 4. Research location distribution

Influential research on CSR in the hospitality sector. The study by Park & Levy (2014) has the highest number of citations, with 132 citations and a citation rate per year of 14.7, while the study by Ubeda et al. (2021) has the highest citation per year (C/Y = 52,0). The most influential studies are shown in Table 1.

Table 1. The most influential studies

Article Title	Authors	Times Cited	C/Y
Corporate social responsibility: Perspectives of hotel frontline employees	Park & E. Levy (2014)	132	14.7
Progress in Research on CSR and the Hotel Industry (2006-2015)	Serra-Cantallops et al. (2017)	119	23.8
Corporate social responsibility and firm performance in the hotel industry. The mediating role of green human resource management and environmental outcomes	Úbeda-García et al. (2021)	104	52.0
Measuring Corporate Social Responsibility in tourism: Development and validation of an efficient measurement scale in the hospitality industry	Martínez et al. (2013)	100	10.0
Online CSR communication in the hotel industry: Evidence from small hotels	Ettinger et al. (2018)	85	17.0
CSR reporting among Zimbabwe's hotel groups: A content analysis	Kennedy Nyahunzvi (2013)	84	8.4
Corporate social responsibility (CSR) and customer loyalty in the hotel industry: A cross-country study	Latif et al. (2020)	82	27.3
Political connections, guanxi and adoption of CSR policies in the Chinese hotel industry: Is there a link?	Gu et al. (2013)	81	8.1
The impacts of corporate social responsibility on organization citizenship behaviour and task performance in hospitality A sequential mediation model	He et al. (2019)	68	17.0
Do consumers care about CSR in their online reviews? An empirical analysis	D'Acunto et al. (2020)	65	21.7
Understanding the link between CSR and employee green behaviour	AlSuwaidi et al. (2021)	63	31.5
Effect of CSR participation on employee sense of purpose and experienced meaningfulness: A self-determination theory perspective	Nazir et al. (2021)	58	29.0
Being sustainable: The three-way interactive effects of CSR, green human resource management, and responsible leadership on employee green behavior and task performance	He et al. (2021)	57	28.5
Why hotel employees care about Corporate Social Responsibility (CSR): Using need satisfaction theory	Kim et al. (2020)	51	17.0
Enhancing customer-based brand equity through CSR in the hospitality sector	Martínez & Nishiyama (2019)	50	8.3

RESEARCH METHODS

Research methods on the topic of CSR in hotels are quite diverse. However, quantitative research methods are the most popular with 42 articles, accounting for 65%, followed by qualitative research methods with 12 articles, corresponding to 19%; experimental and mixed research methods are in small proportion (Figure 5).

Theoretical perspectives. The issue of CSR in hotels is multi-theoretical, allowing scholars to use a variety of theoretical frameworks to investigate related aspects. However, stakeholder theory, social exchange theory (SET), and social identity theory (SIT) are the three most used theories for research on CSR in hotels (Figure 6).

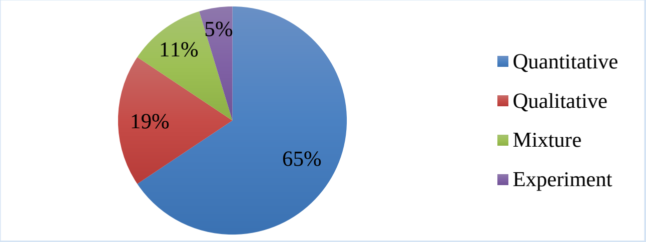

Figure 5. Research method

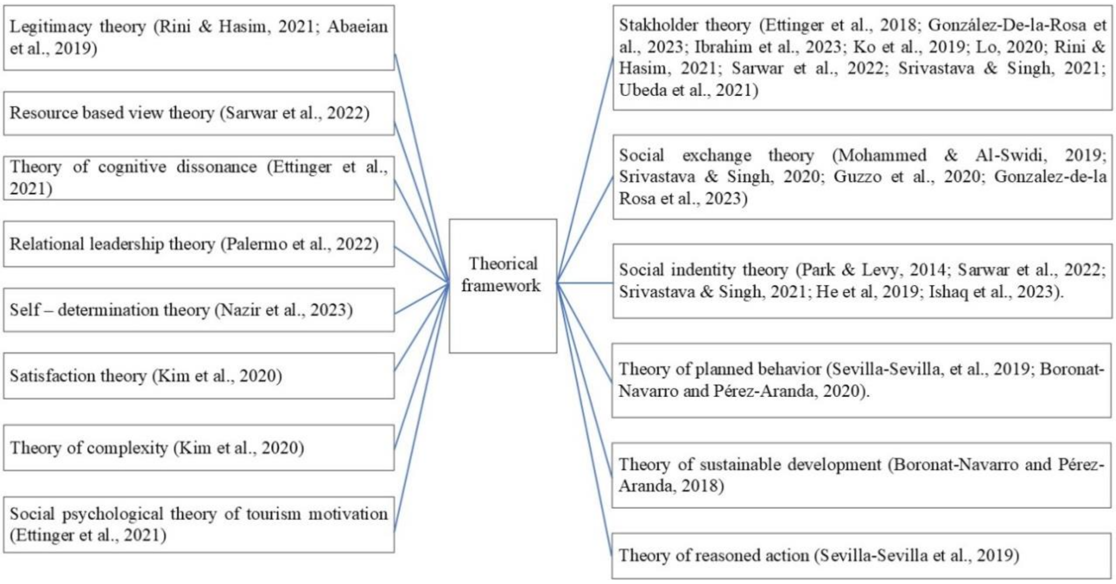

Figure 6. Theoretical perspectives

Main research topics

The main research topics are identified based on data analysis from VOSviewer software. We analyzed keywords from titles and abstracts of 64 related articles, with the minimum number of occurrences of each term being 5. There were 118 terms that met the threshold; however, only 61 keywords were connected through the nominal network, forming 7 main topic clusters. The size of the circle reflects the frequency of the keywords. The larger the circle, the more frequently the keyword appears. The visualization from the VOSviewer shows that the main keywords (words with large circles) (as Figure 7) have received the most attention in research on CSR in the hotel industry during the past ten years. They are the following terms: employee, customer, practice, intention, CSR communication, organization, ….

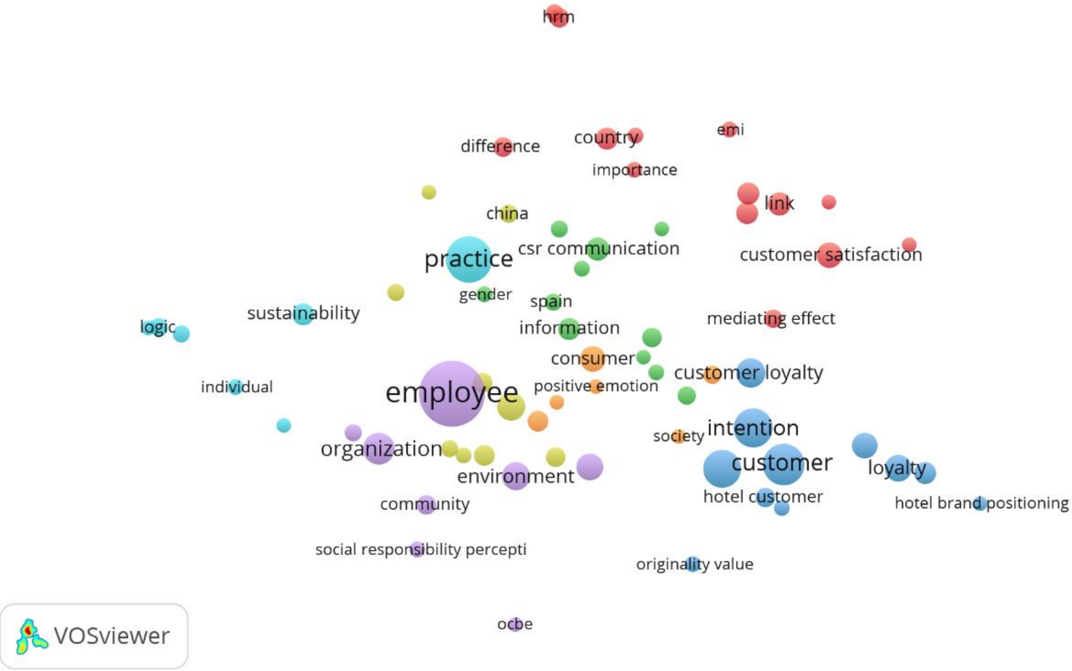

Figure 7. The main keywords

The thickness of the line is proportional to the closeness of the connection between the two keywords. A thicker line between two words means a closer relationship. For example, employee has a strong association with task performance, social responsibility perception, and trust; customer has a strong association with loyalty, satisfaction, and intention; practice connects with company, employee, and sustainability (Figure 8). Circles that are the same color suggest a similar theme for the studies. The visualization shows 7 color clusters, which suggests 7 topics in CSR research over the past 10 years. Based on suggested keywords, studies were classified into each relevant topic for content analysis.

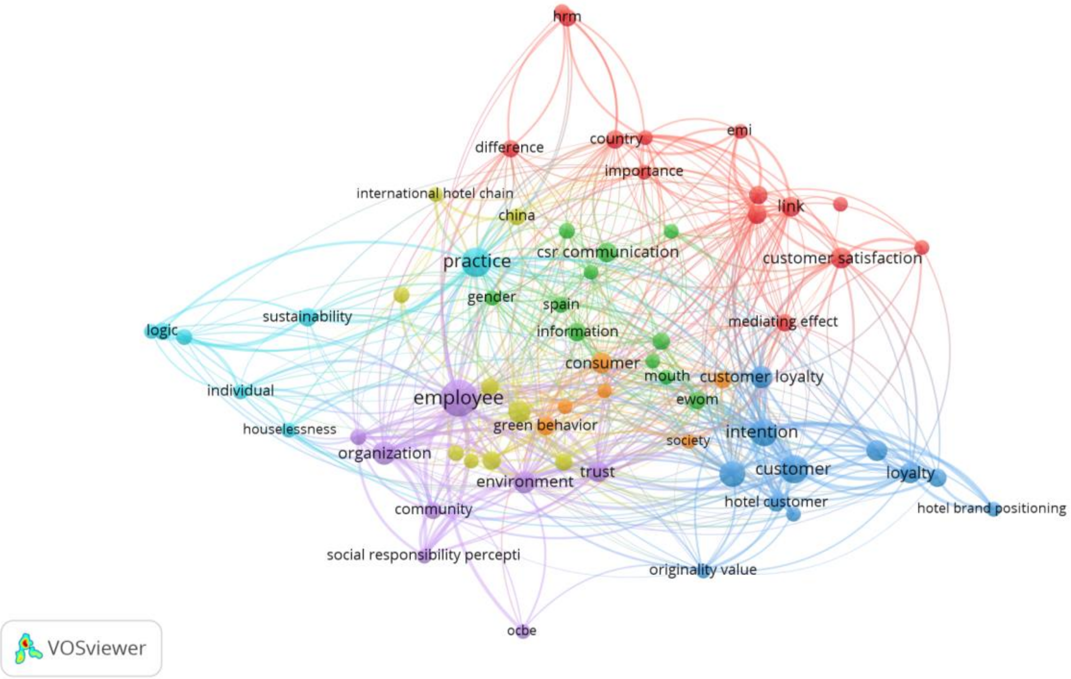

Figure 8. The visual image of research clusters

Cluster 1. This cluster includes main keywords such as HRM, firm performance, sustainable performance, and customer satisfaction, with a red color in the image. These keywords suggest topics about the relationship between CSR, human resource management (HRM), and corporate performance in the hotel sector.

In the connection between HRM, CSR, and sustainable performance, scholars emphasize that HRM plays an important role in how hotels' CSR activities are understood and developed. HRM can inform employees about CSR issues, educating them to become more environmentally and socially responsible. Therefore, HRM is the premise for promoting CSR (Ishaq et al., 2023; Sarwar et al., 2022). In another study by Úbeda-García et al. (2021), CSR is considered a premise, contributing to promoting green human resource management (GHRM). Besides, GHRM, HRM, and CSR are also considered important resources to help increase sustainable performance and create long-term competitive advantages for hotels (Ishaq et al., 2023; Sarwar et al., 2022; Tjahjono et al., 2022; Úbeda-García et al., 2021). This topic is quite interesting, but there is still very little research on the relationship between HRM, CSR, and the sustainable performance of firms.

Cluster 2 includes main keywords such as CSR communication, eWOM, Facebook, and corporate reputation. Cluster 2 corresponds to the green color in the visual image. These keywords suggest CSR communication topic in the hotel sector.

Recent studies have determined that customers are significantly interested in CSR information communicated by hotels in the mass media (D'Acunto et al., 2020). Posts about CSR activities on the hotel's website and Facebook receive a high level of interaction and willingness to respond from customers (Castillo & Villagra, 2019; Ettinger et al., 2018; Kucukusta et al., 2019). In the information about CSR aspects posted, customers are most interested in environmental and social factors (Castillo &Villagra, 2019). These studies show that multimedia communication activities in CSR play an important role in improving communication with customers and help increase communication efficiency for hotels.

Besides, Martínez et al. (2020) also confirmed the important role of the media in CSR practices because the news media helps realize corporate goals related to CSR issues. CSR communication in mass media can influence customers' attitudes and behaviors. Specifically, customers' trust in CSR posts on Facebook can positively influence electronic word-of-mouth (eWOM). CSR communication activities can have a significant direct and indirect impact on Electronic Word of Mouth (eWOM) (Mohammed & Al-Swidi, 2020); improve their attitudes toward hotel CSR communications and reduce their intention to behave unethically (Ettinger et al., 2021); and increase their intention to share posts on Facebook (Garcia-De los Salmones et al., 2021).

The results of the above studies have confirmed that communication about CSR activities plays an important role for companies. Information about CSR helps companies receive feedback from customers and improve their attitudes and behaviors towards the hotel brand, so this topic receives quite a lot of attention from researchers.

Cluster 3 includes main keywords such as CSR activity, customer loyalty, and satisfaction intention, corresponding to the dark blue color in the visual image. The above keywords relate to customers in hotel CSR practices.

In 2014, Qu emphasized the important effect of CSR on customer satisfaction and corporate performance for hotels (Qu, 2014). In the following years, many studies on CSR activities related to customers's attitudes and behaviors were conducted. Studies have proven that CSR activities have a strong positive impact on perceived quality, brand image, brand awareness, and brand loyalty (Ahn et al., 2020; Martínez & Nishiyama, 2019). Not only that, the hotel's CSR activities also have a positive impact on hotel reputation, customers' ability to choose, and purchase intention (Boronat-Navarro & Pérez-Aranda, 2019), contributing to the positioning of the hotel brand and increasing visitors' intention to return (Akbari et al., 2021).

Some studies have confirmed a positive relationship between CSR and customer loyalty (Latif et al., 2020). For example, Mohammed & Al-Swidi (2019) showed that customer perceptions of environmental, social, and stakeholder-related CSR activities were a significant predictor of customer perceived value and social media engagement for the hotel industry. Besides, customers' CSR experiences increase the quality of their relationship with the brand, promoting brand loyalty and commitment to engage in future CSR activities (Lo, 2020). Customer-company identification, company reputation, and satisfaction are also mediators in the relationship between CSR, loyalty, and retention (Jiddi, 2023; Srivastava & Singh, 2021). Several later studies have expanded the connection between CSR and customer behavior. These studies confirmed that customers' awareness of CSR compulsion had a positive influence on their engagement and behavioral intention (Ahn, 2021). The intrinsic and extrinsic attributes of hotel CSR activities increase customers' purchase intentions by improving their perceived authenticity (Ahn & Dias Soeiro, 2022). Cluster 4 has main keywords such as job satisfaction and task performance, which correspond to the yellow color on the visual image. These keywords suggest CSR related to employees in hotel sector.

This topic attracts the interest of many scholars. Studies have confirmed that employee awareness of CSR can positively influence many aspects of their work, such as quality of working life, organizational identification, affective commitment, job satisfaction, and organizational citizenship behavior, and ultimately contribute to enhanced job performance (He et al., 2019; Kim et al., 2017; Kim et al., 2020). Employee well-being is also considered a meaningful result of CSR activities (Guzzo et al., 2020; Kim et al., 2020). Employee participation in CSR initiatives brings positive values such as making them feel motivated and more engaged in their work, driving customer behavior, and ultimately delivering positive performance for the organization (Sharma & Mishra, 2019).

Some studies have expanded the investigation of the mediating role of factors in the relationship between CSR and employee task performance. He et al. (2021) examined the mediating role of green behavior and the moderating role of green HRM, and responsible leadership. Nazir et al. (2021) demonstrated employee engagement in CSR activities positively influences a sense of purpose and experiential meaning, ultimately leading to work engagement and performance. The diverse combination of hotel employees' CSR awareness with moral identity, subjective norms and work engagement is the basis for job satisfaction (Farmaki et al., 2022). CSR is also an antecedent that promotes employee creativity through their satisfaction and perceived happiness. If employees perceive that CSR activities benefit society, they are more likely to exhibit higher job satisfaction and work engagement (Bibi et al., 2022). Finally, supervisors' green transformational leadership style helps companies engage in social responsibility activities and improve their task performance (Moin et al., 2023).

Cluster 5 includes keywords such as employee, trust, social responsibility perception, OCBE, and environment. These keywords suggest studies related to employees in hotels, respectively with purple clusters in the visualization.

Many CSR studies mention the impact of CSR awareness and outcomes. Employees' CSR awareness is a prerequisite for creating intrinsic motivation, contributing to organizational identification (Park & Levy, 2014), and increasing organizational citizenship behavior (Luu, 2017). Employees' organizational trust is also considered an important result of awareness of CSR activities (Boğan & Dedeoğlu, 2019). In addition, CSR contributes to increasing commitment, devotion, satisfaction, and organizational citizenship behavior (Wang et al., 2020).

Recently, CSR is also considered a factor that positively impacts employee happiness and promotes their green behavior (AlSuwaidi et al., 2021; Wood et al., 2021). Wong et al. (2022) emphasize that understanding employees' reactions and perceptions of hotel CSR is essential before implementing effective CSR activities with customers. The study further confirms that the social/philanthropic and ethical aspects of CSR contribute to enhancing attitudes towards CSR activities and thereby increasing employee satisfaction. This outcome promotes organizational citizenship and pro-social behavior. Other studies also demonstrate that employee awareness of CSR positively impacts employment, turnover intention, and pro-social behavior (Vila-Vázquez et al., 2023; Wong & Kim, 2023).

Factors such as job satisfaction, organizational commitment, working conditions, task meaning, intrinsic quality, and turnover intention are also considered mediators in the relationship between CSR awareness and consequences (González-De-la-Rosa et al., 2023; Wong & Kim, 2023). Cluster 6 includes main keywords such as CSR manager, practice, and sustainability that correspond to the bright blue cluster in the visualization. These keywords suggest related studies on CSR practices in hotels and their sustainable effects.

CSR practices in hotels are considered an interesting topic and worthy of consideration by hotel management (Cherapanukorn & Focken, 2014). When hotels realize that they have higher business interests, managers will practice more institutional CSR. Frame of reference and CSR practices are interrelated. Organizations apply CSR to their business strategies based on their awareness and understanding of the environment. CSR practices have proven that they have a positive influence on organizational performance (Abu Farha et al., 2018; Ertuna et al., 2019).

Cluster 7 corresponds to the orange color on the visual image, with main terms such as consumer, green behavior, and positive emotion.

These terms suggest studies related to the green behavior of customers. For example, the study by (Raza et al., 2023) studied the influence of CSR initiatives on green consumer behavior. The study examines the role of consumer involvement, positive emotions, and altruistic values. The results show that consumers' positive emotions and engagement mediate the impact of hotels' perceived CSR initiatives on consumers' green behavior.

In addition to the studies on some of the topics mentioned above, there are still a few studies on CSR in other fields. For example, some studies summarize the research progress on CSR in the hotel sector (Serra-Cantallops et al., 2017), developing a CSR scale (Fung Wong & Kim, 2020; Ko et al., 2019). An interesting topic in hotel CSR research is learning about feedback bias in CSR activities. Research by authors Kuokkanen and Sun (2020) analyzed social desirability and skepticism bias on reported purchase intentions. However, this topic has not received much attention from researchers. In summary, the research content on CSR in the hotel sector in the period 2013–2023 is divided into 7 main clusters, with 4 main subjects: CSR and employees, CSR and customers, CSR communication, and CSR performance. Among them, the impact of CSR on employee attitudes and behaviors has received the most attention.

Research gaps and directions

After reviewing the literature on CSR in the hotel sector from 2013 to 2023, we consider the gaps and propose some research directions as follows:

Research content

The research topic exploring the relationship between HRM, GHRM, CSR, and sustainability is quite interesting. However, there are not many studies confirming the relationship between the above factors. Future research can approach this topic with new research directions, adding to existing research results such as: (1) examining the mediating role of HRM, GHRM, or CSR in the relationship between them and sustainable performance; (2) expanding the attributes of human resource management in relation to CSR and sustainable performance; (3) considering the relationship of factors in small-scale hotels (1-2 stars); and (4) considering differences in hotel scale and ranking in evaluating performance under the impact of HRM and CSR. CSR communication activities were investigated mainly on the hotel's website or Facebook. There are many other social media platforms that have not been evaluated for their communication effectiveness or customer reactions to CSR posts on these platforms. Future studies could further explore the effectiveness of CSR communication in other media. A study on customer feedback on CSR information posted using emoticons is being ignored, which can also be considered an interesting future research direction. Besides, reports on hotels' CSR activities are sometimes perceived to be for marketing purposes only or to raise skepticism among stakeholders. CSR communication and the authenticity of information will be added in the future.

The impact of hotel CSR on customer attitudes and behavior is obvious. However, are different types of customers reacting differently to hotels' CSR activities? This issue should be further clarified in future studies.

When exploring the relationship between CSR and employee task performance, many factors play a mediating role in this relationship, but not many studies have paid attention to the role of moderating variables. Future studies can add moderating variables to more thoroughly explain the variation in the relationship between CSR and task performance. In addition, it is necessary to add more studies investigating hotel management to increase the representativeness of the research problem. The relationship between employees' awareness of CSR and trust, environment, and green behavior has been confirmed. However, the outcomes of employees' green beliefs or behaviors under the influence of CSR have not been thoroughly explored. Therefore, more research is needed to deepen this issue, such as examining task performance as an outcome of organizational trust or green behavior. CSR practices and their impact on hotel sustainability have been proven by a number of studies; however, the research number is still limited. Future studies could explore in more detail the dynamics influencing the above relationship to clarify the role of CSR practices and sustainability.

Although many studies focus on the benefits of CSR, there are a few that examine barriers to participating in CSR and the risks of CSR activities. So, future research should investigate the barriers to participating in CSR for managers, employees, and customers and the risks associated with implementing CSR activities.

Finally, most studies focus on the microlevel, with very few studies combining organizational and individual outcomes in one model. Therefore, it is necessary to combine the CSR results of organizations and individuals in one model to provide a comprehensive assessment of CSR activities in businesses.

Methodology

First, the studies are mainly cross-sectional. Developing a time series database and examining the market orientation relationship with those variables in a longitudinal framework would provide further insight into possible causal relationships. Adding longitudinal studies brings more comprehensive and in-depth assessments of the effectiveness of CSR activities.

Second, the majority of studies are quantitative. Studies using mixed methods are limited. Further research can be carried out using mixed methods. According to Dawadi et al. (2021), mixed research methods help take full advantage of the advantages of both qualitative and quantitative methods, helping to produce more reliable results and expanding the breadth and scope of investigation.

Third, research focuses mainly on Europe, the United States, and some countries in Asia, such as China, India, and Pakistan. Research is still very limited in other regions of the world. Therefore, it is necessary to expand the research area, especially in developing countries. Research in many countries with cultural and economic differences will reveal a comprehensive picture of the level of awareness and implementation of CSR activities in the hotel sector worldwide.

Finally, most of the research focuses on the high-end hotel segment and ignores the small-scale hotel segment. It can be explained that upscale hotels care about corporate image, reputation diffusion, and corporate performance when implementing CSR strategies. However, in the hotel industry, small-scale hotels account for a large number and have important impacts on the economy, society, environment, and other stakeholders. Therefore, future research needs to focus more on small-scale hotels to evaluate the level of willingness to participate in CSR, the effectiveness of implementing CSR activities on business performance, and other impacts.

CONCLUSION AND LIMITATIONS

Social responsibility is increasingly being raised by businesses and society and has attracted the attention of many researchers in the hotel sector. Our research aims to comprehensively systematize research on this topic in the period from 2013 to 2013. By using the systematic literature review (SLR) method and bibliometric analysis, we have statistically described the number of relevant articles, published journals, influential articles, research methods, popular research locations, and main research topics.

After synthesizing and analyzing the literature, we identified 64 articles that fit the evaluation criteria. The research results determine some issues, as follows: (1) The main research method is quantitative research; (2) the majority of research locations are in Europe, America, China, and Pakistan; (3) the most studies are from 2018 to 2023; (4) seven thematic clusters are displayed. We identified seven topic clusters targeting four key stakeholders, including employees, customers, sustainability, and CSR communications. Among them, research on CSR targeting customers is of the utmost interest. Although literature review research on CSR in the hotel sector has been conducted by some authors, such as Serra-Cantallops et al. (2017) conducted from 2006–2015 and Madanaguli et al. (2023) conducted in the period from 2009–2022. However, both of these studies have not used bibliometric methods to vividly visualize the research topic. Our research has overcome the above limitations to present research topics in a more objective way.

Our research results can make a significant theoretical contribution to future research by identifying research topics and directions while also providing valuable information for business practice. Although our study brings certain theoretical and practical values to CSR in the hotel industry, it still has some limitations. First, we ignore research on special subjects, including casino hotels, hotels for the disabled, etc. Our research also only included open-access articles in English, so future studies could consider additional studies in our exclusion criteria. Besides, our research only focuses on the past 10 years, which may not cover all longitudinal CSR research issues, so future studies can add a research period of time to more closely compare the changes in research content on hotel CSR over time.

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N.V.A. and N.K.H.L.; visualization, T.T.H.; supervision, N.V.A; project administration, T.T.H. All authors have read and agreed to the published version of the manuscript.

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CIMANDE'S CULTURAL LEGACY: EXPERT INSIGHTS ON ENHANCING SUSTAINABLE TOURISM THROUGH INTANGIBLE HERITAGE

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Abstract: Cultural heritage plays a pivotal role in sustainable tourism by fostering socio-economic development and enhancing community resilience. However, within the 2030 Agenda for Sustainable Development, its role remains peripheral, explicitly referenced only in Sustainable Development Goal (SDG) 11, which emphasizes the protection and preservation of global cultural and natural heritage. Cimande Village in Indonesia, is renowned for its rich Intangible Cultural Heritage (ICH), including UNESCO-recognized Pencak Silat, traditional bone-setting practices, and religious rituals. Despite its cultural significance, the integration of ICH into sustainable tourism frameworks presents considerable challenges, necessitating strategic approaches that benefit both local communities and visitors. This study aims to identify the key elements of Cimande's ICH and explore expert recommendations for its sustainable revitalization within the tourism sector. Employing an interpretivist paradigm and a single-case study methodology, this qualitative research integrates literature reviews, observations, surveys, and in-depth interviews conducted between October 2023 and May 2024. The study involved 11 tourism scholars from three universities who met the criterion of having visited Cimande Tourism Village at least three times, along with four tourism practitioners with over a decade of professional experience. The survey utilized open-ended questions administered via Google Forms, with follow-up clarifications and additional inquiries conducted via WhatsApp to ensure response accuracy and completeness. In-depth interviews were conducted telephonically at the request of informants due to scheduling constraints. Data were analyzed using NVivo 12 Plus through thematic and content analysis. This study ensured research credibility through member checking and data triangulation. The findings indicate that the sustainable revitalization of Cimande's ICH requires a multidimensional approach encompassing innovative cultural tourism concepts, immersive cultural tourism experiences, and the development of tangible cultural products. These strategies integrate cultural, social, economic, and environmental sustainability dimensions, ensuring long-term benefits for both the local community and the tourism industry. This study contributes to theoretical discussions on ICH preservation within sustainable tourism frameworks and offers practical recommendations for tourism developers and policymakers with significant intangible cultural assets. Future research should incorporate comparative case studies and diverse stakeholder perspectives to refine strategies for ICH revitalization.

Keywords: ICH, revitalization, cultural heritage, sustainable tourism, cultural tourism

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INTRODUCTION

Cultural heritage occupies a peripheral role within the 2030 Agenda for Sustainable Development, explicitly referenced under Sustainable Development Goal (SDG) 11, which emphasises the need to protect and safeguard global cultural and natural heritage (Diaz-Iglesias et al., 2021), which calls for efforts to protect and safeguard the world's cultural and natural heritage. International organisations, such as UNESCO and ICOMOS, underscore the integral role of culture in sustainable development, highlighting the interconnectedness of economic, social, cultural, and environmental systems (Hosagrahar et al., 2016; Issakov et al., 2023; Richards, 2018). Tourism serves as a crucial economic catalyst, fostering employment, community well-being, and the preservation of cultural heritage.

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The principles of sustainable tourism, which aim to minimise adverse effects while amplifying cultural heritage and economic growth, have garnered increasing attention. Revitalizing cultural heritage is pivotal in sustainable tourism by preserving historical assets (Harrington et al., 2015), enhancing visitor experiences, and strengthening local identities (Sardaro et al., 2021). In particular, rural tourism, grounded in cultural heritage, drives socio-economic development and community resilience, contributing significantly to sustainable rural development (Nocca, 2017).

Cimande Village, situated in West Java, Indonesia, is renowned for its rich intangible cultural heritage (ICH), including the Cimande school of martial arts, traditional bone-setting practices, religious rituals, and other cultural traditions. Notably, Pencak Silat, an Indonesian martial art recognised as a UNESCO Intangible Cultural Heritage, encompasses artistic and martial significance and profound philosophical and cultural values (Hasanudin, 2023; Soeswoyo & Dewantara, 2022). However, the preservation and revitalization of this ICH within tourism frameworks remain challenging, necessitating strategies that benefit local communities and visitors (Ancuța & Jucu, 2023). Expert insights from tourism and cultural professionals are vital in identifying best practices and innovative approaches for sustainable cultural tourism, a field that requires greater exploration in the context of ICH revitalization (Lenzerini, 2011; Qiu et al., 2022).

This study seeks to identify the critical elements of Cimande Village's ICH and explore recommendations from tourism practitioners and scholars to support its preservation and development. The study holds theoretical significance by contributing to the growing literature on intangible cultural heritage (ICH) preservation within sustainable tourism frameworks. By examining Cimande Village's unique cultural assets, the research expands the understanding of how ICH can be effectively integrated into tourism development strategies. It provides a nuanced exploration of the interplay between cultural preservation and tourism, enriching theoretical models that link heritage conservation with socio-economic and cultural sustainability. Furthermore, the study offers a foundation for future research on ICH-specific revitalization approaches, addressing gaps in existing theoretical frameworks for sustainable cultural tourism. The findings aim to enrich broader discourses on ICH and sustainable cultural tourism, offering actionable insights for tourism developers, community leaders, and policymakers in Cimande Village and similar cultural destinations. These insights will enhance their attractiveness and competitiveness while safeguarding invaluable heritage for future generations.

LITERATURE REVIEW

Sustainable Tourism

Sustainable development and sustainable tourism are intrinsically interconnected. The World Commission on Environment and Development defines sustainable development as fulfilling present needs while safeguarding resources for future generations. It encompasses critical objectives such as poverty alleviation, responsible consumption, and resource management to facilitate economic and social advancement (Shrestha & Decosta, 2023). In response to the adverse impacts of mass tourism, alternative approaches, including ecotourism, community-based tourism, and rural and cultural tourism, have gained prominence. These models prioritise the preservation of cultural heritage, sustainable use of natural resources, and upholding human dignity (Fang et al., 2023; Gao & Wu, 2017).

Rural tourism, leveraging distinctive natural, demographic, and cultural resources, presents significant opportunities for fostering sustainable development. Culture and heritage are fundamental in promoting long-term regional sustainability (Lyon et al., 2017; Shakya & Vagnarelli, 2024). Furthermore, cultural heritage remains essential in rural tourism regenerative efforts to preserve their assets and values (Lyon et al., 2017; Morén-Alegret et al., 2018).

Cultural tourism has experienced rapid growth in recent decades, driven by rising economic prosperity and evolving social expectations (UNWTO, 2013). As a prominent segment of the tourism industry, it revolves around cultural assets as its primary attraction, cultivating a synergistic relationship between tourism and culture (Richards, 2018). Implementing Indonesia's Law Number 5 on Cultural Advancement has further reinvigorated efforts to safeguard and develop cultural heritage, emphasising its ethical transformation while preserving intrinsic values and wisdom (UU RI, 2017).

Cultural Heritage & ICH

As a manifestation of human creativity, culture enriches the quality of life and reflects adaptive responses to environmental conditions (Ardiwidjaja & Antariksa, 2022). According to Law Number 5 Concerning the Advancement of Culture (2017), culture as expressed through intellect, behavioural patterns, and physical creations, classified into *Cipta* (intellectual and moral values), *Karsa* (behavioural norms and social practices), and *Karya* (tangible creation). These elements, as (Koentjaraningrat, 2009) notes, are integral to cultural heritage, encompassing both cognitive activities and physical creations.Cultural heritage is traditionally categorised into tangible and intangible domains, with intangible cultural heritage (ICH) particularly vulnerable to erosion in the face of societal changes.

ICH comprises practices, knowledge, and skills recognised by communities as integral to their cultural identity and legacy. It evolves through intergenerational transmission, fostering identity, continuity, and respect for cultural diversity. UNESCO delineates five primary domains of ICH: oral traditions, performing arts, social practices, knowledge of nature, and traditional craftsmanship (UNESCO, 2003).

Revitalization

Revitalization is a central theme in cultural heritage studies, particularly within the tourism discourse (Su et al., 2019; Ukaegbu et al., 2018). The concept of cultural revitalization was advanced through the theory of revitalization movements, which conceptualizes it as a deliberate and systematic endeavor by communities to reconstruct a culture perceived as more meaningful and fulfilling (Fang et al., 2023; Harrington et al., 2015). This theory reflects communities' proactive measures to reinvigorate cultural elements threatened by crises or decline. Wallace's perspective emphasises cultural dynamism, aligning with the widely accepted scholarly view that culture is inherently fluid and adaptive (Richards, 2018).

The existing literature underscores the dual potential of tourism in cultural revitalization: while it can generate socio-economic benefits and revive cultural heritage, it also risks commodifying and distorting cultural values. Herbert (1995) argue that tourism often reduces cultural heritage to marketable commodities, leading to a loss of authenticity and the cheapening of culture. Conversely, Komives et al. (2024); Mason (2016), and Ukaegbu et al. (2018) highlight tourism's capacity to preserve handicrafts, traditions, and gastronomic values when managed sustainably.

Similarly, Shrestha et al. (2024) and Ginting et al. (2024) demonstrate tourism's positive role in leveraging historical heritage and diverse local cultures as social capital for sustainable tourism development. Conservative perspectives advocate strict preservation, viewing culture as static, whereas progressive approaches recognize culture's dynamic nature and its ability to adapt while remaining relevant (Nuryanti, 1996; Prideaux et al., 2008). Despite these valuable insights, a notable research gap remains in comprehensively understanding cultural revitalization with an emphasis on diverse forms of Intangible Cultural Heritage (ICH), particularly from the perspectives of business practitioners and academics. Bridging this gap is essential for advancing ICH promotion strategies that not only attract tourists but also strike a balance between cultural preservation and development, ensuring the safeguarding of authenticity and local wisdom.

MATERIALS AND METHODS

Design & Strategy

This study is situated within an interpretive paradigm, emphasising exploring and interpreting meanings within social contexts as perceived by various groups. Employing a single-case study methodology, the research facilitates an in-depth examination of a unique and underexplored phenomenon, focusing exclusively on a single case (Saunders et al., 2019; Yin, 2018). A qualitative, cross-sectional design is adopted, enabling the analysis of specific phenomena within a constrained timeframe (Saunders et al., 2019).

Data Collection Techniques and Participant Scheme

The research was conducted between October 2023 and May 2024 in Cimande Tourism Village, Bogor Regency, West Java Province, Indonesia. Data collection encompassed multiple methods, including a literature review, observations, surveys, and in-depth interviews. The literature review involved sourcing information from academic books, peer-reviewed journals, and conference proceeding. Surveys targeted 11 tourism academics affiliated with three universities in Bogor and Jakarta, selected based on criteria such as geographic proximity to the study site and a minimum of three prior visits to Cimande Tourism Village. In-depth interviews were conducted with four tourism business practitioners from Bogor and Jakarta, each possessing a minimum of 10 years of professional experience.

The survey employed open-ended questions administered via Google Forms, with follow-up confirmations and supplementary queries addressed through WhatsApp to ensure clarity and completeness of responses. In-depth interviews were conducted telephonically at the informants' request due to scheduling constraints, a method deemed suitable under specific conditions (Creswell, 2014). These interviews, lasting between 40 and 58 minutes, followed a semi-structured format guided by a prepared interview protocol.

Procedure/Data Analysis and Organisation

Survey and interview data were transcribed into text-based transcripts for subsequent analysis. Data management involved coding for concepts and themes and categorising individual words, sentences, ideas, images, and videos within the transcripts to extract insights aligned with the research objectives.

The analysis incorporated both thematic analysis, which focused on interpreting qualitative meanings related to the research themes, and content analysis, which emphasised the frequency of specific references. NVivo 12 Plus, a Computer-Assisted Qualitative Data Analysis Software (CAQDAS), was utilised for data processing (Saydam et al., 2022). The NVivo analysis followed a two-cycle coding process. The first cycle included word cloud generation and analysis at Parent Nodes, Child Nodes, and Case levels. The second cycle entailed more detailed coding and creating visual representations of the results using project maps (Miles et al., 2014).

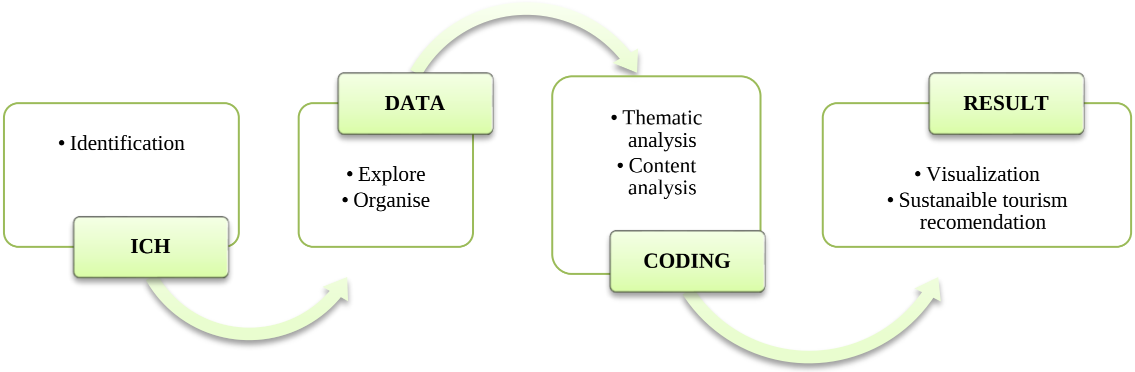

Figure 1. Study flow chart (Source: Author, 2024)

Credibility Testing

Member checking and data triangulation were employed to ensure the credibility and reliability of qualitative findings. Member checking involved verifying data accuracy and consistency with participants' perceptions. Triangulation entailed cross-referencing and validating data from multiple sources, including survey responses, in-depth interviews, direct observations, and previous studies, ensuring a comprehensive and robust analysis. Triangulation in this study also included collaborative analysis among all researchers to ensure consistency and reduce individual bias in interpreting the data. Through regular discussions, the research team compared findings from surveys, interviews, observations, and literature reviews to reach a consensus on critical themes and ensure the conclusions' validity.

RESULTS AND DISCUSSION

ICH Identification

Cimande Tarikolot Village is within the administrative jurisdiction of Caringin District, Bogor Regency, West Java, Indonesia. Its geographical boundaries include Ciderum Village to the north, Pancawati Village to the west, and Lemah Duhur Village to the south. Nestled between the majestic peaks of Mount Pangrango and Mount Salak, the village is renowned for its stunning natural vistas and pristine air quality. Spanning an area of approximately 252 hectares, Cimande Village supports a population of roughly 6,800 residents. Figure 2 displays the position of this village on the Indonesian map.

Figure 2. Cimande Village on Indonesia Map and Java (Source: Google Earth, 2024)

Figure 3. A.*Parebut Seeng* movement, B. Tourists learning Pencak Silat, C. Examine the X-ray result before performing traditional bone-setting treatment in Cimande(Sources: A & C Cimande Documentation, 2023; B Observation at Cimande, 2023)

Cimande is derived from the local West Javanese phrase Ci-Man-De, an abbreviation of ciri iman anu hade, which translates to "signs of people with strong faith." The village is distinguished by several unique and compelling elements of Intangible Cultural Heritage (ICH), as outlined in Table 1, positioning it as an up-and-coming destination for tourism development. Figure 3 shows several images of the martial art (Pencak Silat) from Cimande, which was awarded as a UNESCO World Intangible Cultural Heritage.

Table 1. The ICH Identification (Source: Author, 2024)

Domain	ICH Cimande	Description
Oral Tradition & Expression	*Taleq C*imande	The Taleq Cimande, a 14-point traditional oath, guides Pencak Silat students in faith, social harmony, and respect for nature. Performed at age 17, it marks maturity and commitment to its values, emphasising sincerity and accountability, with the belief that violations bring natural consequences.
Performing Arts	*Parebut Se'eng*	A marriage proposal ritual showcases the groom-to-be's agility in seizing a *seeing* from the bride-to-be. Success signifies proposal acceptance, embodying respect and honour for women in this cultural tradition.
Customs, Rituals, and Celebrations	Customary Law Social Organization System	The Cimande community prohibits cutting trees at the Riverhead and along the Cimande River, believing that harming nature invites misfortune, including illness or calamities, as a form of natural retribution. The community entrusts the *Sesepuh* or *Kaepuhan*, a wise elder of the Cimande lineage, with resolving customary, traditional, and social matters to maintain harmony and cultural values.
Knowledge and Practices Concerning Nature and the Universe	Local Wisdom and Environmental Conservation Traditional Healing for Bone Fractures	The taboo against cutting trees at the Cimande Riverhead reflects respect for environmental preservation, serving as disaster mitigation to prevent landslides and flooding. Cimande's bone fracture treatments use manual techniques and *Balur* Cimande oil, which are regulated by strict traditions. Production and treatment emphasise altruism, forbidding monetary transactions or fixed fees.
Traditional Craftsmanship Skills	Traditional kite Traditional food	Crafts use bamboo and special paper, requiring skilled techniques to smooth, cut, and bind bamboo precisely, complemented by applying paper to the frame. *Ketupat* Cimande, a rice cake for Idul Fitri, involves handcrafting coconut leaf skins and boiling rice stalks tied to the ketupat, symbolising togetherness and equality.

ICH Revitalization

Prior to qualitative analysis, all data were systematically organised and prepared for efficient coding using NVivo software. The word cloud results, presented in Figure 4, reveal several frequently referenced key terms, including culture (*budaya*), tradition (*tradisi*), *ngabungbang*, *Pencak Silat*, tourism (*pariwisata*), and community (*komunitas*). These prominent terms informed the development of nodes, serving as a foundational framework for the subsequent coding process.

The word cloud analysis highlighted several frequently referenced terms, including cultur*e (budaya)*, *Pencak Silat*, tradition *(tradisi)*, learning *(belajar*), products *(produk)*, and value *(nilai)*, which were central to the study's findings. Following the organisation of datasets by file type and format to facilitate coding, each dataset underwent meticulous review and interpretation to uncover underlying meanings. The subsequent coding process, structured around predefined thematic categories, revealed diverse aspects of Cimande's Intangible Cultural Heritage (ICH) with potential for development and revitalization, as identified by research participants. These findings were further categorised into the most frequently emphasised areas: cultural ideas, cultural activities, and tangible cultural products.

Figure 4. Word cloud (Source: NVivo software analysis, 2024)

Cultural Tourism Framework

The study's findings suggest that the revitalization of Cimande Village's ICH can be realised through innovative and immersive cultural initiatives. Notable concepts identified during the analysis include the organisation of cultural festivals, the integration of Internet of Things (IoT) technologies, performing arts, and storytelling techniques, as outlined in Table 2.

Data from Table 2 shows that the revitalization of Cimande's ICH through cultural concepts or ideas received 26 references from 13 data files. The revitalization of ICH in the form of performing arts and cultural festivals can be understood through the following key quotes:

"*Traditional culture must remain authentic and preserved, but it can also be turned into a performance art that* *combines drama with an engaging storyline, incorporating Pencak Silat. We would create interesting settings, storylines, and costumes for the performance..."* (Business practitioner01, 2024)

Table 2. Recommended cultural tourism concepts and activity (Source: NVivo software analysis, 2024)

Coding	File	Ref	Coding	File	Ref
● **Cultural Concepts**	13	26	● **Cultural Tourism Activity**	6	17
Festive	8	10	Silat tradition learning	3	7
IoT	8	8	Traditional local culinary	3	4
Performance	4	4	Traditional local game	2	2
Storytelling	4	4	Traditional therapy	2	2
			Craft learning	1	1
			Traditional music instrument	1	1

"... Organising an annual cultural festival showcasing various aspects of Cimande Village's culture, such as performing arts, cultural exhibitions, and traditional competitions that tourists can attend." (Academic07, 2024).

The interpretation of technology-driven revitalization ideas for Cimande's ICH stems from survey responses, as illustrated by the following quote:

"...Leveraging technology, such as developing a Silat game or Silat-themed film" (Academic08, 2024).

Cultural Activities

Table 2 data indicates that the revitalization of Cimande's ICH in cultural activities has received 17 references cited from 6 files. The analysis results show that the most frequently referenced cultural activities, in order, are learning Cimande Pencak Silat, learning traditional culinary arts, and participating in traditional games. The recommended revitalization of Cimande's ICH through activities such as learning Pencak Silat and traditional culinary arts is interpreted from several core quotes, including:

"*...tourists should be encouraged to participate in various cultural activities, making the experience more memorable and interesting. I think visitors are not only interested in learning about the Cimande Silat tradition, its history, and uniqueness but also keen to learn some simple self-defence moves that could be useful"* (business practitioner01, 2024).

"...many tourists are quite interested in learning to make traditional food and drinks... then tasting them together, and even taking some home as souvenirs..." (business practitioner02, 2024)

Tangible Cultural Tourism Products

This study reveals that Cimande Tourism Village's ICH offers diverse potentials for development into tangible cultural tourism products aimed at attracting tourists and supporting local tourism sustainability, as outlined in Table 3.

Table 3. Recommended tangible cultural tourism products (Source: NVivo software analysis, 2024)

Coding	File	Reference
● **Tangible Cultural Tourism Product**	6	12
Traditional culinary product	4	5
Traditional medicine	3	3
Cloth and craft	2	2
Cultural photo/video spot	2	2

Based on the analysis results in Table 3, the recommendation for revitalizing Cimande's ICH through tangible cultural tourism products has received 12 references from 6 files. As suggested by informants, the most frequently recommended types of tangible cultural tourism products for revitalization include local culinary products, traditional medicine, clothing and crafts, and artistic photo/video spots. As the participant quoted the revitalization of Cimande's ICH in the form of traditional culinary tourism products:

"...It would be ideal if Cimande could create unique souvenirs, such as developing traditional food and drink products made from local agricultural produce." (Business practitioner02, 2024)

Recommendations for tangible cultural products in the form of unique souvenirs, like traditional clothing and crafts and traditional medicine, are interpreted from the following core quotes:

"Developing unique Cimande souvenirs, such as T-shirts, totopong headscarves, miniature Pencak Silat weapons like golok, herbal drinks, fragrant Cimande oil balm, and more." (Business practitioner04, 2024)

Data triangulation was conducted to ensure the trustworthiness of these study findings, as visualised in Figure 5. The project map in Figure 5 shows the triangulation of data from several sources, including transcripts from in-depth interviews, surveys, field notes from observations, and academic journals.

DISCUSSION

Cultural festivals are a powerful platform to promote, celebrate, and preserve local heritage. A festival in Cimande could integrate diverse cultural elements, including art performances, Pencak Silat tournaments, traditional culinary exhibitions, local crafts, traditional games, and traditional medicine. The potential benefits of such an event include: (1) attracting domestic and international tourists eager to experience and learn about local culture, (2) broadening the recognition and preservation of Cimande's cultural identity, particularly among younger generations (Purwanto & Perdani, 2023), (3) generating economic opportunities for local residents through the sale of handicrafts, culinary specialities, homestays, and other tourism-related services (Djunaid & Michelle, 2021; Kadyrbekova et al., 2024) and (4) strengthening Cimande's identity while fostering collaboration among residents, government entities, and tourism stakeholders (Garau, 2015; Soeswoyo & Ingkadijaya, 2023; Sunghee & Kyounghee, 2019; Zhang et al., 2020). Such strategies for revitalizing Intangible Cultural Heritage (ICH) are pivotal in advancing the village's cultural, economic, and social sustainability. Applying Internet of Things (IoT) technologies can significantly enhance the cultural tourism experience while expanding the global reach of Cimande's Pencak Silat heritage.

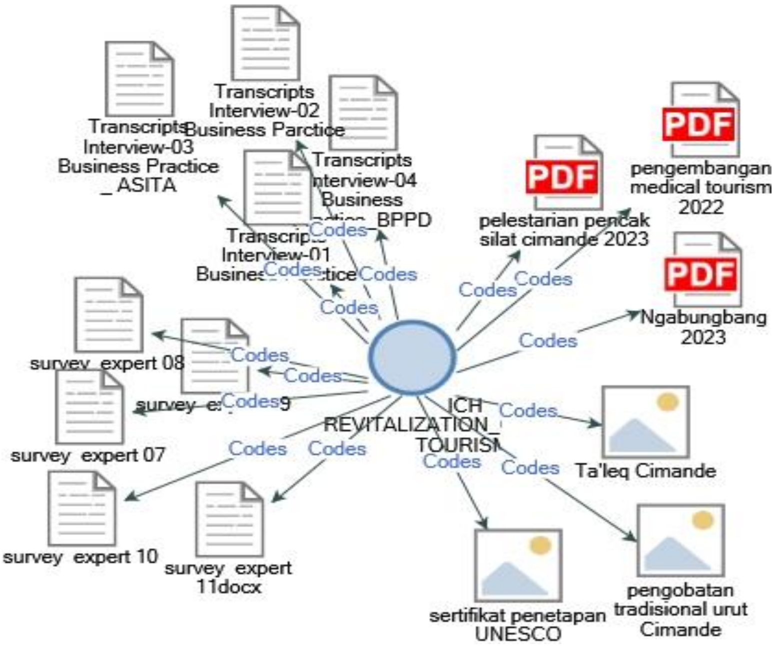

Figure 5. Project map of triangulation data (Source: NVivo software analysis, 2024)

IoT applications could include cultural Pencak Silat-themed films, virtual tours, innovative tourism platforms for managing visitor flows, and mobile applications offering guided tours and historical insights (Kiráľová & Pavlíčeka, 2015; Knezevic et al., 2024). Evidence from China's Wushu sector demonstrates the transformative potential of IoT in advancing cultural industries (Wang et al., 2023). Employing these technologies could bolster the sustainability of Cimande's ICH by integrating economic, cultural, and environmental dimensions.

Storytelling is an engaging method for bringing Cimande's history and culture to life, making it accessible and memorable for tourists. Key storytelling initiatives include (1) guided tours that narrate Cimande's history, legends, philosophy, and traditions, enriching visitors' understanding; (2) storytelling corners at tourist sites featuring audio or written narratives about the village's heritage; and (3) digital storytelling through videos, podcasts, and social media to reach wider audiences (Shakya & Vagnarelli, 2024; Sinaga et al., 2024). Cimande's Pencak Silat tradition, one of Indonesia's oldest and most renowned martial arts schools, is rich in aesthetic, philosophical, and spiritual significance. Designing immersive Pencak Silat learning programs for tourists could offer authentic cultural experiences, appealing to martial arts enthusiasts, cultural lovers, and general visitors seeking unique activities. Such programs could inspire Indonesian youth to connect with and appreciate their cultural heritage (Lajçi et al., 2022; Nagy & Segui, 2020).

Traditional culinary experiences offer a distinctive cultural dimension, enriching tourists' engagement with local heritage. Cimande's cooking classes could feature hands-on lessons on preparing conventional dishes like Nasi Liwet, Balapulang, Ali snacks, and Kembang Goyang. These sessions would share authentic recipes and cooking techniques and convey the philosophies and stories behind each dish. Such activities preserve traditional culinary knowledge while providing visitors memorable experiences (Lenzerini, 2011; Omar et al., 2020; Sutiadiningsih et al., 2023).

Cimande's traditional games reflect rich cultural values and social connections. Engaging tourists in these games offers educational and recreational opportunities, fostering deeper interactions between visitors and the local community (Hermawan & Hutagalung, 2023; Muliani & Krisnawati, 2022). Other cultural activities that could be developed include learning local crafts, agriculture, and traditional music, such as *Nayaga, which* accompanies Cimande Pencak Silat. Similarly, workshops on local crafts, such as kite-making and bamboo crafting, can enhance cultural appreciation while supporting local artisans. Products like miniature golok (a traditional Pencak Silat weapon) and bamboo crafts could serve as unique souvenirs, contributing to the village's creative economy (Bellver et al., 2023; Pham Hong et al., 2021). Locals could produce souvenirs such as miniature *golok*, a traditional weapon used in Pencak Silat, and bamboo crafts. Tourists interested in cultural experiences tend to support the local economy by purchasing culturally relevant products and services (Gao & Wu, 2017; Matteucci et al., 2022). Cimande artisans could also host or participate in craft exhibitions showcasing local craftsmanship, drawing tourist interest and supporting the creative economy.

Cimande Village is renowned for its traditional bone-setting practices using the Urut Cimande technique and Balur Cimande oil, which is prepared with natural ingredients. This altruistic healing tradition, which operates on voluntary contributions, presents unique opportunities for medical tourism development (Soeswoyo & Dewantara, 2022). To protect Balur Cimande from commercial misuse, introducing secure packaging and establishing a dedicated healing clinic could enhance the village's appeal. Expanding this heritage through e-commerce and herbal product development could further elevate its status as a niche tourism destination (Djunaid & Mikhael, 2022; Yoon, 2022).

Additionally, herbal products could be developed for sale or e-commerce. Developing comprehensive tourism packages that showcase Cimande's natural and cultural attractions would provide visitors with a holistic experience. Such packages could integrate high-quality cultural offerings with natural exploration, attracting larger audiences and amplifying the village's appeal on both national and international levels. By leveraging these resources effectively, Cimande can contribute to poverty alleviation, community resilience, and sustainable development, benefiting local livelihoods and preserving its cultural heritage for future generations (Fang et al., 2023; Liu & Xie, 2022), and support livelihood improvements and community resilience (Cuong et al., 2024).

CONCLUSION

This study concludes that the sustainability and enhancement of Cimande's Intangible Cultural Heritage (ICH) can be effectively achieved through a multidimensional approach encompassing three primary domains: innovative cultural tourism concepts, dynamic cultural tourism activities, and the development of tangible cultural products. These strategies are designed to integrate key elements of cultural, social, economic, and environmental sustainability, all of which are pivotal for fostering long-term, resilient tourism development.

This study provides a focused analysis of ICH revitalization through expert perspectives but is geographically constrained to a single cultural village in Indonesia. Hence, such a limited scope may not adequately reflect the diverse dynamics of ICH revitalization in broader contexts. Future research may integrate the perspectives of tourists and local communities to develop a more comprehensive understanding. Furthermore, extending the geographic scope to include comparative case studies at regional or national levels could enhance insights into the mechanisms and impacts of ICH

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PICTURING TRANSFORMATION THROUGH WELLNESS TOURISM: A QUALITATIVE EXPLANATORY REPORT OF PHYSICAL ACTIVITY PROJECT IN PHUKET, THAILAND

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Abstract: Creating engaging physical activity opportunities for health-promoting cities is a unique challenge amidst wellness tourism transformation. This qualitative study explained the determinants of physical activity within the context of wellness tourism in Phuket, Thailand. Data were gathered through in-depth interviews, group discussions, and brainstorming sessions with 57 key informants, including academics, residents, tourists, and government officials. Content analysis was applied. Results showed tactics to redesign healthy spaces, i.e., 1) a city lab integrating tourism with activity zones, utilizing innovative urban design to create active spaces within a limited area; 2) walking routes for cultural exploration, encouraging physical activity while finding the local traditions via buildings, food, and apparels; and 3) connecting the university-community space for enhancing accessibility of communities, promoting active lifestyles among students and fostering community engagement through physical activity. Six key determinants influencing physical activity promotion were; 1) motivation: Engaging activities that inspire physical activity; 2) participation: Community involvement in design and implementation; 3) infrastructure: Supporting infrastructure, i.e., walking routes, parks with activity zones, and accessible public spaces, was essential; 4) networks and social mechanisms: Collaboration among stakeholders (government, community, academics, tourists); 5) public relations: Promoting physical activity through various channels like social media, local media to increase awareness and engagement; and 6) area accessibility: Convenient access to activity opportunities. Findings highlight the potential of integrating physical activity into tourism initiatives by leveraging existing cultural and environmental assets, and the importance of context-specific strategies tailored to the unique needs and characteristics of each setting. This study provides valuable insights for policymakers and stakeholders seeking to create sustainable and engaging physical activity opportunities within a dynamic wellness tourism environment.

Keywords: physical activity, wellness tourism, health-promoting city, picturing transformation, Phuket, qualitative explanatory report, Thailand

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INTRODUCTION

Wellness tourism is a form of tourism that prioritizes holistic well-being by integrating physical health with social, personal, and lifestyle considerations. This tourism affects the health benefits in 4 dimensions: physical fitness, psychological fitness, quality of life, and environmental health (Liao et al., 2023). In line with this, the concept of Transformative Tourism, which emphasizes inner transformation in travelers (Nandasena et al., 2022; Pung et al., 2020; World Tourism Organization, 2016), suggests that Wellness Tourism can facilitate transformative experiences through health-promoting activities. Here, 'physical activity' is defined as all body movement produced by skeletal muscles that requires energy expenditure (WHO, 2024). Promoting physical activity is a highly effective way to improve public health, prevent chronic diseases like obesity, and reduce healthcare costs (Oldridge-Turner et al., 2022). Integrating physical activity as part of wellness tourism could maximize the positive impacts of tourism and lead to a more beneficial

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experience for these tourists. In Thailand, the National Physical Activity Promotion Plan 2018-2030 has the vision that "people should have active ways of life by physical activity in a suitable environment". Two objectives have been set, namely 1) people have sufficient physical activity, and 2) an appropriate environment is provided to facilitate physical activity (Benjatanawat et al., 2023; Topothai et al., 2019). In 2022, the promotion of physical activity focused on walking and cycling in several settings, i.e., workplaces, childcare settings, community sports, and public open spaces.

However, of total deaths still 77% were due to noncommunicable diseases (NCDs), such as cardiovascular diseases, cancer, diabetes, and chronic respiratory disease, among other NCDs in Thailand. The prevalences of physical inactivity in adolescents aged 11-17 were 70% in male and 85% in female, in adults aged 18+ these were 22% in male and 27% in female, and in adults aged 70+ they were 34% in male and 42% in female (WHO, 2022). Besides, the study to assess physical activity promotion in 12 local administrative organizations of Thailand (Topothai et al., 2022), showed gaps in the operation of active environments (such as places, exercise equipment, and appropriate time for exercise), and in active systems (such as policies, budget, personnel, and facilities).

Physical Activity Promotion Project in Phuket Wellness Area was purposed to 1) support wellness tourism by promoting sufficient physical activity for local people and tourists in the area, and 2) support Phuket to be a city with an active environment, following the concept "Healthy City is an Active City". This project was done in 3 settings on Phuket Island, which were areas of a beach, the old town, and a university. Public spaces in these settings can be developed to be healthy spaces along with physical activity promotion activities for local people and tourists. This study aimed to explain the physical activity experiences of project participants and analyze the transformative determinants that influenced physical activity promotion. Phuket with healthy spaces could support wellness tourism and encourage residents and tourists to be active people, and eventually to support active societies.

LITERATURE REVIEW

Physical Activity refers to the body movement, actions, and practices within a specific context and culture, influenced by individual interests, emotions, thoughts, and suggestions. This includes housework, occupational tasks, commuting, cycling, exercising, and engaging in recreational activities for relaxation (Piggin, 2020; Waraphan et al., 2023)

Despite the numerous benefits of physical activity, global rates of insufficient physical activity among adults have risen, increasing from 23.4% in 2000 to 31.3% in 2022. This trend is observed in a majority of countries, with 103 out of 197 countries (52%) and 6 out of 9 regions (67%) showing an increase in insufficient physical activity. This upward trend contradicts the global target of reducing insufficient physical activity by 15% by 2030 (Strain et al., 2024; WHO, 2018). However, studies on facilitating factors related to physical activity management highlight the importance of the physical environment (Giles et al., 2021), such as suitable locations, exercise equipment, and appropriate exercise times. Additionally, supportive policies concerning budget, personnel, and facilities are crucial for promoting exercise (Ablah et al., 2019; Zhang et al., 2024). Furthermore, reinforcing factors, such as support from surrounding individuals and access to information, also affect exercise behavior and physical activity engagement (Laprattanathong et al., 2022).

Recent research emphasizes the critical role of the built environment in promoting physical activity, particularly in suburban areas where urban sprawl can limit access to activity opportunities. The study by Iamtrakul & Chayphong (2024) indicates that the built environment plays a crucial role in promoting physical activity in suburban areas. Urban planning and design should focus on optimizing infrastructure for active travel, increasing access to urban activity nodes, and distributing physical activity opportunities evenly across all age groups. Xu et al. (2024) explain that physical activity mediates the relationship between the urban community environment and physical health in older adults. Xie et al. (2024) highlight the neighborhood environment as a critical factor influencing children's physical activity. While promoting physical activity through the built environment holds significant promise, interventions must be tailored to the specific economic, social, and cultural context of the target population. Future research should further investigate the complex interplay of these factors to develop effective and sustainable strategies for promoting physical activity.

Wellness Tourism is a form of tourism that focuses on health in a holistic way, considering physical, mental, emotional, social and environmental health (Kotur, 2022; Liao et al., 2023). It aims to improve health, promote relaxation, reduce stress, and enhance personal happiness. Wellness tourism is often associated with natural places, i.e. forests, seas, and hot springs. These natural environments have a positive effect on physical and mental health. Various activities in wellness tourism include relaxing at the spa, practicing yoga, meditating, hiking, eating healthy food, and learning about the local culture (Liao et al., 2023; Liu et al., 2023). These activities motivate tourists to participate (Liu et al., 2023) and create memorable experiences. They are also useful in helping to promote physical fitness, prevent disease, relieve stress, restore mental health (Liao et al., 2023), and improve the quality of life (Liao et al., 2023; Liu et al., 2023). Driven by increasing awareness of health and well-being, wellness tourism has gained significant traction, particularly in destinations like Thailand. The holistic nature of wellness tourism is instrumental in integrating healthcare and medical services to cater to the comprehensive needs of patients (Pilelienė et al., 2024) alongside tourists. Lukose et al. (2024) emphasize the importance of interdisciplinary research in combining wellness and medical services to provide a more comprehensive approach to health tourism. This approach is crucial for building resilience and adaptability to global health crises and ensuring sustainability.

MATERIALS AND METHODS

This qualitative study was conducted using multiple case studies according to Grounded Theory (Strauss & Corbin, 1998). The data were collected between October and December 2023. This research was certified for ethics in social and human research by the Public Policy Institute, Prince of Songkla University (certification no. EC 006/66 issued on 6th October 2023).

Study Area

This study was conducted to explain the Physical Activity Promotion Project in Phuket Wellness Area, which was operated in 3 settings, namely on a beach, in the old town, and in the university campus. These were the pilot areas to promote healthy spaces for physical activity (Figure 1) as per the following details.

Setting A = the area on Patong Beach, Patong Municipality; Setting B = the old town area, Phuket City Municipality

Setting C = the area of Prince of Songkla University, Phuket Campus (PSU Phuket)

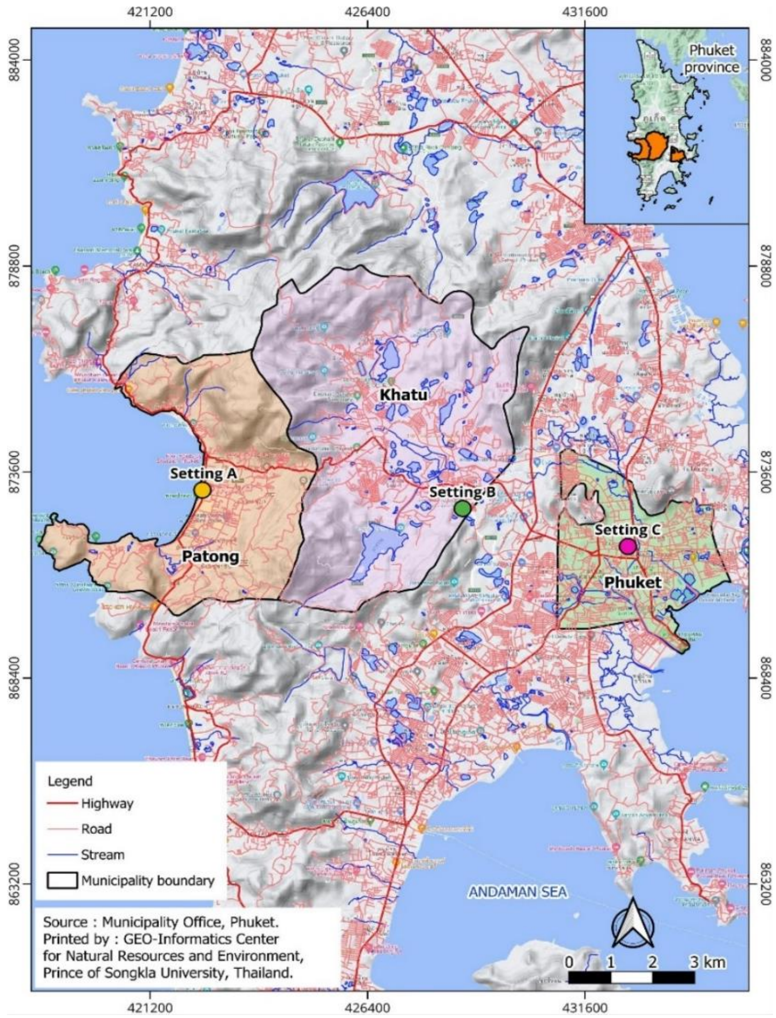

Figure 1. Study Areas (Source: GEO-Informatics Center for Natural Resources and Environment realized by authors)

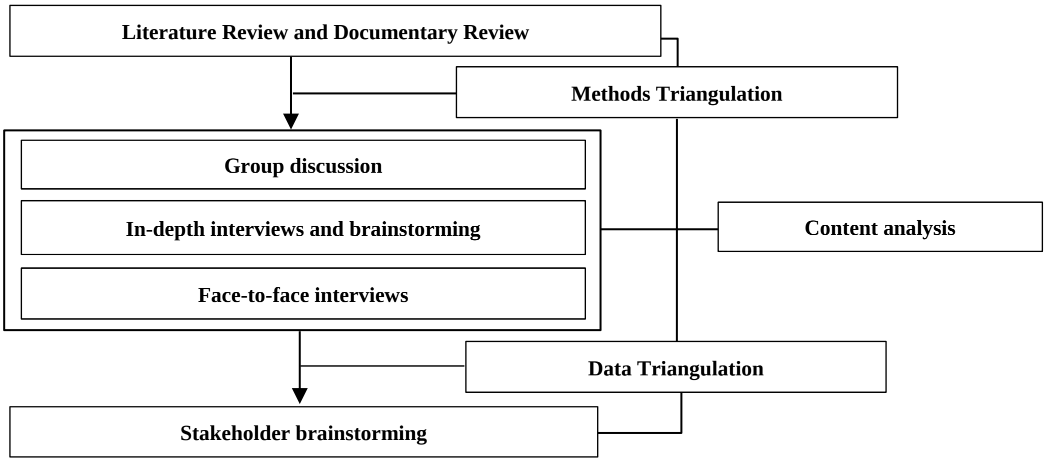

Figure 2. Scheme of research methodology (Source: The authors' elaboration)

Data collection

Qualitative approaches were implemented to gather the data, as follows (Figure 2).

1. Reviewing the literature, and secondary data, including

a) the Physical Activity Promotion Project in Phuket Wellness Area, and the final report of this project. These data were input for project operation, processes related to project activity, and outputs, which are relevant to the project objectives in order to basically identify the preliminary project effectiveness.

b) The literature related to situation of physical activity operation in Phuket, factors affecting the project success or failure, social needs, economic conditions, politics and environment, and policies and related organizations. Then, the gathered data were entered into the Data Extraction Sheet and analyzed.

2. Group discussions were held to explore the opinions related to the wellness area and physical activity operation. The ten participants were community leaders and local people who lived in the 3 settings of Phuket and joined the physical activity or the project.

3. In-depth interviews with 3 project managers and a brainstorming with them and 7 persons in the working team were also conducted, to investigate the consistency of the results.

4. Face-to-face interviews were additionally done to ask for more opinions on healthy spaces and physical activity. Nine tourists from the 3 settings were interviewed.

5. Stakeholder brainstorming was carried out to jointly validate the results. The forty participants comprised 4 private organizations representatives (Andaman and Thai Gulf Wellness Hotel Association, Phuket Tourism Association, and Southern Thai Hotels Association), 9 government and local organization officers (Phuket Provincial Public Health Office, Phuket Provincial Administrative Organization, Phuket City Municipality, Patong Municipality, and Kathu Municipality), 25 community representatives from three settings, and 2 academics of working team.

Key Informants

Fifty-seven key informants in this study were stakeholders involved in the project, including 4 private organizations' representatives (Andaman and Thai Gulf Wellness Hotel Association, Phuket Tourism Association, and Southern Thai Hotels Association), 9 government and local organization officers (Phuket Provincial Public Health Office, Phuket Provincial Administrative Organization, Phuket City Municipality, Patong Municipality, and Kathu Municipality), 25 community representatives (the Old Town, 19 communities around PSU Phuket, and Patong), 9 tourists, and 10 academics of project working team (PSU Phuket, and Health Space Forum). The informants chosen (Table 1) represented:

1. Academics in the working team of the Physical Activity Promotion Project in Phuket Wellness Area.
2. People in networks and social mechanisms for enforcing Phuket to be a healthy city with healthy spaces for physical activity promotion, including government, private, local, and educational sectors.
3. People living in Phuket for at least 6 months and doing physical activity in the 3 settings of this project.
4. Tourists who were travelling in Phuket and joining physical activity in the 3 settings.
5. People who volunteered to participate in this study.

Table 1. Key Informants of the study (n = 62) (Source: The authors' elaboration.)

No	Code	Data collection	Position	Number of informants at provincial level	Number of informants in each area			Total participants	Dates of data collection
					A	B	C		
1	A1-A10	Group discussion	Community representatives	-	2	4	4	10	2023-10-9
2	B1-B3	In-depth interview	Project Manager	3	-	-	-	3	2023-10-16 2023-10-17
3	B1-B3	Brainstorming	Project Manager	3	-	-	-	3	2023-10-18
	B4-B10		Working team	-	1	2	4	7	
4	C1-C9	Face-to-face interview	Tourists	-	3	3	3	9	2023-10-21 2023-10-22
5	A1-A25	Brainstorming	Communities	-	3	8	14	25	2023-11-30
	D1-D4		Private	4	-	-	-	4	
	E1- E9		Government/Local	3	2	2	2	9	
	B1-B2		Working team	2	-	-	-	2	

Research Tools

The tools for this study were data extraction sheet and questions for interview and group discussion, as per the following details.

1. Data extraction sheet was used at the first step of reviewing the literature, namely names of strategies/plans, responsible organizations, operation years, objectives, and vision. These details were also considered for their consistency with the policy in each level and related organizations, connections among policies, or the implementation of physical activity linked to the health equity.

2. Questions for interview and group discussion were conducted to investigate the situation of the project operation, and the factors related to promoting physical activity to the operation. The main questions were **"which activity affected the project operation?"** and **"how did this mentioned activity lead to physical activity in the area?"**. Meanwhile, participants could voice their opinions to promote healthy spaces for promoting physical activity in Phuket.

Data Analysis and Verification

The collected data were analyzed by content analysis and verified for accuracy by data and methods triangulation. Three approaches, namely documentary review, group discussions, and in-depth interviews, were pursued to validate the data. After that, the analyzed data were reflected to stakeholders in the area again to consider the consistency of the results.

RESULTS

The results of the Physical Activity Promotion Project in Phuket Wellness Area can be split into two parts: 1) the general conditions of the area; and 2) transformative determinants of physical activity in wellness tourism, per the following details.

1. The general conditions of the area

Setting A (Figure 3) is an open space for tourism along the beach in the municipality. It was selected to conduct a City Lab, as a public space model for promoting physical activity. This setting was designed to be “Patong City Lab”, using the integration concept of the beach area and physical activity types. A public space was temporarily improved according to the concept 'rak (conserve), lae (watch), len (play)’ for the community and tourists in three zones; activity (waste collection by biking, waste sorting to colored bins), exhibition, and recreation (using physical activity equipment).

Setting B (Figure 4) is the old town located in the city center, including residences, tourist attractions, and the trade center, which are easily accessible to people in the communities and tourists. It is also a place for food culture, unique apparels, and Sino-Portuguese buildings, which represent a culture mixing western and eastern arts. Therefore, use of the Old Town as a model area was designed using the concept of “Pop-up Park” with the vision of “Old Town Pop-up Park Journey”. Then the activity of “Finding Pattern in Phuket Old Town” was held by the community and Children and Youth Council of Phuket City. This activity was used to promote walking as physical activity, which is in accordance with the community’s way of life and support to tourism. In the Old Town, 3 routes were designed regarding the city’s main parts: buildings, food, and apparels. The first route includes viewing buildings and being informed of the history of the Old Town through Phuket Thai Hua Museum. The second route was designed for viewing landmarks that people visit, take photos of, and share about on online social media. The third route was for visiting morning markets, tasting local desserts, and observing ingredients for food.

Setting C (Figure 5) is in a university environment with trees, roof-covered walkways, water reservoir, sports center, and surrounding communities. The setting was designed by connecting the university space to the communities in order for people in the communities to access the setting and gain the most benefit from it. This view is also consistent with the university’s motto “Our Soul is for the Benefit of Mankind”. The vision of the design was “Healthy Space makes good belief” together with having activities to increase physical activity. First, the design for physical space was completed to have an effective space, and then improved to be more attractive to people. Second, there have been some activities to promote physical activity (walking, running, basketball, and Zumba dance) and the university space, such as at PSU Phuket Banzaan, including playgrounds for physical activity in the market together with healthy food.

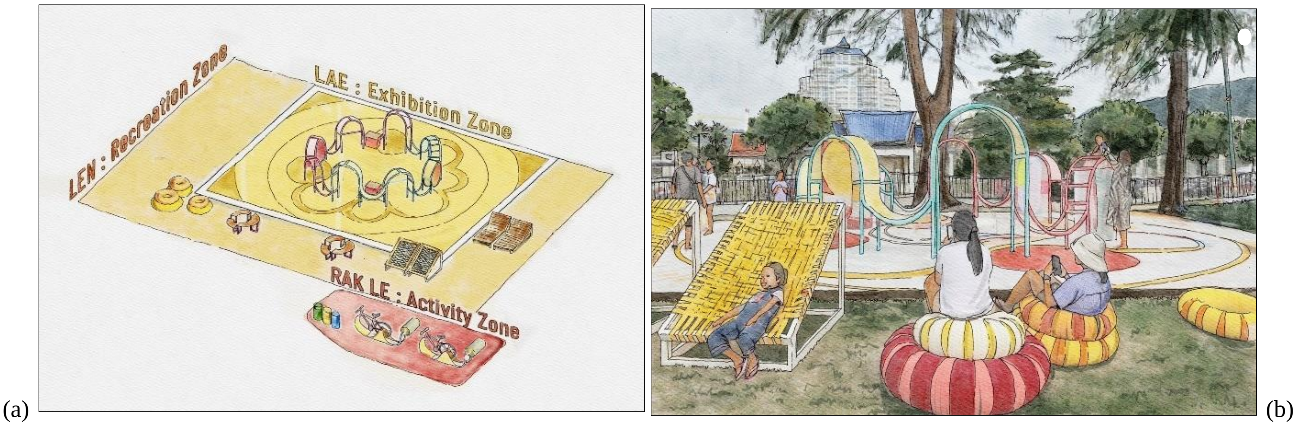

Figure 3. Picturing transformation to Patong City Lab (a) Map of Patong City Lab;
(b) Patong City Lab from street view along the beach (Source: Original Sketch by authors, 2024)

Figure 4. Picturing transformation to Old Town Pop-up Park Journey (a) Map of Walking Routes and Public Spaces;
(b) Old Town Pop-up Park (Source: Original Sketch by authors, 2024)

Figure 5. Picturing transformation to Banzaan Market (a) Covered Walkway in PSU University Space; (b) PSU Phuket Banzaan (Source: Original Sketch by authors, 2024)

2. Transformative Determinants of Physical Activity in Wellness Tourism

The operation of the Physical Activity Promotion Project in Phuket Wellness Area in 3 settings revealed six key determinants for promoting physical activity: 1) motivation for physical activity; 2) participation in physical activity promotion; 3) infrastructure supporting physical activity; 4) networks and social mechanisms; 5) public relations; and 6) area accessibility by people and tourists; per the following details.

2.1 Motivation for physical activity was what makes people understand and do physical activity in Phuket Wellness Area. This motivation came from exhibitions providing activities among the audience. The settings with flexible utilization by every age group of people can create value, as in the Old Town, in the public space on the beach, and so on. This project could actually encourage more young children, local people in the settings, and tourists to participate in physical activity. In Setting A, the public space along the beach was created to be a City Lab as a playground, and it was designed with an Exhibition Zone giving lively knowledge. Therefore, it could positively affect young children to be motivated for physical activity and encourage tourists to take part in the setting. In Setting B, it was found that Pop-up Park was creating a public space that was flexible for the town's events, together with the activity of "Old Town Pop-up Park Journey". It also affected young children and people in the communities helping them understand the Old Town's characteristics and physical activity. One informant said that

"We think that this activity was not spent with high budget, but it had a lot of impacts. Many young people told me that they wanted to join this activity again, so it was the fresh beginning to see smiles of these young people in the activity. It did not just impact physical activity, but it could also impact on this setting as one tourist attraction. We can have more activities." (B1)

Regarding Setting C, it was found that the space improvement was completed to promote walking, so it positively affected young people and people in the communities to understand and utilize the setting. In addition, activities held to promote exercise could create motivation for children and people in the communities to exercise. Besides, giving rewards for exercise motivated every group of people to join the activities. Although the activities were organized for students and staff in the university and people in the communities, some activities such as Zumba dance were of interest only to some people, especially young people and working adults. One informant informed that

"Even though the project was finished, the dancing activity is still going on. It worked when people were willing to group to do activities, and an event was considered a fun center for gathering people. People's behavior can change, but it did not change a lot. I think that it was an activity to gather people who like the same thing." (A1)

However, this physical activity promotion was still not in accordance with every group of people and the area utilization. It interested only some people.

2.2 Participation in physical activity promotion was a process happening at start, during, and after the project operation. People in the communities and representatives from local organizations played their roles and participated in designing the settings and the activities at the beginning of the project. Setting A was a tourist attraction, and there were various types of people living in the area, most of them running businesses. Therefore, in the area development step, many local people in the area could not take part in the project, and the representatives from the local organizations participated in the project, affecting the design to meet the real needs. One informant said that

"The community is not so united because people are in a business sector. These entrepreneurs are ready for the development, but in the business way. It is hard to have public space." (B2)

However, City Lab in Setting A was well accepted by local people in the area and tourists. In Setting B, people in the communities took part in designing the area and promoting physical activity. The area improvement in the Old Town was focused on walking for people of every age, and the museum setting gained a lot of interest and induced learning together. One interviewee said that

"Participants were happy. Everyone tried to keep connected. For example, staff at Phuket Thai Hua Museum cooperated as speakers to explain everything. It is a fresh start to give them more ideas, to not only be the old version of the museum. They can do this to draw tourists' attention to come to their museum." (B1)

In Setting C, it emerged that students and staff in the university and people living around the university took part in giving opinions. In consequence, they understood and joined physical activity for their health, even if some activities, such as basketball and Zumba, drew only some people's attention. Moreover, Setting C was a university area where some rules and regulations were set, which had an effect on people's belief about using the area. However, PSU Phuket BanZaan Market and a playground were known by people outside the university and attracted more of them to use the area.

2.3 Infrastructure supporting physical activity was a factor facilitating physical activity by people in the Wellness Area. The scope in which the environment benefits physical activity was found as follows.

Setting A was designed to be the playground City Lab for promoting physical activity which got attention from children and tourists, and it was colorful and made from reused materials. However, this City Lab was not appropriate for people of every age: it was useful only for young children and young people. After the project was completed, this setting was given to the local government office to take care of. Nevertheless, the setting was temporarily improved to be the City Lab focused on fast, easy, and low-cost construction in order to experiment for some period of time; therefore, limitations in long-term durability were found. In addition, the results revealed that the overall condition of the setting changed, since some materials and equipment were not ready to use and caused risk of accidents to children, people, and tourists, as in the following interview note.

"Many children come here to play and use equipment, but it was dangerous. When children climbed up to play on some equipment, a lot of them fell down." (C2)

Although tourists thought they realized the importance of this City Lab, which was built to be a public space for children, family members, and tourists with their families, allowing some activities, the setting needed fixing and improving continuously. Its concrete floor should be changed to be a cushioning rubber floor, and a fence should be built to reduce the risk of accidents to children, because the setting is located along the main road with congested traffic.

"I do the building work. I think too many much modify. Too much improve like this. This one is very dangerous for children. And the main road is there, this should have the barriers to be the safe place for children. The floor must improve to the rubber floor. I think because this is Phuket, so many families and other countries come. And there is no rest area around here. So, this place must improve." (C3)

In Setting B, walking as physical activity and Pop-up Park were promoted, and the activity of "Finding Pattern in Phuket Old Town" was organized to promote walking in the Old Town and the tourist city, so all events gained attention from local residents, especially young people. However, since the Old Town has limited ways to improve, and some areas in the center of the town are private and tourist attractions, opinions from various sectors are still necessary. This setting could not be changed in a short time. In Setting C, the university area is shaded and green enough for physical activities such as walking and jogging. However, its location was not suitable for shopping activities such as PSU Phuket Bazaan Market. The equipment in the playground was also insufficient for children.

2.4 Networks and social mechanisms

Setting A was a tourist area mostly inhabited by various tourism entrepreneurs and tourists. There was no social mechanism in the community, resulting in no harmony. Therefore, the government office played a role in and were responsible for promoting the healthy space for physical activity as indicated by this comment.

"We can't still find a group of people in the community to promote this activity, so we went to the municipality for this matter." (B2)

In Setting B, it was found that the strong networks and social mechanisms were from people at various ages in several communities. At the beginning of the project, the networks were created from the community leaders, Children and Youth Council of Phuket City, and then they were linked to both private and state organizations in order to mutually participate in the project. Similar to Setting C, the project operation in the institute area was participated in by the residents nearby. The management in the university was comprehensive even if its assigned duties were not tight.

2.5 Public relations

In Setting A, it was found that public relations had not informed well people in the community and some tourists. They thought that this CityLab was held as an exhibition, so only a small number of people, especially Thai people, joined the activities in the City Lab. Unlike foreign tourists, they knew what City Lab was for.

In Setting B, the results revealed that public relations were pursued online by people in the area, government organizations, and the private sector. Therefore, it became a trend for people and tourists to be alert for physical activity together with learning the cultures of the area (food, apparels, and buildings).

In Setting C, the findings showed that public relations to people around the university and tourists did not cover enough in the area. However, some activities such as Walking, Running, and PSU Sightseeing were organized to encourage people in and around the university to be more physically active. People of every age, especially the elderly had an opportunity to join the activity and use the area. Due to PSU Phuket Bazaan Market, more people knew the university; consequently, economic transactions occurred between people in the university and people in the communities. However, the market area was not large enough, inadequate products available, and there were insufficient public relations, so students, working people, and residents nearby who were candidate consumers did not attend that much. Meanwhile, the playground next to that market got attention from young children and youth to do physical activity.

2.6 Area accessibility by people and tourists

Regarding access to Setting A, local people and tourists had convenient access to the setting that was next to the beach and along the main road. However, Thai tourists and others in the setting were not accustomed to the types of playthings that had been specially designed.

In Setting B, cooperative support by local people, entrepreneurs in the communities, and organizations in the area, and interaction among tourists through the cultural capital in the area, promoted walking as a physical activity.

In Setting C, only people around the university and students and staff in the university accessed the setting. This was because of a general belief that the institute had set strict rules and regulations that would restrict entering and exiting the area.

DISCUSSION

The qualitative exploration of the Project of Promoting Wellness Area to Phuket City's Physical Activity Model was done using qualitative approaches in 3 settings: the beach, the Old Town, and the university. Various approaches and tools were used to design public spaces to promote physical activity, such as City Lab, Pop-up Park, Walking linked to cultural capital, and local market. Physical environmental design is an effective way to promote a healthy community (Fathi et al., 2020), and urban interventions, such as park renovations, exercise equipment installations, new pocket parks, improved cycling and walking environments, and multi-component initiatives; these have the power to transform cities into more active places (Zhang et al., 2022).

The transformative determinants that influence physical activity can be discussed based on determinants of health (Dahlgren & Whitehead, 2007; Eikemo et al., 2017; Sohn et al., 2018; Tzenios, 2019). The three most important types of health determinants were 1) individual determinant including motivation and participation in promoting physical activity; 2) structural determinant meaning the environment supporting physical activity; and 3) systematic determinant including networks and social mechanisms, public relations, and area accessibility to people and tourists. Studies by Sallis et al. (2006) and Tuangratananon et al. (2022) were conducted to explain 4 groups of ecological approaches for sustainable changes in physical activity, which were related to the 3 determinants in the current study. 1) A group of individual factors was defined for population, physiological, and biological characteristics. 2) A group of interpersonal factors included family status, social activities with neighbors, interaction, modeling, and social support. 3) A group of environmental factors related to physical activity: the environment should be attractive, relaxing, safe, and convenient. 4) Various policies to support physical activity should be integrated with outcomes in order to develop a healthy space.

When considering each setting, the City Lab in Patong Beach was developed to be a public space and environmentally friendly in a form of a temporary playground. This playground was in accordance with the concept of "CityLab Patong", in which people in the community, especially children and tourists could access the space for physical activities. Accessibility is essential for creating positive experiences and fostering a sense of belonging among children (Liu et al., 2024). This result corroborates a relevant study by Salvo et al. (2017) on creating a temporary public park in Los Altos, California, with limited space. After data on using the public park and doing physical activity there were collected, the findings revealed that public park users were of various ages and accessed the park all day. The largest number of children and teenagers tended to go for a walk and do vigorous physical activity. Having a public park in the city could encourage people to access the area for physical activity, do recreational activities, visit the business area in the city, learn about different area conditions, and have a green space affecting physical and mental health (Hoa, 2024; Kondo et al., 2020).

Although designing a temporary public park along the beach could be interesting and aesthetic for both local people in the city and tourists, the playground was designed only for children, not for people of all ages. The area utilization should be for people of various ages. After the area was transferred to the care of a local government organization, it was found that the conditions of the setting changed. The materials and the equipment were not available for use, and risk of accidents to children, people, and tourists increased. Therefore, the equipment need repairing, and the local organization should play a role in providing facilities and infrastructure to support this active community (Sobczyk et al., 2022; Steele & Caperchione, 2005).

Regarding the Old Town area, under the vision of "Old Town Pop-up Park Journey", walking as physical activity and a Pop-up Park were organized. The youth, people in the communities, and tourists as the participants could learn about the values and the culture in the area, including buildings, food, and apparel. Fathi et al. (2020) found that streets with higher connections to surrounding areas and complex spatial patterns tended to encourage more physical activity, particularly walking, and contribute to a greater sense of public health and happiness. So, these events should be expanded to other areas, raising awareness should be pursued actively, and people's lifestyle behaviors should be monitored with follow-up, especially of teenagers (Pippi et al., 2024). Networks of cooperation among government organizations, private sector, and academics should be developed to support people's physical activity. Salvo et al. (2017) mentioned that a strategy to promote physical activity in an urban area was adjustment of the physical conditions in the area, in order to make areas for physical activity conveniently and fairly accessible. Recreation locations, such as public parks, should play an important role in physical activity and be an essential component of livable cities.

Regarding the university area, under the vision of "Healthy Space makes good belief", the area was designed to link to people's beliefs in order to have the university become the area for people of all ages and provide facilities, equipment, and support to various activities. However, while several activities were operated by some groups of people, the public relations were insufficient, and motivating people in the university and the communities was not successful; these issues need to be addressed. There is a relevant study by Goodyear et al., 2021 revealing that social media positively influenced changes in physical activity and behaviors related to food consumption. Social media platforms were developed to connect to daily routines of people at any age, for example by designing games to promote physical activity, using social media to encourage and motivate conversation groups, and giving information to persuade conversation groups to support physical activities (Goodyear et al., 2021; Wibowo et al., 2024). Therefore, policymakers could design activities for social movement in the future (Ge & Chen, 2024; WHO, 2018).

CONCLUSION

This qualitative study explored the transformative determinants of physical activity within the context of a wellness tourism project in Phuket, Thailand. The project utilized three distinct settings: a beachside public space (Patong City Lab), the historic Old Town (Pop-up Park Journey), and a university campus (Banzaan Market). Each setting provided unique opportunities and challenges for promoting physical activity among both locals and tourists.

The physical activity promotion project in Phuket wellness area demonstrated the potential of integrating physical activity into tourism initiatives. The project's success was contingent on several factors, including motivation for physical activity, participation in physical activity promotion, infrastructure supporting physical activity, networks and social mechanisms, public relations, and area accessibility. The study highlights the importance of tailoring interventions to specific contexts and demographics to ensure their long-term sustainability and impact. Future research could explore the long-term health outcomes of such initiatives and investigate strategies for overcoming barriers to participation.

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EMPOWERING OF COASTAL COMMUNITY ECOTOURISM: THE ROLE OF CULTURAL ENTREPRENEURSHIP AMONG FISHERMEN IN WEST SUMATRA, INDONESIA

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Abstract: Entrepreneurship development in the fisheries sector is important in poverty alleviation efforts. Although fishermen play a role as producers of fishery products, entrepreneurship in this field is increasingly recognized as positively contributing to reducing poverty. In addition, the integration of fishermen into the community and the local economy is increasingly seen as a significant factor in the success of entrepreneurship. This study examines the application and potential of cultural entrepreneurship in fishing communities, aiming to evaluate its effectiveness in addressing social-economic challenges and improving community welfare through the utilization of local knowledge and traditional skills. The research employed a qualitative approach, conducting interview studies, focus group discussion, and limited observation to assess the impact of cultural entrepreneurship practices among fishermen. Data collection focused on entrepreneurial activities, resource utilization, and economic outcomes. This study was conducted in Tiku Selatan Village, located in Tanjung Mutiara Regency, West Sumatra, Indonesia. Data collection was carried out through in-depth interviews with the fishing community, including fishermen and their wives, as well as local government representatives. The study employed semi-structured interviews involving fifteen men and ten women. Additionally, focus group discussions were conducted to gain insights into fishermen's experiences and their collective perceptions of cultural entrepreneurship. Qualitative data analysis was carried out comprehensively throughout the research to highlight the potential of cultural entrepreneurship in improving the socio-economic conditions of fishing villages while preserving their cultural heritage. The findings revealed that fishermen successfully leverage local resources to generate added value, resulting in improved household economies. However, several challenges were identified, including limited market access and inadequate entrepreneurial capacity, which currently hinder the full realization of cultural entrepreneurship potential in fishing community. Cultural entrepreneurship demonstrates promise as a tool for sustainable economic development in fishing communities, but requires targeted policy interventions and support mechanisms focused on developing market relations and entrepreneurial skills to ensure long-term socio-economic benefits. In conclusion, an ecotourism-oriented entrepreneurial culture has the potential to improve entrepreneurial attitudes and strengthen public understanding of innovative and creative village development. We conclude that implementing tourism with a focus on social entrepreneurship can encourage entrepreneurial attitudes and create an environment that is more concerned with the community's needs in village development.

Keywords: cultural entrepreneurship, ecotourism, coastal communities, fishermen, sustainable development

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INTRODUCTION

Coastal communities related to fishing activities have traditionally relied on conventional information and practices passed down from generation to generation (Crona et al., 2010; Pauwelussen, 2017). The community faces various socio-economic challenges, including seasonal economic instability, limited access to markets, and degradation of marine resources (Adhuri & Visser, 2007; Gillis, 2015; Missbach, 2016). In this context, cultural entrepreneurship has emerged as a promising approach to empowering fishers by leveraging their knowledge and skills rooted in aspects of local culture (Jørgensen et al., 2021; Zamzami et al., 2021). Cultural entrepreneurship offers unique opportunities to improve livelihoods, preserve cultural heritage, and promote sustainable development by integrating culture and ecotourism into economic activities. Recent studies have highlighted the role of cultural entrepreneurship in revitalizing coastal communities, demonstrating its potential to transform traditional practices into innovative economic opportunities (Eckert et al., 2018; Pfeilstetter, 2021). Fishing communities have valuable cultural capital that converts into financial capital through participatory

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and innovative strategies. The economic potential of cultural practices such as artisanal fishing techniques, traditional crafts, and local culinary traditions can help open up new income-generating opportunities. Teixeira & Ferreira, 2019 highlight that artisanal entrepreneurship contributes to the local economy and enhances the region's tourism competitiveness through cultural heritage presentation (Teixeira & Ferreira, 2019). The World Bank emphasizes that sustainable livelihoods can be promoted by preserving and commercializing cultural heritage, including traditional fisheries and related industries. Fishing communities are often economically marginalized, with limited access to modern market mechanisms.

However, recent research underscores the growing importance of community-based and participatory strategies in promoting sustainable development and poverty alleviation in these communities (Jentoft & Chuenpagdee, 2015). This strategy can open up new opportunities for value-added products and services, such as ecotourism and artisanal crafts, encouraging cultural preservation while boosting the local economy. Furthermore, we performed an in-depth review of prior studies that explored the empowerment of ecotourism among fishing communities in coastal areas, emphasizing the integration of culture-based entrepreneurship. Since 2020, we have compiled 69 research articles in the GTG Journal that examine or address tourism in coastal areas. Further information is provided in the table as follows.

Table 1. Research gap of coastal tourism studies in the journal Geojournal of Tourism and Geosites

Indicator	Theme	Sub theme	Total
Coastal Tourism Studies	Environmental	Mangrove conservation	4
		Coral reef management	3
		Coastline	2
		Coastal environmental	6
	Management	Community-based tourism	8
		Integrated management / ICZM	3
		Tourism	6
		Service	4
	Socio-economic aspects	Community empowerment	7
		Blue economic	1
		Fishing	1
		Socio-economic adaptation	1
	Development	Resort development	2
		Tourism	5
		Coastal	5
		Waterfront	1
	Safety & security	Tourist safety	1
		Disaster	8
		Destination security	1
Total =			69

The table indicates that the distribution of tourism research, as shown in the coastal tourism studies indicator in the Geojournal of Tourism Geosites from 2020 to 2024, comprises five thematic categories: environmental, management, socio-economic, development, and safety security. Among the five thematic categories, there is a lack of study on coastal tourism studies that investigates the empowerment of ecotourism for fishing communities in coastal areas, particularly in relation to cultural factors that enhance entrepreneurship. This research is important to share due to its significant effect on the sustainability of ecotourism areas that do not marginalize culture in the advancement of fishing community industry.

LITERATURE REVIEW

Cultural entrepreneurship

Fishing communities often have a rich cultural capital deeply rooted in their artisanal practices, traditional knowledge, and communal values. This cultural capital is a crucial resource that, if utilized effectively, can be transformed into economic capital. Previous research from experts has shown that cultural practices such as artisanal fishing techniques, traditional crafts, and local culinary traditions not only represent the identity of these communities but also have the potential to generate substantial economic benefits if properly utilized (Teixeira & Ferreira, 2019). Previous research has generally focused on preserving cultural traditions or economic growth in coastal areas through tourism and fisheries management (Arlym & Hermon, 2019; Ausat et al., 2023; Nugroho et al., 2016).

However, cultural entrepreneurship as a framework to address fishermen's specific economic and social difficulties is still underexplored. Fritsch and Wyrwich emphasized the relevance of regional knowledge and entrepreneurial culture in developing innovative start-ups, implying that cultural elements significantly impact entrepreneurial activities (Fritsch & Wyrwich, 2018). Cultural entrepreneurship helps fishermen diversify their income while increasing social cohesion and pride in cultural identity (Zamzami, 2019). As such, this idea holds great promise to improve the well-being of coastal populations. While research has investigated the socio-economic situation of fishing villages and the importance of local knowledge in sustainable development, there is a considerable gap in understanding how cultural entrepreneurship is systematically applied to these communities (Lekgau et al., 2024).

Coastal community ecotourism

Coastal ecotourism has emerged as a potential sustainable development alternative for coastal communities worldwide. Research in Pariaman City, Indonesia, indicates that the development of coastal ecotourism requires an integrated approach that actively involves the community, the government, and the corporate sector (Arlym & Hermon, 2019). This strategy emphasizes both environmental preservation and the enhancement of the local economy. A recent study in South Africa indicated that coastal ecotourism development through the sharing economy has significantly enhanced sustainable tourist development, generating new economic opportunities for local communities while preserving their natural resources (Lekgau et al., 2024). Studies in various countries demonstrate the significant contribution of ecotourism to the sustainable development of coastal areas.

Research on community-based tourism in Asia indicates that local community participation in ecotourism development enhances economic welfare, strengthens social connections, and protects traditional cultures (Rocharungsat, 2008). In Indonesia, studies in various areas indicate that ecotourism activities can promote rural development by diversifying livelihoods, enhancing infrastructure, and conserving the environment (Nugroho et al., 2016). These approaches have demonstrated effectiveness in establishing alternative revenue sources for coastal communities that formerly depended primarily on fishing activity. Coastal ecotourism serves as an effective framework for integrating cultural elements with business activities in the field of cultural entrepreneurship. This aligns with research indicating that crafts and cultural entrepreneurship significantly enhances regional tourism competitiveness (Teixeira & Ferreira, 2019). Coastal communities may develop many culture-based products and services, including local cuisine, handicrafts, and cultural tourism, through ecotourism. This method generates commercial value while reinforcing cultural identity and promoting the preservation of local cultural heritage (Ratten et al., 2019). Researchers emphasize the necessity of developing an entrepreneurial ecosystem that supports cultural activities, encompassing training programs, market access, and adequate governmental support (Maritz & Foley, 2018). The integration of ecotourism and cultural entrepreneurship fosters a comprehensive and sustainable development strategy for coastal areas.

Despite the potential benefits, several studies have focused on how innovative and participatory strategies can transform cultural capital into economic assets within fishing communities. Most of the existing literature has concentrated on fisheries' ecological and environmental aspects or on top-down economic interventions that often ignore the role of cultural heritage in economic development (Pfeilstetter, 2021; Rocharungsat, 2008). It leaves a significant research gap in understanding the intersection of cultural capital and financial innovation within these communities, especially in participatory approaches involving communities in transforming their cultural resources.

The study intends to fill this void by studying how cultural entrepreneurship can be effectively applied to fishing communities in West Sumatra Province, focusing on its potential for economic and social change. Fishing communities in West Sumatra Province, Indonesia, play an essential role in the region's local economy and cultural identity. These communities are mainly located along the province's coastal areas, with significant populations in districts such as the Pesisir Selatan, Padang, Padang Pariaman, Pasaman Barat and Mentawai Islands. The coastal geography of West Sumatra provides rich marine resources, making fishing a significant source of livelihood for many locals. In addition, cultural and social entrepreneurship convergence has received increased attention in recent years, especially regarding community resilience and sustainable development. Okolo-Obasi et al. (2020) argued that knowing the context of entrepreneurial culture is crucial to solving the fishing community's unique socio-economic problems. This study seeks to investigate how cultural entrepreneurship can increase fishers' adaptive capacity in facing environmental and economic constraints.

Fishing communities suffer from ongoing socio-economic problems, such as fluctuating incomes, market isolation, and resource depletion, jeopardizing their livelihoods and cultural heritage. Despite their extensive local knowledge and skills, fishermen struggle to profit from these assets in the modern economy. The study aims to explain the importance of cultural entrepreneurship in coastal fishing communities while providing a framework for incorporating local knowledge and cultural practices into long-term economic development initiatives. The study helps fill the research gap by examining how cultural entrepreneurship can promote creativity and resilience in underrepresented groups.

MATERIALS AND METHODS

1. Research design

This study uses a qualitative research approach to investigate the relationship between cultural entrepreneurship and the socio-economic growth of fishing villages (Neumann, 2021; Ten Have, 2004). This method allows for a thorough understanding of the local background, cultural customs, and individual experiences of fishermen. The study collected qualitative data through semi-structured interviews, focus group discussions, and participant observations, revealing insights into the opportunities and barriers to implementing cultural entrepreneurship in these communities (Kusumastuti & Khoiron, 2019; Moleong, 2004). This methodology is supported by previous research, which demonstrates that qualitative methods are highly effective at capturing the diverse experiences and cultural contexts of underrepresented groups, such as fishing villages (Babbie, 2010; Bryman, 2016; Neumann, 2021).

The research was conducted in South Tiku Village. South Tiku Village is located in Tanjung Mutiara Regency in West Sumatra, Indonesia. The map of the research location is presented in Figure 1.

This village consists of seven sub-village, each of which has different geographical characteristics and land area: (1) Gasan Kaciak sub-village, covering an area of 1,141 hectares; (2) Banda Tower sub-village, covering an area of 724 hectares; (3) Pasa Tiku sub-village, with an area of 111 hectares; (4) Pasia Tiku sub-village, covering an area of 100 hectares; (5) Kampung Darek sub-village, covering an area of 520 hectares; (6) Pasia Paneh sub-village, covering an area of 605 hectares; and (7) Sungai Nibuang sub-village which stretches over 385 hectares. The total sub-village is four units (21%) located in coastal areas, while the remaining 15 units (79%) are located in the interior (Zamzami, 2019).

The coastal livelihoods in the region sustain approximately 2,152 fishing households, which make up 37% of the village's population. South Tiku Village is bordered to the north by Tiku V Jorong Village, to the south by Batang Gasan Village, to the west by Samudera Indonesia, and the east by North Tiku Village. The topography of South Tiku is characterized by lowland coastal land, with elevations starting from 2 meters above sea level (Zamzami, 2019). The average temperature in the region fluctuates between 26°C and 30°C, accompanied by an average annual rainfall of around 2,000 mm^3. Land use in South Tiku consists mainly of settlements and rice fields, essential for irrigation and agriculture. The village offers a relatively long coastline with beautiful sea views, which are utilized for cultural entrepreneurship initiatives to improve local economic development. This arrangement provides a unique context for analyzing the use of fishermen's entrepreneurial culture for innovation in coastal villages. The findings compared to similar studies conducted in other seaside communities, such as those explored by those researching integrating cultural practices into local economic strategies, highlighting the potential for sustainable development through cultural entrepreneurship. In addition, studies have shown how coastal communities can leverage their cultural heritage to drive innovation and economic resilience, further emphasizing the relevance of South Tiku Village as a case study in this area.

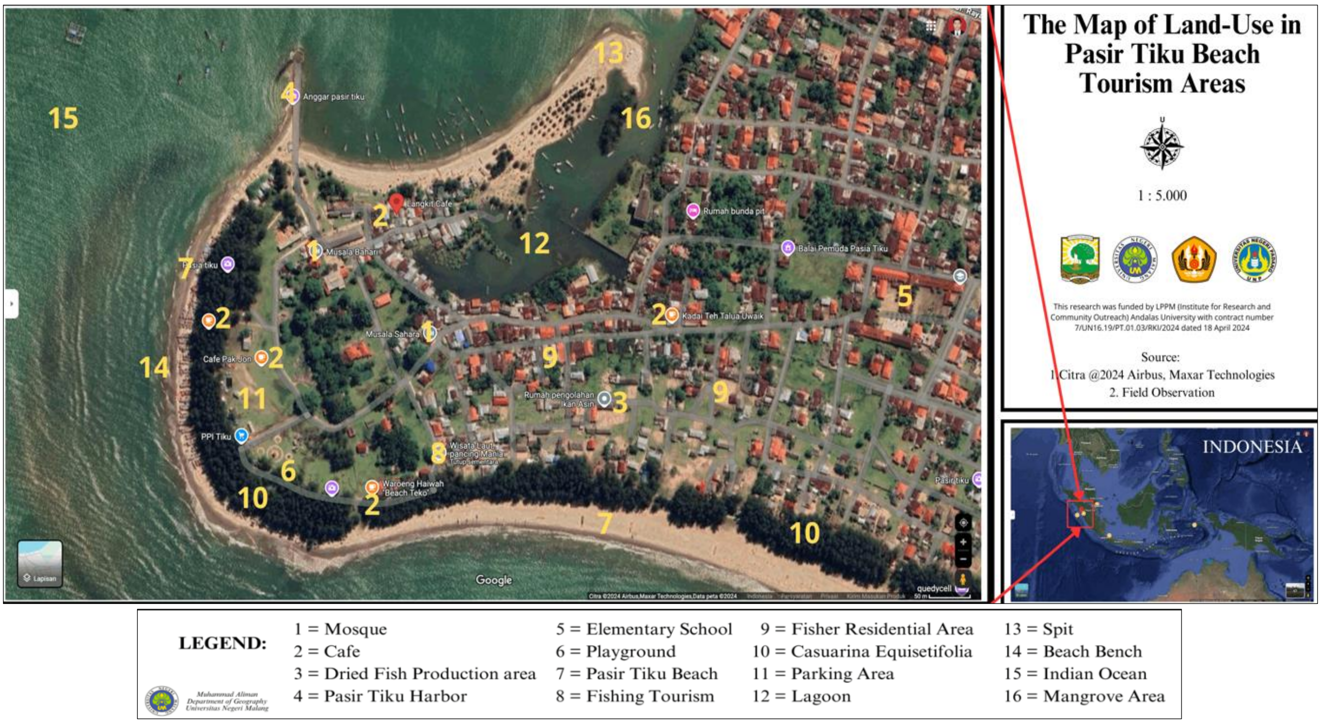

Figure 1. Map of Tanjung Mutiara District, Agam Regency (Source: Authors, 2024)

2. Data collection

The data was collected through in-depth interviews with fishing communities (fishermen and wives) and local governments. The study conducted semi-structured interviews with fifteen men and ten women. The focus group discussions were conducted to understand fishermen's experiences and collective perceptions of cultural entrepreneurship. This method facilitates dialogue and reveals shared insights among informants, thus enriching the data collected (Maritz & Foley, 2018). Observation of the surrounding environment has provided a new understanding through the fishermen's daily fishing activities and their interaction with local cultural practices. This approach aligns with the findings of Hernández & Briegas, who emphasized the importance of observing cultural practices and their economic implications (Sánchez-Hernández & Maldonado-Briegas, 2019). Questions were asked to determine the level of expertise of the informant, as presented in Table 2. Next, the interview was coded, and the results were recorded.

Table 2. Identity of informants from the fishing community in South Tiku Village (Source: Primary data, 2024)

Work	Number of Informants
Village head	2
Fisherman	13
Fisherman's Wife	5
Fish Merchant	5
Total	25

3. Data analysis

Data analyzed carried out to examine the qualitative data during the research. This strategy entails categorizing the material and finding the main themes from interviews and observations. This research aims to see trends related to cultural traditions' economic potential, fishermen's problems when applying entrepreneurial techniques, and the impact of cultural entrepreneurship on community development. Data analysis is used in qualitative research because it allows researchers to methodically understand complex data and gain significant insights (Kaya et al., 2018).

This strategy has been used effectively in research examining the close relationship between culture and entrepreneurship, revealing the influence of cultural values in determining entrepreneurial intentions and behaviors (Ratten et al., 2019). In conclusion, the methodological approach used in this study intended to provide comprehensive knowledge about the use of fishermen's entrepreneurial culture for innovation in coastal villages. This research uses qualitative methods and theme analysis to highlight the potential of cultural entrepreneurship to improve the socio-economic situation of fishing villages while preserving their cultural heritage.

RESULTS AND DISCUSSION

Cultural entrepreneurship has extraordinary potential to improve the socio-economic conditions of fishermen. This form of entrepreneurship leverages local cultural traditions, knowledge, and practices, turning them into valuable economic assets (Gehman & Soublière, 2017). By doing so, fishers can diversify their sources of income and reduce their reliance on traditional fishing activities, which are often vulnerable to external pressures such as overfishing, environmental degradation, and fluctuating market prices. This potential aligns with broader efforts to develop sustainable livelihoods in South Tiku Village as a tourist location (Figure 2), where economic diversification is essential to build long-term resilience. By applying entrepreneurial ideas to cultural practices, fishermen in South Tiku Village can generate new income streams by maximizing their local resources, such as traditional fishing techniques, local crafts, and the sale of sea-based products in seaside restaurants (Figure 3). This activity increases the economic production of the community while strengthening its cultural identity. These findings are consistent with the work of Ratten et al., which underscore the importance of artisan entrepreneurship in regenerating the local economy and preserving cultural heritage (Ratten et al., 2019).

Figure 2. Pasia Tiku is the location of the tourist village (Source: Authors, 2024)

Figure 3. Fishermen entrepreneurs set up cafes and coffee shops on beach (Source: Authors, 2024)

Fishermen in South Tiku Village can increase their market competitiveness by incorporating cultural components into their business activities while preserving their cultural narrative (Gehman & Soublière, 2017; Ratten et al., 2019). However, this study reveals significant barriers to building cultural entrepreneurship.

Fishermen have difficulty reaching markets, negotiating regulatory systems, and obtaining capital for their projects (Crona et al., 2010). In addition, fishing family members often report a lack of entrepreneurial skills and business expertise. These limitations align with Qudah's findings, which found that inadequate management support and limited resource access hinder entrepreneurial efforts across various industries (Qudah, 2018).

Despite these hurdles, communities that receive training and collaborate with external stakeholders demonstrate a higher ability to incorporate cultural entrepreneurship into their economic activities (Jørgensen et al., 2021). The findings support the findings of Maritz & Foley, who found that connecting local entrepreneurs with external resources can significantly improve the entrepreneurial ecosystem (Maritz & Foley, 2018).

The study's findings suggest that cultural entrepreneurship may be a viable solution to the socio-economic problems faced by fishing communities. Fishermen can diversify their income and strengthen their household economies by utilizing local resources and cultural heritage (Teixeira & Ferreira, 2019). This method also helps to promote more equitable and sustainable economic growth by encouraging the participation of excluded populations and preserving local traditions. Hernández & Briegas emphasized the need to incorporate cultural factors into economic tactics, arguing that long-term entrepreneurial culture programs can promote social responsibility and community development (Sánchez-Hernández & Maldonado-Briegas, 2019). It illustrates that one business endeavor conducted by the community near this tourist destination is the opening of food stalls for visitors (Figure 4).

The figure 4 mentions indicates that the stall remains in a temporary condition. This condition requires upgrading in the quality of construction materials. The simple exterior decreases the stall's appeal, discouraging people from trying the offered food and beverages. If such conditions persist, they will ultimately result in a decrease in collective revenue. Therefore, collaboration and cooperation are essential between the Agam district government, specifically the Tourism Office, and the Cooperatives and Small Industry Office. The findings of this study are consistent with the current literature on the benefits of incorporating culture into economic development initiatives.

Figure 4. The condition of food and beverage stalls: a. View of drink Stalls; b. View of food stalls; c. View of place eat and drink (Source: Authors, 2024)

However, this research adds to the discipline by identifying the specific challenges and opportunities for fishermen. For example, capacity building in entrepreneurial skills and market access emphasizes the need for support networks that help people migrate from traditional jobs to cultural entrepreneurship (Okolo-Obasi et al., 2020). It is especially true in coastal communities, where unique cultural practices are used to drive economic innovation, as noted by Zamzami et al, who analyze the socio-cultural aspects that impact entrepreneurship in marginalized populations (Zamzami et al., 2021).

Figure 5. Fishermen Entrepreneurs make dried fish (Source: Authors, 2024)

Figure 6. Fish cleaning process (Source: Authors, 2024)

Figure 7. Dried fish as part of fisherman entrepreneurs (Source: Authors, 2024)

The findings of this study highlight the potential of cultural entrepreneurship as a transformative tool for the fishing community (Ratten et al., 2019). In this context, cultural entrepreneurship refers to individuals or groups' ability to leverage local cultural knowledge, traditions, and practices to create new economic opportunities (Gehman & Soublière, 2017). This framework not only supports economic growth but also helps in preserving the cultural heritage of coastal villages (Eckersley et al., 2018). By utilizing cultural resources such as the processing of fish products through fish drying (The activity show in Figure 5, 6 and 7), fishermen can create products or services with additional cultural value (Teixeira & Ferreira, 2019). This concept is recognized in the rural development literature as a means to foster resilience in marginalized or resource-dependent communities (Nugroho et al., 2016).

However, the process of turning cultural assets into viable entrepreneurial ventures is not without challenges (Qudah, 2018). The study reveals that fishermen in South Tiku Village often face significant barriers, including limited access to financial capital, lack of business training, and inadequate market access (Crona et al., 2010). Entrepreneurial capacity building in coastal areas is hampered by formal institutional support, and entrepreneurial ecosystems urgently require targeted interventions such as financial assistance, business skills education, and support in navigating modern markets (Maritz & Foley, 2018). In addition to overcoming implementation challenges, the ability of fishers to exploit local cultural assets plays an essential role in improving their economic resilience. By imparting their products or services with cultural meaning, fishermen can enter other market realms, such as ecotourism areas, artisanal goods, or organic seafood, which value authenticity and sustainability. It is in line with the research findings that innovation in rural entrepreneurship in South Tiku Village, especially in sectors such as fisheries, requires not only economic but also cultural innovation to adapt to global consumer trends, where traditional livelihoods threatened by overfishing, environmental degradation, and climate change, cultural entrepreneurship offers a path to sustainable economic diversification.

In addition, the study shows that the role of external support networks - such as government initiatives, non-governmental organizations (NGOs), and private sector partnerships - is critical in promoting long-term economic success for fishermen (Jørgensen et al., 2021; Okolo-Obasi et al., 2020). External support can provide fishermen with the necessary resources, technical assistance, and market access they may not achieve independently (Crona et al., 2010). Partnerships between local entrepreneurs and external organizations can improve the sustainability of entrepreneurial activities by providing ongoing mentorship, funding opportunities, and connections to larger markets (Crona et al., 2010). It suggests encouraging collaboration between fishers and external stakeholders is vital to addressing coastal communities' isolation (Zamzami et al., 2021). The potential for cultural entrepreneurship as a tool for innovation is also closely related to the ability of fishing communities to adapt to change (Gehman & Soublière, 2017; Ratten et al., 2019).

Fishermen in coastal villages are often vulnerable to fluctuations in fish stocks, environmental disasters, and the impacts of climate change (Pauwelussen, 2017; Sumarmi et al., 2020). By diversifying their income streams through culturally rooted businesses, fishermen can reduce their reliance on fishing, making them more adaptable and resilient to economic and environmental pressures (Teixeira & Ferreira, 2019). Entrepreneurship in the traditional sector must continue to evolve to meet changing social, environmental, and market demands (Neumann, 2021). Innovation through new technologies, creative business models, or culturally inspired products is essential to maintaining competitiveness and sustainability in these communities (Ausat et al., 2023; Sánchez-Hernández & Maldonado-Briegas, 2019).

This research has explored the dynamics of cultural entrepreneurship in various contexts, focusing on the interaction between internal community-driven initiatives and external support networks (Maritz & Foley, 2018; Ratten et al., 2019). Understanding how these elements interact can provide a more nuanced picture of what drives long-term economic success in coastal villages (Crona et al., 2010; Lekgau et al., 2024). In particular, the study has had to describe a mechanism by which external support, such as government funding programs or NGO partnerships, can empower local entrepreneurs while maintaining the authenticity of their cultural products (Gehman & Soublière, 2017).

In addition, research can investigate the scalability of cultural entrepreneurship models in different geographic or cultural settings and the specific policy frameworks needed to encourage this type of entrepreneurship at the regional or national level (Fritsch & Wyrwich, 2018). While cultural entrepreneurship has great promise for improving economic resilience and cultural preservation in fishing communities, its success depends on the availability of external support, innovative adaptations, and a strong foundation in local cultural knowledge (Eckersley et al., 2018). As these communities navigate the complexities of modern economic systems and environmental challenges, cultural entrepreneurship offers a unique and valuable pathway to sustainable development (Neumann, 2021).

Another challenge is the lack of entrepreneurial capacity in the fishing community (Sumarmi et al., 2020). Fishermen in South Tiku Village may not have the business skills, financial literacy, or technical knowledge necessary to commercialize their cultural assets effectively (Qudah, 2018). Capacity-building programs, including business training and access to economic resources, are essential to empowering fishers to succeed as cultural entrepreneurs (Okolo-Obasi et al., 2020). Investing in human resources through education and skills development is a crucial factor in driving entrepreneurial innovation and ensuring the long-term sustainability of these initiatives (Ausat et al., 2023).

In addition, cultural entrepreneurship can promote equitable and sustainable development by distributing economic benefits evenly within society. Traditional fishing, often characterized by a narrow economic base, concentrates wealth among a few people (Crona et al., 2010). In contrast, cultural entrepreneurship can involve members of the wider community, including women and the younger generation, in entrepreneurial activities related to cultural preservation (Teixeira & Ferreira, 2019). This inclusive approach can lead to a more equitable distribution of income and opportunities, promote social cohesion, and reduce poverty in fishing villages (Lekgau et al., 2024). Regarding sustainability, cultural entrepreneurship encourages the use of environmentally friendly practices (Sánchez-Hernández & Maldonado-Briegas, 2019). Cultural entrepreneurs can promote ecologically responsible practices by emphasizing the cultural value of traditional fishing methods, such as sustainable or artisanal fishing (Kaya et al., 2018). It contributes not only to the conservation of marine ecosystems but also to the long-term survival of the fishing industry itself (Pauwelussen, 2017). Thus, cultural entrepreneurship aligns with the broader goal of environmental sustainability, ensuring that economic development does not come at the expense of ecological degradation (Nugroho et al., 2016). Based on the results and discussions above, this study aims to present a conceptual model of the development of coastal community ecotourism integrated with coastal community cultural entrepreneurship. The model is shown in Figure 8.

The figure demonstrates the potential for cultural entrepreneurship in coastal areas. It implies that success in this field requires a strong support system to address the challenges. The relationship between responses and problems indicates that having cultural value simply is insufficient. The combination of business training, governmental assistance, NGO collaborations, and infrastructure enhancement is crucial for establishing sustainable ecotourism. The success of cultural entrepreneurship relies on diversifying beyond conventional fishing practices, thereby establishing a more robust economic base for coastal communities while preserving cultural heritage and fostering coastal tourism.

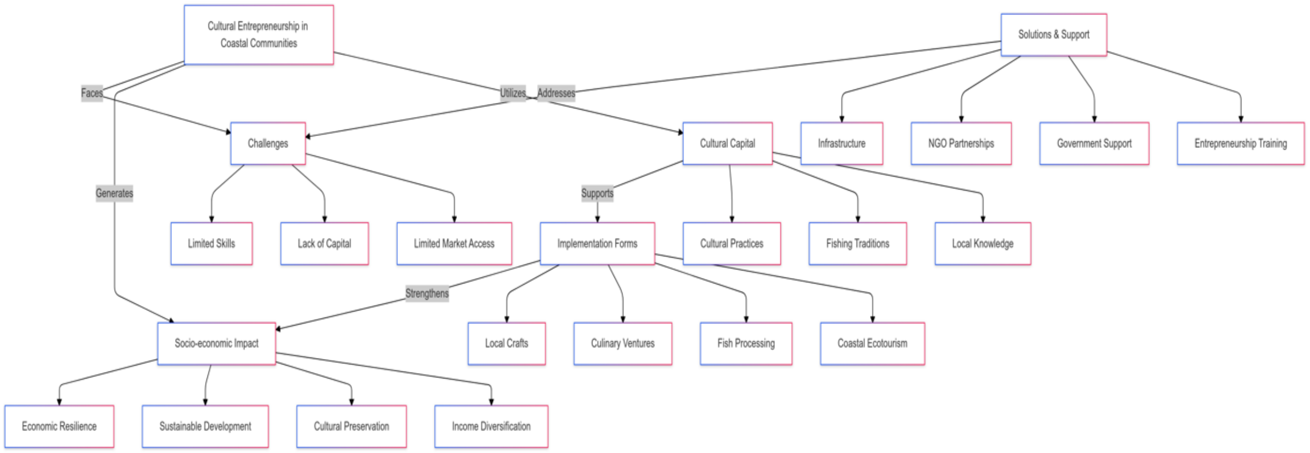

Figure 8. Conceptual model of coastal community ecotourism development integrated with cultural Entrepreneurship (Source: Author analysis, 2024)

CONCLUSION

This study shows that cultural entrepreneurship presents a promising solution to the socio-economic challenges faced by fishers in coastal communities. Fishing communities often experience economic instability due to declining fish stocks, environmental degradation, and market fluctuations. By applying entrepreneurial techniques to their cultural traditions—such as traditional fishing practices and fish drying innovations - fishermen can create unique and culturally enriched products and services that add economic value and strengthen their cultural identity.

This approach allows fishers to diversify their income streams, reduce dependence on the volatile fishing industry, and potentially increase their long-term economic resilience.

One of the key insights from the study is that cultural entrepreneurship allows fishers to maximize their local resources. It means transforming traditional knowledge, skills, and practices into marketable offerings. For example, fishermen can develop ecotourism activities, artisanal seafood products through drying, or locally branded crafts that highlight the unique cultural assets of their communities. Thus, they not only generate additional income but also contribute to the preservation of the intangible cultural heritage of their territory. This dual benefit of economic improvement and cultural preservation makes cultural entrepreneurship an attractive strategy for sustainable development in coastal areas.

Apart from these benefits, the study also highlights some challenges for cultural entrepreneurship to reach its full potential. One of the most significant obstacles is limited market access. Coastal communities are often geographically isolated, and their products may struggle to get a broader market. In this case, external support, such as partnerships with NGOs, government programs, or private sector actors, is crucial in helping fishers connect with a broader consumer base. Digital platforms and e-commerce can also play an essential role in overcoming these geographical barriers, providing new avenues for fishermen to sell their unique cultural products domestically and internationally.

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FACTORS INFLUENCING THE USE OF MODERN MANAGEMENT METHODS IN TOURISM ORGANIZATIONS

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Abstract: The paper focuses on the use of modern management methods in hotel establishments. For the development of hotel establishments, it is important to respond to current changes and trends in the current unstable and constantly changing environment. The paper is oriented towards exploring the use of modern management methods that support the competitiveness of hotel establishments. The methodological part is focused on the characteristics of the research methods and the research sample. Questionnaire research was chosen as the main research method, which is one of the most frequently used methods for obtaining data of a similar focus.To evaluate the data necessary for processing the research conclusions, methods of higher statistics such as Pearson-Chi square test of independence and the method of proportion of a given phenomenon in the population were used. For better orientation, the data from the respondents were processed in the form of descriptive statistics and contingency tables. As a result of the research focused on the use of modern management methods in hotel establishments, the findings confirm that the mentioned organizations are open to innovations and changes brought about by current trends in strategic management. The research confirms that the classification of a hotel through the stars assigned has an impact on the use of these methods and the more stars a hotel has, the more it uses these methods. Among other things, the research brought findings that a higher number of stars, i.e. a classification class, tends to make more use of modern management methods such as change management, the Balanced Scoreard method or Change management. The research conducted also yielded positive results in the overall use of modern management methods, which are used by more than half of the surveyed hotel establishments. Benchmarking and SWOT analysis are among the most frequently used management methods in hotel facilities. The research conducted brought about findings that hotel establishments use modern management methods in managing their business activities. These methods help in the development of these organizations and thus contribute to the overall development of the tourism industry and its sustainability in a highly competitive environment. The current era brings a lot of innovations that can also be used in the field of tourism, such as information technology and the advent of artificial intelligence. These innovations are suitable for application in modern management methods, with the help of which the management knows how to effectively manage businesses in the tourism industry, including hotel facilities.

Keywords: tourism, hotel establishments, management methods, innovation, competitiveness

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INTRODUCTION

In today's business environment, striving to improve the management effectiveness of tourism organizations is one of the fundamental tasks of every manager (Ali & Anwar, 2021; Handiman et al., 2024). Tourism and its elements have existed for many years and are associated with various motives, often also health, religious, etc. (Koželová & Drengubiak, 2023). Achieving increasing efficiency is an essential prerequisite for the success of any modern organization, especially in the ever-evolving highly competitive tourism environment (Herman et al., 2023; Alsetoohy et al., 2024; Hassan et al., 2024).

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Accommodation and food service organizations are an important part of the tourism industry. It can be concluded that tourism is an industry that has a high potential for employment growth and economic development; therefore, it is essential to take care of the prosperity of accommodation and food service organizations. Creating and maintaining a competitive advantage is a fundamental strategy of hotel management. Hotel management is a dynamic process that must be mastered to ensure the stated goals of the organization. According to Ayvaz-Çavdaroğlu et al. (2024), it is necessary to follow the development and application of hotel management. Calderón-Fajardo et al. (2024) point out the adherence to the basic objectives, which include maximizing revenue while considering and maintaining quality, striving to maximize capacity utilization, striving for efficient use of employees and minimizing cost levels, which can ensure profit and profitability while considering and increasing quality. Business in the hotel segment is not only demanding on human capital but also on overall facilities. A guest in a hotel is often in direct contact with the staff, but not on the same level as with the hotel facilities, so it is important that the hotel's facilities and amenities come first. However, to maintain a good first impression, care must also be taken to have well-trained and quality staff (Mate et al., 2019; Park et al., 2021). According to Hu et al. (2019), planning in accommodation facilities is of vital importance, given that it helps to reduce business risk, enables the improvement of work efficiency, facilitates the integration of the efforts of all workers as well as external suppliers. It is the basis for the professional growth and development of managers and also underpins the development of performance standards. In order to determine the most optimal alternative course of action for decision-making, it is the manager's task to choose from a range of options.

The more variable the given environment, the more established alternatives the plan must have and the greater the role decision making plays in the hotel management process. The authors state that managers often consider decision making as their main role, and this is because they must continuously make decisions about what to do, who should do it, how to do it, when to do it, and under what conditions (Brogni et al., 2024; Chowdhury et al., 2024). Organizing belongs to that part of management that involves creating purposeful tasks for people and purposeful structures for the organization. Purposefulness in this case means the creation of certainties in which all the set tasks necessary to achieve the set goals are assigned to skilled workers (Phuong & Huy, 2022; Cwibi, 2023). The top activity of the whole management is controlling, whose main task is to detect in due time all deviations of the actual state from the desired state. The information that comes from the external environment is very closely related to the information that comes from the internal environment and about the development and actual progress of the plans of the tourism organizations.

Modern management methods are increasingly being used in the management of these organizations, and this is not limited to the tourism sector. As a modern method we mention the concept of Balanced Scorecard, which is considered one of the most famous modern methods that focuses not only on performance measurement, but also on its incorporation into the overall performance management system in the organization. The Balanced Scorecard aggregates both financial and non-financial indicators in order to group them into a single enterprise information system accessible at all levels of management (Dlamini et al., 2020). As reported by Agbenyegah & Neequaye (2024), the Balanced Scorecard method is used by innovative organizations as a strategic management system designed to drive long-term strategy. According to Alphun et al. (2023), the Balanced Scorecard method translates individual missions and visions into goals and their measurements to address all business areas and core areas of assumptions. The individual goals and measurements are divided into four areas, which are the learning and growth perspective, customer perspective, process perspective, and financial perspective. The emergence of such a method was conditioned by existing performance measurement approaches that considered only financial indicators. The Balanced Scorecard links other different perspectives on its operations, strategy and management in addition to the financial perspective (Fatima & Elbanna, 2020).

Another important modern management method is controlling. Controlling represents a special form of organizational management, which is oriented towards continuous profit creation. Although the name evokes controlling, it is not possible to identify and reduce controlling to the area of business process control only (Trinh et al., 2023). Hotel controlling refers to the acquisition, analysis and processing of operational and economic information that is used to support management decision making. The common purpose for all processes is to capture and record the current as well as future economic situation in a tourism enterprise. According to Kwakwa (2024), hotel controlling is used at both strategic and operational levels. In the strategic focus, we are talking about issues of enterprise security, where controlling is used to analyse information of qualitative form in making managerial decisions. According to Campayo-Sanchez & Nicolau (2024), in the operational focus, controlling has mainly the task of managing profit, where it focuses on the internal environment of the hotel and analyses quantitative variables. We consider that the most important role of hotel controlling is the elimination of the causes through which performance and revenue might not be realized, since this condition cannot be changed. For hotel services, the crucial factor of performance and revenue realization is their time of realization, in case of non-performance of an event and subsequent cancellation, hotel establishments lose revenue.

Therefore, planning, comparing the results of the current time-period and budgeting is important to avoid losses from unfulfilled hotel capacity (Musavengane, 2019; Gunter et al., 2024). Benchmarking is also a frequently used management method in tourism organizations and is a process for finding the most effective hotel practices and new ideas based on a consistent and continuous comparison of the organization's own performance in quality, productivity and production process with organizations that perform exemplary in the market and are market leaders (Alemayehu et al., 2024). It is a tool to enhance the competitive ability of an organization in the tourism industry. It is a search for best practices within industries that lead to superior performance (Gong et al., 2024; Wang et al., 2024).

MATERIALS AND METHODS

The main objective of this paper is to present the results of research focused on increasing the efficiency of management in hotel establishments using modern management methods and tools such as the Balanced Scorecard method, controlling, talent management, benchmarking, and others. The aim of this paper is to examine the ways in which organizations in the tourism industry are managed and to highlight opportunities that could increase the effectiveness of the management of organizations in this sector. We have chosen a questionnaire survey as the main research method. The questionnaire was designed to include questions that allowed for the addition of a specific answer, the selection of a specific answer option, and questions that presented answers in the form of a Likert scale. The Likert scale choices were made up of a four-point scale and the respondent could choose which point he or she considered most appropriate in answering the specified question. The structure of the questionnaire consisted of two main parts, namely identification and research. The first part contained the identification questions of hotel establishments in which we surveyed the size of the organization, its ownership and its classification through the number of stars.

The second part of the questionnaire was related to the research itself. The questions were aimed at finding out the use of modern methods in the management of the organization and the conditions under which these methods are used. We were specifically interested in the use of modern methods such as Balanced Scorecard, Benchmarking, controlling, talent management and others. In developing the questions and hypotheses, we were based on the stated research problems, which were obtained through literature study research and similarly conducted research studies.

Our main research areas included questions of whether hotels are favourably disposed to change and innovation, whether they use the method of controlling in their management and what is the actual pricing of hotel performance. In the research we investigated how the classification of a hotel, determined by the number of stars, influences the creation of a plan using modern methods and whether a hotel tends to use its capital for modernization if its approach to pricing is maximizing sales. In the last research question, we started from the fact that nowadays it is no longer sufficient if an organization is managed only by financial indicators, but it is only through a combination of financial and non-financial indicators that prosperity and long-term sustainability is achieved. When selecting organizations by means of a questionnaire survey, we relied on the methodology of the OKEC and SK NACE classification of enterprises. SK NACE is the standard classification of economic activities used in the European Union. The database of organizations from the tourism sector that we used for the purposes of our research was obtained from the Slovak Business Agency.

The questionnaire was sent to 515 organizations operating in the tourism sector in Slovakia. The return rate of the questionnaires was 105, which represents a percentage of 20.38%. For the purposes of the questionnaire survey, we can consider a return rate of approximately 20% as standard and the results obtained can be considered relevant. In our research we have set four main hypotheses:

H1: We assume that there is a statistically significant relationship between hotels' openness to change and innovation and the introduction of controlling into management.

H2: We assume that there is a statistically significant correlation between the classification of a hotel in a higher class and the use of modern management methods in the development of the plan.

H3: We assume that there is a statistically significant relationship between sales maximization and the use of capital for modernization.

H4: We assume that more than 50% of the hotel establishments surveyed use modern management methods and tools.

Research methods (such as descriptive statistics, contingency tables and others) were used to evaluate the data obtained, using analysis, comparison, synthesis, selection, induction and deduction. The hypotheses we set out were statistically tested for the purpose of our research. We used Chi-square test of independence method to test the hypotheses. The Chi-square test of independence is based on the contingency table and tests the null hypothesis that expresses the independence of the variables. Table 1 contains the formulas and their characteristics.

Table 1. Pearson's Chi-square Test of Independence (Source: According to Marcheová et al., 2011)

Formula (Marcheová et al., 2011)	**Explanatory note**
$\chi^2 = \sum \frac{(f_e - f_t)^2}{f_t}$	χ^2 – the Chi-square value subsequently compared to a table value based on the selected error probability, f_e – the empirical frequency of observed variables, f_t – the theoretical frequency of observed variables.
$p = \hat{}p \pm z\alpha * \sqrt{\frac{p * \hat{}q}{n}}$	p – method of proportion of given phenomenon in the population; q – proportion of the opposite phenomenon in the selected sample; n – size of sample ; z_α – confidence level.

RESULTS AND DISCUSSION

The research conducted was focused on ways of managing organizations in tourism. The research sample consisted of hotel facilities categorized by the number of stars, which are listed as follows:

1* - budget hotel, cheap, does not provide any room service. The hotel must provide guests with a drink ticket and daily housekeeping. The rooms are equipped with sanitary facilities.

2* - these hotels provide basic services such as catering and are among the cheaper ones. The hotel already provides a breakfast buffet, internet and the option of a terminal and payment by card is part of it.

3* - middle class of the hotel classification, intended also for families with children on vacation. There is daily cleaning, internet and a pool. The reception should be available 24/7, the rooms should have a telephone and the hotel should have laundry and ironing facilities available.

4* - Hotels with these services are expensive with higher comfort. They are e.g. congress hotels, where we can find congress rooms with technical equipment as well as recreation opportunities in the form of a sauna, necessary recreation and a swimming pool the rooms have a minibar, a bathrobe and slippers.

5* - luxurious and expensive hotels that provide high-level services and 24/7 services. These hotels they organize various shows and also offer sports and recreational activities to fill free time.

The distribution of hotel facilities by number is shown in Figure 1.

In our research, we focused on modern methods of managing organizations that will enable organizations to increase management efficiency and thus achieve the stated goals of the organization. One of these modern methods is the controlling method. In connection with controlling, we were interested in the innovative activity of organizations, and based on these two factors, we formed the following hypothesis:

H1: We assume that there is a statistically significant relationship between hotels' openness to change and innovation and the introduction of controlling into management.

The results of testing first hypothesis are shown in Table 2.

Table 2. The results of testing 1st hypothesis (Source: Own processing; formulas according to Marcheová et al. 2011)

Formula of the Pearson's Chi-square Test of Independence (Marcheová et al., 2011)	$\chi^2 = \sum \frac{(f_e - f_t)^2}{f_t}$
Number of respondents (N)	105
Error profitability	α = 5% (0.05)
Critical value	$\chi^2 = 0.01$
Calculated value	p = 0,576

Based on the research problem, we used a hypothesis to determine whether the degree to which hotels are willing to introduce controlling into their management increases with their openness to change. Based on the validity of the inequality p=0.576 > α=0.05, we do not accept the hypothesis that there is a statistically significant relationship between hotels' openness to change, innovation and willingness to introduce controlling into management. This means that the introduction of controlling into the management of an organization is not influenced by the openness of organizations to innovation and change. Thus, the introduction of controlling is fully independent of innovations and changes in the market environment. In Figure 2 we illustrate whether a hotel has a controlling method in relation to the hotel's openness to change and innovation.

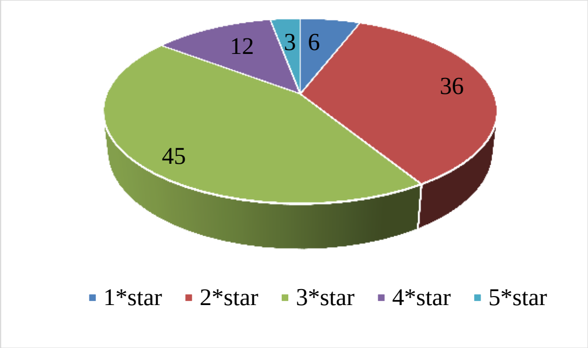

Figure 1. Division of hotels (Source: Own processing)

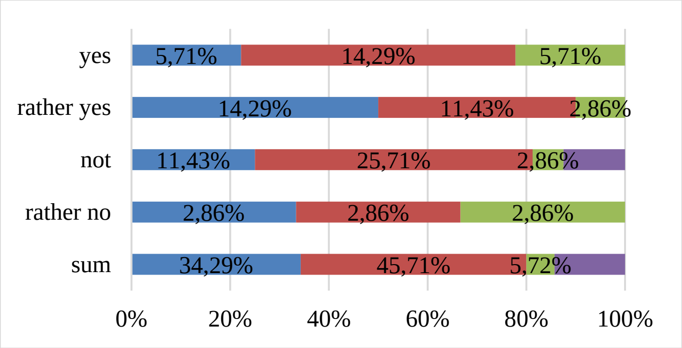

Figure 2. Controlling in the surveyed organizations (Source: Own processing)

The second hypothesis focused on the use of modern management methods in plan development. The hypothesis was stated as follows:

H2: We assume that there is a statistically significant correlation between the classification of a hotel in a higher class and the use of modern management methods in the development of the plan.

The results of testing second hypothesis are shown in Table 3.

Table 3. The results of testing 2nd hypothesis (Source: Own processing; formulas according to Marcheová et al. 2011)

Formula of the Pearson's Chi-square Test of Independence (Marcheová et al., 2011)	$\chi^2 = \sum \frac{(f_e - f_t)^2}{f_t}$
Number of respondents (N)	105
Error profitability	α = 5% (0.05)
Critical value	$\chi^2 = 0.01$
Calculated value	p = 0,004

In relation to the above research problem, we set a hypothesis, where we tried to find out whether a hotel classified in a higher class tends to use modern management methods such as change management, SWOT analysis, BSC method, Benchmarking, etc. in the development of the plan. Based on the results of the conducted research and the validity of the inequality p=0.004 < α=0.05, we accept the hypothesis that there is a statistically significant relationship between the classification category of the hotel and the use of modern methods in the development of the plan.

According to the answers of the respondents, the modern management method Benchmarking and SWOT analysis are most often used in hotel establishments. In the classification category of four-star hotels, the Balanced Scorecard method and also talent management are most frequently used. Hotels in the three-star classification category also use

Benchmarking most frequently. Hotels in the two-star classification category most often use SWOT analysis, which is one of the most general management methods. Figure 3 shows the most commonly used modern management methods for managing an organization. At least Figure 4 shows relationships between approaches in hotel facilities.

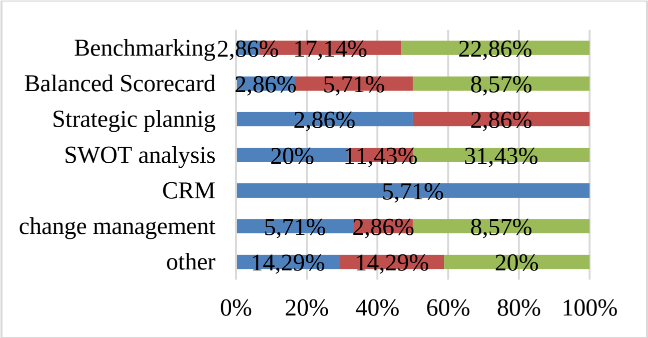

Figure 3. The relationship between the hotel classification category and the use of modern methods (Source: own processing)

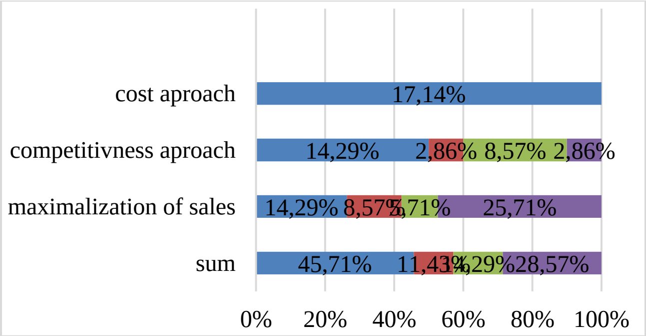

Figure 4. Relationship between pricing approach and capital utilization (Source: own processing)

The third hypothesis focused on the use of the organization's capital for its modernization and was stated as follows:

H3: We assume that there is a statistically significant relationship between sales maximization and the use of capital for modernization.

The results of testing third hypothesis are shown in Table 4.

Table 4. The results of testing 3rd hypothesis (Source: own processing (formulas according to Marcheová et al., 2011))

Formula of the Pearson's Chi-square Test of Independence (Marcheová et al., 2011)	$\chi^2 = \sum \frac{(f_e - f_t)^2}{f_t}$
Number of respondents (N)	105
Error profitability	α = 5% (0.05)
Critical value	$\chi^2 = 0.01$
Calculated value	p = 0,080

In the context of the research question, we set out a hypothesis where we sought to determine whether, if a hotel's approach to pricing is to maximize sales, it tends to use capital for modernization. Based on the validity of the inequality $p=0.080 > \alpha=0.05$, we do not accept the hypothesis that there is a statistically significant relationship (dependence) between pricing approach and capital utilization. In the following Figure 3 we graphically illustrate the relationship between pricing approach and capital utilization. However, the difference shown does not prove to be statistically significant by statistical analysis. The last research hypothesis focused on exploring the use of modern management methods in hotel establishments and was stated as follows:

H4: We assume that more than 50% of the hotel establishments surveyed use modern management methods and tools.

Testing of hypothesis that focuses on using modern management methods and tools, we provided by the method of the proportion of the phenomenon in the population. The method is suitable for this kind of research since we do not have data from all respondents. The probability is defined by a coefficient of 1.96, which means the validity of the results at the level of 96%. The results of the hypothesis testing are shown in Table 5.

Table 5. The results of testing 4th hypothesis (Source: own processing)

Entity	**Calculation variables**	**Calculation by formulas of authors (Marcheová et al., 2011)**
Businesses in tourism	$\hat{p} = 0{,}7142$ $\hat{q} = 0{,}2857$	$p = 0{,}7412 \pm 1.96 * \sqrt{\frac{0{,}7412 * 0{,}2857}{105}}$ $p = 0{,}7412 \mp 0{,}0440$ $0{,}6278 \leq p \leq 0{,}8006$

By testing the hypothesis, we found that the level using of modern management methods in hotel establishments is between 25% and 37%. In the hypothesis, we have assumed of 50% which is above the expected level. From the above, we conclude that more than 50% of hotel establishments use modern management methods in conducting their business activities.

We continue with part of discussion. The researched area was the subject of several studies and publications. Authors Shtal et al. (2024) examine a comprehensive understanding of the issue of innovative management methods in the hotel industry. The research results point to contractual strategic management in conditions of economic and political instability. The use of elements of strategic management in the context of innovative methods were successfully used to reduce potential threats to the hotel segment, taking into account the specifics of this industry. An insight into the performance and innovations of hotel facilities is also offered by a study by Clauss et al. (2021), in which the authors state that strategic management has become a tool for achieving sustainable results. Their research showed that the use of innovative tools had a positive effect on the performance of hotel facilities. In a study by Havlovska et al. (2019) the importance of management decisions in connection with modern management methods is emphasized.

The authors created and applied a model that uses elements of information analytical support for management support, which contributes to cost optimization and improves the quality of management decisions. Pohuda (2023) analyzed modern management tools in the context of information and communication technologies in hotel facilities. She paid considerable attention to the tool CRM - IT-tour, in which she found that the use of this tool often best meets the requirements of the tourism industry. The results of the research were linked to the information field, in which the author emphasized the usefulness of information and communication technologies, which best correspond to the field of business activity and in the creation of a competitive strategy for business development in the tourism industry.

CONCLUSION

Organizations operating in the tourism industry that use modern management methods such as controlling, benchmarking, Balanced Scorecard and others in the management process have a better chance to succeed in this challenging and turbulent business environment. The development and advancement of information systems and technologies enable the improvement and streamlining of business activities, which cause an increase in customer needs and demands. How an organization copes with the expectations of modern management greatly influences the way, how the organization affects the surroundings, how the organization is perceived, and what its competitive position is.

Organizations in the field of tourism are constantly looking for new solutions that will move the organization to the right place in society and attract new customers. Currently, several management methods and techniques are used to help organizations stay ahead of the competition in the modern world. Many of them are classical and as a result new, more effective methods or procedures have been found. Nevertheless, they dominate by the inability to effectively transform the values achieved in these concepts into daily practice and the lack of utilization of appropriate tools for managing and evaluating the processes' performance. From the point of view of the practical application of findings for hotel establishments, we state the importance of using modern management tools to improve competitiveness and increase value not only for owners, but also for other interest groups. Following the linking of researches, we present the importance of using these tools in the context of a constantly changing political and economic environment. Strategic management tools help managers to implement the right decisions in the management of hotel establishments.

The research conducted, which was oriented to the issue of management methods in hotel establishments, also has its limits and limitations, which need attention to be paid to. A limiting factor may be the research sample, which is primarily defined by hotel facilities. In other types of tourism establishments, the data could be different. Another limiting factor may be the geographical coverage of respondents, which was limited to the Slovak Republic. Different results would be in connection with the international environment, for example, V4 countries such as Poland, the Czech Republic, Hungary, etc. An important limiting factor is the willingness of hotel establishments to participate in the conducted research. It is necessary to contact competent persons who would provide relevant answers to the research-related questions asked. The factor of a relatively specific issue, for which there is not yet a sufficient number of relevant studies in the environment of Slovak hotel facilities, can also be a limit. Extension of these studies would encourage comparison of current research results with other research. In this context, it is therefore important to mention the orientation to future research, in which we would like to focus on cross-border results, and we would try to reach out to hotel establishments that operate abroad and possibly compare them with the domestic environment.

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ROLE OF SOCIAL MEDIA AS A CATALYST FOR SUSTAINABLE TOURISM DEVELOPMENT IN CALABAR METROPOLIS, NIGERIA

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Abstract: This study investigates the role of social media in tourism development in Calabar, Nigeria, emphasizing its influence on image building, destination promotion, and information dissemination. A quantitative research design was adopted, utilizing structured questionnaires to collect data from tourism industry operators and local residents in key tourism zones. Findings reveal that social media significantly shapes public perception, attracts tourists, and fosters engagement between stakeholders and visitors. The study identifies educational campaigns and stakeholder collaboration as crucial strategies for maximizing social media effectiveness in tourism promotion. However, several challenges hinder its full potential, including budget constraints, intense competition for audience attention, and risks of misinformation or misrepresentation of tourism

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destinations. Hypothesis testing indicates a strong positive correlation between social media's role in tourism development and the challenges it encounters in Calabar. The study underscores the importance of strategic investment in digital marketing to enhance tourism growth. Strengthening public-private partnerships and adopting emerging social media trends are recommended for improving promotional efforts. To mitigate challenges, the study suggests implementing effective social media management practices, ensuring content accuracy, and optimizing engagement strategies. Additionally, increased funding for digital tourism initiatives and stakeholder training can support the sustainable use of social media. This research contributes to the growing body of knowledge on digital marketing in tourism and offers valuable insights for policymakers, tourism boards, and industry stakeholders.

Keywords: Calabar metropolis, destination, social media, tourism development, sustainable tourism

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INTRODUCTION

Globally, social media has become an essential component of tourism development worldwide, and West Africa is no exception. The region's rich cultural heritage, natural attractions, and burgeoning tourism sector have greatly benefited from social media platforms, which are instrumental in marketing, engaging tourists, and promoting sustainable tourism practices (Candia, 2024; Rocha, 2020). Studies conducted in West Africa demonstrate that social media networks have transformed many tourism destinations into thriving hubs, thereby facilitating tourism development (Mensah et al., 2023; Afrifah & Mensah, 2023). Tourism boards and operators across West Africa are increasingly adopting social media marketing strategies to enhance the visibility of attractions and cultural sites (Ajibade et al., 2023).

For example, Nigeria's Tourism Development Corporation (NTDC) has effectively utilized social media to promote the country's cultural festivals and natural landmarks (Adeola et al., 2023; Rahman et al., 2022). In countries like Ghana, Nigeria, and South Africa, social media plays a critical role in destination branding, enabling tourism boards to create strong brand images that resonate with potential tourists (Wang & Yan, 2022). Furthermore, campaigns on platforms such as Instagram and YouTube have significantly increased awareness and interest in Nigerian tourism, contributing to a rise in both domestic and international travel (Arasli et al., 2021).

Similarly, social media campaigns have proven effective in promoting events like the Chale Wote Street Art Festival, which attracts both local and international visitors (Dassah, 2023). Platforms like Facebook and Instagram are popular among young West Africans for exploring new travel destinations and activities (Odoom et al., 2021). Furthermore, social media enables destinations to offer personalized experiences by promptly responding to tourists' inquiries and requests. Hotels and tour operators in West Africa, for example, leverage social media to provide customized recommendations and address customer concerns efficiently (Raji et al., 2024). This level of interaction enhances customer satisfaction and fosters positive perceptions of the destination. By facilitating direct communication between tourists and tourism service providers, social media significantly boosts customer engagement (Sigala, 2019). Tourists frequently use platforms like Trip Advisor and Facebook to share their experiences, post reviews, and offer feedback. This user-generated content becomes a valuable resource for other potential tourists, who often rely on these reviews to make informed travel decisions (Cheung et al., 2022). Additionally, the real-time capabilities of social media allow tourism businesses to interact with their customers immediately, addressing concerns, answering questions, and creating a sense of community. This level of engagement is crucial for increasing customer satisfaction and loyalty, both of which are vital for the sustainable development of the tourism industry in West Africa (Chaulagain et al., 2024; Adam, et al., 2022; Raji et al., 2024). A strategic approach is essential for aligning social media efforts with the broader marketing objectives of a destination or tourism organization (Sano et al., 2024). Collaborating with social media influencers, who command large audiences, can significantly enhance a destination's visibility (Bastrygina et al., 2024).

Accordingly,by monitoring and analyzing social media metrics, tourism organizations can refine their strategies to strengthen their online presence (Sakas et al., 2022). Authentic engagement with audiences is crucial for building a loyal community of followers, who are more likely to become advocates for the destination (Singha, 2024). Social media has transformed global communication and business practices, presenting unparalleled opportunities for businesses, governments, and individuals to engage with their audiences (Alghamdi et al., 2023; Akpuokwe et al., 2024).

In Ghana and Nigeria, the social media landscape is particularly vibrant, with platforms like Facebook, Twitter, Instagram, and WhatsApp being widely used for a range of activities, including marketing, political campaigns, education, and social interactions (Arueyingho et al., 2023; Ampofo, 2023). In the digital era, social media has revolutionized how people make travel decisions, playing a pivotal role in influencing tourist arrivals worldwide. Platforms such as Instagram, Facebook, Twitter, and YouTube have become indispensable for travelers, offering inspiration, information, and reviews (Saleh, 2020; Irgashev, 2023). Research shows that influencer marketing on social media can significantly boost tourist arrivals at highlighted destinations (Venkatesh et al., 2024).

Influencers share their travel experiences with vast audiences, creating a sense of authenticity and trust that traditional advertising often lacks. Travelers use social media not only for inspiration but also for practical information, such as accommodation options, local attractions, and travel itineraries (Joseph et al., 2022).

Furthermore, social media enables real-time updates and interactions, allowing travelers to receive instant feedback and recommendations from their social networks (Kaur et al., 2024). Tourists are more inclined to trust information shared by fellow travelers rather than content from official tourism websites or advertisements (Lyu et al., 2023). User-generated content (UGC), including photos, videos, and testimonials, provides an authentic perspective on destinations, aiding potential tourists in making informed decisions. Historically, West Africa has often been portrayed negatively in international media, which has affected its appeal as a tourist destination. Social media has significantly shifted the narrative around West Africa, allowing local voices and travelers to share authentic experiences and positive stories. Social media platforms have been instrumental in changing the global perception of West Africa by showcasing its rich cultural heritage, diverse landscapes, and vibrant festivals (Engmann, 2022). User-generated content, such as travel blogs, Instagram posts, and YouTube videos, provides potential tourists with a more nuanced and appealing view of the region, challenging stereotypes and encouraging travel. Research indicates that social media marketing has significantly raised awareness of cultural events like Ghana’s Chale Wote Street Art Festival and Nigeria’s Calabar Carnival, leading to increased tourist arrivals during these festivals (Dassah, 2023; Obijuru, 2023). Additionally, the integration of social media with online booking platforms has streamlined the trip-planning process for tourists, contributing to a steady rise in visitor numbers (Hoang & Trang, 2023). Furthermore, positive reviews and active social media engagement have encouraged repeat visits and recommendations, further boosting tourist arrivals in the region (So et al., 2021).

Several challenges impact the global effectiveness of social media. A primary issue is the digital divide, which highlights the disparity between those with access to digital technologies and those without. The International Telecommunication Union (ITU) reports that, despite a global increase in internet penetration, significant gaps persist between developed and developing countries, as well as between urban and rural areas within nations (Bala, 2024). This digital divide restricts certain populations from fully engaging with and benefiting from social media. In Nigeria, social media penetration is substantial, with over 33 million active users (IseOlorunkanmi et al., 2023). This trend is similarly observed in Ghana, where social media is becoming an essential tool for business and political communication. The growth is fueled by widespread mobile phone use and increased internet access (Biney & Kumi Asamoah, 2023). In Nigeria, efforts by both government and non-governmental organizations to enhance digital literacy through community-based training programs are underway (Onyekwere, 2024; IseOlorunkanmi et al., 2023).

Additionally, South Africa’s National Broadband Policy aims to provide universal internet access, which is expected to significantly improve the effectiveness of social media (Mhlanga & Ndhlovu, 2023). In South Africa, addressing the digital divide necessitates integrating digital literacy programs into the education system to equip young people with essential skills for navigating the digital landscape (Le Hanie, 2021). Similarly, in Cameroon, there is a critical need for widespread digital literacy initiatives that extend beyond urban areas to rural populations. These programs should emphasize responsible and effective use of social media (Suvannadabha et al., 2022). South Africa has launched campaigns such as "Think Before You Click" to promote responsible social media usage among youth (Le Hanie, 2021). In Cameroon, similar initiatives are needed, especially to encourage responsible social media use in political communication contexts (Suvannadabha et al., 2022; Tatchou, 2022).

In Nigeria, a significant barrier to leveraging social media for tourism development is the inadequate digital infrastructure (Eze, 2019; Folayan & Obun-Andy, 2020; Abdullahi, 2021). Unreliable internet connectivity and frequent power outages severely hinder effective social media use (Adenuga & Montowska, 2023). Additionally, note that many tourism-related social media accounts in Nigeria suffer from poor content quality, limiting their effectiveness (Idem, 2022). Many Nigerian tourism organizations struggle with maintaining consistent and meaningful engagement with their audience (Arasli et al., 2021; Andem et al., 2024). Furthermore, proposed regulations, such as the Social Media Bill, have raised concerns about potential censorship and content restrictions, which could deter tourism operators from fully embracing social media due to fear of legal repercussions (Adae et al., 2023). The prevalence of fake news and misleading information online has led to a general mistrust of online content among potential tourists, complicating efforts to promote tourism via social media (Kanashina, 2024). Although numerous studies have been conducted globally and regionally on the role of social media in sustainable tourism development, few have specifically focused on the Calabar metropolis, Nigeria (Ghaderi et al., 2023; Mkumbo & Mbise, 2022; Amadi et al., 2024; Uyang et al., 2024; Uzodinma, 2021; Balogun, 2023). None of these studies have thoroughly explored the role of social media as a catalyst for sustainable tourism development within this context. This research aims to address this gap by assessing the role of social media as a catalyst for sustainable tourism development in Calabar, with specific reference to role of social media in tourism development, measures to ensure effectiveness of social media, Influence of Social media on tourist arrivals, challenges of social media for effective tourism development and Socio-economic characteristics of the sample population.

CONCEPTUAL FRAMEWORK: CAUSAL-CHAIN FRAMEWORK

The research findings were operationalized using the casual-chain framework to illustrate the inter-relationships among different dimensions and results of user behavior in social media adoption. This framework is grounded in the input-moderator–mediator-output model proposed by (Oyinbo et al., 2024).Within this framework, various research constructs are categorized into antecedents, mediators, moderators, and outcomes. For example, the variable "social influence" is positioned as an antecedent in some studies while serving as a mediator in others (Hoang et al., 2022). In the causal-chain framework, an antecedent is a factor that precedes a behavioral outcome and is placed on the input side. Social media research typically considers antecedents in three dimensions: social factors, user attributes, and organizational attributes.

Regarding social factors, numerous studies have utilized social influence and social capital as antecedents to explain users' socio-psychological motives. The social influence model, which includes subjective norms, group norms, and social identity, is frequently applied to explore users' or customers' motivations for engaging in specific behaviors or changes, as seen in the works of (Hoang et al., 2022; Ruangkanjanases et al., 2020; Hsu & Lin, 2020; Kwon et al., 2021; Lee & Kim, 2020). Similarly, the social capital model, encompassing social ties, social interaction, trust, and reciprocity, has been used as an antecedent in various social media studies. The causal-chain framework is a conceptual tool designed to trace the sequence of actions or events that lead to specific outcomes. When applied to sustainable tourism development, this framework helps to examine how social media contributes to the promotion and adoption of sustainable practices in a tourism destination. It operates on a set of assumptions regarding social media's impact on awareness, behavior, and policy, which collectively drive sustainable tourism development.

Assumption 1: Social Media as a Primary Tool for Awareness Creation

The initial assumption of the causal-chain framework is that social media functions as a key instrument for raising awareness about sustainable tourism practices. Platforms such as Instagram, Facebook, Twitter, and YouTube are considered highly effective in reaching broad and varied audiences with sustainability-related information. This belief is based on the idea that the extensive reach and interactive features of social media make it an ideal medium for quickly and widely disseminating messages. It is assumed that tourism boards, non-governmental organizations (NGOs), and influencers utilize social media to advocate for sustainable tourism principles, including environmental conservation, cultural preservation, and responsible travel. Through the creation of visually engaging and compelling content, these entities aim to shape public perceptions and enhance awareness of sustainability in tourism. This effectiveness in raising awareness is viewed as crucial for prompting subsequent changes in behavior.

Assumption 2: Social Media Influences Tourist Behavior

The second key assumption of the causal-chain framework posits that social media has a substantial impact on tourist behavior. Once awareness has been raised, it is believed that social media can directly influence how tourists plan and undertake their trips. This influence manifests through various mechanisms, such as influencer marketing, user-generated content (UGC), and peer-to-peer interactions. Influencers who advocate for sustainable travel are thought to set trends and establish norms that their followers are likely to adopt. This assumption is grounded in the idea that individuals are inclined to mimic behaviors demonstrated by those they admire or consider credible. Similarly, UGC such as images, reviews, and travel narratives shared on social media is presumed to offer social proof, enhancing the attractiveness and practicality of sustainable tourism practices. This content plays a role in shaping tourists' decisions, motivating them to make more environmentally and socially responsible choices. The assumption here is that social media not only raises awareness but also drives tangible behavior changes by increasing the visibility and appeal of sustainable practices. Such changes are expected to boost demand for sustainable tourism options, thereby affecting the supply dynamics within the tourism industry

Assumption 3: Social Media Facilitates Policy Implementation and Destination Management

The third assumption is that social media plays a pivotal role in supporting the implementation of sustainable tourism policies and managing tourism destinations. This assumption is based on the belief that social media platforms serve as a forum for public discussion, advocacy, and stakeholder engagement. Through these platforms, various stakeholders including tourists, local communities, and NGOs can express their concerns, share best practices, and push for sustainable policies. It is assumed that social media campaigns, particularly those that gain widespread attention, can pressure policymakers and destination managers to focus on sustainability in tourism planning. This influence may arise from viral campaigns initiated by NGOs, grassroots movements, or broad public support for sustainability issues. Social media is thought to facilitate a bottom-up approach to policy development, where public demands and input are integral to shaping effective sustainable tourism policies. Additionally, the assumption is that social media fosters the collaborative creation of sustainable tourism solutions by enabling idea exchange and cooperation among different stakeholders. This collaborative approach is expected to result in more inclusive and effective policies, which are crucial for achieving long-term sustainability in tourism destinations.

Assumption 4: The Cumulative Effect of Social Media on Sustainable Tourism Development

The final assumption of the causal-chain framework is that the cumulative impact of social media activities such as raising awareness, driving behavior change, and facilitating policy development ultimately contributes to sustainable tourism development. This assumption rests on the belief that effective use of social media to boost awareness, shape behavior, and influence policy will result in a more sustainable tourism destination across economic, environmental, and social dimensions. It is assumed that these interconnected processes create a positive feedback loop, where increased sustainability in tourism practices further enhances social media’s role in promoting these practices. For instance, as more destinations adopt sustainable policies and tourists increasingly engage in sustainable behaviors, social media content related to sustainability is expected to proliferate, thereby reinforcing the entire causal chain. Within this framework, social media is considered a crucial driver of sustainable tourism development, influencing various stages of the causal chain and accelerating the adoption of sustainable tourism practices. Without social media’s impact, the spread and adoption of sustainable tourism practices would likely be slower and less extensive (Figure 1). However, the causal-chain framework concerning social media's role as a catalyst for sustainable tourism development is based on several fundamental assumptions. These assumptions include the capability of social media to effectively raise awareness, its impact on shaping tourist behavior, its contribution to policy implementation, and its overall influence on advancing sustainable tourism development.

By understanding and applying these principles in this research, the data reveal several ways social media contributes to sustainable tourism development, influences tourist behavior, and increases tourist arrivals. Furthermore, the data indicate various measures to ensure the effective use of social media in tourism development within the study area. These research findings are framed within the causal-chain framework, which underscores how stakeholders in the tourism industry can more effectively leverage social media to foster positive change and advance sustainable tourism development in the study area.

RESEARCH METHODOLOGY

The study employs a survey research design to collect both qualitative and quantitative data, aiming to establish relationships among variables (SyJr & Gempes, 2023).

Methods of data collection: This study was conducted in the Calabar metropolis, focusing on the role of social media in sustainable tourism development. A questionnaire served as the primary data collection instrument, with a total of 230 copies distributed randomly to residents within tourism development areas. Population of the study: The study population consists of operators from various sectors within the tourism industry in the study area. Additionally, residents living around the tourism developments also constitute the study population. Sampling technique: The study used a random sampling technique to ensure that every individual in the study area had an equal chance of selection. This approach was chosen to provide an unbiased representation of the population. Sample size: A sample size of 230 respondents was used for the study, drawn from both operators in the tourism industry and residents within tourism development areas.

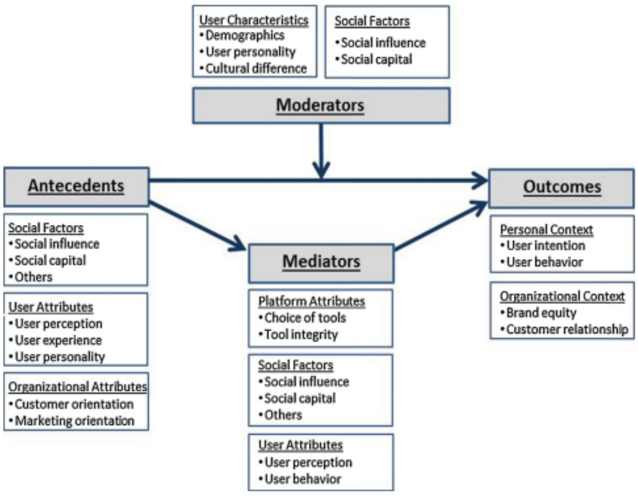

Figure 1. Causal-chain framework

Hypothesis

One hypothesis was stated in this research work thus: There is no significant relationship between the role of social media in tourism development and challenges of social media for effective tourism development in Calabar

Techniques for data analysis: This hypothesis can be tested using Pearson's Product Moment Correlation formula, as outlined by Pearson (1896), which is mathematically expressed as follows:

$$r = \frac{N\sum xy-(x)}{\sqrt{[(N\sum x^2)(\sum x)2]}\,[(N\sum Y^2)-(\sum Y^2)]}$$

Where: r = Correlation Coefficient; X = Role of social media; Y^2 = Challenges of social media; N = Number of variables; ∑ = Summation; ∑x = Sum of X (independent variable); ∑y = Sum of Y (dependent variable).

Table 1. Role of social media in tourism development in Calabar **(**Source: Authors fieldwork, 2024)

	Impact of media	Frequency	Percentage
1.	Destination promotion	53	23.04
2.	Image building	90	39.13
3.	Information dissemination	22	9.60
4.	Cultural exchange	8	3.4
5.	Social media engagement	6	2.6
6.	Influencer marketing	3	1.3
7.	Crises management	7	3.0
8.	Online booking and reservations	6	2.6
9.	Environmental conservation	7	3.0
10.	Economic impact	5	2.1
11.	Event promotion	23	10.0
	Total	230	100

RESULTS AND DISCUSSION

Role of social media in tourism development

The analysis of social media's impact on tourism development showed that image building, driven by media efforts, had the greatest influence, accounting for 39.13 percent, followed by destination promotion at 23.04 percent. Additionally, information dissemination and cultural exchange were identified as significant impacts, with values of 9.60 percent and 3.4 percent, respectively. The findings also highlighted that social media engagement, 2.6 percent, and crisis management, 3 percent, played roles in tourism development. However, influencer marketing within the destination had a minimal impact, with only 1.3 percent among the eleven factors examined (Table 1) (Figure 2).

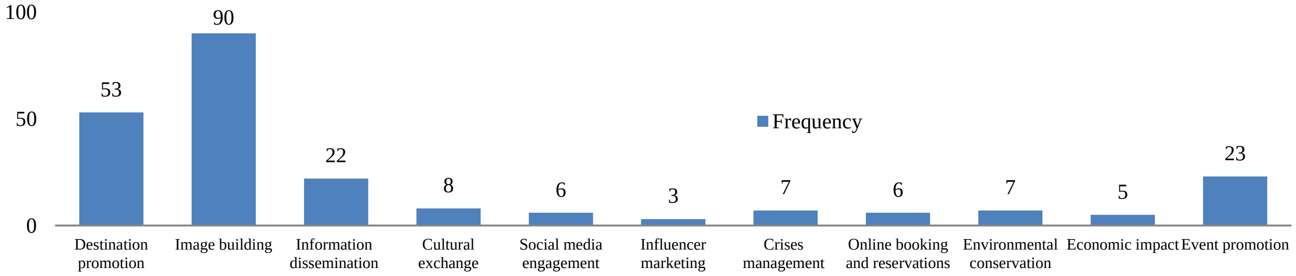

Figure 2. Role of social media in tourism development in Calabar (Source: Authors fieldwork, 2024)

Measures to ensure effectiveness of social media

The study identified key measures for enhancing the effectiveness of social media in tourism development. Education campaigns and community engagement emerged as the most significant measures, with 36.5 percent and 33.91 percent, respectively. Additionally, 18.70 percent, 13.03 percent, and 8.6 percent of respondents highlighted collaboration with tourism stakeholders, strategic destination marketing, and collaboration with influencers as important strategies.

Table 2. Measure to ensure effectiveness of social media (Source: Authors fieldwork, 2024)

S/N	Measures to enhance media effectiveness	Frequency	Percentage
1.	Education campaigns	84	36.50
2.	Data analysis for targeting	13	5.6
3.	Collaboration with tourism stakeholders	43	18.70
4.	Crises communication	10	4.3
5.	Community engagement	78	33.91
6.	Virtual tours and experiences	6	2.6
7.	Interaction campaigns	7	3.0
8.	Collaboration with influencers	20	8.6
9.	Digital presence and online platforms	5	2.1
10.	Visual Storytelling	6	2.6
11.	Strategic destination marketing	30	13.04
	Total	230	100

Other measures included interaction campaigns 5.6 percent, virtual tours and experiences 4.3 percent, and visual storytelling 3 percent. Furthermore, 3 percent of respondents agreed that interaction campaigns are also crucial, while 2.6 percent emphasized the importance of virtual tours, experiences, and visual storytelling (Table 2) (Figure 3).

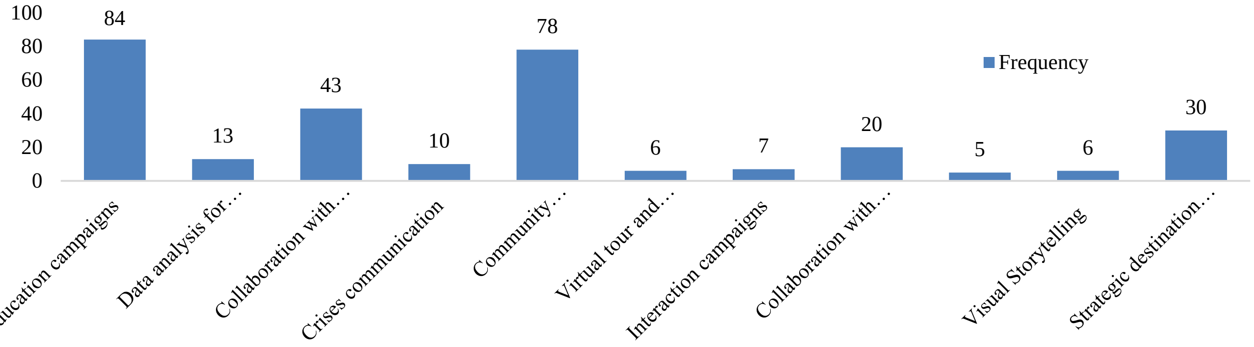

Figure 3. Measure to ensure effectiveness of social media (Source: Authors fieldwork, 2024)

Influence of Social media on tourist arrivals

The analysis of social media's influence on tourist arrivals revealed that social media presence and advertising campaigns were the most significant factors, with values of 34.80 percent and 20 percent, respectively. Similarly, 20 percent and 10 percent of respondents confirmed that event coverage and digital marketing also played a crucial role in influencing tourist arrivals in the study area. Additionally, peer recommendations and crisis management, each with a value of 3 percent, further contributed to social media's impact on tourist arrivals. The data also showed that online reviews and testimonials, collaboration campaigns, and influencer partnerships, each with a value of 2.6 percent, were notable social media influences on tourist arrivals in the study area (Table 3).

Table 3. Influence of Social media on tourist arrivals **(**Source: Authors fieldwork, 2024)

S/N	Media influence in visitors arrivals	Frequency	Percentage
1.	Advertising campaigns	46	20.00
2.	Travelplanning and research	8	3.4
3.	Social media present	80	34.80
4.	Influencer partnership	6	2.6
5.	Video content	5	2.1
6.	Peer Recommendations	7	3.0
7.	Online reviews and testimonials	6	2.6
8.	Event coverage	36	15.70
9.	Collaboration campaign	6	2.6
10.	Crises management	7	3.0
11.	Digital marketing event	23	10.00
	Total	230	100

Challenges of social media for effective tourism development

The challenges of social media for effective tourism development in the study area are highlighted by several key issues. Over 29.13 percent of the respondents identified budget constraints as a significant obstacle to the effectiveness of social media. Additionally, competition for attention, 17.8 percent, and misrepresentation, 14.7 percent, were noted as challenges. Another 14.7 percent of respondents pointed to language and cultural barriers as impediments to effective social media use for tourism development. Furthermore, 10.86 percent of respondents cited the perception of overpopulation as a challenge. The impact of global events and sustainability concerns, with values of 3.91 percent and 3.00 percent respectively, also posed challenges. Negative publicity, 2.6 percent, and privacy concerns were identified as the least significant challenges to social media's role in tourism development in the study area (Table 4).

The findings from Hypothesis, which posited no significant relationship between the role of social media in tourism development and the challenges of social media for effective tourism development in Calabar, warrant closer examination. The data presented reveal a positive correlation between these variables, as demonstrated by a coefficient of (R=0.686; P<0.001). This indicates a clear alignment and a linear relationship between social media's role in tourism development and the challenges faced in ensuring its effectiveness in Calabar. Consequently, the null hypothesis is rejected in favor of the alternative hypothesis, leading to the conclusion that a substantial relationship exists between social media in tourism development and the challenges it encounters in achieving effective tourism development in Calabar (Table 5).

Table 4. Challenges of social media for effective tourism development **(**Source Authors fieldwork, 2024)

S/N	**Challenges of media**	**Frequency**	**Percentage**
1.	Impact of global event	9	3.91
2.	Rapid technological changes	6	2.6
3.	Sustainability concern	7	3.0
4.	Language and cultural barriers	18	7.80
5.	Budget constraint	67	29.13
6.	Lack of diversity in representation	9	3.9
7.	Competition for attention	41	17.8
8.	Privacy Concerns	6	2.60
9.	Misrepresentation	34	14.7
10.	Over- tourism perception	25	10.86
11.	Negative publicity	6	2.6
	Total	230	100

Table 5. Correlation analysis of the relationship between social media in tourism development in Calabar and challenges of social media for effective tourism development (Source: Data analysis, 2024)

Parameter	N	R	p-value
Socio-media	10		
		0.686**	0.001
Challenges	10		

Socio-economic characteristics of the sample population

The socio-economic characteristics of the sample population reveal that 66.96 percent of the respondents were male, while 33.04 percent were female. Additionally, 32.60 percent of the respondents were single, 22.60 percent were married, followed by 18.26 percent who were divorced, 13.47 percent who were widows, and 13.04 percent who were widowers. Furthermore, 22.17 percent and 32.17 percent of the respondents fell within the age brackets of 26 to 45 years, while 12.17 percent and 11.17 percent were between 46 to 65 years. Moreover, 9 percent of the respondents were aged 66 years and above. The data also indicates that only 13.91 percent of respondents were within the age bracket of 15 to 25 years (Table 6).

Table 6. Socio-economic characteristics of the sample population **(**Source: Authors fieldwork, 2024)

Sex	**Frequency**	**Percentage**
Male	154	66.96
Female	76	33.04
Total	**230**	**100**
Marital status	**Frequency**	**Percentage**
Single	75	32.60
Married	52	22.60
Divorce	42	18.26
Widow	31	13.47
Widowers	30	13.04
Total	**230**	**100**
Age	**Frequency**	**Percentage**
15 – 25	32	13.91
26 – 35	51	22.17
36 – 45	74	32.17
46 – 55	28	12.17
56 – 65	25	11.00
66 and above	20	9.00
Total	**230**	**100**

DISCUSSION

The Role of social media in tourism development as observed in result findings, revealed that image building propagated by the media followed by destination promotion were the major role of social media in tourism development (Chaulagain et al., 2024; Adam et al., 2022). The findings align with the empirical works of social media, which constitutes a major factor that enhances tourism development at any given destination (Cheung et al., 2022; Raji et al., 2024; Balogun, 2023; Omotomilola et al., 2024). Moreover, cultural exchange and event promotion also form a significant role of social media in tourism development, which aligns with the research findings (Dassah, 2023; Mzembe & Idemudia, 2022). Furthermore, it was noticed in the research findings that social media has a smaller role to play in influencer marketing in the destination (Arasli et al., 2021). This assertion agreed with the works of (Sigala, 2019). Although social media plays a vital role in destination image and promotion (Candia, 2024; Rocha, 2020). Accordingly, the research findings further indicate that several measures are required to ensure effectiveness of social media for tourism development in the study area (Bastrygina et al., 2024). However, the research findings show that education campaigns and community engagement were the major measures to ensure the effectiveness of social media in tourism development (Arueyingho et al., 2023; Ampofo, 2023). This is also supported by the empirical works of (Alghamdi et al., 2023; Akpuokwe et al., 2024) and further align with (Sakas et al., 2022). Similarly, it was observed from the research findings that several factors of social media had influence on tourist arrivals in the study area (Venkatesh et al., (2024). This evidence from the research findings showing that social media presence and advertising campaigns were the major influence of social media on tourist arrivals (So et al., 2021; Dassah, 2023). Notably, the research finding shows several challenges of social media for effective tourism development in the study area (Onyekwere, 2024; IseOlorunkanmi et al., 2023; Le Hanie, 2021). Similarly, these challenges such as budget constraints and misrepresentation were observed to constitute a major threat to tourism development in the study area (Suvannadabha et al., 2022; Tatchou, 2022). These findings further collaborate with the works of (IseOlorunkanmi et al., 2023; Mkumbo & Mbise, 2022) and also align with the empirical findings of (Mhlanga & Ndhlovu, 2023; Bala, 2024). Again, the findings indicate that competition for attention, the impact of global events and lacks of diversity in representation were also challenges of social media in tourism development (Biney et al., 2023; Ghaderi et al., 2023).This finding further agrees with the empirical findings of (Andem et al., 2024) that show several challenges associated with social media for tourism development in the study area (Eze, 2019; Folayan & Obun-Andy, 2020; Abdullahi, 2021).

CONCLUSION

Evaluating the role of media as a catalyst for sustainable tourism development of Calabar as a tourism destination highlights the vital connection between media influence and the growth of the tourism industry. Media, spanning platforms such as television, radio, social media, and print, is essential in shaping perceptions, sharing information, and promoting destinations. For Calabar, a city celebrated for its rich cultural heritage, natural beauty, and historical significance effective social media use is crucial for tourism development. Social Media acts as a bridge, showcasing Calabar's unique attractions and experiences to both local and international audiences. With captivating visuals, compelling narratives, and persuasive messaging, social media platforms can spark the interest of potential tourists and inspire them to visit Calabar. The impact of social media on tourism development in Calabar is undeniably substantial. By leveraging social media's potential to highlight its distinctive features, Calabar can attract more tourists, drive sustainable growth, and contribute to the region's socio-economic development. It is therefore imperative that stakeholders prioritize the strategic use of social media as a driving force in enhancing tourism growth and realizing Calabar's potential as a top travel destination in Africa.

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DECIPHERING THE CRYPTOCURRENCY IMPACT ON TOURISM DYNAMICS: LEGAL INSIGHTS FROM SPAIN, FRANCE, CROATIA, AND THE NETHERLANDS

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Abstract: The research delves into the nexus between cryptocurrencies and touristic activity, with a special focus on the facet of legal regulations. The study's objective is to fathom how cryptocurrencies influence the tourism sector, how legal standards bear on transactions involving cryptocurrencies within the tourism industry, and to what extent they render the adoption of cryptocurrencies in tourism feasible. The principal aim is to unravel the interconnection between the employment of cryptocurrencies in tourist services and its concurrent legal governance in four handpicked countries: Spain, France, Croatia, the Netherlands The investigation encompasses, on the one hand, the exploration of legal case studies and, on the other, the evaluation of hypotheses using clustering neural networks to dissect the interrelation between cryptocurrencies and tourism. Clustering was achieved through SOM and PCA methodologies, which, in unison, proffer profound insights into the data's architecture and interconnectedness. The data was collected by scraping with an API key, allowing us to examine all cryptocurrency acceptance points by category in each country. During this process, we employed a big data setup. The research underscores that blockchain technologies, including but not limited to Ethereum's advancements that extend beyond just Bitcoin, are steadily gaining a more influential role in tourism. Furthermore, legal guidelines, especially within the EU, have a significant influence on transactions and operations associated with these digital assets. This becomes paramount as, in the scrutinised region, the count of cryptocurrency and blockchain acceptance venues correlates with the vigour of tourism. Blockchain technologies, which transcend just the realm of Bitcoin and encompass advances like Ethereum, are progressively playing a pivotal role in tourism sector. Legal regulations emerge as a cardinal determinant in the governance of blockchain and cryptocurrency-related transactions and operations. The interplay between tourism and these technologies calls for further investigation, especially against the backdrop of a mutable legal environment. However, a conclusion can be drawn regarding its multiplicative impact on the economic pulse of the tourism sector.

Keywords: cryptocurrencies, tourism, legal regulations, blockchain technology, smart contracts

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INTRODUCTION

Since Önder et al. (2017) stated that most academic community is slow in identifying and investigating blockchain's potential impacts, the topic itself has evolved and is the focus of tourism research. Technology such as blockchain also belongs to the latest digital solution to spend money through your own devices. Alexandar et al. (2020) referred to ‘app-capitalism’ which has also had a strong impact on financial decisions. Cryptocurrency, mainly Bitcoin, has attracted high media attention, so blockchain technology is at the forefront of interest in various industries.

Thanks to this technology, the creation of decentralised currencies (like Bitcoin) can be created, and security is ensured by digital contracts that are called smart contracts. According to the European definition of the Court of Justice - which was in the preliminary ruling of the Judgment in Case C-264/14 - “Bitcoin is a virtual currency used for payments between private individuals over the Internet and in certain online stores that accept it; users can purchase and sell the currency based on an exchange rate.” In this Judgment, the Court stated that „the exchange of traditional currencies for units of the virtual currency is exempt from VAT”. That decision ensures an important legal background on the tourism market and helps travellers to buy more and higher levels of services.

Furthermore, it minimises the need for a central authority, banks or other third parties (Valeri & Baggio, 2021), like online travel agents (Önder & Treiblmaier, 2018). By these movements, the use of the new era of financial assets (cryptos) is challenging the actual legal solutions, regulations. From this standpoint, the question for the legislators arises as follows. Is the current (old) regime appropriate in all cases or do we have to re-button the jacket? This paper firstly details the importance of modern technology, followed by the specific legal background in the countries covered, and finally the analysis of the aggregated and clustered data on NUTS 3 regions.

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Our research focuses on the European region, including France, Spain, Croatia, and the Netherlands, and tries to explore whether there is a significant correlation between the number of cryptocurrency acceptance points and tourism activity and spending, while also focusing on the legislative background. After reviewing the broader academic context according to the articles cited below, the contribution of this research is to establish the correlation between the use of cryptocurrencies and their acceptance points. By this result, the current scientific debates could be centred around the idea that crypto acceptance stimulates and promotes the development and operation of the tourism sector.

LITERATURE REVIEW

Blockchain, the technology

Blockchain technology is a decentralised and secure system that developed the data management technology for Bitcoin currencies for the first time. This descriptive database consists of a list of transaction blocks, i.e. information and hash collection. These blocks contain all transactions that were previously secured in the chain, and a particular transaction can overtake all substances in the block. The blocks are linked together and form a secure chain (Nakamoto, 2008; Alexandar et al., 2020; Önder et al., 2017; Thees et al., 2020), and a particular transaction can overtake all substances of the block. Blocks are linked together and form a secure chain (Prados-Castillio et al., 2023). Blockchain provides not only data integrity but also security, anonymity (Thees et al., 2020), transparency, trust, privacy (Alexandar et al., 2020), and collaboration among stakeholders (Balasubramanian, 2022), but it is decentralised and can be used without the control of a third-party organisation or government and does not need a human intervention from a legal perspective (Nakamoto, 2008; Balasubramanian et al., 2022; Shen & Bay, 2020). Kowalski et al. (2021) stated that trust in mathematical methods is stronger than trust in authority. Since 2008, blockchain technology has slowly but increasingly influenced the tourism industry (Nam et al., 2019). From a tourist perspective, it improves tourism experience, rewards sustainable behavior, ensures the benefit of the local community and reduces privacy concerns (Tyan et al., 2020) to build trust between the parties and to help solve problems directly. In terms of sustainability, it is important to note that traditional events provide an opportunity for tourists and the local community to enjoy a wide range of local traditions, customs and popular culture (Kőmíves & Vehrer, 2024). By offering more local and organic food, and deliberately introducing new cooking methods and techniques, the food prepared would better meet the changing needs of guests (Kőmíves, 2018). Hungarian cuisine has been renowned and famous for centuries, and we have continued this tradition and passed it on to the next generations (Kőmíves, 2017).

Smart technology, smart contract, and smart destinations

The blockchain can be considered a distributed database that can guarantee the reliability and validity of information. Erol et al. (2018) noted that sustainability is crucial in tourism. The WTO also stated that the installation of environmentally efficient new technology can ensure sustainability goals (UNEP, 2005). Blockchain technology has three generations (BTC Wires, 2019; Nam et al., 2019). The first was the invention of Bitcoin (David et al., 2019), which was followed by the second generation of blockchain technology that enabled smart contracts. The newest third generation of technology enabled smart contracts through applications. Smart contracts are self-executing and self-enforcing contracts based on the blockchain code (Nam et al., 2019; David et al., 2019; Alexandar et al., 2020; Balasubramanian et al., 2022) that was innovated by Ethereum founders (BTC Wires 2019; Nam et al., 2019). These are computerized transaction protocols that apply the terms of the contract (Szabo, 1994 cit. Gans, 2019; Szabo, 2020 cit. Prados-Castillo et al., 2023).

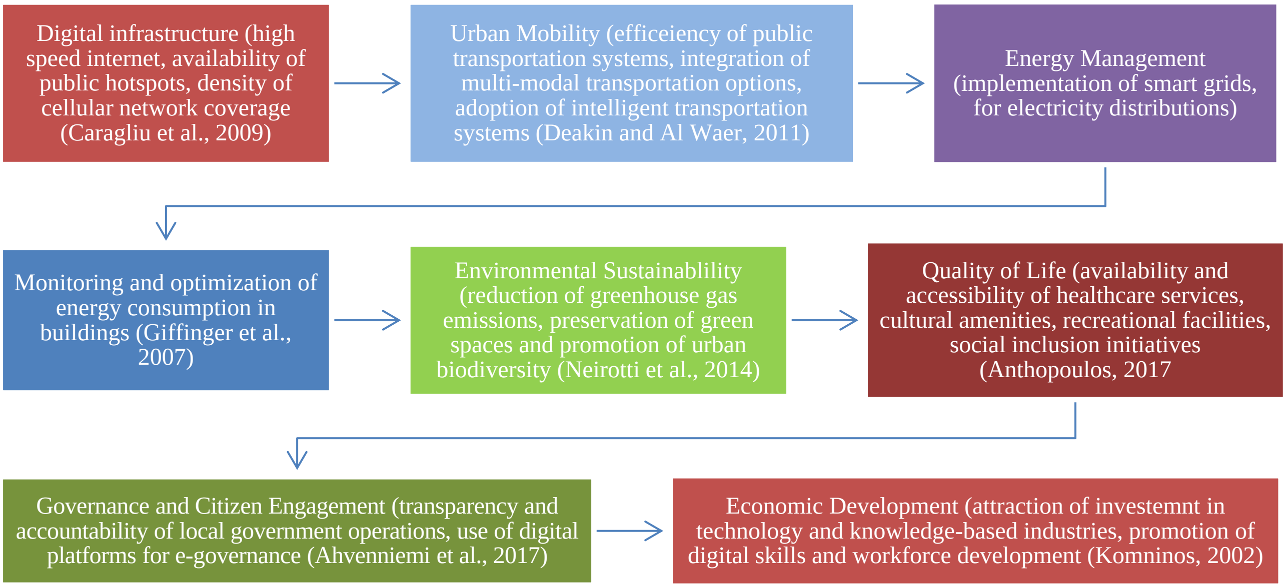


Figure 1. Key indicators of smart destinations (Source: Own edition)

Since data protection is the basis for tourism consumption, technology appears to be a great solution for travelers and service providers. The third generation is called DApps (Decentralised Applications), which allows people to interact more regularly and familiarly with blockchain technologies on their electronic devices (Nam et al., 2019: 2) and not on a single computer anymore. Nam et al., stated in 2019 that there were more than 2,551 DApps with an estimated daily active user of 78,120. In 2022, the number of DApps on the Ethereum scaling platform Polygon reached 37,000, a 400% increase since the beginning of 2022, and in July 2022, the number of monthly active blockchain teams reached 11.800.

These figures show that interest in and access to technology is growing at an extraordinarily fast rate. The importance of blockchain technology lies in its ability to link a complex data system to identify online consumers (Tyan et al., 2020; Line et al., 2020; Balasubramanian et al., 2022). Smart tourism destinations use different databases and platforms and apply different ICTs to ensure continuous information of tourists and stakeholders. In practice, smart tourism is a combination of smart destination, smart experience and smart business (Gretzel et al., 2015; Baranyai, 2018) while digitalization is vital basis for the destinations development. All three components are necessary for the success, while the destination itself must continue to focus mainly on the improvement and development the local quality of life, but unlike in the past, it also reflects the 21st century needs of tourists. Investment in digital infrastructure and innovation hubs help to to develop innovative smart tourism solutions. Indicators for smart cities destinations are crucial for assessing the effectiveness of technological implementation and gauging progress towards sustainable, efficient urban development. Below you can see Figure 1. with the main indicators commonly used for evaluating smart cities and destinations.

The use of information and communications technologies (ICTs) is inevitable. The use of blockchain technology makes destinations able to achieve four main goals (Tyan et al., 2020): offer better services to improve tourism experience, rewarding sustainable safeguard local communities’ benefits and reduce privacy concerns. Real-time information is crucial to tourist decisions. Koo et al., 2017; Tyan et al., 2020 said that new realities in tourism are caused by ICT in destinations, travellers, and businesses. Smart tourist destinations can provide authentic travel experiences by obtaining real-time information on all tourism services, such as tourist tracking, luggage management, fast check-in procedures, and travel insurance to improve tourism experiences (Dogru et al., 2018; Tyan et al., 2020).

These transactions include the preparation and receipt of money, the payment of products and services, the reservation of hotel rooms and flights, the reservation of seats, and the entry into force of a smart contract between the parties (Dogru et al., 2019). Smart cities and destinations with a crypto-economic can be more successful than cities without or without a digital infrastructure (Prados-Castillo et al., 2023: 815). Basis for smart tourism destinations is the smart city and it can improve the experience of tourists by personalising services (Buchalis & Amarangganana, 2015). According to a recent ProtechOS survey, London is one of Europe's 100 most popular cities, followed by Amsterdam, Berlin, Paris, and Lisbon.

The European Commission states that Smart cities are places where traditional networks and services can be made more effective through digital solutions, for the benefit of residents and businesses. The Commission also says that smart tourism is capable of responding to new challenges such as the evolution of digital tools, products, and services, equal opportunities and Access for all visitors, sustainable development of local communities and support for the creative industry, local talent and heritage. The potential of digital platforms and the use of blockchain technology will enable sustainable development. The title Sustainable Tourism Destination emphasises the importance of providing economic benefits to local communities and tourists. The use of B lock chain technology can achieve and contribute to the achievement of these objectives.

Importance of Blockchain Technology for the European Union

Until now, national regulators have responded in various ways, from the wait-and-see approach, warnings to sanctions to avoid compliance with capital market rules. The regulatory response concerned primarily illicit trade, market integrity and customer protection. Despite the activities carried out in individual countries - as will be shown in the next chapter - regulatory intervention often spans a variety of regulators, crypto markets operate globally within the regulatory gap, and have not yet achieved a globally harmonised position. The European Commission is currently developing a legal framework for innovation in the areas of digital assets (tokenization) and smart contracts to protect consumers and provide legal certainty to companies. The Commission strongly supports the pan-European framework and hopes to avoid the fragmentation of legislation and regulation. As the global economy accelerates, the EU is paying close attention to the opportunities offered by digital technologies. One of Europe's progressive pillars is the European Blockchain Partnership (EBP). “The EU wants to be a leader in blockchain technology and to become a pioneer in blockchain technology and a home for important platforms, applications and companies” (European Commission).

The focus of EBP is on the construction of the European Blockchain Service Infrastructure (EBSI). According to EBSI data, in early 2021, 21 projects from 18 European countries participated in the first pilot program. (European Commission - EBSI). According to the European Commission, The Netherlands, France and Spain signed the EBP Declaration on Digital Day 2018. Croatia joined the partnership in 2019 with the aim of avoiding fragmentation of the blockchain landscape by promoting close cooperation between EU countries. EBSI is an interconnected network of nodes running a blockchain service infrastructure. Until 10 April 2021 (last update to the official website of the EBP), the programme had 30 members. (European Commission). The Regulation 2023/1114 of the European Parliament and of the Council on markets in crypto-assets (further defined as MiCA) defines the crypto asset in its Article 3 point (5) as a digital representation of a value or of a right that is able to be transferred and stored electronically using distributed ledger technology (DLT) or similar technology. The MiCA distinguishes between three types of crypto assets as per Article 3 points (6), (7), (9):

1. asset-referenced tokens: designed to maintain stable value by referencing the value of multiple fiat currencies that are legal tender, one or more commodities, one or more crypto-assets, or a combination of these assets.

2. e-money token: the main purpose of which is to be used as a medium of exchange and to maintain a stable value by referencing the value of a fiat currency that is legal tender; and

3. utility token: Provides digital access to a good or service available on a DLT and is accepted only by the issuer of the token in question. NFTs are excluded from MiCa's scope.

The digital opportunities offered by blockchain technology and smart contracts affect public administrations and bring with them the need for regulation. It comes from the fact that major economies have been contentious on blockchain technology and regulation, specifically cryptocurrencies (Kwok & Koh, 2018).

Although EU legislation and its policymaking are of primary importance in the community, the implementing legislation and specific rules of the countries are of direct relevance. In the following sub-chapter, the paper will look at the rules harmonised with EU law in each of the countries discussed.

Legal background of cryptocurrencies in tourism activity in the countries surveyed

France enacted a new genre of regulation through Law n° 2019-486 of 22 May 2019 (Plan d'Action pour la Croissance et la Transformation des Entreprises, PACTE law). Putting aside the European regulator's preferences, France chose to grant an optional visa for Initial Coin Offerings ("ICO"), as well as a combination of required registration for select intermediaries and a voluntary license for everyone. Most laws need an opt-in, but once the choice is exercised, certain constraints apply.France has adopted quite an authentic approach to regulating digital assets, willing to perform a balancing act between sufficiently attracting an elusive and intangible environment towards a more normalised existence.

The Authority of Financial Markets (AFM) is the **Dutch** regulatory body for financial markets. Furthermore, the Netherlands' financial sector is overseen by the Dutch Authority for Consumers and Markets (ACM) and the Dutch Central Bank (DNB). AFM and DNB have issued a taxonomy that is commonly used on a global scale, delineating between three distinct kinds of cryptocurrency.: transaction crypto(s); utility crypto(s); and investment crypto(s). These categories are highly interconnected, as these "cryptos" can have multiple functions simultaneously, and their function can change over time. For example, an investment crypto may transform over time into a utility crypto or a payment crypto.

Cryptocurrencies do not qualify as money (geldmiddelen) within the meaning of the FSA. Under the FSA, money is defined as cash (chartaal geld), scriptural money (giraal geld) and electronic money (elektronisch geld) altogether.

The prevailing view is the Netherlands takes an innovation-friendly strategy with an open but careful connection between regulatory, supervisory, and governmental bodies and market participants.

In **Spain**, cryptocurrency is largely un(der)regulated because cryptocurrencies are not financial instruments under Spanish law. However, there are some main regulations related to the issue of cryptocurrencies.

The Fifth Money Laundering Directive (5MLD) was transposed into Spanish law through Royal Decree-Law 7/2021 (RD-Law 7/2021). Such RD-Law 7/2021 also introduced the most relevant amendments on Law 10/2010 on the prevention of money laundering and terrorist financing (Law 10/2010) including as obliged entities the exchanges of virtual currency for fiat and e-wallet custodian service providers. The main financial services regulation is Spanish Law 6/2023 on Securities Markets and Investment Services ("LMVSI"). The CNMV proposal gives us a normative definition of crypto assets, stating that a crypto asset is a '[d]igital representation of an asset or right that can be electronically transferred or stored by using distributed ledger technologies or other similar ones'. There is no specific regulation on cryptocurrencies in Spain, except that they cannot be treated as legal tender, which is exclusively reserved for the euro as the national currency.

Regardless of your nationality, if services related to "Virtual Currency Exchange for Fiat Currency' or "Services for the Custody of Electronic Wallet Custody' are offered or provided in the Spanish territory, these individuals or entities will have to be registered with the Registry of the Spanish Central Bank ("SCB") created for these purposes. Virtual currencies are defined as 'a digital representation of value that is not issued or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency, and does not possess a legal status of currency or money but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored, and traded electronically.' Since 'virtual currency' is a synonym for 'cryptocurrency' the **Croatian** government has implicitly provided cryptocurrencies with a legal definition as shown in Table 1. The fact that the Croatian legislation does not regulate cryptocurrency raises two considerations. First, Croatian authorities do not issue licenses to cryptocurrency companies. However, cryptocurrency investors should be aware that cryptocurrency trading is considered a 'financial transaction' in Croatia.

Table 1. Overview table of the various national approaches (Source: Own edition)

	France	**The Netherlands**	**Spain**	**Croatia**
Main attribute	To establish sui generis regulating attitude	To elaborate a strict and clear taxonomy to empower the crypto development	Unclear, un(der)regulated legal surroundings	Developmental legal surroundings, relying to the regarding acts of the EU
Main act / regulation	PACTE-law	Wet op het financieel toezicht (Financial Supervision Act – FSA)	Law 6/2023 on Securities Markets and Investment Services (LMVSI); Law 7/2021 on the Fifth Money Laundering Directive (5MLD)	None, just a rulebook
Key agents	French Parliament; Autorité des Marchés Financiers (AMF)	Authority of Financial Markets (AFM); The Dutch Central Bank (DNB)	Securities Market Commission (CNMV)	Blockchain and Cryptocurrency Association in Croatia; Croatian Government
Pro / contra	Pro-crypto attitude with a unique approach	The pro-crypto attitude encourages the development and use of blockchain technology, and has a positive attitude toward technological innovations	Highly un(der)regulated legal environment, but proactive defending strategies in favor of the small investors	Pro-crypto attitude and efforts to catch up with EU policies

It is not clear how big the crypto market is in Croatia. The Blockchain and Cryptocurrency Association counts several hundred members. There are 18 crypto companies registered with the authorities in Croatia, according to a list of groups filed with regulators. One of those companies is Electro coin, an exchange that reported €72 million in revenue last year. Its leaders welcome the new crypto regulations despite the compliance process.

MATERIALS AND METHODS

To conduct an in-depth investigation and establish stronger correlations in which aggregated data do not distort the relationships, we determined the level of each of our regional statistical studies at the NUTS 3 level. In this research, the intensity of tourism is interpreted based on the number of nights spent in tourist accommodation according to NUTS 3, for which data were provided by Eurostat (2023). Consequently, a total of 221 NUTS 3 regions were included in the analyses.

The number of cryptocurrency acceptance locations was collected through scraping methodology using an API key. This was based on the CoinMap database, accessed through their official API key. Data collection occurred in September 2023, using Python code within the Jupyter framework. This process collected information about the names, categories, dates, countries, states, localities, and geocodes of the cryptocurrency acceptance locations. To obtain accurate location data, an instance of Geolocator was implemented in the code. Our script was capable of handling external influences, server responses, and other technical issues, managing errors such as GeocoderTimedOut, GeocoderServiceError, and RequestException. Additionally, it checked the validity of coordinates using Geolocator and handled incorrect coordinates.

A total of 20,012 data points were collected for the four selected countries. The NUTS 3 divisions were deduced from the settlement level using Eurostat's LAU list, allowing both tourism- and cryptocurrency-related data to be interpreted at the same level, the NUTS 3 level. To expand our previous research and examine the relationship between cryptocurrencies and tourism, we found it worthwhile to begin by conducting a relevance test. Specifically, we sought to answer the following question: Q1 - In which category are cryptocurrencies most commonly used?

This leads to the Q2 question: if they are most used in tourism-related categories, which is the most popular tourism service used with cryptocurrencies? Given that previous research has shown that tourism demand generally leads in terms of digitalisation level, it is reasonable to assume that if cryptocurrencies are used in the examined region, then H1: they are primarily used in the tourism sector. Furthermore, it is also plausible to assume that the most successful tourist areas keep up with the demand for cryptocurrencies. Therefore, we hypothesise that H2: the number of nights spent in tourist accommodation correlates with the number of cryptocurrency acceptance locations in the examined regions.

RESULTS AND DISCUSSION

On reviewing the established database, several characteristics were observed on the data. In the case of Croatia, presented in Figure 2., several concentrations were observed: Zagreb, as the capital, with a rich cultural and business life, serves as the primary destination for cultural and MICE tourists in the country, as well as the area of Vir and Split, which are central tourism hubs in Dalmatia. Although not regionally, but at the city level, Dubrovnik also stands out as one of the country's primary destinations.

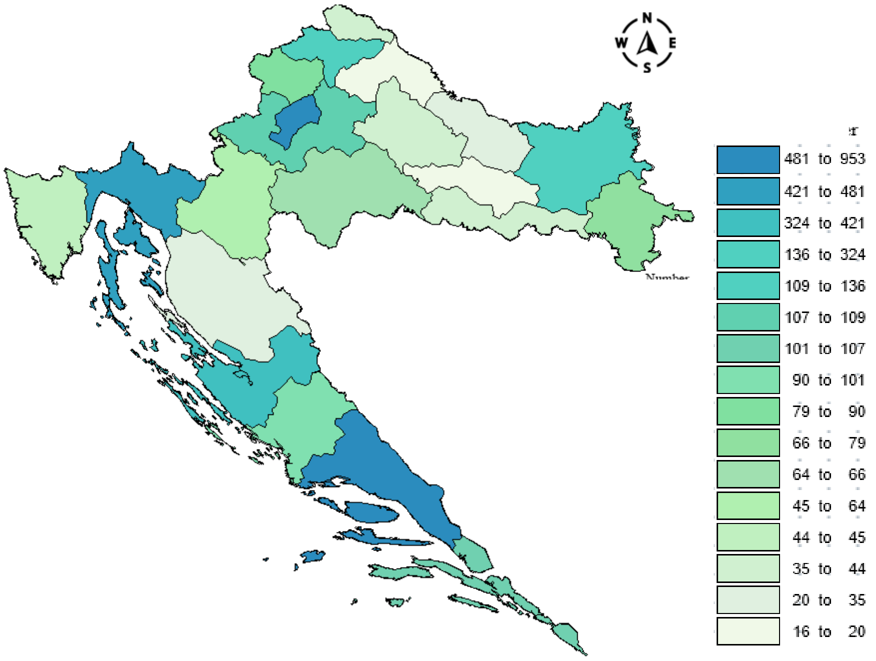


Figure 2. Number of cryptocurrency acceptance locations in Croatia, NUTS3 regional representation (Source: Self edited by own collection)

The number of cryptocurrency-accepting accommodation providers is exceptionally high in the Zadarska županija county (178 cryptocurrency-accepting accommodation providers), the highest number among the counties, indicating the region's touristic popularity. Dubrovačko-neretvanska županija (50 cryptocurrency-accepting accommodation providers) also demonstrates significant touristic allure, especially in historical cities similar to Dubrovnik. Primorsko-Goranska županija (31 cryptocurrency-accepting accommodation providers) likely reflect the touristic offerings around Opatija and Rijeka. Maintaining focus on the research, it is essential to mention the Splitsko-dalmatinska županija county from a tourist perspective, significant for its cryptocurrency-accepting nightlife venues, likely due to the city of Split and the surrounding islands, while Osječko-baranjska županija county is notable for its café cryptocurrency acceptance category.

These data suggest that Zadarska and Dubrovačko-neretvanska counties are particularly attractive to tourists with cryptocurrencies, especially regarding accommodation. The Splitsko-dalmatinska county stands out in the nightlife category, while the Osječko-baranjska county does so with its cafés. Based on the data, these counties could be the focal points of Croatian cryptocurrency tourism. In these counties, where the applicability of cryptocurrencies in the tourism sector is clearly dominant, the composition of service providers was also analyzed. In Zadarska županija county, larger enterprises appear; for example, a supermarket chain is also on the list of service providers, but several apartments, such as Apartman Punta Bajlo and Apartments VIRIĆ, also reinforce the legitimacy of cryptocurrencies: these and similar apartments indicate that the demand for accommodation in the region is significant, showing its impact on tourism.

In the case of Dubrovačko-neretvanska županija, cryptocurrency-accepting accommodation providers near Dubrovnik represent one of the pillars of tourism, especially in the form of high-standard apartments and villas.

In Splitsko-dalmatinska županija, the presence of hair and beauty salons and apartments shows that the region offers comfort, wellness, and private accommodation as opportunities for spending digital currency. On the other hand, Osječko-baranjska županija county differs from the former, where a multitude of local businesses strives to satisfy tourists wishing to pay with cryptocurrencies. Service providers catering to smaller segments of tourism, but essential from the perspective of the local economy and digital currencies, are abundant. In France, several "empty" regions are observable from the perspective of cryptocurrency acceptance locations. However, concentrations are also noticeable.

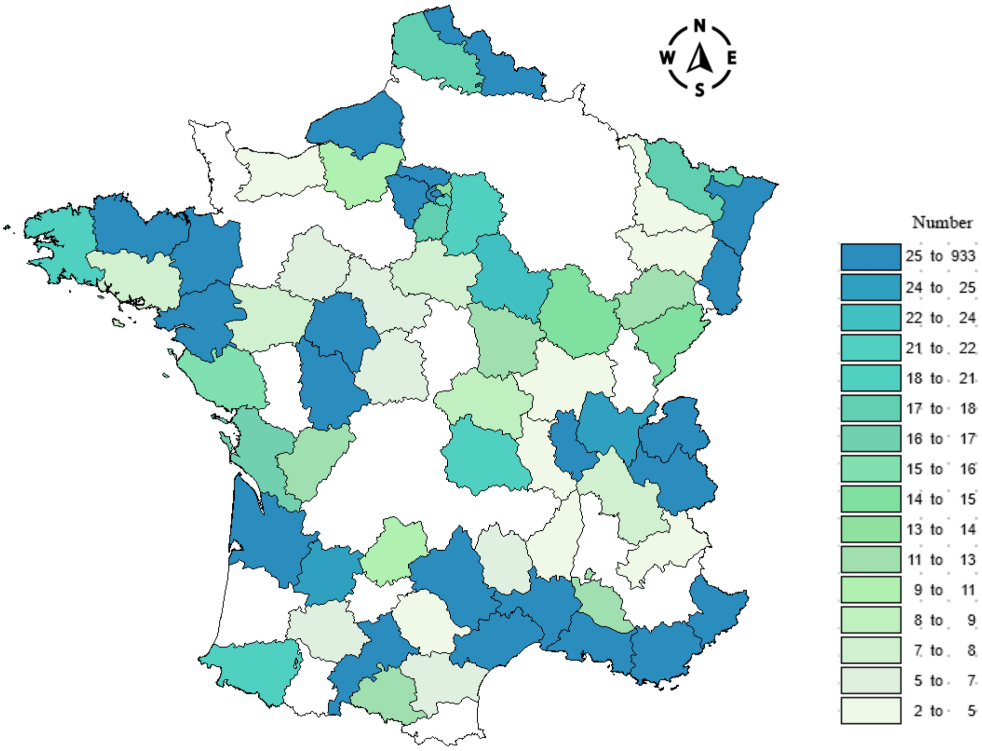


Figure 3. Number of cryptocurrency acceptance locations in France, NUTS3 regional representation (Source: Self edited by own collection)

Based on the analysis of cryptocurrency-accepting service providers in France, as we can see in the Figure 3, Alpes-Maritimes is undoubtedly noteworthy, standing out in the categories of shopping, restaurants, attractions, and transportation. These data indicate that the Côte d'Azur region, especially the cities of Nice and Cannes, are significant touristic destinations, attracting visitors with cryptocurrencies with diverse services. In this region, restaurant chains and players of significant players, tourism experiences, and accommodation services widely accept digital currencies. Bas-Rhin primarily addresses digital wallet holders looking for shopping and attractions, encompassing Strasbourg, an important site for historical and cultural tourism. Naturally, other cryptocurrency-accepting service providers are numerous here, mainly in the technological and commercial sectors, but the region is also significant from a touristic perspective, remaining within the focus of this research.

Aveyron is an excellent location to spend digital currencies, especially for accommodation, as indicated by the significant number of such providers. This suggests that the county focuses on active tourism, such as rural tourism and hiking, when interpreting cryptocurrencies. The high presence of the Gite de la Fontaine accommodation network is an excellent sign of this. Based on the data mentioned, France's touristic geographical peculiarities show significant regional differences, reflecting the touristic profile of various regions, in the aspect of cryptocurrency acceptance. Alpes-Maritimes is distinguished for luxury tourism and coastal vacation opportunities, while Bas-Rhin could be a center for cultural and historical tourism. Aveyron may be attractive for rural tourism and natural beauty.

The analysis could also be interesting regarding the capital city, identifying the following touristic aspects for Paris: The city is exceptionally attractive for shopping, gastronomy, and nightlife from the perspective of cryptocurrencies. The city offers various cultural and entertainment opportunities, attracting tourists and locals alike who wish to pay with cryptocurrencies. The variety of different types of services and the presence of popular restaurants and bars contribute significantly to Paris's touristic appeal in the context of Web3.0, with several chains such as Restaurant Le 43, Sof's Bar, Beaubien, Crea-Shop, Alzon, Nagatomi, Butte aux Tha, and other service providers significantly adding to this.

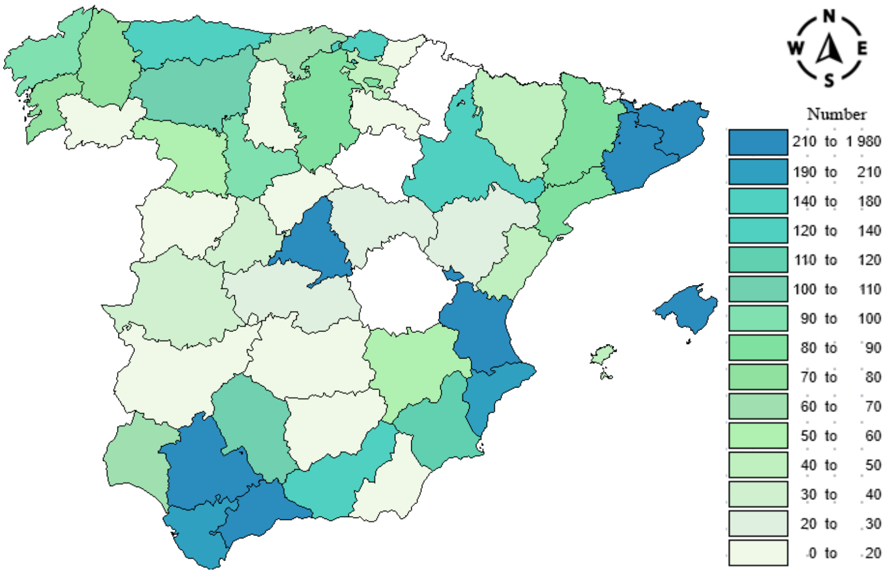


Figure 4. Number of cryptocurrency acceptance locations in Spain, NUTS3 regional representation, (Source: Self edited by own collection)

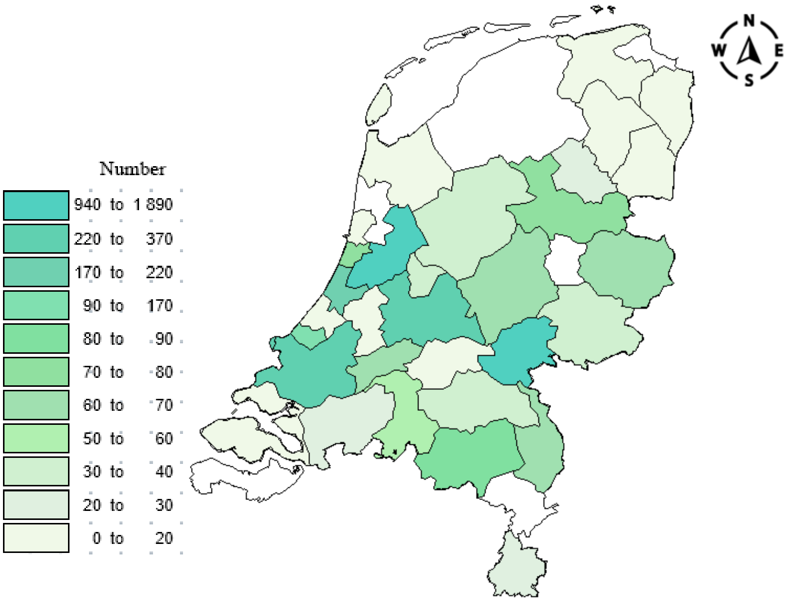


Figure 5. Number of cryptocurrency acceptance locations in The Netherlands, NUTS3 regional representation (Source: Self edited by own collection)

In the case of Spain, is shown in Figure 4, the larger cities provide the strength of each region. Mentioning Barcelona, Madrid, Málaga, Valencia, Palma alone evokes thoughts of tourism. In Madrid, those with cryptocurrencies are mainly welcomed in restaurants, of significant importance, but shopping venues are also significant categories. This indicates that gastronomic and shopping experiences are the key for cryptocurrency-shopping tourists in the region. The number of accommodation providers is also substantial, ensuring comfortable placement for tourists arriving in the city. Nightlife and cafés also play an important role in the aspect of cryptocurrency-accepting locations, indicating the city's dynamic and diverse cultural life. Barcelona is also prepared, with touristic services almost everywhere present in the aspect of acceptance of cryptocurrency, whether it is nightlife, food, or drink. The number of attractions is also significant in the context of digital coin acceptances, enhancing the city's touristic appeal. The transportation services. The most popular providers, such as Ultramarinos and Tollodaris, represent local flavours and the Barcelona lifestyle in the field of web 3.0 payment tools.

In Málaga, cafés lead, reflecting the southern Spanish lifestyle and the desire to relax. Shopping opportunities and transportation are also important, ensuring the comfort of tourists and easy access to the region in terms of cryptocurrencies. The top providers, such as El pequeño Buda - Tetería and the segway malaga experience, emphasize the local culture and the unique experiences offered to tourists, enhancing the legitimacy of the digital tourist.

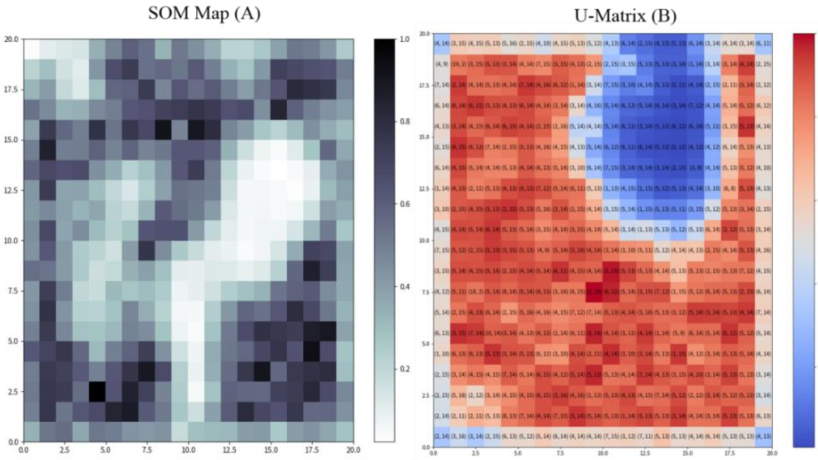
In the Netherlands, shown by Figure 5, city-dominant regions are identifiable – Amsterdam, Rotterdam, Utrecht, The Hague, Eindhoven, Arnhem – but the acceptance of cryptocurrencies in rural, smaller settlements is not rare. The Netherlands is particularly strong in shopping and dining options regarding cryptocurrencies, an important attraction for tourists. The number of accommodation providers is also significant, indicating the strengthening of tourism infrastructure. The diversity of the Dutch tourism sector is reflected in the wide range of different types of services that meet the diverse needs of tourists. Based on the analysis, the strength of the Netherlands' tourism sector in the context of web3.0 payment tools lies in the diverse and quality services that attract international visitors. This is reinforced by the fact that among the top service providers are names such as StarBikes Rental, Jia, Snackbar 'De Hoefslag', Camping de Eendenkooi, and B&B De Haven. These service providers offer various services to the web 3.0 digital tourists, including bicycle rental, restaurants, snack bars, camping opportunities, and accommodation.

A peculiarity of the Netherlands is that the western regions are much more developed in terms of analysis, whereas in the north, the presence of crypto service providers is almost negligible compared to the total examination.

For the four selected countries, the establishment of a clustering neural network was justified to explore whether there are specific patterns in the grouping of categories at the settlement level. The clustering neural network analysis method, through SOM (Self-Organising Maps) and PCA (Principal Component Analysis), is suitable for examining the research question whether there are groupings of categories at the settlement level.

In this context, SOM and PCA serve as complementary methods in data analysis, particularly in this case, where data are provided by a big data file. We found both methods justified because SOM allows for clustering of data in a lower-dimensional space, aiding in the visual identification of patterns and groupings while preserving the topological properties of the data. This is reinforced by the linear transformation technique of PCA, which repositions the data in a new coordinate system where the variables (principal components) are independent. This enables dimensionality reduction without a significant loss of information. In the PCA process, the data is transformed to maximise variance, so the first principal component represents the greatest variance, the second the second greatest, etc. This helps identify the most significant patterns and trends in the data. For neural network analysis, the data was normalised, upon which the SOM was trained. During the training process, typographical errors were collected to examine how the error changes over iterations.

The Self-Organising Map (SOM) was trained on the normalised data over 1000 iterations. Figure 6. illustrates the SOM map (A.), where distances between different cells are represented by colour intensity (darker areas indicate greater distances). To interpret this, we also created a U-matrix (B) that represents the distances between the neurones of the SOM, as shown in Figure 6. to which we added the centroids of the clusters. These two maps help identify different clusters and their distances from each other. Identifying clusters helps to understand the data structure and the relationships between different categories.


SOM Map (A)

U-Matrix (B)

Figure 6. The SOM Map (A) and the U-Matrix (B) (Source: Output from own analysis)

During the categorization process, the neural network model divided data into 120 distinguishable categories. The Figure 7. illustrates the most common categories within the clusters. The "Item number" column indicates how many clusters feature the category as the most frequent one. As evident from the figure, the trio of nightlife, food, and lodging – categories directly related to tourism – collectively has the most significant influence in the clusters. This influence is not distorted by the shopping category, as both locals and tourists use the opportunities it presents. This is reinforced by the fact that typical local services - such as groceries and sports - and the categories with negligible presence on the diagram, such as ATMs and local services – greatly underperform in weight compared to the other categories. Reflecting on the research question, the data and methods used suggest that cryptocurrencies are used in tourism in the regions studied with significant intensity, and as shown in Figure 3, mainly during nightlife. During SOM clustering, input data (settlements and categories) were organised on a two-dimensional map, creating a data table with X and Y coordinates, where similar data points are located close to each other. Different arts of the map represent clusters, which denote groups of data. The most prominent groupings in terms of categories are as follows: Nightlife: 44 clusters; Shopping: 38 clusters; Food: 34 clusters; Lodging: 31 clusters; Transport: 5 clusters; Sports: 1 cluster; Grocery: 1 cluster. The notation "Nightlife: 44 clusters" signifies that the "Nightlife" category is the dominant category in 44 distinct clusters. A deeper examination of the data reveals that, according to the methods used in this study, cryptocurrencies are predominantly used in tourism in the regions examined, thus validating the H1 hypothesis.

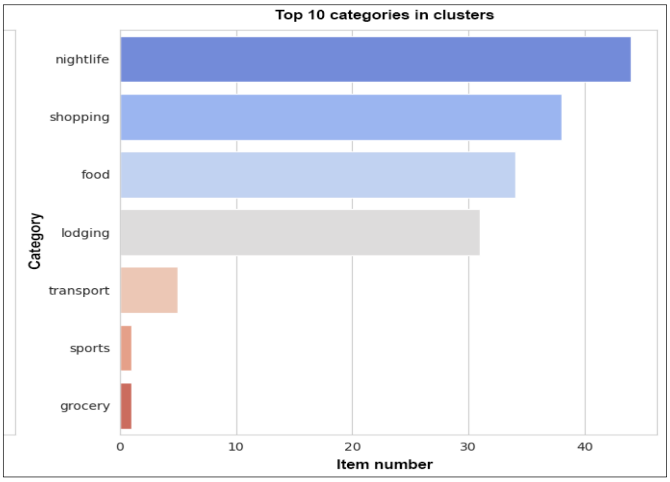


Figure 7. Summary diagram for category clusters
(Source: Output from our analysis)

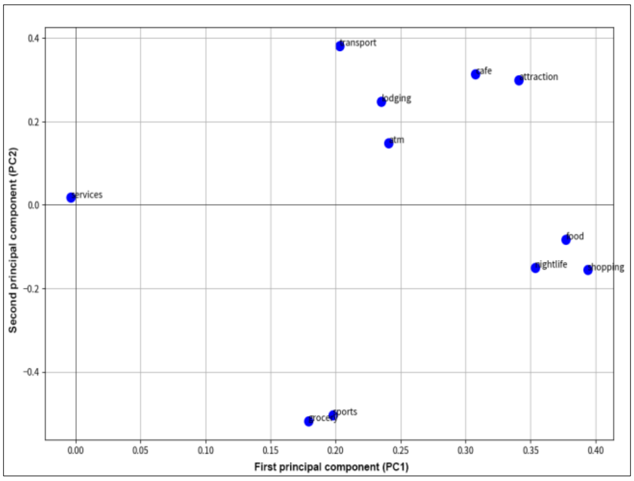


Figure 8. Loadings of the categories in the first two principal components, (Source: Output from our analysis)

To gain a better understanding of the clustering neural network, principal component analysis (PCA) was used, which involves creating linear combinations of the original variables. In our analysis, the first few principal components account for a significant portion of the data's variance. As we increase the number of principal components, the cumulative variance also increases, albeit at a diminishing rate. The first principal component alone explains a substantial part of the data's variance. However, as we increase the number of principal components, the increase in cumulative variance decreases, indicating that each additional principal component contributes less to the total variance.

Figure 8 illustrates the loadings of categories in the first two principal components. Categories located close to each other on the figure, such as "nightlife" and "cafe," show similar patterns across settlements, suggesting that places with a vibrant nightlife likely also have numerous cafes. This observation indicates regions where cryptocurrencies are more widely accepted in tourism. Categories situated further from the origin demonstrate greater loadings in a particular principal component. For example, the category „shopping" shows a substantial loading in the first principal component (PC1), indicating that shopping is a critical factor across settlements. This has implications for the tourism sector, suggesting that shopping opportunities with cryptocurrency play a significant role in tourists' choice of cities.

Categories near the origin exhibit lower loadings in both principal components, which implies that they contribute less to the explanation of variance in the data, such as sports or groceries. The wide distribution of categories in the figure indicates that settlements offer unique experiences in different categories. For the tourism sector, this means cities should diversify their offerings to attract various types of tourists. Based on the PCA results, the tourism sector could benefit from diversifying offers and leveraging connections between categories. For example, in a city where nightlife is popular, investing in cafes and restaurants could be advantageous. Similarly, enhancing shopping opportunities can be crucial, as they significantly influence tourists' city choices. Cities should also identify unique or exceptional categories to use in their tourism marketing.

This analysis not only strengthens the answer to our research question, but also confirms that, according to data and methods, cryptocurrencies are highly used in tourism in the studied regions. To demonstrate the correlation between cryptocurrency acceptance locations and tourism intensity and to examine our hypothesis H2, that the number of nights spent in tourist accommodations correlates with the number of cryptocurrency acceptance locations in the regions, correlation analyses were carried out. We interpreted the data at the NUTS 3 level, considering the number of guest nights spent in tourist accommodations as the dependent variable (Y) and the number of cryptocurrency acceptance locations in the NUTS 3 region as the independent variable (X). The consolidated data analysis yielded the following results:

Table 2. Correlation Table (Source: Output from our analysis)

	Value	**Lower 95%**	**Upper 95%**	**Signif. Prob**
Correlation	0.458693	0.332622	0.568658	<.0001*
Covariance	9.236e+8			
Count	174			

The correlation coefficient value of 0.458693 indicates a moderately strong positive relationship between the number of nights spent at tourist accommodations and the number of cryptocurrency acceptance locations within a country's NUTS 3 regions. It can be concluded that as the number of cryptocurrency acceptance locations in a region increases the number of guest nights generally increases as well. The 95% confidence interval indicates the level of certainty we have in the value of the correlation coefficient. In this case, we can say with 95% confidence that the true value of the correlation coefficient lies between 0.332622 and 0.568658. This means that even under the most pessimistic estimate, there is a positive correlation between the two variables. The p-value "<.0001" suggests that it is highly unlikely that the observed correlation coefficient occurred by chance. This implies a probable genuine relationship between the two variables, and not merely due to random fluctuations in our sample. The positive covariance value indicates that as one variable increases, so does the other, consistent with the positive correlation value. Based on these results, we can say that the number of nights spent in tourist accommodations is positively correlated with the number of cryptocurrency acceptance locations in the country's NUTS 3 regions. As the number of crypto-accepting locations in a region increases, the number of guest nights typically increases as well. With these findings, we consider our hypothesis H2 to be validated, confirming that the number of nights spent in tourist accommodations correlates with the number of cryptocurrency acceptance locations in the examined regions.

CONCLUSION

In our research, we conducted a detailed analysis of the current status and potential impacts of cryptocurrency applications in the tourism industry in four examined countries. Our study paid special attention to key aspects highlighted in the literature, such as the application of digital payment tools in tourism and the economic impacts of tourism.

During our literature review, we tracked the global trends in cryptocurrency applications in tourism. Digital payment tools such as cryptocurrencies are increasingly gaining traction in the tourism sector, as supported by several studies. The application of cryptocurrencies in tourism not only diversifies payment methods but also offers new opportunities for the hospitality industry, such as reducing transaction costs and speeding up payment processes. Our research concluded that there is a moderate positive correlation between the number of cryptocurrency acceptance points and the intensity of tourism in the four countries studied. Using self-organising maps (SOM) and Principal Component Analysis (PCA) methods, we determined that cryptocurrencies in tourism appear primarily appear in accommodations, nightlife, and shopping centres. This correlation is particularly pronounced in Spain, France, the Netherlands, and Croatia.

The application of cryptocurrencies in tourism not only signifies a diversification of payment methods, but also opens new opportunities in the tourism sector, such as faster and simpler service for guests and promoting sustainable tourism. Additionally, cryptocurrencies allow for transactions without intermediaries, reducing costs and increasing transaction security. According to our research, the increase in the use of cryptocurrencies correlates with an increase in the number of nights spent in tourist accommodations, indicating that this payment method is increasingly accepted in the tourism sector. This trend could be particularly important for the digitalisation and sustainable development of tourism, especially in the countries we studied, where tourism is a significant economic factor.

Our research has several limitations that should be noted. The data on cryptocurrency acceptance points was not uniformly detailed or up-to-date, potentially affecting the results. The study focused on four countries—Spain, France, the Netherlands, and Croatia—limiting its generalizability to other regions. The analysis primarily examined accommodations, nightlife, and shopping centers, overlooking other sectors like transportation. Additionally, while self-organizing maps (SOM) and Principal Component Analysis (PCA) identified correlations, they did not establish causation. Finally, the findings represent a specific point in time, and the rapidly evolving nature of cryptocurrencies and tourism may lead to changes not reflected in this study. In conclusion, the growing acceptance of cryptocurrencies in tourism opens new opportunities for the sector, particularly in terms of digitalisation and sustainability. Our research highlights that the use of cryptocurrencies in tourism not only emerges as a new payment tool but also contributes to the transformation of the tourism sector.

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GEOMORPHOLOGICAL STRUCTURE OF LANDFORM CHARACTERISTICS AS A REFERENCE FOR DEVELOPMENT RECOMMENDATIONS IN WADI RUM PROTECTED AREA

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Abstract: This research will look at numerous fundamental geomorphology ideas, with a focus on geomorphological systems. Geomorphology researchers use a variety of landscape evolution models, with the assumption that unstable landscape equilibria evolve quickly. We investigate the relationship between geomorphological concepts and ecosystem dynamics, with a particular focus on categorizing plant groups based on various landform features observed in southern Jordan. By conducting research in this region, we aim to gain a deeper understanding of previous scholarly discussions surrounding Wadi Rum, specifically in the context of geomorphology. Furthermore, we must integrate geomorphological references with socioeconomic research, given their inextricable link to community activities and development. This research used a geomorphological technique to thoroughly examine and assess the physical and ecological attributes of the Wadi Rum Protected Area. The research used both qualitative and quantitative methodologies to provide a thorough understanding of the geomorphological structures and processes affecting the area. The researchers performed a comprehensive content analysis of current scientific literature, concentrating on geomorphological characteristics and their interaction with ecosystems. This study established a theoretical framework and criteria for articulating field observations, providing insights into the degree and scale of temporal change. The diverse geomorphological features play important roles in shaping and influencing local ecosystems. According to established theories, the unique characteristics of landforms offer valuable insights, as they emerge from a lengthy process of morphogenesis, or landscape evolution. This makes them ideal for analysis when formulating recommendations for sustainable development, which considers the unique qualities of landforms. The researchers utilized Global Mapper and AutoCAD for geospatial data analysis, digital terrain modeling, and accurate topographic mapping, aiding geomorphological analysis and sustainable development planning. We should avoid uncontrolled and unsustainable development to preserve the area's landform characteristics for future generation.

Keywords: Wadi Rum Protected Area (WRPA), geomorphological structure, landforms, geomorphology on ecosystems

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INTRODUCTION

Wadi Rum Protected Area (WRPA) holds immense significance in terms of its rich history, not solely due to its unique culture and the notable sites found within it, but also because of the breathtaking landscape and diverse biodiversity it diligently protects. The rugged terrain of this region provides an ideal refuge for a wide variety of wildlife and their respective habitats, creating a critical sanctuary for nature. The landscape, preserved predominantly in its natural state, presents a mesmerizing sight that draws tourists from populated countries who are eager to witness its stunning beauty.

Although the area appears relatively barren at first glance, it is home to native and specialized flora, which plays a vital role in grazing practices for local livestock. A small population resides in the vicinity of the protected area, relying on it not only for livestock grazing but also for its picturesque landscapes and rich historical value, further emphasizing the area’s importance in both agricultural and cultural contexts. WRPA has transformed into an appealing hub for the exchange of experiences and the dissemination of knowledge, thanks in part to its various activities that encompass creative writing, photography, painting, sculpture, and film-making. The high quality of geomorphological studies conducted in this region

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provides invaluable insights, paving the way for significant advancements in managing human impact on geosystems. This ongoing research is critical in the efforts to substantially reduce the anthropogenic pressures within mostly protected areas. Consequently, the primary aim of our study was to develop relevant landform characteristics using Wadi Rum and Ma'an as a foundation for potential development recommendations. This development primarily concerns the establishment of a desert park, which would be characterized by various forms of infrastructure enhancement and diverse industrial and investment opportunities. In order to mitigate potential conflicts with the nearby WRPA, it is essential to manage the area thoughtfully, taking into consideration the distinct geodiversity that these developments will generate.

The key factor in advocating for the appropriate development of the region lies in accurately determining the landform-related geomorphological dynamics, wherein the applicable planning principles must be instituted. The entirety of the work comprises four substantive chapters. The geographical conditions present in the WRPA and its surroundings play a crucial role in influencing the geomorphological dynamics of the existing eco geosystems. We have also established a comprehensive group of geo components and geo processes that most effectively reflect the intricate relationship between the geomorphology and the ecosystems present in the area. In conclusion, we delve into the intricacies of the geomorphological structure associated with selected landform characteristics. Based upon the outcomes of our analyses, we engage in a discussion surrounding the existing knowledge concerning the geomorphological typology of the region and identify potential areas for future research that could reinforce the recommendations for the area's development plans.

To minimize conflicts with the conservation objectives dedicated to the Wadi Rum Protected Area, we propose diverse potential themes closely linked with the new desert park. The landform characteristics inherent to the area may serve as a solid foundation for future development opportunities within both the tourism and facilities sectors. This development will be mindful of the principles of sustainable growth, the unique natural experience of the place, and the existing character that defines the Wadi Rum reserve, ensuring a harmonious relationship between development and conservation efforts (Gani et al., 2024; Al-Shawabkeh, 2023; Wright et al., 2023; McPherran, 2023; Rowley et al., 2021).

2. BACKGROUND OF WADI RUM PROTECTED AREA

The geography of Jordan is uniquely characterized by a richness of several iconic landscapes that attract the steadfast attention of both locals and foreigners alike. These remarkable and special natural areas require ongoing preservation, enhancement, and restoration efforts in response to the ongoing environmental degradation threatening their existence, in order to secure long-term benefits for future generations. Consequently, seven distinct natural areas in Jordan have been officially declared as protected areas to safeguard their integrity. One of the most recent natural areas to be designated as a protected area is the renowned Wadi Rum Protected Area, which was designated in 2011. This stunning Wadi Rum Protected Area is strategically located in the southern part of Jordan and is included in the protected area category V, which is classified as a protected landscape or seascape. This classification emphasizes the importance of conserving its unique landscape while allowing for sustainable tourism and local use (Jawabreh et al., 2024a; Shatnawi & Obaidat, 2022).

Wadi Rum is a deep, dry valley nestled on the edge of southern Jordan. Wadi Rum, roughly half the size of Amman, is located 60 kilometers east of the Jordanian coastal city of Aqaba and about 100 kilometers south of the ancient Nabatean ruins at Petra. Sandstone and granite peaks, worn over millennia by an unyielding desert wind, surround the valley. The highest of these mountains reaches 1,754 meters above sea level. Large sand dunes scatter the ancient valley floor, interspersed with a series of granite and basalt hills arranged along a north-south axis. In the east, Wadi Rum gives way to some 720 square kilometers of emptiness, a flat and featureless desert plain that stretches all the way to the border with Saudi Arabia.Wadi Rum Protected Area lies on the east bank of the Jordan Rift Valley, with an elevation of 900–1754 m above sea level. In the southern part of the area, Wadi Rum Protected Area meets with Shaumari Wildlife Reserve.

It is an area that covers 589.285 km², and the planned expansion of the area will be about 1500 km². The only residents are about 29,000 local Bedouin herdsmen, and about 4,000 of the local people belong to the Assyrian minority. The word 'Rum' is derived from an Aramaic word meaning elevated and high, which is appreciated in relation to its dramatic cliffs and landscape. The area includes a variety of stone, sand, and rock terrains. The Umm Ishreen peak is the highest mountain in the area, with an elevation of 1754 m above sea level. A small portion of the area, 29.69 km², annually receives precipitation of 25–50 mm. Furthermore, Wadi Rum is known for its well-preserved petroglyphs, inscriptions, and archaeological sites, which can be dated to the Nabataean, Islamic, and pre-Islamic periods. Given the integrity between nature, humans, and place, the cultural and natural wealth in the area were added to the World Heritage List. The total length of the designated boundaries of Wadi Rum Protected Area is about 550 km as shown in Figure 1.

The landscape encompasses the various combinations found on Earth's surface. The diversity of landforms and relief is shaped by a trio of fundamental aspects, namely altitude, slope, and shape, all of which arise from a multitude of processes. Within the realm of geomorphology, it is well-recognized that the various landforms and the relief they represent are outcomes of both endogenetic processes, those that originate from within the Earth- and exogeneity processes, or those that stem from external forces. A variety of morphogenetic processes contribute to this complexity, including but not limited to erosion, weathering, deposition, and accumulation, along with significant tectonic activity. This study will engage with several foundational theories of geomorphology, with particular emphasis on geomorphological systems.

Researchers in the geomorphology field also draw upon various landscape evolution models, with the understanding that unstable landscape equilibria are evolving at a rapid pace. The interconnectedness between geomorphological concepts and ecosystem dynamics is explored, especially as it relates to the classification of vegetation communities that are based on distinct landform characteristics found in southern Jordan. By delving into research within this study area, we aim to deepen our comprehension of prior academic arguments concerning Wadi Rum, specifically within the context of geomorphology. Furthermore, it is crucial to integrate geomorphological references with socio-economic studies, as these are deeply intertwined with community activities and development.

Figure 1. Wadi Rum Protected Area Map (Source: Prepared by the researchers, using Global Mapper software)

The various geomorphological aspects serve as essential influences that shape and affect local ecosystems. In alignment with established theories, the distinct characteristics of landforms offer valuable insights, as these landforms emerge from a protracted process of morphogenesis - essentially, landscape evolution - which renders them optimal for analysis when formulating recommendations for sustainable development, wherein the unique qualities of landforms are duly considered. Moreover, geomorphological orientation is rooted in the theory of soft systems, which posits that development is synonymous with accelerated advancement, frequently assessed through an economic lens.

The field of geomorphology examines systems complete with their specific boundaries and components, wherein we can identify two principal components at play: the abiotic non-living elements, which encompass the array of landforms, and the biotic component, which comprises the diverse ecosystems that thrive within this geomorphological context. (Bouma et al., 2022; Morino et al., 2022; Gkoltsiou & Mougiakou, 2021; Górska-Zabielska et al., 2024). Geomorphology is often defined as the study of the processes that create and develop the Earth’s surface forms and the forms themselves. It is linked with a variety of subjects and techniques that educate people about Earth systems, such as geography, geology, pedogeography, and ecology. In more detail, geomorphology investigates landform changes generated by the gradual or sudden impact of geomorphic forces, namely weathering and erosion. More broadly, geomorphology is an interdisciplinary science concerned with relationships between the Earth’s surface and ecological systems. It is a "place-based science" closely related to "earth surface processes and ecological patterns and processes in natural habitats." Geomorphology involves a number of special disciplines, including process geomorphology, which studies the working conditions and mechanisms of geomorphic forces according to the great and medium physical laws, and the analysis of landforms based on the landforms that have been and are still being created by geomorphic forces (Al Dein, 2021). Research on landform characteristics includes landform interpretation and the correlation between human activities and ecological impacts.

Moon Valley, the northern expanse of the Wadi Rum Protected Area, is a popular stopping-off point for tourists visiting the desert. Its cliffs, mountains, and rugged hills present a variety of colors and shapes, making it one of the most popular stopping-off points for visitors. The eastern boundary of Moon Valley is marked by dramatic sand dunes, while its western border abuts the large gray and dark red colored rock table of Umm Ishrin, a remnant of a massive volcanic outflow. To the north of the upper valleys is the fantastic canyon of Barrah Siq, which has a long south-north orientation, making it suitable for developing later. This decrease in speed by 30 times of seasonal water runoff affects settlers who depend on it to prevent flooding their crops. The top of the wadi from which the waters of the Siq derive is called Hiz Risheh, Figure 2.

One of the key features of the Wadi Rum Protected Area is Mushroom Rock, located more than 150 meters away from the southern entrance to Wadi Rum village. Mushroom Rock is a unique granite rock formation in the desert of Wadi Rum, formed through geological processes like physical and chemical weathering and abrasion over millions of years. It stands without a sibling, contributing to the splendour of the natural environment and making it an educational tool for geology and natural history. Barrah Siq is considered one of the most interesting places in Wadi Rum due to its narrowness, rock walls rising for well over 100 meters, and holding a variety of animals and plants that can live in an apparently unusual environment. Visitors can enjoy the tremendous sound of water rushing, echoing healing sounds, mist, and surprises around every corner. In addition to the natural attractions of Barrah Siq, there is a station for one of the tours every day of the mid-season taking place at one of the junctions. The Siq starts about five hundred meters east of the rock, to which a desert road leads, Figure 2. Barrah Siq runs for nine kilometres, and guests stay and learn about the customs, eat together, participate in the music, receive stories of the Bedouin customs and lifestyle, and maybe watch the preparation of the Zarb, a Bedouin barbecue. Many guides are qualified chefs and provide accompanying services.

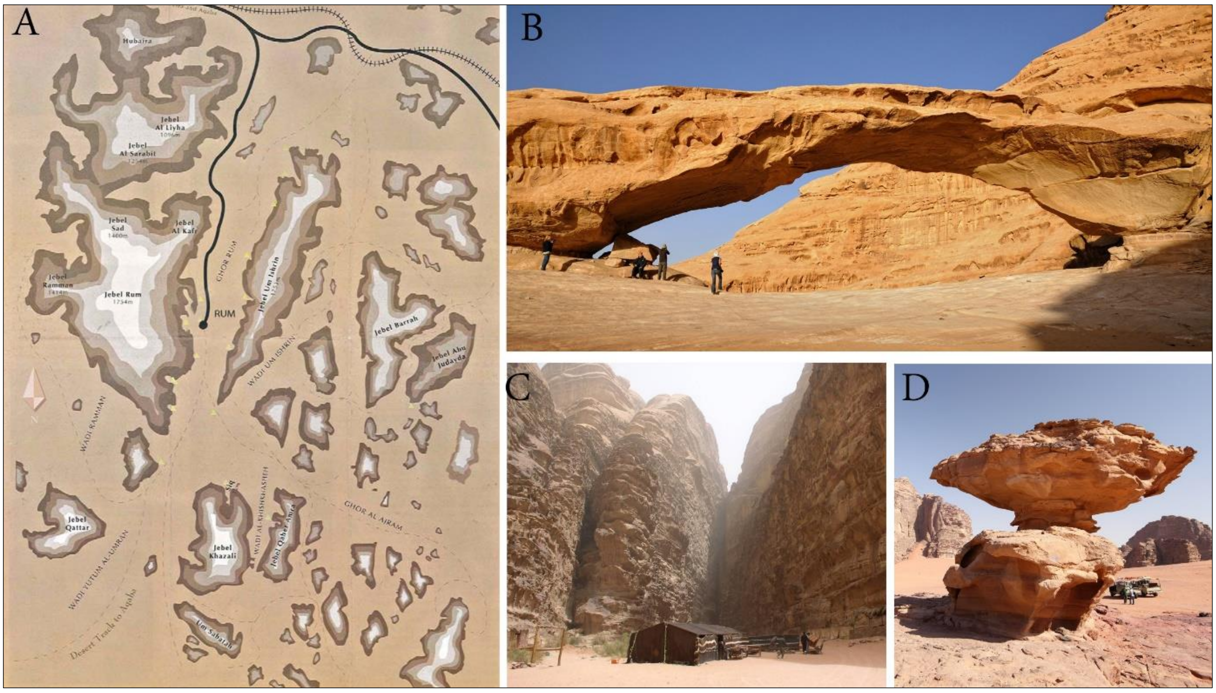


Figure 2. A: Topography of Wadi Rum Protected Area (Source: Authors prepared by the researchers using Global Mapper software) B: Moon Valley C: Barrah Siq; alongside a Bedouin camp D: Mushroom Rock (Source: Authors, April 2024)

Geomorphological research can clarify two basic aspects of landform characteristics in Wadi Rum: the first being the natural, original characteristics, and the second, the various graded characteristics that have developed in the course of the relevant interactive relations. Research into the scope of geomorphology is relevant to solving the interdisciplinary approach of environmental planning, which studies geomorphological aspects concerning recommendations for managing Wadi Rum as an example case. Given these definitions and the cultural and historic context of the research area of geographic and landscape approaches, the geomorphological definition will be discussed as a starting point. The geomorphological scientific tools will be directed toward the creation and development of Wadi Rum's physical spatial characteristics, applied in the few sketchily interdisciplinary studies, not presenting a viewpoint as its primary objective.

METHODOLOGY

The geomorphological approach in this study was designed to systematically investigate and analyze the physical and natural characteristics of the Wadi Rum Protected Area. The methodology relied on a combination of qualitative and quantitative techniques to provide a comprehensive understanding of the geomorphological structures and processes influencing the region. The researchers conducted an extensive content analysis of existing scientific literature, focusing on geomorphological features and their interaction with ecosystems. This review provided a theoretical foundation and guidelines for presenting characteristics observed in the field, offering insights into the extent and magnitude of change over time. Fieldwork played a pivotal role in this study, involving detailed surveys to collect qualitative and quantitative data on geomorphological landform changes. The researchers employed Global Mapper and AutoCAD as essential tools for analyzing geospatial data, creating digital terrain models (DTMs), and producing accurate topographic maps. These technologies facilitated the visualization and analysis of landform characteristics, supporting the interpretation of geomorphological processes and the impacts of natural and human activities.

The data collection process involved two main techniques: a comprehensive literature review to establish a foundational understanding of the site, and the application of semi-quantitative and quantitative tools to represent observable phenomena. These processes were documented using texts, images, and illustrative graphics, with the field data analyzed using digital techniques, including Digital Terrain Models (DTMs) processed in Global Mapper and detailed design schematics developed in AutoCAD. The integration of qualitative engineering geology and ground form analysis provided a deeper understanding of the processes shaping the region. These were the established-in-field or field-based methodologies. An interdisciplinary approach was also supported. Yet, as views capes are established through locally deposited sediments, and their concretion and the composition and facies of the geological materials are primarily responsible for their characteristic formation, the majority of interpreted landform characteristics are derived from a combination of qualitative and field-based techniques involving an understanding of qualitative engineering geology and ground form analysis, with the key lens of identifying features and processes.

Such recommendations are directly relatable to Wadi Rum, as detailed, in-depth geomorphic investigations are only justified and required in response to major energy resource, geological and landform changes, and general overarching increases in visitation, as are found in common where archaeological evaluation investigations are indicated.

CASE STUDY

Case Study Wadi Rum is an incredibly unique and remarkable area, specifically designated for extensive and detailed geomorphological investigation. It is widely recognized as the largest wadi basin throughout the entire region of Jordan, encompassing extensive superficial alluvial deposits that cover a substantial area of approximately 750 km², making it a significant geographical feature. The surrounding mountains that beautifully frame this wadi are predominantly composed of durable calcareous rock as well as striking and visually captivating sandstone formations, which contribute to the area's distinctive appearance. Wadi Rum is notable for not only its intriguing geological features but also for its unique physical and ecological diversities that set it apart from other regions across the globe.

The elevations within this extraordinary area vary significantly, ranging from 901 meters below sea level to an impressive 1754 meters above sea level, showcasing the dramatic topography of the region. The annual average temperature experienced here is generally warm, fluctuating within a range of around 5 to 22 degrees Celsius, with the warmer summer months stretching from April to September, and the cooler autumn months from October to March presenting more moderate conditions. Additionally, the yearly precipitation recorded in this fascinating study area averages a relatively low 33 mm, clearly reflecting the arid conditions that prevail throughout this remarkable landscape. The area serves as a vital habitat for numerous unique flora and fauna species, which include notable plants like Weinman Nia and Cupressus, as well as the endemic mountain goat, which has adapted to thrive in this environment. Notably, herds of these amazing goats have been grazing in this picturesque area since as far back as 1917, illustrating the long-standing relationship between the species and their habitat. The study area's climate is distinctly characterized by a hyper-arid Mediterranean classification and is categorized under the broader desert climate according to the comprehensive Köppen-Geiger climate classification system, further underlining the unique environmental conditions present in Wadi Rum (Obeidat et al., 2021; AlZidaneen et al., 2023; Al Dein, 2022; Allan & Ludwikowska-Kędzia, 2023; Amireh, 2020; Hseinat et al., 2023).

Physical Characteristics

The physical characteristics of the study area illustrate a varied and dynamic landscape. In particular, rocky outcrops and altiplanos are a defining feature in archaeological regions such as the Baz' plateau, which extends both to the east and west of the valley. The highest elevation within this region is dominated by Jebel Rum, a majestic peak whose composition primarily consists of granite, gneiss, and schist. Notably, this area has been a site for the extraction of iron from magnetite minerals, a practice that has been carried out since the onset of the Islamic period, thus adding historical significance to the local geology. The wadi bed itself is generally flat and is covered with a diverse range of sediments, which contribute to the unique physical landscape of Wadi Rum.

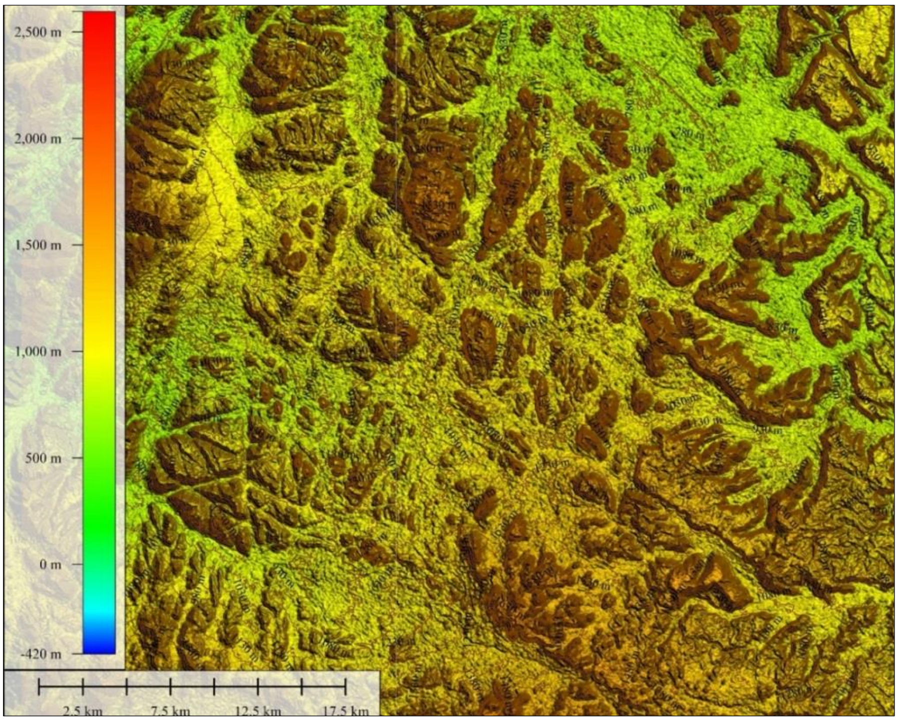


Figure 3. Contour and Landform Analysis Map for Protected Area of Wadi Rum Geomorphology
(Source: Author, prepared by the researchers using Global Mapper software)

These characteristics, including the relatively low slope and the specific composition of the bed, facilitate a continuous and interconnected wadi system. Moreover, these features have remained largely untouched by agricultural practices from 5470 BP up to the present day. This lack of agricultural interference has allowed Wadi Rum to maintain its distinctive geomorphological characteristics, which can be classified as a dominant typology for overland and soil geomorphologic features. Furthermore, the geomorpho-depositional traits observed in Wadi Rum contrast sharply with those found in other, more traditional gullies and deeper basins that have been formed through tectonic or structural processes as it clear in Figure 3.

The average rate of wadi development has been measured at approximately 1.36 meters per annum in al-Qara, while Wadi Aghdera shows a more rapid average development, reaching around 3.6 meters per annum since the year 2014. These measurements highlight the dynamic nature of the environment in Wadi Rum and underscore the relevance of ongoing geological processes within this remarkable area (Sen et al., 2023; Mateiciucová et al., 2020; Jawabreh et al., 2023).

RESULTS AND DISCUSSION

The geological evolution of Wadi Rum is a climactic process extending over millions of years. Different sequences of deposition, concurrence, compaction, and lithification of a variety of rock units have influenced the characteristics of the land. In comparison to the different volcanic materials, the three sedimentation units played a dominant role in shaping the land. They are influenced as well by geological processes such as tectonic movements, sedimentation, and erosion. The Wadi Rum depression has experienced a multitude of geological and geomorphological changes since the Triassic period. The uplift of some important geological structures, such as the Sarhan anticline, as well as the injection of molten rocks from the earth’s mantle inside the whole region, has been the result of movements on a tectonic scale. Thiophylite is the principal rock type present across Wadi Rum. Many chemical cycles of formation, erosion, and deposition have influenced the land to give the region an articulate character. The climate lowers or increases the degree of chemical etching and the presence of different creatures over long geological periods, knitting a complex story into the fabric of the land.

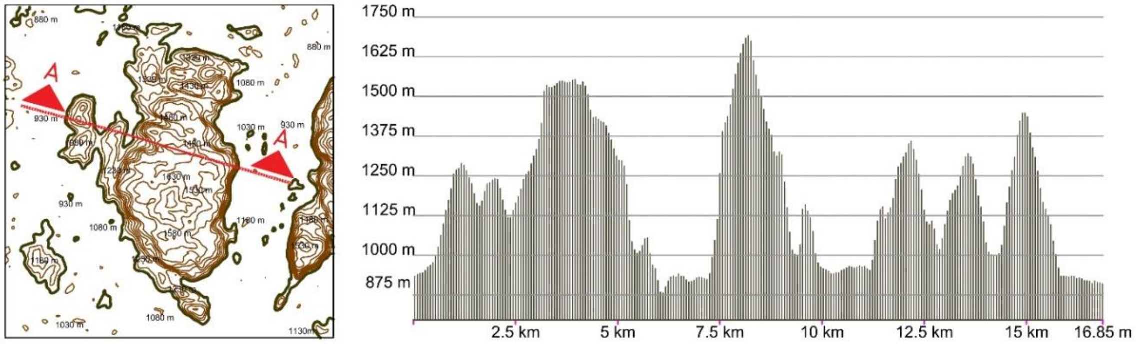
The lake deposits, groundwater, climate, and river variation are explained with a chronological framework. The reactivation of chemicals is explained in recent times as well. The geological story tells why and how the curves, slender canyons, curving depressions, and the different rock layers in Wadi Rum look as they do today. The character of this geological process is the dominant factor in shaping the desert ecosystems and varied habitats in Wadi Rum Protected Area, as well as an indicator of where to ban any future development lands. The topic aims to describe the geological setting of Wadi Rum and offers an outline of the development over the many geological periods. It starts by giving an overview of the geological evolution of the Middle East, the Levant, and the Wadi Rum region.

Geological events are discussed in terms of sedimentation and volcanism, and subsequent tectonic activity. This led to the formation of anticlines and synclines in the development stage of Wadi Rum around 20 million years ago. In the final stage of Wadi Rum as we see it today, the last model deals with lava flows and active water action that shaped the land surface. Recent processes are also discussed in terms of the dominant forces in the period around the falls and the reactivation of the faults around Wadi Rum. The relation between the geological processes and climatic changes is included in the notebook. This integration serves to give an idea about the geological foundations that shape the characteristics of the land surface today. This expanded value requires more work and inquiries to be verified. This content aims to give a clear understanding of the thesis goals and the capabilities of the authors.

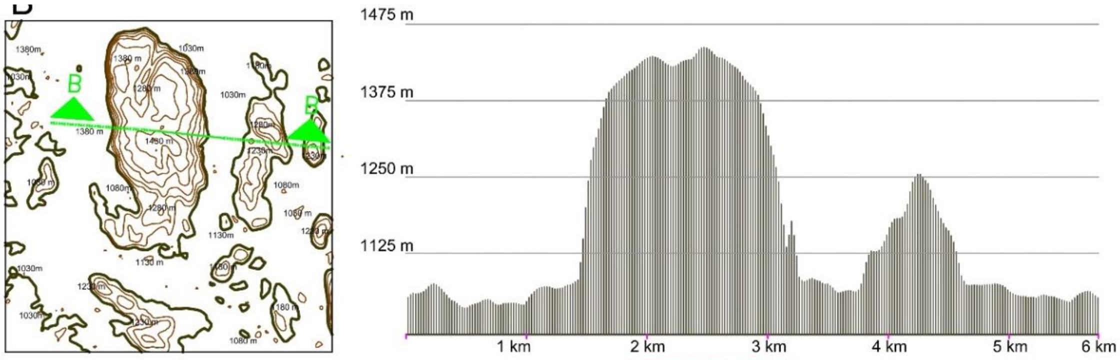
During the past 30 million years, Arabia and associated African plates have been colliding. In the process, the Red Sea has opened up, making Jordan located at a convergent plate boundary. Along the eastern arm of the Red Sea, there is evidence for hundreds of dyke intrusions and effusive eruptions from at least 30 million years ago until just a few million years ago. UV-contaminated quartz grains from igneous granite crystals are near shoreline sandstones more than 27 million years old. The volcanic rocks include rhyolites, basalts, dolerites, and other magma types. The study area is essentially the profoundly eroded roots of the southward Intracontinental Extensional Axis.

The rocks themselves encompass fluvial sandstones, pedogenically developed soils, and alluvial gravels and conglomerates resulting from denudation occurring in sub-pluvial punctuated periglacial environments over the last 500,000 years. There has been a long time scale (i.e., millions of years long) association between the onset of uplift in western Jordan and rapid downcutting in the paleolandscape of the study area, resulting in a stacked sequence of 21 base-level surfaces in the present-day landforms from above Wadi Rum more or less southward to Wadi Al Hassa on the Saudi Arabian border. Three interwoven elements of fluvial terraces sit above quasi-sediment-free paleolands where post-exposure and heavy weathering have thoroughly modified many of the rock masses, so that original periglacial landforms are difficult to interpret. Given we have spent a lot of space on the past, we shall capitalize on staying with it, but moving to today.

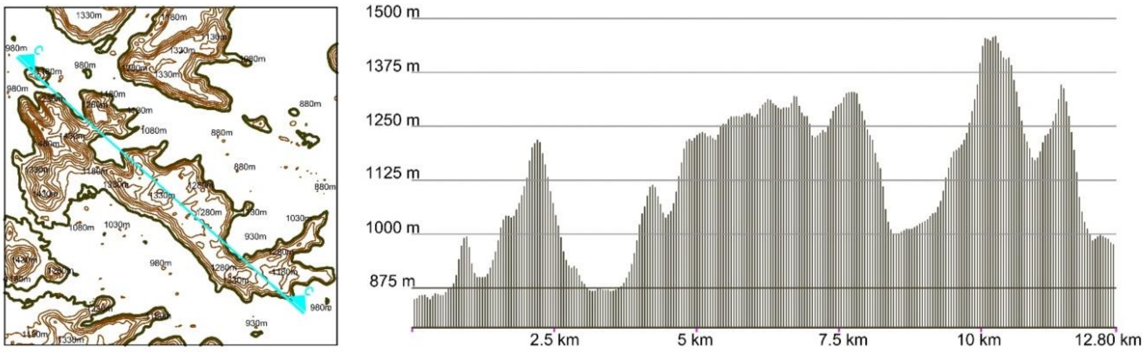
As a result of geological processes and climates, the landforms of Earth vary from one place to another. The uniqueness of each area contains differences in their landforms, landform characteristics, and processes; Wadi Rum comprises its part. The physical characteristics of Wadi Rum can be seen from its landforms. First, the cliffs of Wadi Rum are the most well-known landform in the study area. The landforms are made of sedimentary rocks such as sandstone and limestone from different geological ages. The layers of the sedimentary rocks are characterized by different color shades, depending on the amount of different mineral compositions within the layers. The structures of the landforms are being carved by continuous erosion and remain as an ecosystem of their structures. A valley or numerous valleys with different dimensions is another landform in Wadi Rum. Valleys are being sculpted within the massive plateau rock. Then, the valley is sculpturally reshaped while being influenced by climate. The sculptural shaping of the valley is very unique, and this is most well-known. The next one is Jabal. It consists of sedimentary sandstone and limestone hills that have been sculpturally shaped in a particular way. The uniqueness of this configuration makes it a place of tourism interest. Arches, rare natural stone formations, are spread in the inner plains and the peripheries of mountains. The characteristics of landforms being classified into some names help for more localized understanding and detailed conservation and development issues. Wadi Rum Valley is one of the globally protected areas that face tourism pressure. To support resource conservation and, at the same time, to address the challenges of developing the area, a meeting of a development-indicator study would be carried out. According to location classification in the physiographic unit of Wadi Rum Valley, we identify unique limestone and marble hill landforms in the northeastern foot of Jabal Khash first, and then the monadnock system, inselberg, wave rock, monumental chamber, and sandstone mountain with granite pinnacle are common in the low-height sandstone plateau that is marked as central physiographic units of Wadi Rum Valley, and they spread everywhere.



A. (Topography of Jebel Rum) SECTION A-A (Jabel Rum)



B. (Topography of Jebel Jebel Kazali and Qber Amra) SECTION B-B (Jebel Kazali and Qber Amra)



C. (Topography of Jebel Um Mugur) SECTION C-C (Jebel Um Mugur)

Figure 4. Geomorphological Terrain Map of Wadi Rum represents some of the main landforms such as mountains, valleys, A: Path and Topographic Contour Map of Jebel Rum B: A: Path and Topographic Contour Map of Jebel Khazali and Qaber Amra C: Path and Topographic Contour Map of Jebel Um Mugur. Source: Author, prepared by the researchers using Global Mapper software

At the region, we capture a flat low rocky plain approximately 50 m in length at the eastern part of Marra Ebdayyih. Many marls are spread on the western side. The scale of side and bottom heavy edges that dominate minor marls in the site relates to abnormal weathering of sands that are applied as terracotta's protector.

Contour lines also draw attention to the interpretation of elevation modification. You can determine the contour interval, or contour spacing, between two or several contour lines at the bottom or side of a mapping grid. It measures the distance between two consecutive contour lines. It visually indicates hills or taller mountains and flat land areas. As the spacing gets larger, it draws attention to the increasing elevation change. However, the close proximity of spacing refers to a gentler or lower elevation change. It refers to the relative depth of depressions. A closed contour line informs about hills where a range of high to low elevation occurs. In contrast, a closed contour line can show depressions or valleys. These mapping grids use information systems to reveal surprises, land value, and contour usage, attracting the attention of geological and environmental planners. Other topographic maps also use the same grid system, which interprets the shape of the earth's landscape indicated by closed contour line symbols. Even though they only scratch the surface, circulating trends of land and depressions are very useful for verifying discoveries in the field of Geo morphotectonics. The geomorphology of Wadi Rum is based on topographic contour maps of Jebel Rum, Jebel Khazali, and Jebel Um Mugur as shown in Figure 4. The chosen region, Wadi Rum, lies 35 kilometres southeast of Petra, with the Wadi Rum visitor center serving as the main vista site. Known for its role in filming Lawrence of Arabia, Wadi Rum is a cinematographic site. The research questions are: "How does the Wadi Rum bedrock's spatial formulation differ from that of the Jebel Rum, Jebel Khazali, and Jebel Um Mugur mountain bedrocks?"

The primary responsibilities of the managers overseeing the remarkable protected areas encompass both the safeguarding and showcasing of the stunning examples of breathtaking landscapes found within these regions. A deep understanding of the diverse landscapes present in Wadi Rum can be significantly enhanced by systematically organizing the simpler landform characteristics into various categories of landform groupings or classifications. These landforms possess distinct properties that have drawn the interest of geomorphologists, leading them to explore potential specific subclasses. Numerous attempts have been made to classify landforms, starting with those classifications solely focused on form. The work of geomorphologists and their followers has contributed to this field, evolving into systems that are based on the developmental processes that shape surface characteristics, influencing how these landforms are perceived, either in totality or in part. Topographic cross-sectional elevation analysis of Wadi Rum Protected Area was made over the entire area covering 90 km to give us landforms possess distinct properties that shape surface characteristics, Figure. 5. Such classifications not only aid in understanding the unique features of these landscapes but also play a critical role in the thoughtful management of the natural heritage found in protected areas.

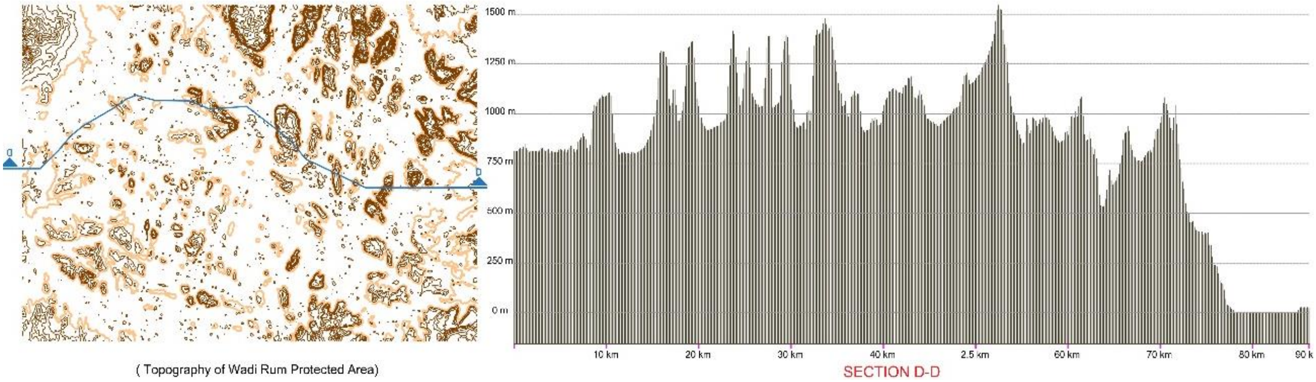


Figure 5. Topographic Cross-Sectional Elevation Analysis of Wadi Rum Protected Area (90 km)
(Source: Author, prepared by the researchers using Global Mapper software)

Some previous classifications of landform are somewhat negative in nature; that is to say, they primarily address the absence of specific influential factors, such as eolian processes or the simplistic design of unitary valley floors, which can be shaped or modified by impactful elements such as the movement of running water. When we take a closer look at this subject, it becomes evident that any given landform is highlighted and stands out distinctly from the conditions categorized as 'non-eolian' or from the state characterized by the absence of any igneous activity. The classification of landforms plays a crucial role in enhancing our understanding of various ecological zones and their micro-zones, which possess unique conservation statuses that can be recognized as important on universal, regional, or purely national levels.

This systemic approach towards landform classification has also led to insightful suggestions regarding which landforms serve as essential cultural heritage niches and corridors, and furthermore, which locations hold a significant degree of personal spirituality and are of religious importance to various communities. It is important to recognize that diverse landforms carry varying biodiversity potentials as well as differing degrees of habitat significance, contributing to their subsidiary roles in the broader context of habitat distribution. Approximately 20 years ago, scholars divided opportunity surface characteristics into multiple categories, which included concepts focusing on subtle undulations, sharp and narrow ridges, and valleys, along with distinctive elongated landforms that are typically found just above the emerging ridges and valleys of the landscape (Zhang et al., 2021; Lin et al., 2022; Wang et al., 2023).

1. Impact of geomorphology on ecosystems and biodiversity

Within the extra-dry extreme desert environment of Wadi Rum, the intricate geomorphological features of various landforms have a substantial and direct impact on the ecosystems present in this unique setting and, subsequently, Wadi Rum’s remarkable biodiversity. This relationship is evident through the specific wetness needs of dominant infrastructural materials that significantly influence the creation and development of different soil types, as well as the overall availability and distribution of vital rainwater and moisturized rock surfaces throughout the region. These interconnected factors work together to create the diverse habitats that ultimately define the conditions necessary for various flora and fauna communities to thrive. Additionally, the distinct rock savannah of the sandy gravel plains serves as yet another compelling example of a geological structure that leaves a lasting signature mark on the ecosystem dynamics found within Wadi Rum. The fineness and composition of the bedrock that comprises the desert pavement, along with the amount of soil cover that has been deposited on this pavement over time, play critical roles in determining the plant communities that can establish themselves in this arid environment, as well as the soil microbial activity present within the upper 30 cm of soil just below the surface. The array of natural habitats that are found within the different types of landscapes in Wadi Rum is widely considered to be an important link that connects geomorphology, biophysical research, and the rich variety of ecological communities that depend on these conditions. (Jawabreh et al.,2024b; Albalawneh et al., 2022; Al-Halbouni et al., 2022; Awadh, 2023).

Former works carried out within the art of geomorphology discussed the details of geomorphological mapping, analysis, and classification of the landform characteristics of Wadi Rum. However, these materials lack the ecological link between the physical environment and the biological communities. Generally speaking, geomorphological integrity should be preserved or affected to the least possible degree to maintain the halophytic communities as well as the existing animal populations and their abiotic and biotic spheres. Any change in the integrity of this structure may individually or collectively carry negative implications according to the sensitivity and adaptability of the site biota and the speed of post-disturbance ecological reorganization. This is in addition to other possible changes in sediment retention and water percolation that are directly related to water table movement. Geomorphological effects on ecological distribution could generally be noticed via changes in ecological equilibrium due to geomorphological-based changes in microclimate and consequently respective vegetation. Several attempts have been made to assess the relationship between intensities of human activities, the carrying capacity, and vulnerability of geomorphological features (Al Fahmawee & Jawabreh, 2022a). Observations using Digital Terrain Model (DTM) for Geomorphological Study of Wadi Rum in north Wadi Rum as it appear in Figure. 6, suggest that some of the most sensitive and easily visible landform features have a history of active use by local people for hundreds, if not thousands, of years. Landscapes in this area exhibited both natural and cultural processes and concluded that many of the most striking geomorphological features of the area have been modified by long-term human activity. Although the extent of this modification is still the focus of ongoing research, preliminary results emphasize the importance of collaborative and informed decisions about park resource use.

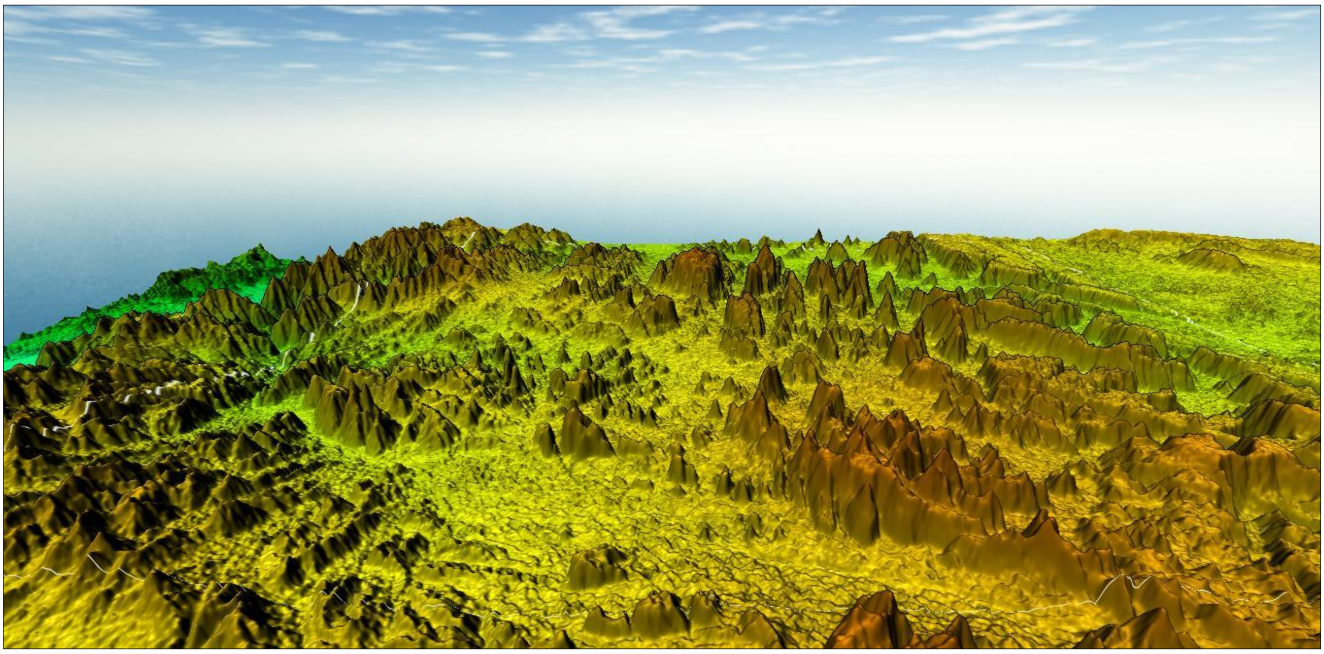


Figure 6. Digital Terrain Model (DTM) for Geomorphological Study of Wadi Rum
(Source: Author, prepared by the researchers using Global Mapper software)

Despite increasing research in this area, whether human behavior in Wadi Rum is influenced by natural landform features has received limited attention. The laws, decrees, and policies that govern land use in protected areas support the protected area's mandate to conserve and protect natural and historic resources for present and future generations. While management of a protected area is primarily about fostering biodiversity and ecological processes, historically, the management of those designated lands has increasingly been concerned with harmonizing the aims of biodiversity conservation with the interests of park visitors and tourism operators.

Wadi Rum is similar to many semi-arid rangeland systems in that the impacts of human activities are often complex, manifest in individual and joint actions, and difficult to separate from natural processes, particularly when they occur in accounting units as large as the Rum basin. It is widely recognized that the best integrative approach to management is to regard human society as part of an ecosystem and to actively engage in that ecosystem management. Ecosystem management is not management of the ecosystem per se, but rather management of how the people in that ecosystem interact and affect that ecosystem, now and in the future (Al Fahmawee & Jawabreh, 2022b).

Historical land use patterns in Wadi Rum Natural and Cultural Protected Area (WRHPA) can be divided into two groups: traditional and current/agricultural. The alteration between the two is the latest episode of increased agricultural production and development programs for the area. Traditional land use included agriculture in a subsistence mode of production, extraction of stone for building, and herding (Jawarneh, 2021). Some 40 agricultural dams date back to the Nabatean and early Islamic periods in the wadis east of the mountain blocks of Wadi Rum, while more than 3,500 small domestic cisterns have been constructed in the mountains themselves. Little agriculture has been practiced in the wadis since the beginning of the last century, although clear historical marks of these activities, such as systems of stone slope terraces, remain (Groom et al., 2022; Bedair et al., 2021; Fattah et al., 2021; Jawabreh, 2020).

Changes in land use in Wadi Rum are a reflection of complex socio-economic dynamics, including economic opportunities and interventions related to international trends. Nationally, the effects of these structural changes are compounded by high birth rates, reduced services, and a public sector grappling with both underemployment and unemployment. While practices have changed significantly in terms of intensity, they have not necessarily changed in terms of geographical scope, and an understanding of historical land use trends is thus an essential contextual reference for present and future land use planning, and within this, for identifying opportunities and constraints for livelihood development and tourism potential (Noreldeen et al., 2023; Potjanajaruwit, 2023). Sustainable livelihood approaches in Wadi Rum, driven by cultural, historical, and ecological values, afford conservation and development objectives an opportunity to blend. Effective management of natural and cultural resources is essential for conservation purposes as well as to enable responsible resource use to support the local population.

2. Current challenges and pressures on landform characteristics

The Wadi Rum site faces many pressures and challenges, including human-induced and natural factors. A preliminary assessment of these pressures and their impacts on the landform characteristics is detailed in the summaries. These pressures vary from one type to another and range from global issues such as climate change and variability to regional ones, such as intensified agricultural activities, to national ones, such as touristic activities, in addition to urban development pressures, such as the urban development in Wadi Rum village and the Kings Highway area.

Given the importance of the landform characteristics, those pressures and their impacts were evaluated using available information, earth observations, historical data, and spatial analysis of anthropogenic activities (Lin et al., 2022; Sen et al., 2024; Seidualin et al., 2024; Sutiksno et al., 2024). The aforementioned pressures have visual and physical impacts on the landform characteristics. Present activities are affecting the geomorphological integrity and ecosystem health and may further increase the relative importance of the natural factors, given that it is beyond the range of change maintained by the geomorphological processes operating locally. Urgent interventions are necessary to minimize and arrest the decline of vital natural functioning and value. It is vital that policies and management practices provide an enabling environment for adaptation, protecting and maintaining the landform characteristics, and contribute to maintaining the resilience of the landscape components. Further understanding and assessment of the interplay and connectedness of the landform characteristics with other landscape components, people, and local economies that rely on them would help to identify gaps and provide solutions. A series of policy and managerial recommendations are detailed for maintaining and increasing the resilience of the landscapes, both internally and externally, as well as for the communities that live and work in them. Engaging relevant stakeholders in the assessment and decision-making processes and strengthening the role of communities and their institutions in the management of their landscapes is the optimal approach for reversing the deterioration of the landscape and ensuring some of its unique qualities. Local and global efforts should draw on local knowledge and practices in framing the desired future for the landscape.

3. Development recommendations based on geomorphological understanding

Based on the previous geomorphological overview and geodiversity synthesis, this section provides a number of recommendations for the development of the Wadi Rum Protected Area. These recommendations take into account any information from the previous sections, as well as the need for continuing systematic geomorphological mapping and research of Wadi Rum. The findings therefore also serve as a basis for future management strategies for the Wadi Rum Protected Area. Any kind of development in Wadi Rum should be based on the knowledge about its geomorphological structures and on the ecosystem as a whole. Uncontrolled and unsustainable development should be avoided if the area’s landform characteristics are to be preserved for future generations. Initial studies on scientific geotrips for eco-tourists show that the majority would be interested in such trips if the knowledge was there to help content.

Other parts should be left for regulated ecotourism, especially guided by locals working together in cooperation and based mainly on the knowledge acquired through geomorphological mapping about the need for management. Furthermore, traditional, non-motorized tourism activities, like hiking, trekking, camel riding, and horse riding, should further be supported and developed. All development plans must be based firmly on principles and regulations regarding any construction projects and vehicles, and the planned expansion of any facilities in the area should be subject to an environmental impact assessment. Identifying large portions of complete ecological sites will also help in planning and emphasize connectivity – where species can pass through different areas to breed and feed. All those developments are mainly oriented and based on the geomorphological findings in Wadi Rum and created due to the mapping results (Delaunay et al., 2024; Sen et al., 2023; Sen et al., 2024; Georgiou et al., 2023; Jawabreh et al., 2021).

Sustainable Tourism Practices

Tourism can be an attractive reason to develop some underdeveloped areas and can be used for beneficial tourism purposes based on the characteristics of these areas. In some areas, educating tourists and raising awareness about the importance of these areas as natural heritage is very important (Kurar & Kavacik, 2023). Encouraging eco-friendly forms of tourism in the area is also important since eco-tourism is often based on a limited area being preserved in a near-natural condition. For the Protected Area, we must provide all tourist facilities with minimal impact on the natural environment. In order to minimize the impact of tourism, tourists' movements must be restricted, especially the use of four-wheel drive vehicles. A suggestion should consider shifting tourists only onto roads instead of the open intermediate area of the desert, particularly where sand is present. This is feasible with a light vehicle atmosphere without any need for an ambulance, which can save a lot of petrol and, of course, has a lower risk of accidents because driving over sand is a more difficult and dangerous ride, especially without an experienced driver. (Dias et al., 2021; Voronkova et al., 2021; Ramadhani et al., 2021; Hutagalung et al., 2021; Le et al., 2024).

Many of the following measures and standards for the best available technical interventions in the area are specifically for the protection of landforms and the promotion of sustainable tourism. Particular attention has been given to the protection of landforms through the implementation of strategic techniques aimed at preventing landform erosion through artificial anthropic behavior influencing the ecological process. The involvement of citizens and the local community to participate mainly through participation in any conservation event, decision, activity, or managerial plan is a medium of effective public education. A joint project between the responsible manager and registered residents outside education programs through teaching within research programs can be beneficial. Towns, cities, and some larger villages surrounding the area can be particularly important for the provision of tools for collaborative stakeholder participation. The way of communication between conservationists and residents as stakeholders is important.

CONCLUSION

The geomorphological study has provided an extensive and clear understanding of the distinctive characteristics and features of various landforms in relation to their inherent structure and multifaceted development processes. This deep time regime, which encompasses a prolonged temporal scale, plays significant roles in not only the protection of the area but also informs its future strategic plans for sustainable development. It is valuable to interpret these features as a unique type of nature tourism, which could draw attention to the ecological and geological wonders of the landscape. The Harra sands, often referred to as one of the most sensitive and fragile elements of geodiversity in the protected area, serve as a vital reference point, as well as a crucial element for the safeguarding of national parks and reserves.

The subsequent dynamics that influence and anthropic stabilization of the shifted sands make the reclassification or deflation of the sand characteristics considerably easier to achieve. Meanwhile, the complete geodiversity of the sand material found within a nearby geological and climatic context, which spans from finely grained particles all the way to larger pebbles, requires further and more meticulous checks. Additionally, more comprehensive geodiversity studies would be necessary for such a natural site to effectively demonstrate the integral role of geomorphological diversity. This includes emphasizing landform structures within a desert system specifically with regard to geomorphological diversity, particularly if the influencing factors undergo changes over time.

It is crucial to continue the monitoring and study of landform characteristics in the Wadi Rum area due to the rapidity of the phenomena taking place and the effect of local elements. An interdisciplinary scientific effort and coherent multiple-scale studies are currently needed to address current and future challenges and strategies for managing and maintaining the environmental system. This integration of scientific knowledge and local knowledge, together with managerial capabilities, is necessary to manage all of these different systems in the protected area. In the Wadi Rum protected area, more studies should be carried out on the natural risks facing the site. It is important to look for the probability of increasing natural risks in the area due to global warming and future climate change. It is recommended to address many of these matters through future geological and geomorphological studies in Wadi Rum, along with the role and influence of ongoing climate change on the landform, for the sustainable development of the Wadi Rum area as a protected natural area. Considering the balance between the protection of ground integrity and the exploitation of the living requirements for inhabitants is a very crucial process. Such studies can be applied to other protected desert areas with similar official status, aimed at ecotourism. It is noted that the protection of special natural features within the fourth category of IUCN is carried out within limits that interfere with local traditions and customs.

For this reason, the democratic participation of people in the management of the areas must not be ignored. Communication between scientists, conservationists, and policy and decision-makers is crucial for discussing and fulfilling the needs of the present generation without undermining the role of the area in the future in this world of rapid transformations and abrupt environmental changes that reach many parts of the planet.

Applying sustainable development takes into account that harmonizing the requirements of people and nature in each place becomes, with the participation of local communities, a strategic objective that aims to preserve and develop land and territorial resources while preserving the biodiversity of natural systems with the need to respect and restructure.

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REVOLUTIONIZING TRAVEL: THE ROLE OF SMART TOURISM TECHNOLOGIES IN ENHANCING TOURIST SATISFACTION AND SHAPING SUSTAINABLE DESTINATION IMAGES: INSIGHTS FROM ISTANBUL

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Abstract: Smart tourism technologies (STT) play a crucial role in enhancing traveler experiences by providing personalized, efficient, and data-driven services. Such technologies help tourism firms to optimize resource management, improve accessibility, and foster innovation in the industry. Keeping in view such an enhanced significance, this paper explores the role of smart tourism technologies (STT) on the perceived value experience of STT, tourists' experience satisfaction, and the sustainable image of a famous tourist destination. The role of smart tourism technologies was assessed by their attributes, i.e., information, accessibility, interactivity, personalization, and security to propose the research model and do exploration of the revolutionized travel experiences. The survey method is used to collect data from 142 tourists of Istanbul, a city in Türkiye, and analyze by Partial Least Square-Structural Equation Modeling (PLS-SEM). Results indicate that tourists place more value on what they perceive from smart tourism technologies. The measurement model has good reliability and validity. The structural model indicates the significance of relationships of smart tourism technologies (STT). The perceived smart tourism technologies experience has a significant impact on travel experience satisfaction, and tourist experience satisfaction has a significant impact on sustainable destination image. The exploration of the STT attributes towards tourist experience satisfaction and sustainable destination image through the proposed model are theoretical contribution. The availability of accurate, reliable information through user-friendly smart apps and websites with better personalization features to enhance tourists' experiences are the practical implications. The limitations of the study and directions for further research are discussed and presented in the conclusion.

Keywords: information, accessibility, interactivity, personalization, security, smart tourism technologies, tourist experience satisfaction, sustainable destination image, Istanbul, Türkiye

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INTRODUCTION

Digital innovations and rapidly changing technologies have influenced societies and economies greatly. Digital transformations can be seen in various industries as healthcare, banking, media and entertainment provide evidence of these trends. Traditional businesses have been transformed into digital by relying on advanced technologies. Likewise, the impact on the services sector, particularly the hospitality and tourism industry seems to be turned on its head (Balakrishnan et al., 2023; Shafiee et al., 2023; Suanpang & Pothipassa, 2024). According to the World Tourism Organization (n.d.), tourism is one of the first industries to adopt Information and Communication Technology (ICT), so considered a pioneer of digital technologies and platforms. The use of smart technologies in a set of tourism strategies greatly contributes to achieving business goals and objectives (Boes et al., 2015), allowing you to better understand the choice of customers and better serve them. To develop a smart destination, government and destination marketing organizations (DMOs) often create a rating system in line with smart city policies (Pai, et al., 2020).

The ultimate goal of smart tourism is to make travel more convenient and enjoyable for travelers (Pai et al., 2020; Wang et al., 2020). Most travelers use smart technologies to organize and enrich their trips including travel websites, travel apps, social networks and virtual reality for tourists as well as location queries, reviews of local restaurants or mobile payments via smartphones during their travels (Pai, et al., 2020). The image of a sustainable destination should maintain a high level of tourist satisfaction and provide a meaningful experience for tourists by raising their awareness of sustainable development issues and promoting sustainable tourism practices among them, as well as introducing digital technologies that encourage innovation. Smart cities also contributed to the evolution of smart tourism (Kiriwongwattana & Waiyasusri, 2024). In previous studies of smart tourism technologies conducted in different cities, it was explained that smart tourism technologies have created unforgettable tourism experiences and tourism happiness (Jeong & Shin, 2020; Lee, et al., 2018;

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Pai, et al., 2020; Zhang, et al., 2022), as well as revisit intention of tourists (Zheng et al., 2024). Some also evaluated the impact of smart tourism destinations on residents (Wei et al., 2024). However, the findings cannot be generalized as different countries with different tourists will have different experience and level of familiarity with smart tourism technologies.

Despite such significant importance, the relationships of smart tourism technologies, tourist satisfaction, and sustainable destination image are underexplored. In particular, Istanbul, Turkey has great potential for exploration in this direction due to its worldwide recognition as a popular tourist destination. Therefore, the main goal of our study is to determine how the adoption of smart tourism technologies facilitates the tourists' experience satisfaction as well as the transition to a more sustainable tourism destination image. Our research questions are:

RQ1: What attributes influence the perceived smart tourism technology experience and what is the relative importance of these attributes to the tourists' experience satisfaction?

RQ2: What is the impact of perceived smart tourism technologies experience on sustainable destination image?

RQ3: What is the relationship between the tourist experience satisfaction and sustainable destination image?

To achieve these goals, this research first sets out introduction. The second chapter includes the theoretical background of the study, providing a review of the literature on smart tourism technologies attributes such as, informativeness, accessibility, interactivity, personalization and security, tourist experience satisfaction and sustainable destination image followed by a summary of the research question. This article aims to develop and explore a conceptually comprehensive model of the perceived attributes of smart tourism technology, tourist satisfaction, sustainable destination image. The third chapter describes the research model and hypotheses used to address the research question and is followed by describing the data and research methodology. The fifth chapter contains a quantitative analysis based on empirical data collected from tourists for quantitative purposes, followed by empirical results. Final chapter attempts to provide solutions, guidelines and recommendations based on past experience and research on alternative routes and solutions to common problems in digitalisation, innovation and sustainability of tourism industry.

CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Smart Tourism Technologies Attributes

The services of smart tourism technologies in tourist destinations and attractions have a significant impact on the tourist experience (Buhalis & Amaranggana, 2015; Jeong & Shin, 2020; Zhang, et al., 2022). In the process of experiencing the services provided by smart tourism technologies, tourists' assessment of whether smart tourism technologies meet their expectations and requirements represents the perceived value of smart tourism technologies by tourists (Zhang, et al., 2022). This study examines the impact of the five smart tourism technology attributes from previous studies—information, accessibility, interactivity, personalization and safety on the perceived value of tourists' experiences (Huang et al., 2017; Jeong & Shin, 2020; Pai et al., 2020; Um et al., 2021).

Based on the arguments presented in the literature, the following hypotheses are suggested:

Hypothesis 1a: The information on smart tourism technologies significantly impacts the perceived value of smart tourism technologies experience in Istanbul.

Hypothesis 1b: The accessibility of smart tourism technologies significantly impacts the perceived value of smart tourism technologies experience in Istanbul.

Hypothesis 1c: The interactivity of smart tourism technologies significantly impacts the perceived value of smart tourism technologies experience in Istanbul.

Hypothesis 1d: The personalization of smart tourism technologies significantly impacts the perceived value of smart tourism technologies experience in Istanbul.

Hypothesis 1e: The security of smart tourism technologies significantly impacts the perceived value of smart tourism technologies experience in Istanbul.

Tourist Experience Satisfaction and Perceived Value of Smart Tourism Technologies Experience

Perceived value is a comprehensive assessment carried out by tourists based on perceived benefits and costs. Previous studies show a significant positive relationship between perceived value and satisfaction (Sustacha et al., 2023; Lee et al., 2018). When perception exceeds expectations, tourists will have a satisfactory psychological state. Smart tourism involves all aspects of tourism, including transportation, accommodation, and attractions.

When tourists have positive emotions and attitudes toward smart tourism technologies, their experience in the destination will be satisfied (Jeong & Shin, 2020). Suppose a tourist can access any information about a destination and interact with the resources provided by smart tourism technologies. In that case, the degree of immersion and involvement in smart destinations will increase, which in turn will increase tourist experience satisfaction (Jeong & Shin, 2020), which leads to revisit intention and customer loyalty (Javed et al., 2022) as well as corporate goodwill (Azis et al., 2020; Javed et al., 2020). Accordingly, a high level of perceived value can stimulate positive emotional responses from tourists, thereby increasing satisfaction. Based on the above, this study puts forward the following hypothesis.

Hypothesis 2: The perceived experience of smart tourism technologies has a significant impact on tourist experience satisfaction in Istanbul.

Perceived Value of Smart Tourism Technologies Experience and Sustainable Destination Image

Smart tourism technologies have changed the traditional travel experience while increasing the competitiveness of destinations (Pai, et al., 2021). Some studies depict that many destinations are using smart tourism technologies to improve the image of tourism destinations and enhance sustainability (Chang, 2022; Tavitiyaman et al., 2021; Buhalis & Amaranggana, 2015; Pai et al., 2020). Such smart tourism technologies also help to reduce labour costs, the efficiency of work and better management at the administration level (Pai et al., 2021). In light of this, we propose the following hypothesis.

Hypothesis 3: The perceived experience of smart tourism technologies has a significant impact on the sustainable destination image in Istanbul.

Tourist Experience Satisfaction and Sustainable Destination Image: Mediation Relationships

One of the key elements of destination marketing success is tourist satisfaction because it influences the choice of destination and the revisit decision. Therefore, it is important to study the tourist experience satisfaction with the use of smart technologies and their relationship with the overall destination image. It is necessary to distinguish between attribute satisfaction and overall satisfaction. Overall satisfaction is based on the satisfaction of individual attributes along with other components that influence the experience, such as the natural environment and the social environment. Attribute satisfaction, used in our case, is based on the individual destination component and typically refers to hotels, technologies, restaurants, shops, attractions, etc (Leou, et al., 2015).

Destination image formation is a dynamic process, and the destination image is a multidimensional construct. With more destinations emerging, a common-unique dimension of the destination image has been proposed (Leou, et al., 2015). The common-unique dimension should be supplemented by the general functional and psychological characteristics of the destination where common features are the price level, transport, infrastructure, accommodation, climate, friendliness level, safety and quality of service etc (Leou, et al., 2015). The uniqueness of the destination image is also a determining factor in the destination selection process. Therefore, in the light of this aspect, the following hypothesis is put forward.

Hypothesis 4: Tourist experience satisfaction mediates the relationship between perceived value of smart tourism technologies experience and sustainable destination image in Istanbul.

Hypothesis 4a: Tourist experience satisfaction mediates the relationship between information (perceived value of smart tourism technologies experience) and sustainable destination image in Istanbul.

Hypothesis 4b: Tourist experience satisfaction mediates the relationship between accessibility (perceived value of smart tourism technologies experience) and sustainable destination image in Istanbul.

Hypothesis 4c: Tourist experience satisfaction mediates the relationship between interactivity (perceived value of smart tourism technologies experience) and sustainable destination image in Istanbul.

Hypothesis 4d: Tourist experience satisfaction mediates the relationship between personalization (perceived value of smart tourism technologies experience) and sustainable destination image in Istanbul.

Hypothesis 4e: Tourist experience satisfaction mediates the relationship between security (perceived value of smart tourism technologies experience) and sustainable destination image in Istanbul.

The proposed theoretical research model explored the relationship between the five attributes of smart tourism technologies, the perceived value of tourists' smart tourism technologies experience, tourist experience satisfaction and sustainable destination image with all hypotheses of the study (Figure 1). All research constructs were adapted and modified from previous studies. The perceived value of smart tourism technologies by tourists was selected and classified according to a literature review that identified five attributes: information, accessibility, interactivity, personalization, and security. It was assumed that the perceived experience of smart tourism technologies would affect the tourists' experience satisfaction and sustainable destination image, accordingly, tourist experience satisfaction will affect sustainable destination image.

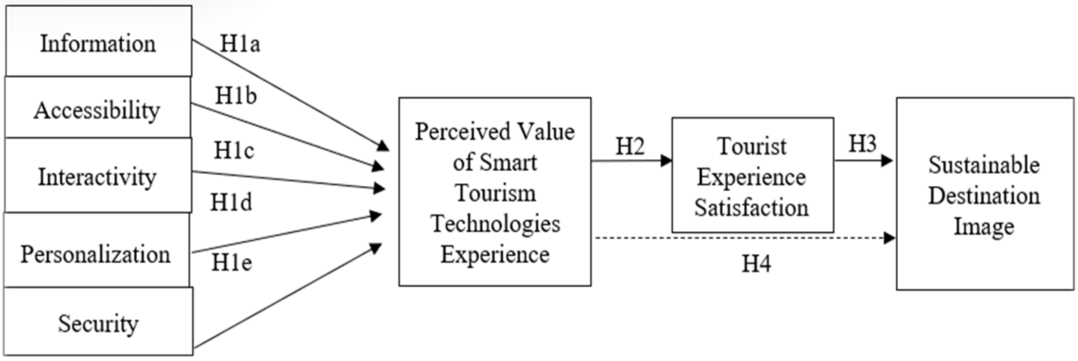

Figure 1. A proposed research framework from the literature (Sources: Authors' own)

MATERIALS AND METHODS

Data collection

To investigate and evaluate the possible effects of smart tourism technologies on visitor experience satisfaction and sustainable destination image, this research used a quantitative study methodology and an online survey technique. To prevent the collection of inaccurate data that may otherwise affect the analysis's findings, the questionnaire was made using Google Forms. A live survey URL was sent on social media sites like Facebook and LinkedIn along with a brief explanation of the study's methodology and a request for tourists to participate. Respondents were chosen using a non-random sample technique called the snowball sampling method, which asks respondents to invite and recommend friends and acquaintances to take part in the study. In examining tourists' perceptions of how satisfied they are with the services provided by these tools or applications; it is assumed that they have already used smart tourism technologies. It seeks to determine how successfully Istanbul fits to the idea of smart tourism. Due to this method's capacity to meet certain requirements, including ease of accessibility, willingness to participate, proximity, availability of participants at a specified time, and cost-effectiveness, it was suitable and practical for the study. A total of 142 questionnaires from travelers to Istanbul were gathered. Since it guarantees validity and reliability, the sample size is thought to be appropriate.

Measurements

This study's questionnaire is based on two sections: demographic characteristics and the measurement of the constructs. Six questions about personal information are included in the first section. The second section of the survey consists of 27 questions about the tourists' opinions on the attributes of smart tourism technologies, the perceived value of smart tourism technologies, their satisfaction with their travels, and their perceptions of Istanbul's sustainable tourism industry. The attributes of smart tourism technologies such as information, accessibility, interactivity, personalization, and security are included. Three items of each attribute of smart tourism technologies are adapted for the literature (Pai et al., 2020; Zhang et al., 2022; Jeong & Shin, 2020). Likewise, three items from the studies of Zhang et al., (2022) and Jeong & Shin (2020) are included. In addition, tourism experience satisfaction is measured through three items (Zhang et al., 2022; Sandos-Roldán et al., 2020; Jeong & Shin, 2020). Lastly, the sustainable destination image is captured through the scale of six items (Mohaidin et al., 2017; Králiková et al., 2020).

Responses could range from 1 for disagree to 5 for agree on a five-point Likert scale. The questionnaire was drafted in English containing information about the reason for conducting the survey, instructions for responding, and a statement about maintaining respondent privacy and confidentiality. All questions of the questionnaire were designed in such a way as to obtain the most accurate data for accepting or rejecting hypotheses in the proposed model. The constructs were measured using multi-measurement items adapted from the extant literature and modified for this research (see details in Appendix A). The demographic details of the respondents included in the analysis of this study are summarized in Table 1 below. The demographic profile includes details like gender, age, education level, occupation, marital status, and respondent category.

Table 1. Demographic profile of the respondents (Source: Authors' Survey)

Demographic Variables	Details	Frequency	Percentage
Gender	Female	73	51.4
	Male	69	48.6
Age	Below 20 years	4	2.8
	21-35 years	100	70.4
	36-45 years	21	14.8
	46-60 years	14	9.9
	Above 60 years	3	2.1
Education	High school	21	14.8
	Bachelor's degree	70	49.3
	Master's degree or higher	51	35.9
	Other	0	0
Occupation	Student	60	42.3
	Employed	71	50
	Unemployed	2	1.4
	Retired	3	2.1
	Others	6	4.2
Marital status	Single	58	40.8
	In a relationship	43	30.3
	Married	36	25.4
	Divorced	5	3.5
Nationality	Local resident	43	30.3
	Domestic tourist	23	16.2
	Foreign tourist	76	53.5
Total respondents		142	100 %

Data Analysis

Using the computer program Smart PLS 3.3.9, partial least square structural equation modeling (PLS-SEM) empirical results were obtained. Over the past ten years, PLS-SEM has been widely used by researchers in the social sciences. It has excellent predictive abilities and the potential to estimate complex models with numerous constructs and indicator variables (Hair, et al., 2019). Because of the hypothesized nature of the proposed relationships in this study, this method was chosen in this study. Two phases make up the PLS-SEM analysis: validation of the measurement model and evaluation of the structural model. The relationship between latent variables and observed data is represented by the measurement model, while the relationship between latent variables is represented by the structural model. As a result, the questionnaire was thought to be very trustworthy. Additionally, after the preliminary test was distributed, some of the questions' wording was changed to avoid ambiguous statements until the official release of the final questionnaire.

According to the descriptive analysis of demographic data in Table 1, the sample consisted mainly of females (73 or 51.4%) from the age group 21-35 years (53 or 37.3%). Most tourists have a bachelor's degree education (70 or 49.3%) and are employed (71 or 50%). Mainly, foreign tourists took this survey (76 or 53.5%), followed by local residents (43 or 30.3) and domestic tourists (23 or 16.2%). The following section discusses the analyses and results.

Multicollinearity

In a multiple regression model, multicollinearity refers to a high level of linear intercorrelation between independent variables, which produces inaccurate regression analysis results (Kim, 2019). Variance inflation factors (VIF) were used for each element to test multicollinearity as diagnostic tools. According to Hair et al. (2017), VIF less than 5 generally denotes that multicollinearity is no longer a concern in the model. VIF values of 5 or 10 suggest that the multicollinearity may present a challenge. According to the study, variance inflation factor (VIF) values is ranged from 1.348 to 2.499 in Table 2, which indicates that multicollinearity does not exist in the data.

It is suggested that the presence of a VIF above 3.3 is a sign of pathological collinearity and also suggests that a model may be contaminated by common method bias. As a result, the model can be said to be free of common method bias if all VIFs obtained from the full collinearity test are equal to or lower than 3.3 (Kock, 2015; Hair, et al., 2017).

Table 2. Variance Inflation Factor (VIF) and Factor Loadings (Source: Authors' Estimations from Smart PLS 3.3.9)

Constructs	**Items**	**Variance Inflation Factor**	**Factor Loadings**
Accessibility	ACC1	1.893	0.865
	ACC2	2.288	0.893
	ACC3	1.951	0.857
Information	INF1	2.179	0.862
	INF2	2.419	0.897
	INF3	2.053	0.892
Interactivity	INT1	2.148	0.892
	INT2	1.791	0.854
	INT3	1.626	0.803
Perceived Value	PV1	1.477	0.777
	PV2	1.763	0.871
	PV3	1.495	0.813
Personalization	PER1	1.689	0.815
	PER2	1.636	0.846
	PER3	1.556	0.838
Sustainable Destination Image	SDI1	1.618	0.707
	SDI2	1.665	0.731
	SDI3	1.889	0.744
	SDI4	2.000	0.804
	SDI5	1.348	0.688
	SDI6	1.935	0.763
Security	SEC1	2.499	0.890
	SEC2	2.518	0.882
	SEC3	1.795	0.869
Tourist Experience Satisfaction	TES1	2.646	0.917
	TES2	2.099	0.873
	TES3	2.242	0.877

Factors Loadings

All items significantly loaded above the threshold level for the factor loadings of the latent construct. A factor loading of 0.7 or higher indicates, in the SEM approach, that the factor extracts enough variance from the variable.

Internal consistency reliability

The composite reliability, also called construct reliability or Cronbach's alpha, can be used to assess the internal consistency reliability. According to researchers, Dijkstra-Henseler rho and Cronbach's alpha coefficients were used to analyze and test the model for construct reliability and internal consistency (Hair et al., 2017).

According to Hair et al. (2017), it is advised that the composite reliability and Cronbach's alpha values for exploratory studies must be higher than 0.70. All Cronbach's alphas were greater than 0.7, as shown in Table 3, indicating good reliability for all items. Additionally, the analysis complied with the criteria for composite reliability (CR), as determined by Dijkstra-Henseler and Joreskog rho with threshold values of 0.9 and 0.7, respectively.

Accessibility (0.905), Information (0.915), Interactivity (0.887), Personalization (0.872), Security (0.912), Perceived Value of Smart Tourism Technologies Experience (0.861), Sustainable Destination Image (0.879), and Tourist Experience Satisfaction (0.919) are all shown to have acceptable composite reliability values in the results. All items consequently exhibit a higher degree of internal consistency.

Table 3. Construct Reliability and Validity

Constructs	**Cronbach Alpha (α)**	**Dijkstra-Henseler's rho_A (ρA)**	**Jöreskog's rho (ρc) Composite reliability (>0.7)**	**Average variance extracted (AVE) (>0.5)**
Accessibility	0.842	0.843	0.905	0.760
Information	0.861	0.876	0.915	0.781
Interactivity	0.809	0.816	0.887	0.724
Perceived Value	0.758	0.768	0.861	0.674
Personalization	0.781	0.791	0.872	0.694
Security	0.856	0.866	0.912	0.775
Sustainable Destination Image	0.836	0.844	0.879	0.548
Tourist Experience Satisfaction	0.867	0.873	0.919	0.790

Convergent validity

To demonstrate the reliability of the survey data, validity analysis was done for both convergent validity and discriminant validity. The new scale's convergent validity describes how well it correlates with other variables and measures of the same construct. The construct must not only not correlate with dissimilar, unrelated variables but also not correlate with related variables. Convergent validity can be assessed using the factor loading of each indicator and the average variance extracted (AVE) (Hair, et al., 2017). According to statistics, convergent validity is established when the factor indicator loading is higher than 0.708, as the AVE is 50% and the number squared (0.7082) equals 0.50. Indicators with a lower loading, however, can only be taken into account if other indicators have an AVE of 0.50 or higher. 0.708 is a suitable benchmark. The findings demonstrate that every construct indicator had higher loadings, or an AVE above 0.50 and above 0.70. The AVE scores for Accessibility (0.760), Information (0.781), Interactivity (0.724), Perceived Value (0.674), Personalization (0.694), Security (0.775), Sustainable Destination Image (0.548), and Tourist Experience Satisfaction (0.790), as shown in Table 3, supported the measurement model's convergent validity.

Discriminant validity. Fornell-Larcker criterion

The Fornell-Larcker test, which suggests that a construct is empirically distinct and represents a phenomenon of interest that other measures in the model do not capture, was also used to examine discriminant validity (Henseler et al., 2015). The findings demonstrate that discriminant validity is established and that the basic and strict assumptions of the Fornell-Larcker test are satisfied. It is important to note that each construct measured must have an AVE value greater than 0.5 and that the diagonal values in Table 4 represent AVE. To establish discriminant validity, each construct's coefficient value must also be higher in both the column and row (Henseler, et al., 2015).

Table 4. Discriminant Validity – Fornell-Larcker Criterion (Source: Authors' Estimations from Smart PLS 3.3.9)

	Accessibility	Information	Interactivity	PV	Person	Security	SDI	TES
Accessibility	**0.872**							
Information	0.778	**0.884**						
Interactivity	0.732	0.647	**0.851**					
PV	0.697	0.639	0.573	**0.821**				
Personalization	0.550	0.478	0.701	0.636	**0.833**			
Security	0.501	0.513	0.565	0.556	0.639	**0.880**		
SDI	0.440	0.489	0.440	0.398	0.481	0.447	**0.740**	
TES	0.660	0.658	0.632	0.691	0.614	0.526	0.535	**0.889**

Heterotrait-Monotrait ratio

Heterotrait-Monotrait ratio (HTMT) result displayed in Table 5 was below the minimum threshold of 0.85, which is appropriate for this study.

Table 5. Discriminant Validity – Heterotrait-Monotrait Ratio (HTMT)

Constructs	Access	Inform	Interact	PV	Person	Security	SDI	TES
Accessibility	0.810							
Information	0.778	0.773						
Interactivity	0.729	0.664	0.849					
Perceived Value	0.695	0.627	0.568	0.819				
Personalization	0.531	0.462	0.693	0.663	0.829			
Security	0.494	0.508	0.563	0.549	0.639	0.881		
SDI	0.439	0.491	0.438	0.404	0.482	0.444	0.746	
TES	0.662	0.678	0.637	0.715	0.619	0.524	0.537	0.888

Structural model and hypotheses testing

The path analysis of the structural model can be used to continue examining the model's quality of fit. This analysis is highly relevant for identifying and establishing causal relationships or construct relationships that underlie research assumptions and hypotheses (Figure 2).

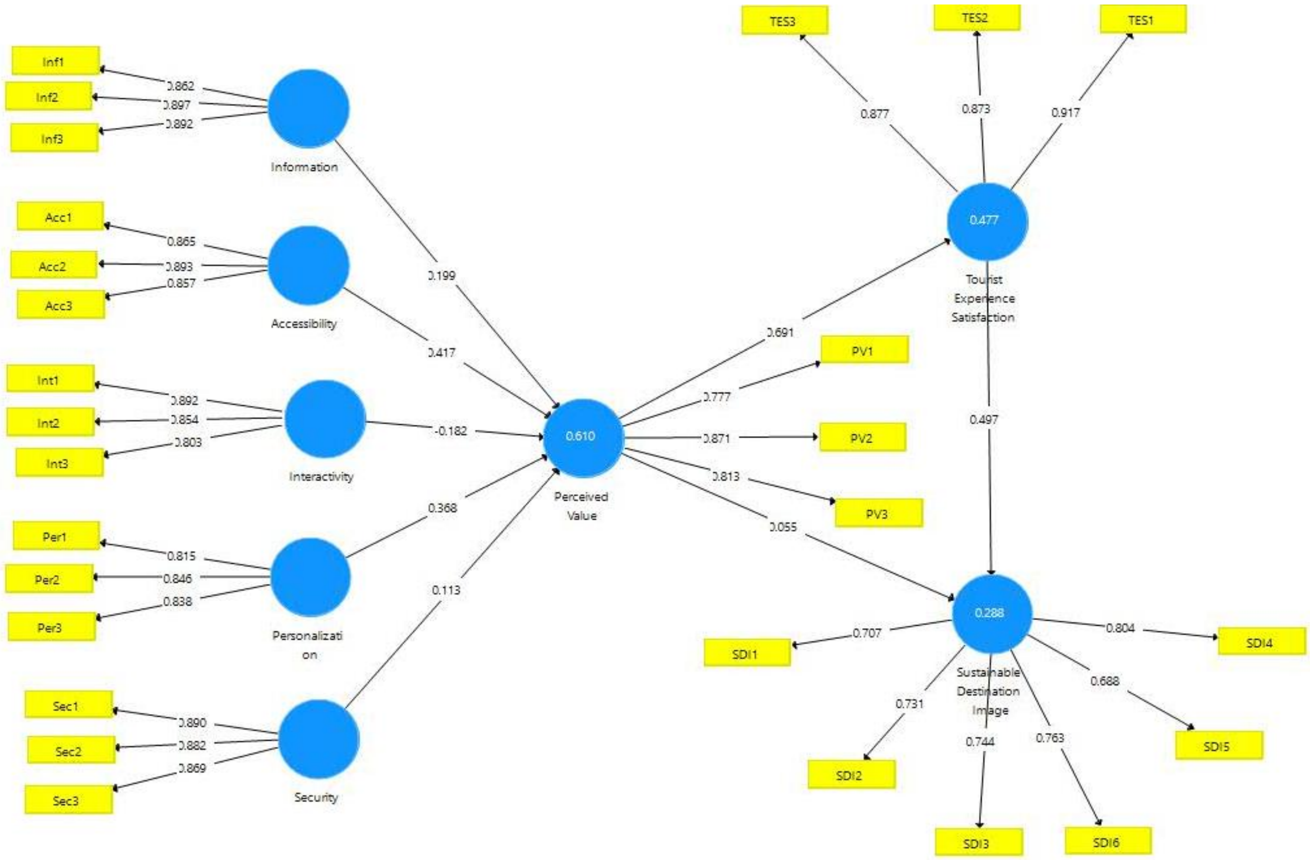

Figure 2. Structural Equation Model extracted from Smart PLS 3.3.9

Direct effect

The findings shed light on tourist satisfaction and Istanbul's reputation as a sustainable destination. To approximate the parameter's statistical significance, a bootstrapping method with a 5000-sample size and one-tailed significance was utilized. There are eight variables in this study. In the "decision" column of the table below, relationships with significant impacts and support for the corresponding hypothesis are labelled "Supported." The direct relationship results revealed accessibility having the highest value (H1a, β = 0.417, t = 2.915, p = 0.002), followed by personalization (H1d, β = 0.368, t = 4.419, p = 0) and information (H1b, β = 0.199, t = 2.148, p = 0.016) which were significantly positively related with the perceived value of smart tourism technologies experience. H1a, H1b, and H1d hypothesis are supported, as shown in Table 6. The results showed that the perceived value of smart tourism technologies experience (H2, β = 0.691, t = 11.618, p = 0) was significantly positively related to tourist experience satisfaction. Tourist experience satisfaction (H4, β = 0.497, t = 5.066, p = 0) was significantly positively related to sustainable destination image.

Table 6. Path Coefficient direct and indirect relationship

Hypotheses	Original Sample (O)	Sample Mean (M)	Standard Deviation	t-value	P-Values	Decision
Direct Relationship						
H1a: Accessibility → PV	0.417	0.383	0.143	2.915	0.002	**Supported**
H1b: Information → PV	0.199	0.208	0.092	2.148	0.016	**Supported**
H1c: Interactivity → PV	-0.182	-0.150	0.142	1.287	0.099	Not Supported
H3: PV → SDI	0.055	0.060	0.101	0.543	0.294	Not Supported
H2: PV → TES	0.691	0.691	0.059	11.618	0.000	**Supported**
H1d: Personalization →PV	0.368	0.357	0.083	4.419	0.000	**Supported**
H1e: Security → PV	0.113	0.119	0.077	1.459	0.072	Not Supported
H4: TES → SDI	0.497	0.504	0.098	5.066	0.000	**Supported**

Indirect effect

This research examined the potential mediation mechanism of tourism experience satisfaction (Table 7). Mediation analysis was performed to test H4, H4a, H4b and H4d, which hypothesized a positive mediating effect on tourist experience satisfaction in relationship between perceived value of smart tourism technologies experience, accessibility, information, personalization and sustainable destination image (H4: β =0.343, t = 4.410, H4a: β =0.068, t =1.969, p =0.024, H4b: β = 0.143, t = 2.315, p = 0.01 H4d: β =0.126, t = 2.992, p = 0.001). Conversely, H4c and H4e show tourist experience satisfaction with an insignificant mediation relationship between the perceived value of smart tourism technologies experience, interactivity, security, and sustainable destination image (β =-0.063, t= 1.214, p =0.112, β =0.039, t=1.367, p =0.086).

Table 7. Mediation Analysis (Indirect Effect)

Hypotheses	Original Sample (O)	Sample Mean (M)	Standard Deviation	T-Statistics	P-Values
H4: PV → TES → SDI	0.343	0.349	0.078	4.410	0.000
H4a: Information → PV → TES → SDI	0.068	0.072	0.035	1.969	0.024
H4b: Accessibility → PV→ TES →SDI	0.143	0.135	0.062	2.315	0.010
H4c: Interactivity → PV → TES → SDI	-0.063	-0.053	0.052	1.214	0.112
H4d: Personalization → PV → TES → SDI	0.126	0.125	0.042	2.992	0.001
H4e: Security → PV → TES → SDI	0.039	0.041	0.028	1.367	0.086

Coefficient of determination (R^2)

Additionally, the coefficient of determination was assessed to examine the constructs' predictive abilities. The percentage of change in the dependent variable that was explained by the independent variable is represented by the coefficient of determination (R^2) value. The coefficient of determination values listed in Table 8 adequately explain the variability. As a result, the R^2 of perceived value (0.610) indicates that independent constructs (accessibility, information, interactivity, personalization, and security) account for 61% of the variance.

According to Table 8, the sustainable destination image has an R^2 of 0.288, indicating that the perceived value of smart tourism technologies and tourist experience satisfaction (an independent construct) account for approximately 29% of the variance. The tourist experience satisfaction R^2 of 0.477 indicates that the perceived value of smart technologies (an independent construct) accounts for approximately 48% of the variance.

Table 8. Coefficient of determination

Coefficient of determination (R^2)		
	R-Square	**R-Square Adjusted**
Perceived Value	0.610	0.595
Sustainable Destination Image	0.288	0.278
Tourist Experience Satisfaction	0.477	0.473

DISCUSSION AND CONCLUSION

Smart technology integration into current business processes is crucial for businesses today. This not only saves time and improves organizational performance overall, but it also makes sure that the company stays one step ahead of the competition in the long run. Technology in an organization must be perfectly aligned with the values, mission, culture, and current business processes to enable successful digital transformation. Smart tourism technologies have revolutionized tourism businesses, products, and experiences as well as business ecosystems and destinations, bringing about significant changes to the tourism industry (Idris et al., 2021). One of the key elements in the growth of sustainable and smart tourism is information and communication technology. To give visitors a convenient, welcoming, and personalized travel experience and increase their satisfaction, many tourist destinations and attractions have adopted smart tourism technologies (Zhang et al., 2022). Smart technologies assist tourist destinations in managing tourism resources better, promoting their best possible use and sustainable development of tourism resources, and enhancing the standard of living for locals and visitors.

A customer's ability to visit an attraction before departing using augmented reality tools is a trend that cannot be ignored when examining technological developments in the travel industry. Although the technology is already available, adoption is still at a low level. One of the barriers to adoption may be the severe lack of interesting content, which should soon change. Another tool that promises to raise customer satisfaction while decreasing customer service expenses is the use of chatbots and virtual assistants. We believe that over time, the majority of communication-related to obtaining basic information about a product or planning a trip can be automated. They might not be intelligent enough to replace a human right now, and they probably won't replace travel agent communication anytime soon.

The primary objective of this article was to comprehend the characteristics of the perceived experience of smart tourism technologies and to investigate the connection between the tourists' perception of the value of smart tourism technologies, their satisfaction with their experiences, and the image of sustainable destinations. To begin, the perceived value of experience associated with smart tourism technologies has been measured. Accessibility, personalization, information, security, and interactivity are in descending order of importance. Particularly, when comparing the findings of the analysis on the attributes of smart tourism technologies that tourists perceive to be of the highest perceived value, tourists are most likely to recognize accessibility when employing smart tourism technologies. The fact that it is easily accessible to tourists traveling through Istanbul could be one of the reasons. Tourists use the smart technologies that are currently available to make decisions, such as making travel arrangements on their mobile phones, interacting with other tourists, and exchanging travel stories. Travellers can enjoy a technology-based travel experience at their destination because smart tourism technologies are readily available and require little time or effort to learn how to use (Pai et al., 2020).

Another significant factor that affected how the perceived smart tourism experience was personalization. Since relevant and appropriate offers are made to tourists, saving them time while boosting travel satisfaction in the destinations, smart tourism technologies offer insight and better knowledge of consumer preferences. In addition, this article does not endorse the significance of security and interactivity, contrary to expectations. Whilst, accessibility, personalization, information, and play an important role in improving the travel experience based on smart technologies. This study claims that if smart tourism and smart city applications are used in all facets of governance, Istanbul will become the center of attention and take the lead in the global race for leadership. Smart technologies are being implemented to improve the lives of both residents and visitors. Accordingly, the Istanbul Metropolitan Municipality should continually upgrade the use of smart tourism technology infrastructure and services, simplify the use of smart tourism technologies, and strengthen contact and communication between tourists and other stakeholders, thereby further enhancing tourists' perception of the usability and usefulness in the context of smart tourism technologies. Lastly, when developing related platforms, applications, websites, etc., software developers should plan for more diverse experiences and pay more attention to individual service performance.

Theoretical Contributions

This article theoretically makes significant contributions. The proposed research model and identified constructs contribute to the expanding body of knowledge regarding the investigation of specific connections and relationships. Numerous studies have explored the impact of technologies, and sustainable destination image on tourist experience satisfaction. However, reverse exploration is relatively rare, hence the exploration of the relationships of smart tourism technologies, and tourist experience satisfaction toward sustainable destination image is the contribution of this article. Additionally, as a world-famous tourist destination, using tourism technologies was an ideal context to carry out such research. As a result, another contribution of this research is the examination of the aforementioned relationships in the context of Istanbul, Turkey.

Practical Implications

This article also has important practical implications. Firstly, the findings indicate the significance of information quality, reliability, and accuracy for the perceived value of smart tourism technologies. Therefore, the management and administration of tourist destinations should value and incorporate accurate and reliable information to be transmitted through smart tourism technologies, and all such information should be updated quite frequently.

Secondly, the tourists have placed a high value on accessibility and ease of information access. Therefore, all sources of information through smart tourism technologies should be user-friendly and create smart travel applications or websites that better meet the expectations of tourists with better personalization features.

Thirdly, the perceived value of smart tourism technologies experience showed the highest impact on tourism experience satisfaction (H2), indicating that perceived smart tourism technologies experience can lead tourists to higher satisfaction. Travel apps or websites provide tourists with the services they require, replacing traditional manual processes. This not only increases the sense of participation among tourists but also saves money on transportation and labour costs (Pai et al., 2021). As a result, local smart tourism websites, applications, and software can get more attention. This could further develop Istanbul's travel industry experience fulfilment. Fourthly, as shown by the study's findings tourist experience satisfaction positively affects sustainable destination image (H4). In this manner, to support and encourage more explorations, destination management should seriously focus on enhancing the tourist experience satisfaction by using tourism-related smart technologies to improve the destination's image and competitiveness.

Limitations and Recommendations for Future Research

The first limitation is the survey's use of the snowball sampling method and online data collection. The sample size of respondents is relatively small and may not be representative of the entire population due to time restrictions and accessibility. To increase the diversity of the study sample, it is advised that future research prepare surveys in a variety of languages and enrich sample types from various nations. Additionally, information could be gathered from well-known tourist attractions. Secondly, this study was carried out in Istanbul, which might have a unique tourist type and urban environment. Respondents of different genders, ages, regions, and experiences with smart technologies may have different attitudes toward the smart tourism technologies experience. The findings of this study may not apply to other regions and may differ depending on the demographic and geographic characteristics.

Thirdly, this study focused on the perceived value of the smart tourism experience, tourist experience satisfaction, and sustainable destination image. The applicability of these constructs is limited and needs further investigation. To better understand current smart tourism technologies, future research should keep looking into additional factors that affect the experience, as well as exploring the phenomenon on a broader level.

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STRATEGIES FOR BUSINESS SUSTAINABILITY THROUGH DIGITAL MARKETING AND INNOVATION IN ASPIRING GEOPARK

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Abstract: This study explores the impact of digital marketing on business sustainability through geoproduct innovation among Micro, Small, and Medium-sized Enterprises (MSMEs) in the Aspiring Geopark Pangandaran. While previous research has examined geoproduct development and its contributions to local livelihoods, limited studies have addressed the relationship between digital marketing, geoproduct innovation, and MSME sustainability in a geopark setting. This research aims to fill this gap by employing a quantitative approach. Data were collected from 100 MSMEs through an online questionnaire, and the Structural Equation Modeling-Partial Least Squares (SEM-PLS) method was applied for hypothesis testing, given its suitability for small sample sizes. The study reveals that geoproduct innovation, particularly eco-friendly product development, plays a crucial role in business growth by attracting environmentally conscious consumers. Additionally, digital marketing significantly influences geoproduct innovation strategies, enhancing their impact on business performance. The integration of digital marketing with geoproduct innovation fosters long-term sustainability for MSMEs operating within geopark regions. The findings suggest that leveraging digital marketing tools can optimize geoproduct promotion, improve market reach, and strengthen customer engagement. Furthermore, the study highlights the need for MSMEs to adopt digital strategies to remain competitive in an evolving business landscape. By incorporating geoproduct innovation into marketing efforts, MSMEs can enhance brand positioning and expand market opportunities. These insights offer valuable implications for policymakers, business owners, and stakeholders in geopark territories. Strengthening digital marketing initiatives and innovation strategies will ensure the resilience and sustainability of MSMEs, contributing to economic growth and environmental conservation. This study underscores the strategic importance of integrating digital marketing with geoproduct innovation in fostering sustainable MSME development within geoparks.

Keywords: digital marketing, geoproduct innovation, business sustainability, Aspiring Geopark Pangandaran

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INTRODUCTION

Geoparks serve as hubs for sustainable development, integrating geological, ecological, and cultural heritage into cohesive frameworks that support local economies and preserve natural resources. Geotourism, a prominent feature of geoparks, emphasizes responsible tourism practices that balance environmental conservation with cultural appreciation (Šambronská et al., 2023). Within this context, micro, small, and medium enterprises (MSMEs) play a vital role by offering products and services that showcase local heritage, thereby connecting visitors with the region's unique attributes (Miśkiewicz, 2024). However, while geoparks present significant opportunities for community development and environmental stewardship,

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ensuring the long-term sustainability of MSMEs operating within these areas remains a persistent challenge. Sustainability in the context of MSMEs extends beyond environmental considerations to include economic resilience and social responsibility. As key players in the geopark ecosystem, MSMEs contribute to the local economy through employment, innovation, and cultural preservation. Geoproducts - items or services inspired by a geopark's natural and cultural resources - emphasize the integration of local identity and environmental education into tourism offerings (Hermawati et al., 2020; Miśkiewicz, 2024). Despite their potential, many MSMEs face barriers to scaling their operations and maintaining competitiveness in a dynamic market. Addressing these challenges requires innovative marketing strategies that leverage digital technologies to enhance visibility, engagement, and customer loyalty (Muis et al., 2024; Purba et al., 2021). Geoproducts and MSME sustainability was explored independently, the intersection of these topic, particularly the role of digital marketing in driving geoproduct innovation within geopark has received limited academic attention. Geoparks such as Aspiring Geopark Pangandaran exemplify the need for integrated approaches that foster innovation while promoting responsible tourism. Research indicates that digital marketing offers MSMEs a means to adapt to evolving consumer preferences and market demands, thereby ensuring their sustainability (Kasavan et al., 2017; Mahajan, 2023; Lestari et al., 2023). Yet, the application of these strategies in the geopark context remains underexplored, particularly in regions with significant geotourism potential.

Digital marketing, characterized by its ability to amplify reach and engagement, is transforming the way MSMEs operate in geoparks. By utilizing platforms like social media, businesses can establish direct connections with consumers, showcase their unique offerings, and enhance brand visibility (Anyadighibe et al., 2024). These tools not only provide cost-effective marketing solutions but also facilitate the integration of sustainability principles into business practices. For instance, MSMEs that align their digital marketing strategies with responsible tourism practices can attract environmentally conscious consumers and bolster their reputation (Kasavan et al., 2017). However, for these benefits to materialize, MSMEs must adopt a multifaceted approach that combines innovation, marketing, and community engagement.

Innovation plays a central role in the sustainability of MSMEs, enabling them to develop unique products and services that cater to both local and tourist markets. Geoproducts, as highlighted in recent studies, represent a novel strategy for enhancing competitiveness by leveraging local resources and cultural heritage (Retnaningsih et al., 2024; Pratiwi et al., 2022). Continuous product development and creative marketing strategies allow MSMEs to differentiate themselves in a competitive market with environmental challenges, ensuring long-term resilience (Olazo, 2022). Despite the recognized benefits of digital marketing and innovation, their application within the geopark setting remains fragmented. For instance, studies on MSMEs in Indonesia highlight the role of entrepreneurial orientation in improving marketing performance through digital channels (Anyadighibe, 2024). A study by Fiona et al. (2024) indicate a positive correlation between effective digital marketing practices and improved performance metrics for MSMEs. This includes increased sales, customer engagement, and overall business growth. However, these insights often lack specific focus on the unique context of geoparks, where environmental and cultural considerations intersect with business operations. Similarly, while partnerships between MSMEs and geopark management are acknowledged as valuable for resource sharing and joint marketing initiatives, their implementation remains inconsistent (Sánchez-Cortez et al., 2024). These gaps underscore the need for comprehensive strategies that integrate marketing, innovation, and sustainability to address the specific challenges faced by MSMEs in geoparks.

The literature provides a foundation for understanding the potential of digital marketing and innovation in enhancing MSME sustainability within geoparks. For instance, studies have shown that training programs focused on entrepreneurial competencies can empower MSME operators to implement effective marketing strategies and adapt to changing market conditions (Ibrahim et al., 2021; Noverani et al., 2023). Furthermore, community involvement in geotourism initiatives fosters a sense of ownership and responsibility towards sustainable practices, creating synergies that benefit both local businesses and the environment (Hermawati et al., 2020). However, these findings also highlight the need for context-specific approaches that address the unique characteristics of geoparks and their associated MSMEs.

This study aims to bridge these gaps by exploring how digital marketing influences geoproduct innovation and contributes to the sustainability of MSMEs in Aspiring Geopark Pangandaran. By focusing on this specific geopark, the research provides novel insights into the integration of marketing and innovation strategies within a geotourism framework. The study's findings will inform both practitioners and policymakers, offering practical recommendations for enhancing business performance while preserving the natural and cultural heritage of geoparks. This approach not only addresses the identified research gaps but also contributes to the broader discourse on sustainable development in geoparks. Through this investigation, the study seeks to advance the understanding of how MSMEs can leverage digital tools to achieve economic resilience and environmental stewardship, ultimately supporting the sustainable growth of geotourism.

MATERIALS AND METHODS

In the theoretical framework of this study, several key theories and frameworks provide a foundation for understanding how digital marketing and geoproduct innovations contribute to the sustainability of MSMEs in the Aspiring Geopark Pangandaran. Innovation Diffusion Theory, developed by Everett Rogers, elucidates how, why, and at what rate new ideas and technologies spread through cultures. This is supported by findings who emphasize the role of cultural similarity in the acceptance of innovations within communities (Giraldo et al., 2024). This theory is used to examine the adoption of digital marketing strategies and geoproduct innovations by MSMEs, as it highlights the roles of early adopters and opinion leaders in gaining traction for these innovations. is particularly relevant in the context of geoparks, where the adoption of innovative practices and technologies can significantly impact environmental management, tourism, and community engagement.

The Resource-Based View (RBV) of the firm further complements this perspective by positing that firms can achieve a competitive advantage through the strategic utilization of unique resources and capabilities. In this context, digital marketing and innovation serve as critical resources that enable MSMEs to differentiate themselves and achieve sustainability. Additionally, sustainability frameworks such as the Triple Bottom Line (TBL) and the Sustainable Development Goals (SDGs) provide a comprehensive lens through which MSMEs can balance economic, social, and environmental objectives. These frameworks underscore the importance of integrating sustainability into business practices, aligning with the study's focus on enhancing business sustainability within geoparks. These theories and frameworks offer a robust foundation for exploring the interplay between digital marketing, innovation, and sustainability in the context of MSMEs. A conceptual framework was developed to illustrate the integration of variables emphasizing how digital marketing strategies and innovative practices contribute to the long-term sustainability of MSMEs.

Digital Marketing

Digital marketing is a tool for reaching targeted customers with pertinent marketing messages and promotional offers. Due to its simplicity and affordability, digital marketing is now accessible to even small business owners. Digital marketing consisted of social media-based strategies, collaboration with influencers, customized content, and understanding of consumer perspectives for marketing success (Mishra et al., 2022). MSME digital marketing are analyzed from the aspects of: skills, technology, security, and creative content (Phalle, 2021). Digital marketing variables are measured based on the effectiveness of using digital platforms.

Innovation Strategies

The innovation strategy outlined in (Couñago-Blanco et al., 2024) study focuses on aligning innovation efforts with consumer perceptions and readiness for adoption. A robust innovation strategy integrates consumer insights with adaptive, consumer-focused innovation processes. MSME innovation strategies focus on technology-based sustainable practices, including innovation, collaboration, communication, and commitment, to increase competitiveness, brand loyalty, and market value (Wibowo et al., 2023). Geoproduct innovation strategy is measured based on the utilization of local potential in products.

Business Sustainability

Sustainable business models generally emphasize creating economic, social, and environmental value while aligning business practices with customer needs and preferences. This approach helps MSMEs establish long-term resilience and competitive advantage through sustainable practices (Zimmer et al., 2023) MSME business sustainability customer segmentation, environmental value proposition, online distribution channels, personalized customer relationships, and revenue from product or service sales. Business sustainability is measured from three dimensions: social, economic, and environmental.

METHOD

The study utilized the quantitative method, where the variables are: digital marketing, innovation strategies and business sustainability. The study starts with gathering literature review form journal articles and study reports, then designing the research questions and design. The research instrument were developed to collect the data from respondents, then data processing and analysis is conducted. The steps in methodology are shown in Figure 1.

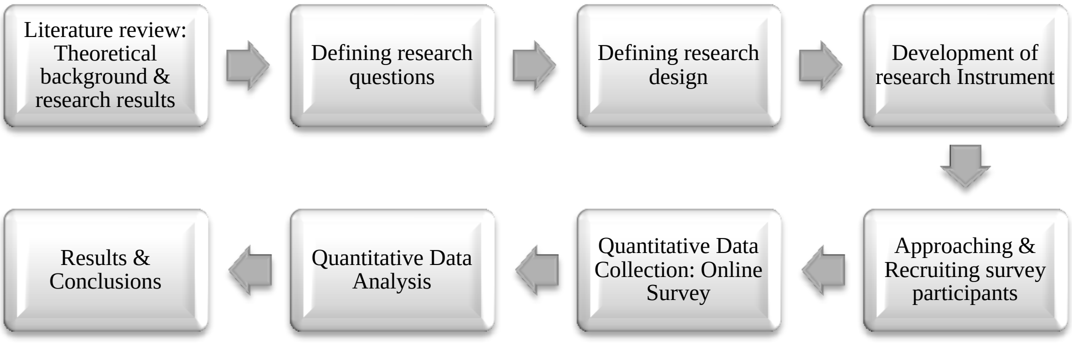

Figure 1. Steps in Research Methodology

Study Location

Aspiring Geopark Pangandaran located in West Java Province of Indonesia is a prime example of a sustainable tourism destination that integrates geodiversity, biodiversity, and cultural diversity. Its geological richness, including sedimentary, volcanic, and alluvial formations, coupled with unique landforms such as karst hills and coastal plains, showcases the region's significant scientific and educational value. Biodiversity thrives in its ecosystems, with mangrove forests and coastal habitats supporting endemic species while enabling eco-tourism activities like body rafting and river tubing. Additionally, Pangandaran's cultural heritage, reflected in traditional arts, cultural villages, and local customs, enhances its appeal by offering visitors experience of nature. These elements collectively create a strong foundation for developing sustainable geotourism, fostering environmental conservation, community empowerment, and cultural preservation, ensuring long-term benefits for both the local population and visitors.

The list of Aspiring Geopark Pangandaran’s geosites are as follows: 1.Pangandaran beach, 2. Ciwayang Rafting, 3. Batukimpang,4. Lanang Cave, 5.Jojogan, 6.Papedan Hill, 7.Green Canyon,8. Batu Cave, 9.Cicurug River, 10.Madasari

Salt Mine, 11. Jojongor beach, 12. Madasari Beach, 13.Situ Cisamping, 14.TPI Palatar Agung, 15.Krapyak Beach,16. Karang Tirta Beach,17.Panenjoan Fossil Hill, 18. Haur Mountain, 19.Curug Leuwiutak, 20.Sutra Reregan Cave, 21.Santirah, 22. Upper reaches of Ciljulang River, 23.Cijumleng Doline. For more details refer to the map in Figure 2.

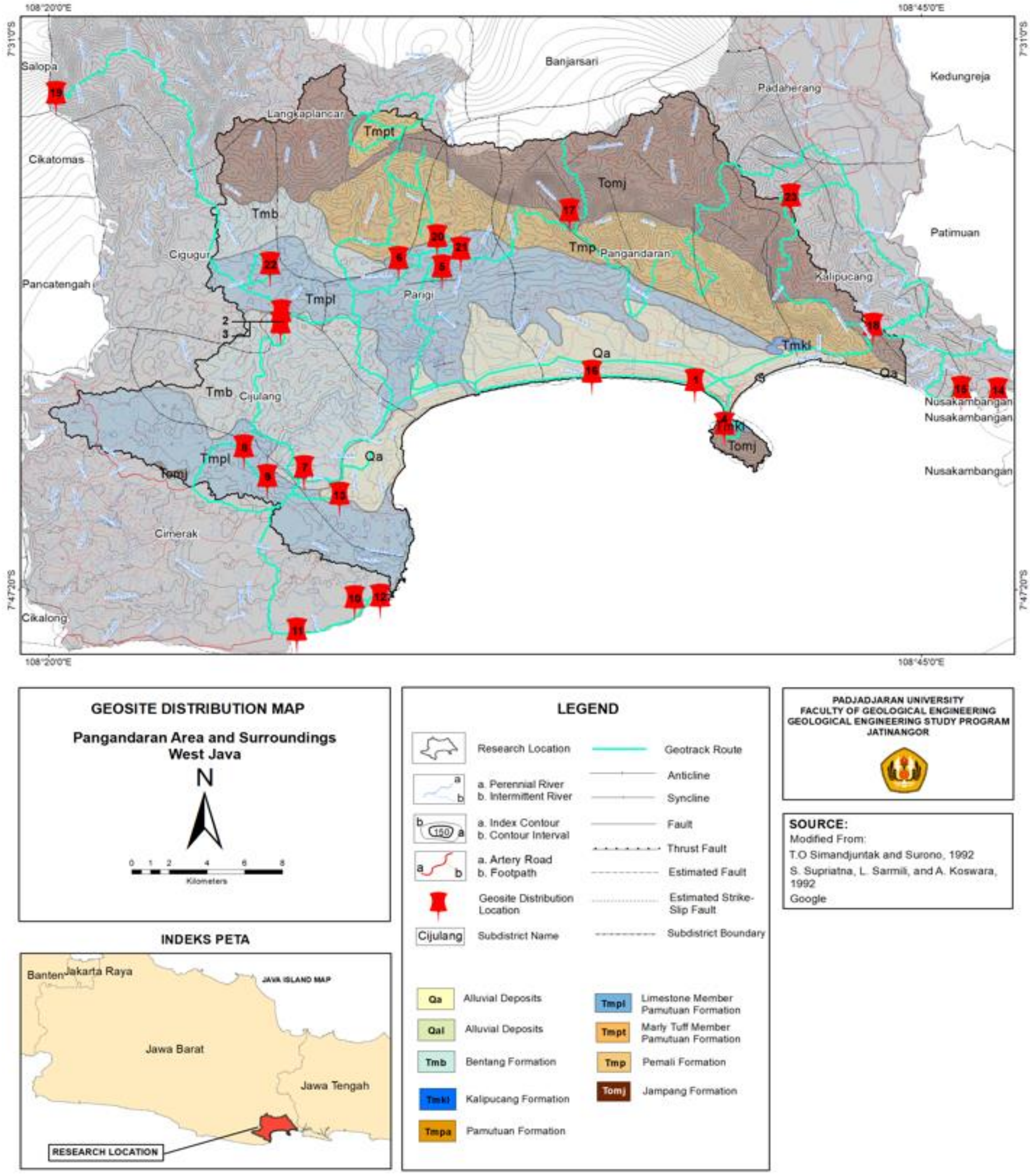

Figure 2. Map of Aspiring Geopark Pangandaran

Aspiring Geopark Pangandaran as natural tourist destinations is rich in natural beauty and geological uniqueness is classified as a geosite. The categories of geosites are based on natural forms, including beaches, rivers, caves, karst, landscapes, and fossils, including megafauna fossils such as megalodon. The park has the following category of geosites:

1. Beaches Pangandaran is known for its beautiful beaches and high tourist appeal. The beaches in Pangandaran serve as geosites that showcase geological phenomena related to sedimentation and erosion processes. Some famous beaches include: Pangandaran Beach (curved coastline and waves suitable for surfing), West and East Pangandaran Beach (West Beach more exposed to large waves)
2. Rivers in Pangandaran have distinctive geomorphological characteristics. The rivers in this region are formed by erosion and deposition by water flowing through mountainous and karst areas. Several rivers that are geosites include: Citanduy River, Cijulang River (natural scenery with high cliffs and surrounding caves).
3. The caves in Pangandaran are the result of limestone dissolution by water containing carbonic acid. These caves often form in karst areas that are abundant in this region. The well-known caves include: Pananjung Cave (stalactite and stalagmite formations), Kera Cave (unique rock formations and habitat for monkeys).

4. Karst a landscape formed by limestone dissolution by water and Pangandaran has many very interesting karst areas, both geologically and aesthetically. These karst areas show natural phenomena that can be deep geological study objects. Several well-known karst areas in Pangandaran include: Pananjung Karst (unique landscapes, such as steep cliffs, caves, and underground river flows), and Ciamis Karst (distinctive morphology with many caves, dolines, and springs) .
5. The landscape in Pangandaran includes various natural formations formed through geological processes such as erosion, sedimentation, and tectonics. Some interesting landscapes in Pangandaran include: cliffs on the West Coast (morphology resulting from erosion creating g natural formations often used as geological research objects), Karst Hill (overview of dynamics of soil formation influenced by limestone dissolution and other geological processes).
6. The fossils in Pangandaran such as the Megalodon fossil are a valuable find in paleontological studies. These fossils show traces of ancient marine life that once lived in the waters around Pangandaran during prehistoric times. Megalodon is a giant shark that was the dominant predator in the oceans during the Miocene to Pliocene epochs. Some sites in Pangandaran, especially those near the coast, have found megalodon tooth fossils that can be used to understand the evolution of ancient marine species and changes in the marine environment over millions of years. The discovery of megalodon tooth fossils is evidence that this area was once part of an ancient marine habitat. These fossils are very important for paleontological studies because they provide information about past geological and biological conditions.

Data

This study used an online survey method. The population and sample of this study consists of MSMEs located in the Aspiring Pangandaran Geopark. A representative sample of 100 MSMEs have been collected out of 200 questionnaires distributed online. Purposive sampling was used to select Micro, Small, and Medium Enterprises (MSMEs) that operate within Aspiring Geopark Pangandaran. This study adhered to ethical research practices, including informed consent from all participants. The online survey method was deemed appropriate as it allowed the study to focus on MSMEs directly involved in geoproduct development and active in digital marketing. Such businesses were selected to capture unique geotourism dynamics and their alignment with the sustainability objectives of the geopark. The selection criteria included MSMEs engaged in geoproduct innovation, active use of digital marketing platforms such as social media or e-commerce, and a minimum operational experience of five years. These criteria ensured the inclusion of enterprises with sufficient maturity and relevance to the study's objectives. According to (Sekaran & Bougie, 2020) purposive sampling is used in research that requires sample selection based on certain criteria that are relevant to the research objectives (Sekaran & Bougie, 2020). The demographic profile of the selected MSMEs was particularly relevant to the research due to their active involvement in the geopark's geotourism framework. These enterprises were characterized by a focus on locally inspired geoproducts, reliance on digital marketing for visibility, and operations aligned with sustainable tourism practices. Such characteristics made them ideal subjects for exploring the integration of digital marketing, geoproduct innovation, and business sustainability within a geopark context. Figure 3 indicates that many respondents (38%) are in their productive age between 31-40 years old. Based on the online survey data, the majority of respondents education are high school degree (51%), and most respondents have currently more than 15 people working at their MSMEs (92%).

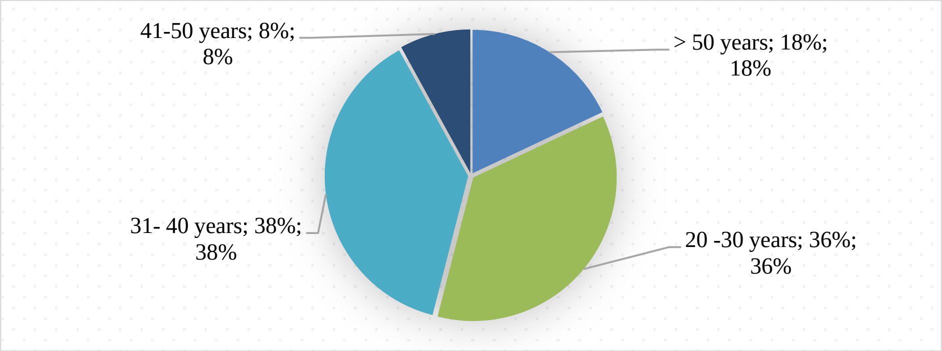

Figure 3. Age Profile of MSMEs Owner

Questionnaire design

Research data were collected through a survey using a Likert scale-based questionnaire. The Likert scale is used to measure the level of respondent agreement with statements related to research variables on 5-point Likert scales ranging from 1=strongly disagree to 5=strongly agree. There was a total of 21 questions in total where digital marketing has six questions, innovation strategies 10 questions, and 5 questions related to business sustainability.

Data - Analysis techniques

To ensure the reliability and validity of the data, several measures were undertaken. The questionnaire used in this study was pretested with a subset of 30 MSMEs to identify and address any ambiguities, thereby improving clarity and usability. Triangulation methods were also employed, with data cross-verified through interviews, observations, and document analysis to enhance credibility. Internal consistency was assessed using Cronbach's alpha, yielding a value of 0.85, which indicated a high level of reliability. These steps collectively ensured that the data collected was robust and reflective of the dynamics being studied. For estimating the measurement and structural models, the researchers apply Partial Least Squares

(PLS). This technique has several advantages over covariance-based models structural equation modelling (SEM) models (Sarstedt, 2019; Shmueli, 2019): (1) higher convergence due to its simplicity; (2) predictive applications; (3) better suited for small sample studies (less than 250 cases); and (4) better suited for formative construct analysis.

This method has been applied in numerous research to estimate formative and reflective first- and second-order models (Cepeda-Carrion, 2019; Sarstedt, 2020). Smart PLS was the program used to model the PLS. The significance test was conducted using the bootstrapping technique, which creates a standard error value distribution by employing a replacement value to generate a predetermined number of samples that are the same size as the original sample.

This study conducted data validity and reliability tests (Table 1). The research findings revealed that digital marketing includes six indications with an alpha score of 0.907. Furthermore, innovation strategy has ten indicators with an alpha score of 0.909, whilst competitiveness has four indications with an alpha score of 0.826. All structures were trustworthy.

Table 1. Loading factor for each measurement variable

Variables and Indicators	Factor Loadings	Cronbach's Alpha
Digital Marketing		0.907
Customer relationships	0.793	
Usage of digital media	0.874	
Digital marketing strategies	0.810	
Digital marketing channels.	0.878	
Communicate product sustainability	0.874	
Digital marketing for the sustainable growth	0.723	
Innovation Strategy		0.909
Optimalization of resources	0.648	
Innovate new products or services.	0.791	
Environmentally friendly practices.	0.763	
Environmental commitment to consumers.	0.763	
Product promotions	0.761	
Price of the product or service is affordable	0.729	
Product packaging environmentally friendly	0.839	
Environmentally friendly information	0.733	
Work safety culture in daily operations.	0.795	
Savings in the production process.	0.585	
Business Sustainability		0.826
Repurchased products in the last 3 years.	0.670	
Community service activities	0.686	
Comply to regulations on environmental friendliness	0.816	
Saved energy (water, electricity, and gas) for the last 3 years.	0.789	
Reduce costs of processing business waste	0.874	

Table 2. Result of Hypotheses Testing

Research Hypothesis	Relationship Between Construct	Coefficient	t count	CR	P Value	Information Research Hypothesis
$H_{1:}$ Digital Marketing influenced Innovation Strategy	X → M	0.698	12,993	1.96	0.000	H_a Accepted
$H_{2:}$ Digital Marketing influenced Business Sustainability	X → Y	0.295	2,594		0.010	H_a Accepted
$H_{3:}$ Innovation Strategy influenced Business Sustainability	M → Y	0.514	4,884		0.000	H_a Accepted
$H_{4::}$ Digital Marketing through Innovation Strategy influenced Business Sustainability	X → M → Y	0.358	4.281		0.000	H_a Accepted

RESULTS AND DISCUSSIONS

To achieve the research purpose, the sampling unit were evaluated and the results used preset criteria. The study employed MSMEs as owners who have integrated digital marketing in their businesses. The fieldwork was completed in a short amount of time, with a focus on the July-August 2024 school holiday season, when Aspiring Geopark Pangandaran welcomed many tourists and MSMEs were actively marketing their products/services. This method aimed to ensure relevance to queries about specific events and enhance answer consistency.

Statistic Result

The basis for testing the hypothesis is the values contained in the output results for inner weight. In PLS, statistical testing of each hypothesized connection is performed using simulation, and in this case, the bootstrapping method is employed. Bootstrapping is used to minimize issues related to the abnormality of research data. The results, along with the t-statistic values obtained from the bootstrapping process. Based on the Table 2, it can be concluded as digital marketing (X) has a significant positive effect on geoproduct innovation strategy (M) with a coefficient direction of 0.698, t count 12.993 > 1.96 with a significance level of 0.000 < 0.05. Thus, the first hypothesis (H1) in this study is accepted (Ho is rejected and Ha is accepted). Digital marketing (X) has a significant positive effect on business sustainability (Y) with a coefficient direction of 0.295, t count 2.594 > 1.96 with a significance level of 0.0010 < 0.05. Thus, the second hypothesis (H2) in this study is accepted (Ho is rejected and Ha is accepted). Geoproduct innovation strategy (M) has a significant positive effect on business sustainability (Y) with a coefficient direction of 0.514, t count 4.884 > 1.96 with a significance level of 0.000 < 0.05.

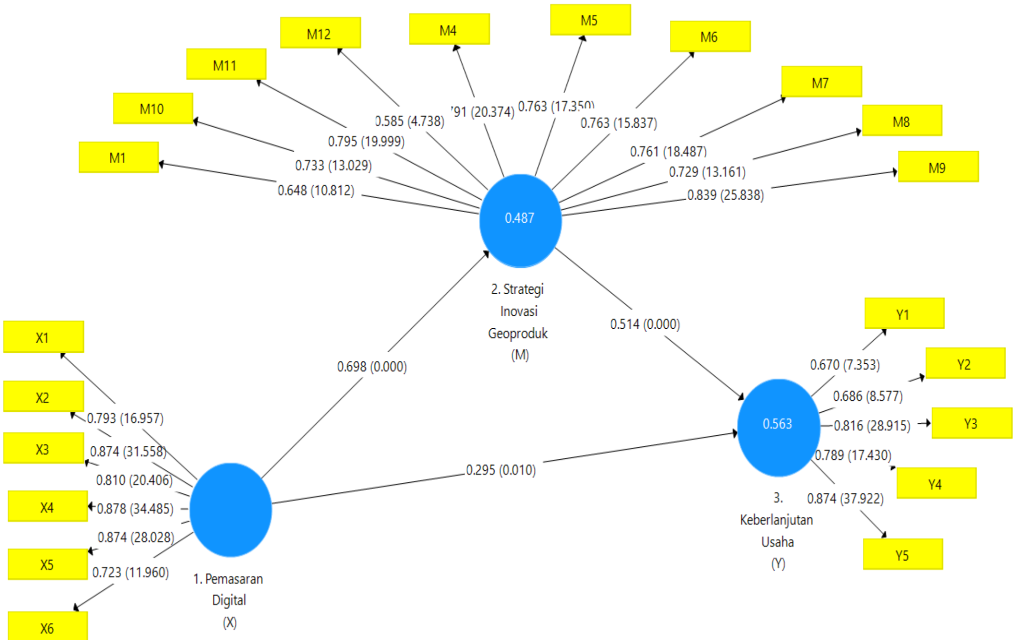

Figure 4. Research Framework

The third hypothesis (H3) in this study is accepted (Ho is rejected and Ha is accepted). Digital marketing (X) has a significant positive effect on business sustainability (Y) through geoproduct innovation strategy (M) with a coefficient direction of 0.358, t count 4.281 > 1.96 with a significance level of 0.000 < 0.05. The fourth hypothesis (H4) in this study is accepted (Ho is rejected and Ha is accepted) (Figure 4). Meanwhile, the results of the total influence of the innovative digital marketing approach model to improve the sustainability performance of Geoproduct MSMEs in the Aspiring Geopark Pangandaran can be presented in the following Table 3.

Table 3. Total effect result

Relationship between Constructs	**Effect**			**t value**	**P Value**	**95% CIBC**	
	Direct	**Indirect**	**Total**			**2.5%**	**97.5%**
X → M	0.698	-	0.698	12,993	0.000	0.570	0.785
X → Y	0.295	0.358	0.653	11,031	0.000	0.509	0.751
M → Y	0.514	-	0.514	4,884	0.000	0.298	0.710

Based on the table above, information on the total influence of each exogenous predictor that has been tested provides significant results ($p < 0.05$, 95% CIBC $\neq 0$). This means that digital marketing is a predictor that has the strongest relative total influence on the innovation strategy of MSME geoproducts in the Aspiring Geopark Pangandaran. Additionally, hypothesis testing results indicate that the geoproduct innovation strategy mediates the impact of digital marketing on business sustainability. In other words, MSMEs who not only adopt digital marketing but also combine it with environmentally friendly innovation are more successful in achieving business sustainability. The indirect effect coefficient of 0.358 indicates that geoproduct innovation plays a key role in ensuring that digital marketing efforts are translated into long-term sustainability.

The analysis revealed key relationships among digital marketing, geoproduct innovation, and business sustainability for MSMEs in the Aspiring Geopark Pangandaran. Hypothesis 1 (H1) was supported, with a strong path coefficient of 0.698 ($p < 0.001$), indicating a significant positive influence of digital marketing on geoproduct innovation. This emphasizes the transformative potential of digital strategies in driving innovation, enabling MSMEs to create geoproducts that cater to evolving consumer demands. Hypothesis 2 (H2) also demonstrated a significant positive effect, with a coefficient of 0.652 ($p < 0.01$), affirming that geoproduct innovation enhances business sustainability. This finding underscores the role of innovative practices in ensuring the long-term viability of MSMEs by aligning their offerings with sustainable and responsible tourism principles. Hypothesis 3 (H3) confirmed the mediating role of geoproduct innovation in linking digital marketing to business sustainability, with a mediating effect coefficient of 0.456 ($p < 0.05$). Tables 2 and 3 provide detailed statistical results and group comparisons, highlighting differences in performance across MSMEs based on their digital marketing intensity and innovation adoption. These insights demonstrate that higher levels of digital marketing and innovation adoption lead to significantly greater business sustainability outcomes. The strong relationship between digital marketing and geoproduct innovation (0.698) aligns with findings from Muis (2024) and Purba et al. (2021), who identified digital platforms as essential tools for fostering innovation. This study extends these insights by highlighting the specific mechanisms through which digital marketing drives innovation in the unique context of geoparks. MSMEs in this study benefited from leveraging social media and online platforms to promote geoproducts, reaching environmentally conscious consumers and enhancing their market presence.

The positive impact of geoproduct innovation on business sustainability (0.652) resonates with research by Retnaningsih (2024) and Pratiwi et al. (2022), which emphasized the importance of developing locally inspired, sustainable products. This study builds on this literature by demonstrating that innovative practices contribute to sustainability not only by meeting consumer preferences but also by preserving the cultural and geological heritage of geoparks. The mediating role of geoproduct innovation (0.456) bridges gaps in existing studies, such as those by Lestari et al. (2023), which have emphasized the indirect pathways connecting marketing strategies to sustainability outcomes. By integrating innovation into the marketing-sustainability framework, this study provides a cohesive model for MSMEs aiming to thrive in geopark settings.

To summarize key insights from Tables 2 and 3, MSMEs that scored high in digital marketing intensity and geoproduct innovation adoption exhibited significantly improved sustainability metrics compared to those with lower scores. For example, high-intensity adopters reported increased consumer engagement, higher revenue stability, and a stronger alignment with sustainable tourism objectives.The results of the study show that digital marketing plays an important role in supporting the sustainability of MSME businesses, especially in the geoproduct sector in the Aspiring Geopark Pangandaran area. The use of digital media, such as social media and e-commerce platforms, allows business actors to reach a wider audience at a more efficient cost. The high loading factor for using digital channels to reach target consumers (X4) demonstrates how essential creative marketing strategies are in geopark marketing, which relies not only on a geosite’s physical allure but also on effectively reaching a broader audience (Table 1).

Digital marketing allows for broader access and sparks greater interest in local products through a narrative-driven approach. Geotourism development goes beyond environmental conservation, demanding a deep understanding of visitors’ preferences for destination products and services (Šambronská et al., 2023). Furthermore, the strategic use of social media marketing has positively affected MSMEs, helping them reach more customers and foster loyalty affordably (Fu et al., 2024). Interaction and communication through digital media enable business actors to better understand customer needs and adapt their marketing strategies dynamically. This aligns with research highlighting digital technology’s essential role in expanding market reach and building consumer loyalty. By allowing companies to diversify services, digital technology broadens market access and fosters customer loyalty across regions. Furthermore, digital marketing facilitates global reach, encourages purchasing behavior, and supports loyalty through cost-effective interactions (Vladimirovna & Viktorovna, 2022; Bordoloi & Bhardwaj, 2020)

CONCLUSION

The findings of this study underscore the critical role of digital marketing and geoproduct innovation in enhancing the sustainability of MSMEs within the Aspiring Geopark Pangandaran. By leveraging digital marketing tools, MSMEs can achieve higher visibility and engagement with environmentally conscious consumers, fostering the development of innovative geoproducts that align with sustainable tourism principles. The strong mediating effect of geoproduct innovation demonstrates that sustainability outcomes are best achieved through a synergistic approach combining marketing strategies and innovative practices. From a practical perspective, MSME actors should prioritize adopting digital marketing platforms, such as social media and e-commerce, to expand their market reach and engage directly with consumers. Training programs emphasizing digital competencies, content creation, and data analytics can equip MSMEs to maximize their marketing potential. Concurrently, fostering innovation through collaborative networks, such as partnerships with Geopark management, can lead to the creation of distinctive products that reflect local heritage and appeal to niche markets.

Policymakers and local governments play a pivotal role in facilitating this transformation. Providing infrastructure support, such as internet access and digital literacy programs, is essential for enabling MSMEs to adopt digital marketing effectively. Additionally, policies promoting responsible tourism, capacity-building initiatives, and financial incentives for sustainable practices can create an enabling environment for MSMEs to thrive. Future research could explore the role of government interventions and public-private partnerships in scaling digital marketing adoption among MSMEs. Examining consumer behavior in response to digital marketing efforts within geopark settings could provide deeper insights into optimizing marketing strategies. Furthermore, longitudinal studies assessing the long-term impacts of digital marketing and innovation on sustainability metrics would contribute to a comprehensive understanding of this dynamic.

This study has limitations, where the sample was restricted to MSMEs in a single aspiring geopark, which may limit the generalizability of findings to other contexts. Additionally, the cross-sectional design precludes an analysis of temporal effects or causal relationships. Addressing these limitations in future research could enhance the robustness of the evidence base.

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JORDANIAN WOMEN'S CONTRIBUTION TO THE REVIVAL AND PROTECTION OF HERITAGE INDUSTRY

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Abstract: Handicrafts are a vital component of the cultural, civilizational, and social legacy passed down over the ages. They represent innovation derived from societal demands. In addition to being an important economic resource by creating jobs and reducing unemployment, traditional crafts are essential for maintaining cultural identity. Since rural people are crucial to fostering peace, achieving economic growth, and ensuring agricultural self-sufficiency, countries like Jordan work to integrate them into various artisan fields. This study is among the few that focus on the role and contribution of Jordanians to heritage revitalization and the importance of documenting heritage crafts in Jordan. Remarkably, many Jordanian heritage crafts have begun to disappear due to the shift toward modernity and urbanization, making it necessary to document heritage industries to preserve them from extinction. This study aims to identify the extent of Jordanians 'contribution to heritage industries that still exist in some Jordanian villages, as well as their role in meeting family needs in partnership with the family members to achieve a decent standard of living. The study employed in-depth interviews with 59 persons from 12 villages in Jordan for data collection. These Jordanian villages continue to preserve their heritage, and people still actively engaged in producing traditional handicrafts. The study revealed that Jordanians possess high skills in producing heritage crafts such as mud houses and clay ovens. It also highlighted how Jordanians utilize available raw materials from their surroundings and recycle certain materials, which have now become integral components of traditional heritage and comprise a significant portion of it. The significance of the study lies in highlighting the role of Jordanians in preserving the nation's material heritage. It also aims to document the traditional crafts produced by Jordanians, expanding our understanding of the elements and techniques involved in creating various crafts. This study underscores the importance of Jordanians, alongside men, in providing for their families over the past few decades.

Keywords: heritage, handcrafts, Jordanian heritage, traditional costumes, tangible heritage

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INTRODUCTION

Handicrafts are an essential part of cultural, civilizational, and social heritage passed down through generations. They represent creativity born from the daily needs of society. Traditional crafts play a vital role in preserving cultural identity

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and serve as a significant economic resource by providing job opportunities and helping reduce unemployment. Countries like Jordan strive to integrate rural people into various craft fields, especially since rural people play a prominent role in establishing peace, achieving economic development, and ensuring food self-sufficiency (Aljedayah et al., 2024; Hernes, 2018; Qiu et al., 2024). Despite the threats facing traditional crafts due to modern technology and globalization, Jordan is working diligently to protect this heritage by providing the necessary support to artisans. Rural people contribute significantly to the development of traditional industries, including handicrafts. Even though these crafts face challenges, rural people remain key development partners, and support must be provided to enhance their participation (Al-Abdulrazaq, 2024; Al-Rousan et al., 2025; Al-Rawashdeh et al., 2024; Harara et al., 2024; Newisar et al., 2024).

Craft industries are considered part of traditional industries. They represent an ancient cultural, social, and civilizational heritage passed down through generations. It is therefore crucial that craft industries receive significant attention, as they reflect creativity inspired by people's daily needs (Alhawamdeh et al., 2023; Al-Jezawi et al., 2024; Rababah et al., 2023; Yassien et al., 2023). Furthermore, discussions around traditional and craft industries reveal various perspectives on how to approach these industries. Some view them from a heritage perspective, advocating for preserving their traditional and primitive forms. Others align with modern industrial development, while a third group sees them as heritage and a source of employment, subject to market demands and tourism trends (Alsayyed & Randall, 2023; Harara et al., 2024; Khdeir, 2024).

Traditional industries remain a constant presence and serve as a cultural and traditional heritage defining the Levant region. However, they suffer from marginalization by specialists in the field. To revive traditional industries, creativity must be activated to develop them in line with technological advancements, as modern industries increasingly encroach upon the space occupied by traditional crafts. Globalization has contributed to the marginalization of local cultures and the decline of traditional crafts (Al-Habies et al., 2024; Al-Tal, 2006; Rababa'h et al., 2024; Wolor et al., 2024). Perhaps the most prominent element in traditional industries is the rural woman, who has played a key role in bearing the burdens of daily life and contributing effectively to agricultural development in rural areas. Jordan places great emphasis on integrating rural people into all aspects of life. Additionally, their pioneering role in achieving development and ensuring food self-sufficiency cannot be overlooked (Al-Gayam et al., 2025; Hassan, 2020; Shehabat et al., 2025).

With the rise of industrial machinery, new generations have developed a limited understanding of the human and spiritual values embedded in these crafts. To preserve traditional and craft industries, it is essential to take pride in the aesthetic and artistic value of these traditional crafts, and to raise awareness of their cultural significance by promoting national cultural pride and preserving national identity (Al-Ani, 2020; El-Ebiary et al., 2024; Wolor et al., 2023).

Few studies specifically address the role of Jordanians in heritage crafts, and there is limited documentation of these crafts. Al-Khatib (2004) discussed the use of the environment from an Islamic economic perspective, emphasizing the importance of modern scientific techniques for pollution control and environmental preservation. The study warned that globalization, driven by financial incentives, could lead to environmental degradation. Tobazah (2013) documented commonly utilised traditional crafts in Jordan, including labour force, knowledge transmission techniques, materials, procurement sources, production procedures, and geographical distribution of crafts. The research emphasised the importance of traditional popular crafts as a component of cultural heritage, arguing that societal indifference and a lack of official attention were major difficulties.

The study recommended marketing, education, and training to revive these trades. The current study seeks to answer the question: What role do Jordanians play in the survival and growth of traditional industries? The significance of the study lies in highlighting the role of Jordanians in preserving the nation's material heritage. It also aims to document the traditional crafts produced by Jordanians, expanding our understanding of the elements and techniques involved in creating various crafts. This study underscores the importance of Jordanians in providing for their families over the past few decades.

METHODS

The research employs a historical-descriptive methodology to explain and characterize the evolution of Jordanians' production of traditional crafts. This approach seeks to determine the existence, history, and development of these crafts, offering a comprehensive description and documentation. The methodology involves:

- Providing an accurate technical description of these industries, showcasing their everyday use through tools, and clarifying the relationship between popular industries and available raw materials. This is crucial, as the existence of crafts and industries depends on local raw materials.
- Categorizing and documenting these tools, including their well-known brand names and images, while also explaining their industrial quality.

Crafts, like folk traditions, are analyzed using the historical-descriptive methodology. This includes the craft's name, the tools and machinery used—both old and new—the workforce involved, the production cycle, previous experience, development stages, and raw material processing. Additionally, the historical phases the craft has undergone are addressed, alongside a technical and aesthetic evaluation of folk art, which is essential for both marketing and satisfying consumers' aesthetic and practical needs. The initial step involves exploring the historical roots of folk industries and their relationship to art and beliefs, from Mesopotamian civilizations in Iraq to ancient Egyptian civilizations like the Pharaohs. The research involves investigating museums, individual folklore collections, heritage centers, and marketplaces. After establishing these historical foundations, the study shifts focus to modern folk industries. The process includes reviewing written materials, conducting observations, interviewing craftsmen in-depth, recording their responses, and cataloging and photographing their creations to compare traditional crafts from the past and present.

Population and Sample of the Study

The study population consists of persons from Jordan. The sample includes 59 persons who were specifically selected from the general population. The criteria for selection include direct involvement in the production of traditional handicrafts and the necessary expertise to make them. The participants provided oral and direct consent for the interviews, ensuring ethical conduct.

The study primarily relies on in-depth, face-to-face interviews with these 59 persons, who are actively engaged in the creation of traditional crafts and the preservation of Jordanian heritage. The ages of the participants range from 60 to 90 years. Of them, 54% are illiterate, 29% have completed the seventh grade, and only 16% hold a bachelor's degree.

Tools

The study predominantly used in-depth interviews. The researchers conducted face-to-face interviews with 59 elderly persons from villages in Jordan, which continue to maintain their heritage and produce traditional crafts.

Data Collection

The following steps provide a general overview of the procedures followed to understand the evolution of traditional Jordanian crafts and the importance of the local environment and experience in shaping these crafts.

Phase 1: Gathering Historical Information
- Examining the historical roots of folk industries.
- Studying Mesopotamian civilizations (Iraq) and ancient Egyptian civilizations (Pharaohs).

Investigating museums, individual folklore collections, heritage centers, and markets.

Phase 2: Technical Description
- Providing an accurate technical description of traditional industries.
- Highlighting the use of everyday tools in these crafts.
- Clarifying the relationship between available raw materials and folk industries.

Phase 3: Classification of Tools
- Classifying the tools used in crafts.
- Recording the well-known brand names and pictures of the tools.
- Explaining the industrial grade of each tool.

Phase 4: Technical and Aesthetic Evaluation
- Analyzing the technical and aesthetic aspects of folk crafts.
- Determining the importance of these crafts for marketing and fulfilling aesthetic and practical needs.

Phase 5: Comparison between Past and Present
- Reading written materials and observing tangible objects.
- Conducting in-depth interviews with craftsmen to gather information on past experiences.
- Indexing and photographing craft creations.
- Comparing folk crafts from the past with modern crafts.

Phase 6: Final Analysis
- Studying and documenting the development of traditional crafts over time.
- Analyzing the results of interviews and collected information on how the environment and experiences have influenced the evolution of crafts.

FINDINGS AND DISCUSSION

Clay Crafts

Pottery is made by moulding and sculpting clay into various forms and objects, which are then dried and fired in a kiln. This process changes the clay's structure and colour, transforming it into a solid substance with new features and characteristics. Pottery is differentiated by its texture and porosity due to the complete drying of water combined with clay before to shaping. The colour of the completed pottery changes according on the mineral content of the clay. Higher mineral concentration frequently yields black pottery, whereas lesser mineral content yields red pottery (Eramo, 2020).

Pottery is one of the oldest traditional crafts known to humanity, with numerous important archaeological artefacts left by ancient civilisations. It is the technique of converting soft clay into solid material by heating it in specialised kilns. Pottery has a variety of applications, including food preservation and plant culture. It helps to keep soil wet and drains excess water. Pottery is also known for its beautiful decorations and variety of colors. Red clay, which must be well-saturated with rainwater, is commonly used. The clay is sourced from areas untouched by humans, animals, or vehicles, where rain turns the soil into small clay lumps that dry over time. Historically, regions like North Africa, the Levant, and the Arabian Peninsula became renowned for their pottery production (Otte & Priestman, 2022).

Clay Ovens

Clay is a thick soil that is soft when wet and hard when dry. It is used to make bricks and containers. Clay consists of minerals, plant and animal remains (components found in soil), rocks, mineral bodies, and individual particles that are difficult to see, as well as larger particles filtered from rocks and sand. Clay ovens are crafted from a specific type of clay prepared for this purpose (Figure 1).

Figure 1. Clay Ovens (Source: Collected by authors, 2024)

Participant 2 described the steps of pottery making: We start by beating the clay with a beater to soften it, aiding the sieving process. Then, we place baskets of red, white, and green clay into a circular pool, add water, and leave it for a few hours. After that, we mix the water and clay, using a sieve to remove impurities. The clay is then transferred from the circular pool into other pools through a strainer and left until it solidifies. Finally, the pottery is shaped as desired.

Participant 3 explained that: Clay is the primary material in pottery making, so it is crucial to obtain high-quality soil to ensure the production of high-quality pottery. Materials like sand and old pottery fragments may be added to the clay to prevent cracking. The preparation involves beating the soil with a stick to soften it. Good clay paste is made from fine soil. A circular hole and three rectangular holes connected by openings are dug. Red, white, and green soil is placed in the circular hole, water is added, and it is left for two hours. The mixture is then stirred, impurities are removed, and the clay is distributed to the rectangular holes to solidify.

Participant 16 added: To increase the durability of clay ovens, the clay is mixed with sand, straw, and sometimes goat hair in specific proportions. The type of clay used for making clay ovens varies by period, location, and even village. The ovens are built in stages, starting from the bottom and building upwards by placing strips of clay shaped like ropes on top of each other. These are pressed by hand to ensure they adhere well together, and then the inner and outer surfaces are smoothed using stone tools. Once complete, the ovens are left to dry under indirect sunlight before being installed and fired using fuel like wood, straw, and animal waste.

Participant 23 shared that: The clay oven is one of the most traditional methods used in the past for baking bread, pastries, and cooking. These ovens come in various sizes, from large to small, and are often built in the backyard of homes. Bread baked in a clay oven has an irresistible flavor and a delicious aroma. The oven is fired using wood, and in many Arab cultures, the clay oven is considered an integral part of local heritage. Despite modern advancements, the use of clay ovens continues in some areas to this day.

Participant 20 detailed the process of building a clay oven: We gather regular stones from farmland or home gardens and arrange them in a semicircular shape. Dry grass or straw is placed over the stones, creating a separation between the clay and the stones, which is removed once the clay dries. The clay is mixed with water and kneaded using a shovel or other tools. The clay is applied over the stones and grass, spread in a circular shape, with the main opening left at the front for the oven door. Small openings are also made on the sides and top of the oven to allow air to flow in and intensify the fire. When baking, these openings, except for the main door, are closed with a wet cloth, which doesn’t burn in the fire and prevents dust from entering during the baking process.

Participant 20 also added: We let the oven dry for a day or two. In the winter, drying may take longer due to the lack of sunlight. Afterward, the stones are carefully removed from the oven using a small shovel through the oven door. A fire is lit inside the oven to burn off the remaining grass. A metal sheet or suitable metal piece is placed inside the oven, serving as the surface for the dough. Some people leave an opening in the metal sheet to allow flames to rise to the inner surface of the oven, giving the bread a smoky, wood-fired flavor, making it even more appetizing when eaten fresh from the oven.

The Taboon

The Taboon is an open-roofed earthen oven designed for baking bread. It is made from limestone soil mixed with straw and water. After drying in the sun, it is covered with ash and dry animal dung (*zibl*) and topped with a special metal cover. Inside, smooth stones are heated to a sufficient temperature for baking. The temperature is maintained by adding dung daily. The Taboon was also used for heating by burning dry wood buried in the dung until it turned into glowing coals, which were then removed and placed in a metal stove (Figure 2a and 2b). The Taboon is a traditional oven built using clay and natural materials from local environments, used for baking and cooking food. It provides a stable and balanced heat for long periods, making it ideal for use in rural and traditional communities.

Participant 8 explained that: Choosing the right location for building the Taboon is crucial for its efficiency and long-term sustainability. The site should be level to ensure stability and a dry ground to prevent the clay from absorbing excess moisture. A slightly elevated area is preferred to avoid water accumulation around the Taboon during rainfall. Participant

11 explained that: Since the Taboon operates using fire and high heat, it is essential to keep it away from dry wood, straw, or any flammable materials to avoid accidental fires. The Taboon should be erected in an open space or well-ventilated location to provide optimal smoke and heat ventilation, increase fuel combustion efficiency, and limit user health risks.

Figure 2a. Al-Taboon (Source: Collected by authors, 2024)

Figure 2b. Al-Taboon, (Source: Collected by authors, 2024)

Participant 12 said that the Taboon's base must be strong enough to sustain high temperatures for an extended duration. Natural stones or clay bricks can be utilised to build a strong foundation that won't fracture over time. Once the stones or bricks are in place, the surface is coated with a layer of clay mixed with straw, which reinforces the clay and keeps it from splitting when exposed to high temperatures. This layer also offers extra insulation, allowing heat to be retained within the Taboon for extended periods of time when cooking.

Participant 14 indicated that the base should be raised to make it easier to handle, decrease strain when cooking, and protect the Taboon from ground wetness. Straw or hay is used to improve thermal insulation, which reduces heat exchange with the outside environment and allows food within the dome to cook more evenly. This helps to reduce energy consumption and save time since the residual heat inside the dome may endure longer, eliminating the need for numerous fire ignitions.

Participant 8 indicated that during the drying period, the dome is covered with a mixture of clay and other natural minerals such as lime or volcanic ash to improve the structure's water resistance and sustainability. In certain situations, the construction is strengthened with layers of clay mixed with gravel or sand, which considerably enhances thermal insulation and works as a moisture barrier.

Participant 33 indicated that: To increase the structure's endurance and protect it from changing weather conditions, the dome's outside surface can be covered with waterproofing material. Materials such as lime, treated clay, or natural oils are utilised to provide a protective coating that shields the structure from moisture absorption and minimises the likelihood of cracking caused by environmental factors.

Participant 19 explained that: After the Taboon is built, it is left to dry completely before starting to use it to ensure its cohesion and readiness to withstand harsh conditions during use. Users light a small fire inside the Taboon as part of the initial testing process to check the structure's ability to withstand high heat generated during cooking. When the heat reaches the required level, the remaining embers are removed from the Taboon using a long tool, leaving some small embers in the corners to maintain the heat. When cooking inside the Taboon, food or dough can be placed directly on the Taboon's inner walls or in cooking vessels, allowing it to cook slowly, imparting a unique flavor to the dishes.

Participant 8 explained that: The "taboon" is a type of clay oven, made by mixing clay with straw, sand, goat hair, and other materials. The "taboon" has a dome-like structure designed to retain heat for extended periods. The taboon has two openings: a top one for placing and removing bread, and a smaller side opening for inserting fuel and removing ash. The top cover may be made of clay or metal and usually has a handle.

Participant 35 explained that: After the oven's construction is completed, it is left to dry. They then prepare more clay (a mixture of loam, straw, and water) and use it to reinforce the oven's nozzle and door from the bottom, smoothing them until they become solid. A circular cover is created, often protruding in the middle to make it easier to handle, or it may be made of tin. The oven is then left untouched for two months to dry completely. After drying, it is moved to its final position for baking, known as the "home oven." Once set on fire, the oven should not be moved, as doing so would cause it to break. After the oven is installed in its final place, they collect red soil from limestone, grind it finely, and mix it with water to form a smooth, thick mixture. This is then poured onto the oven's floor, making it ready for use. Besides baking bread, the oven is also used for heating water and cooking many dishes.

Al-Tannoor

Archaeological evidence suggests that al-tannoor was known in the region in earlier times, with examples found at sites like Tall Irbid from the Late Bronze Age (Lenzen & McQuitty, 1984). Tandoors come in various sizes, with larger ones used for commercial purposes and smaller ones for home use. They are typically installed in a corner or placed side by side in bakeries. The spaces between the tandoors are filled to form a platform where dough can be rolled before being placed inside and stuck to the tandoor's walls. Al-tannoor is heated using wood, date pits, or even oil stoves that operate with air pressure (Figure 3). Participant 44 said: Like the taboon, Al-tannoor is built from the bottom up but differs in shape, resembling a large, wide-mouthed jar. Al-tannoor ovens are placed on a stone base, elevated above ground level, and have a small opening at the bottom for ash removal. Once installed, Al-tannoor ovens are surrounded by a protective wall made of clay and stones to maintain heat during use.

Participant 36 said: Bread is baked by sticking the dough to the inner walls of the tannoor, unlike the taboon, where the bread is placed at the base. Additionally, the tannoor does not require constant heating, as the taboon does. It can be heated just before use, with fuel like wood or solid materials ignited at the base. Bread can be baked while the fuel is still burning. Modern Al-tannoor ovens can also use fuel like oil or gas, especially in bakeries and restaurants today.

Regarding the construction of the tannoor, Participant 45 reported: The tannoor is made from pure clay (slate), which is prepared by mixing and fermenting the clay. The clay is then shaped into rings with a diameter of about 1 meter, a height of about 30 cm, and a thickness of about 5 cm. These rings are left to dry and are later assembled to form the full structure of the tannoor, which stands at a total height of 1.5 meters. The rings are placed on top of each other to form the final shape of the tannoor, which is then left to dry under the sun.

Figure 3. Al-Tanoor (Source: Collected by authors, 2024)

Straw Crafting or "Badi"

Straw crafting, also known as “badi," is a traditional rural craft in Jordan. It is a manual, artisanal practice typically carried out by women in rural areas to create straw plates and baskets for various household needs, including food storage, clothing, and decorative items (Figures 4). This craft is part of traditional domestic activities, typically performed in rural areas where the necessary raw materials are readily available. The craft relies primarily on wheat stalks, supplemented by barley stalks, reed stalks, and bamboo skins. Additionally, straw from wild plants such as bulrushes (sedge) found in marshes, reed plants along riverbanks, or seaweed is used. Straw crafting involves making baskets and dishes from wheat straw, a handicraft mastered by most Jordanian women in past decades.

Participant 45 reported: Straw crafting is one of the most important crafts that women used to employ with great skill to provide their homes with straw baskets and dishes at the lowest cost, using raw materials available in their environment. During the harvest season, they would collect wheat straws, bundle them, and store them for processing during the long winter nights when their participation in agricultural work with their husbands is paused. This shows how people managed their time and made optimal use of it, especially since agricultural seasons occur mostly in summer when the days are filled with work and the nights are short, leaving little time for other activities. During the long winter nights, Jordanians would make baskets and straw dishes. The manufacturing process begins with soaking the straws collected during the wheat harvest season in water for an hour until they become soft and easy to shape without breaking.

Participant 41 reported: Wheat straw is collected after the wheat harvest and used as the primary raw material for handicrafts. The straw must be flexible and of suitable length to be shaped without breaking. Impurity-free straw is preferred to ensure high-quality products. After collection, the straw is spread in shaded areas or dry air, away from direct sunlight, to prevent damage and maintain its flexibility. Drying is a highly precise process that ensures all parts are evenly dried.

The straw is then prepared for weaving or crafting items such as baskets and plates. In some cases, additional processing is required after drying to make the straw suitable for crafting, such as soaking it in water or adding other softening agents to enhance flexibility. These treatments facilitate the handling of raw materials during weaving or knitting, allowing for the creation of intricate and delicate designs. After drying, the straw undergoes cleaning and processing to ensure its quality for further manufacturing. Cleaning removes dirt and impurities, improves flexibility, and enhances its ability to be shaped into complex designs. The first step in cleaning involves removing dirt and foreign materials accumulated during harvesting and drying. In some cases, a more thorough cleaning process using compressed air or specialized machines may be necessary to eliminate hidden dust trapped between straw fibres.

Participant 35 observed that soaking the straw in water for a brief length of time improves its flexibility and makes it simpler to shape. The period varies according to the straw kind and hardness. After soaking, the surplus water is drained by hanging the straw in the air or gently pressing it against a cloth to absorb moisture. Participant 22 stated that the straw may be aesthetically enhanced by dyeing it with natural dyes derived from plants and minerals, giving it an artistic and visually pleasing appearance. Straw hues provide you a broad variety of design and pattern options. Natural dyes produced from plants such as tomatoes and saffron are often utilised and provide warm, natural hues. Mineral-based dyes can also be employed to create more vibrant and long-lasting hues. In addition to dyeing and soaking, straw may be treated using various techniques such as inlaying or engraving, which adds another layer of beauty and originality to straw goods. In certain circumstances, chopped straw is filled to improve the strength and longevity of the material used in crafts.

Participant 24 stated that treatments contribute to the great quality of straw products. When straw is properly washed, soaked, and coloured, it becomes more flexible, making it simpler to form into intricate and attractive pieces. Further use of these treatments extends the lifespan of straw goods, making them more suited for everyday use. Participant 31 reported: The "shaping" step is one of the most intricate and important stages in straw handicrafts, when raw materials are changed into a variety of goods such as baskets, plates, hats, and other exquisitely produced objects. This step entails precise and sophisticated processes that need significant expertise, ranging from simply weaving strands of straw together to including ornamental arts that improve the product's appearance.

Participant 26 observed that weaving threads or straw into one other in intricate ways produces rich ornamental designs that can be abstract or influenced by nature, such as floral or geometric shapes. Interlaced forms enhance the items, increasing their longevity and aesthetic appeal. Artisans may incorporate geometric designs like triangles or circles into baskets or dishes, giving levels of beauty and intricacy. This form of braiding necessitates very skilled craftsmanship, since the straw is precisely organised to ensure that the ornamental design remains consistent throughout the weaving process.

Participant 29 stated that, in addition to processing procedures, straw is often wrapped over metal or wooden frames to create larger and more sophisticated constructions such as shelves or ornate decorations. This process is essential when the final product requires additional support for stability, such as large baskets or multi-dimensional structures. In making a large basket, an artisan may start by forming a wooden or metal frame as the main structure, then wrap the straw around it using strong threads or ropes to secure the elements together, ensuring stability and durability.

Participant 45 indicated that raw craftsmanship necessitates the application of complicated processes that need understanding of geometric and mathematical principles in order to maintain the structural integrity of the finished product. During the braiding process, tools such as rulers or scales are utilised to correctly evaluate distances and angles, assisting in the creation of straw products that strike a balance between aesthetic appeal and practicality.

Participant 11 reported: Other product cohesion using braiding and shaping techniques includes artistic decorations such as hanging wall art or artificial flowers. These artistic crafts often incorporate fine decorative details, ranging from small floral motifs to complex, nature-inspired embellishments. Decorative embellishments also include various types of threads and colors, adding a special color diversity to straw products.

Participant 37 reported: The braiding subcultures is considered one of the most challenging phases in straw craftsmanship, requiring significant time and skill to shape the final product correctly. Artisans sometimes struggle to maintain the cohesion and flexibility of the straw during braiding, especially when the raw material is damaged, too light, or uneven. Artiuneven.t continuously monitors the braiding process to ensure that the products retain their high quality in terms of durability and aesthetics. After decoration, the finishing stage ensures that the product is ready for use or display. This involves a meticulous inspection to verify that all parts of the piece have been properly treated and that decorations have been carefully applied without leaving any undesirable marks on the surface.

Participant 39 stated: The atmosphere during badi is one of happiness and intimacy. Women gather in a wonderful social setting, chatting and exchanging conversations while making baskets and dishes according to their needs. Participant 36 added: The practice of badi begins by braiding three wheat straws and knotting them. The woman then inserts additional straw with an awl into the braid's loops, twisting and winding it down. She re-inserts it the same way, alternating between top and bottom until the entire piece of straw is incorporated into the braid. This process continues until the dish takes the desired shape and size. If a woman wanted to make a basket made from straw, she would bend the straws inward with her hands while clamping them together in each row until it takes the hollow shape of the basket, as illustrated in Figure 4.

In the beginning, most women were accustomed to using the natural color of straw to form bowls and dishes. However, in more recent and advanced stages, some women began using dyed wheat stalks before forming them to introduce different colors into the dishes and baskets. They would obtain special dyes in various colors. The dye is a powder that is dissolved in water in a deep iron bucket.

Participant 10 explained: The dye powder is dissolved in water, which is then placed on a fire until the solution boils. The wheat stalks are placed into the solution and boiled briefly. Afterward, the stalks are removed and spread out. Once they are slightly dry but still moist enough to prevent breakage during formation, they are ready for use. They are formed in the same manner as undyed stalks, but in this case, geometric patterns are crafted on the baskets and dishes in a beautiful, artistic way. These patterns, as Participant 1 explained, these decorated dishes were used to hold food plates during meals and to spread dough and bread, while baskets were used to collect grains, vegetables, and other items (Figure 4). Participant 46 described the method of making straw plates: After harvesting wheat and stacking it on threshing floors, women gather wheat stalks, selecting those of good quality, and medium thickness. They remove the ears and husks, cut them, bundle them, and hang them until winter, when they have ample free time to work on them.

Figure 4a. Straw crafting (Source: Collected by authors, 2024)

Figure 4b. Straw plates (Source: Collected by authors, 2024)

Participant 41 reported that: If a decorated plate is desired, dyes are dissolved in boiling water. Each bundle is immersed in a different color for some hours, then dried in the sun to ensure the dye adheres well to the stalks. Before crafting, the straw is soaked in cold water for about an hour to soften it for weaving.

Participant 31 explained that: The process begins with selecting some undyed straw stalks and braiding them into a base. This braid is coiled into a circular shape, forming the foundational knot, which is essential for the plate's durability. The soft straw is then wrapped around this knot, with additional coils secured by weaving straw through the loops to hold each layer together. A small triangle is created at the top for hanging the plate, and excess straw is trimmed and wrapped with fabric to secure it.

Participant 37 noted that: Straw crafting is one of the most beautiful traditional crafts passed down through generations in rural Jordan. Women are keen to teach their daughters this craft, which not only provides essential household items but also helps protect against poverty. The practice has a social aspect, with women and girls gathering in one home, especially in the winter, to work on their straw items while sharing stories and competing to finish their crafts.

Participant 39 highlighted the importance of straw tools in daily rural Jordanian life. It is customary to teach these skills to young girls, much like other domestic handcrafts, as a way to demonstrate their readiness for marital responsibilities. The income generated from this craft is significant for the family and is considered a valuable part of the cultural heritage, showing how people have adapted their environment to meet their needs.

Participant 24 discussed straw crafting as a cherished tradition among rural Jordanian women. The process starts in summer when women and girls gather at threshing floors to sort and arrange wheat stalks, selecting the most suitable parts for crafting. The ideal stalk is from the base of the ear to the first knot. Women bundle these selected stalks until they have enough for crafting. In addition to this type of straw, they also set aside unprocessed straw without ears, known as "filler," for crafting. The second phase involves preparing the materials, including obtaining dyes for colorful items.

Participant 34 explained that: The straw is softened by soaking it in water for a sufficient amount of time, just like the filler straw. When ready to craft, women typically gather in winter, each bringing her own tools and materials. They sit together, working on their crafts while discussing village matters.

Participant 36 explained that the process begins with knotting four to five straw stalks into a circle about 1 cm in diameter. Some women finalize the plate by securing the outer layer with a small piece of fabric, sometimes decorating the entire plate with fabric to preserve it longer. A small triangle, about 3 cm high, is formed on the last layer to serve as a hook for hanging it on the wall. Large, colorful plates are typically used for serving food to guests or on special occasions, while smaller, uncolored plates are made for regular household use.

Participant 45 reported: We also make small plates. Women often decorate these plates and attach a handle for ease of use. Sometimes, a small mirror, about 10 cm in diameter, is embedded in the center for personal use, such as applying makeup. We also make baskets from straw, which are often wrapped with goat leather on the outside to protect them and extend their lifespan. However, declining demand for handmade straw plates and baskets, due to competition from modern products, changing lifestyles, and lower financial returns, has led to a reduced interest among young women in learning the craft. This has resulted in fewer experts and a weaker labor force. Despite this, straw plates and baskets hold a special appeal and evoke a sense of nostalgia for nature. Many modern homes, clinics, malls, hair salons, and large shops display straw items as part of their decor, encouraging a revival and evolution of this craft."

CONCLUSION

The Jordanians have proven their ability to contribute in work and production in all areas of life. They are fully capable of mastering various crafts that elevate their status and that of their family. Despite the fact that most of these people did not receive formal education, with many being illiterate or having only a basic level of schooling, they possessed a high degree of knowledge and awareness.

The participants in the study sample demonstrated self-motivation and a sense of responsibility, producing many necessary household items. Despite their numerous work and domestic duties, Jordanians did not neglect their personal adornment or that of their families. Their active participation in the production of various items reflects their significant role in preserving Jordan's tangible heritage. In this way, the Jordanians have made a great contribution to the components of Jordan's cultural heritage. A considerable portion of Jordan's heritage items were crafted by the participants, confirming their vital role in the economic life of their communities. In fact, Jordanians often excelled in creating many essential household crafts, driven by their own initiative and sense of responsibility.

Limitations

Some of the main limitations that this study may face are as follows:

- Limited education: Most of the participants who participated in the study were illiterate or had a low level of education, which may affect their full understanding of certain technical or scientific aspects related to the crafts they practice, hindering their ability to develop these crafts in a scientific manner.
- Limited sample: The study may have relied on a specific group of participants, which may not reflect the experiences of all Jordanians across different regions or socio-economic contexts within Jordan.
- Impact of social and economic factors: The study may not sufficiently take into account the varying impacts of social and economic factors on female artisans, such as access to raw materials or markets, which could affect the accuracy of the results.
- Cultural bias: There may be a focus on participants who participated in traditional crafts only, without considering others working in other fields or non-traditional crafts, which could limit the inclusivity of the study.

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MITIGATING EMPLOYEE TURNOVER IN HOSPITALITY INDUSTRY THROUGH EMOTIONAL INTELLIGENCE: EVIDENCE FROM KASHMIR INDIA

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Abstract: The aim of this study is to examine the impact of emotional intelligence (EI) on employee retention and job satisfaction in the hospitality industry, with a specific focus on understanding how EI dimensions contribute to improving employee engagement and reducing turnover. Emotional intelligence, encompassing self-awareness, self-management, social awareness, and relationship management, is increasingly recognized as a critical factor in workplace dynamics, particularly in high-stress industries like hospitality. A survey questionnaire based on a five-point Likert scale was developed after a thorough literature review. Data was collected from 190 respondents working in the hospitality sector, including hotels, restaurants, and tourism-related businesses. The survey assessed emotional intelligence dimensions and their relationship with job satisfaction and retention. The collected data was analyzed using reliability analysis to ensure the consistency of the survey instrument, followed by correlation techniques to evaluate the relationships between EI dimensions and job satisfaction. The analysis revealed significant positive relationships between all emotional intelligence dimensions (self-awareness, self-management, social awareness, and relationship management) and job satisfaction. Notably, self-management and social awareness exhibited the strongest correlations with job satisfaction, highlighting their critical role in enhancing employee well-being and engagement. Employees with higher self-management skills were better equipped to handle workplace stress, while those with strong social awareness demonstrated improved interpersonal relationships, contributing to a more positive work environment. These findings align with previous research suggesting that emotionally intelligent employees are more likely to experience job satisfaction and remain committed to their organizations. The findings underscore the importance of incorporating emotional intelligence training programs in the hospitality sector to enhance employee job satisfaction and retention. Hotel administrators and HR professionals can leverage these insights to design targeted interventions aimed at developing EI competencies among employees. By fostering self-management and social awareness skills, organizations can create a more engaged and stable workforce, ultimately reducing turnover rates. This study contributes to the growing body of evidence supporting the value of emotional intelligence in improving workplace outcomes, particularly in high-turnover industries like hospitality.

Keywords: employee retention, emotional intelligence, hospitality, turnover, targeted training

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INTRODUCTION

Employee turnover is a persistent global challenge, particularly in the hospitality industry, which is renowned for its high attrition rates. Globally, employee turnover in hospitality is significantly higher compared to other industries. For instance, the U.S. Bureau of Labor Statistics reports an average annual employee turnover rate of 12-15% across all industries, whereas the hotel and motel industry experiences a turnover rate of 73.8% (Penn & Nezamis, 2022). This problem is even more severe in Quick Service Restaurants (QSRs), where turnover rates often exceed 150% (Kusluvan et al., 2010). Such staggering numbers highlight a critical weakness in workforce management strategies, with far-reaching implications for profitability, customer satisfaction, and service quality. In the context of Indian settings, the culturally unique and economically vital union territory (UT) of Jammu and Kashmir, the hospitality industry forms a cornerstone of the economy due to its strong reliance on tourism. However, the high employee turnover in this sector undermines operational efficiency, disrupts customer service, and escalates recruitment and training costs. Additionally, the socio-political instability in the UT and harsh climatic conditions further exacerbate workforce challenges. Despite the critical role that human capital plays in the hospitality sector of Kashmir, little attention has been given to understanding and addressing these issues from a contextually relevant perspective (Nguyen et al., 2023; Igbinoba et al., 2022).

The purpose of this study is to address these challenges by exploring the potential of emotional intelligence (EI) as a tool for controlling employee turnover and enhancing job satisfaction. Emotional intelligence, which encompasses self-awareness, self-management, social awareness, and relationship management, has been widely recognized as a critical factor in improving workplace relationships, team dynamics, and individual job performance. Yet, its application to the hospitality industry, particularly in high-turnover regions like Kashmir, remains underexplored. To achieve this, the study investigates the relationship between the four dimensions of emotional intelligence and job satisfaction among hospitality employees in Kashmir (Figure 1). The following hypotheses were formulated to guide the research:

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H1: There is a significant relationship between emotional intelligence and job satisfaction.

H1a: There is a significant relationship between self- awareness and job satisfaction.

H1b: There is a significant relationship between self- management and job satisfaction.

H1c: There is a significant relationship between social awareness and job satisfaction.

H1d: There is a significant relationship between relationship management and job satisfaction.

Using a robust quantitative approach, this research employs surveys and statistical analysis to evaluate the reliability of EI constructs and their correlation with job satisfaction. By addressing both global and local challenges, this study contributes to a deeper understanding of how emotional intelligence can be harnessed to mitigate turnover and improve workforce stability in the hospitality sector. In doing so, the research provides valuable insights for industry practitioners and policymakers, offering a roadmap for fostering emotionally intelligent workplaces that not only retain employees but also thrive in an increasingly competitive global market.

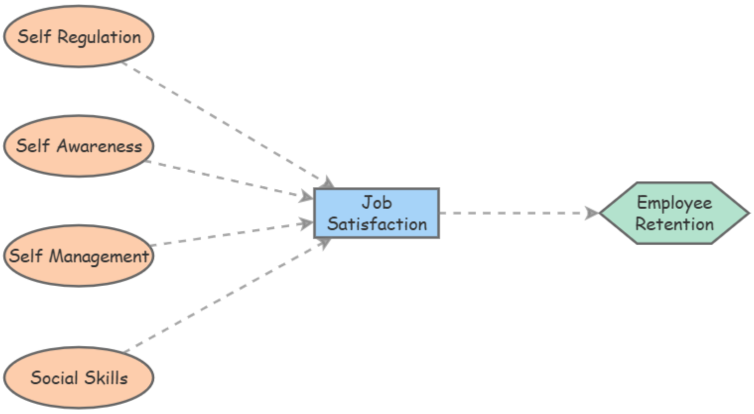

Figure 1.Conceptual framework of the study

PREVIOUS RESEARCH

Employee turnover remains a critical challenge in the hospitality industry, with global studies highlighting emotional intelligence (EI) as a promising approach to mitigate this issue. Defined as the ability to perceive, understand, and manage emotions in oneself and others, EI is increasingly recognized for its role in improving workplace outcomes (Mayer et al., 2001). Goleman (1998) extended this understanding by identifying four dimensions of EI—self-awareness, self-regulation, social awareness, and relationship management—critical for managing interpersonal dynamics in high-stress environments. There is a need to understand EI and its dimensions in detail as portrayed by various literature sources.

“A rational ability of understanding and controlling one's emotional behavior at work place to capitalize one's thinking ability. It includes the ability to perceive emotions, to generate and control emotions so as to make thought, to discern emotions and emotional knowledge, and to control emotional state so as to encourage intellectual and emotional growth respectively” (Mayer et al., 2001, p. 197). Literature provides a number of different ways of defining the concept of emotional intelligence but in general it refers to the potential to understand, recognize, and manage emotions of ourselves and of others. Emotional intelligence is playing a significant role in organizations like positive workplace outcomes, organizational commitment, organizational behavior, and job organizational performance (Peker et al., 2022).

In the fast and professional pass of the world, the EI has gained an essential place in determining various aspects of an individual's personal and professional life (Xiao et al., 2023; Brackett et al., 2011). Particularly in view of the hospitality industry, it plays a crucial role in achieving job satisfaction among hotel employees. Employees with higher emotional intelligence are better in managing customer interactions, foster positive relationships, and moreover contribute in long retention, enhanced customer engagement and loyalty (Prentice et al., 2023).

The relevant literature also suggests that emotional intelligence is closely associated with job satisfaction among hotel employees. Customers tend to prefer service experiences with employees who possess strong emotional intelligence, as they can easily understand and respond to the emotional demands of their clients. (Prentice et al., 2023) In addition to above, the hotel industry is characterized by a compact environment with high levels of stress and demanding healthy customer interactions, which remains an easy task for employees with strong emotional skill sets (Cavelzani et al., 2006). Employee’s real feelings for their work environment, work compensation, career development opportunities, and overall well-being have a visible impact on job satisfaction. Apparently, management of an organization must line up the culture of emotional intelligence among their employees to enhance satisfaction and, in turn, improve service standards and organizational performance (Prentice et al., 2023). Wash answered the question how to attain emotional intelligence among the hotel employees by providing them with particular training sessions, educational interventions (Walsh et al., 2015).

Hospitality trainers can also play a crucial role in equipping students with the necessary emotional skills to thrive in the industry and foster long-term career success. The EI as a topic for research has gained a lot of popularity in recent times (Dev et al., 2012; Mayer et al., 2001; Petrides & Furnham, 2003; Schutte et al., 2009; Goleman, 2001; 2009; Stough et al., 2009) Many researchers defined EI as an skill of recognizing own feeling better than others, motivate themselves and have healthy management of emotions with relationships (Goleman, 2001). Woolfolk, et al. (2008) defined EI as the efficiency to process emotional thinking accurately and efficiently, Goleman (1998) and Higgs (2004) said that EI is about own feeling and having ability to hand those as well, having motivation to get jobs done, have creativity and perform at highest level, being sensitive and able to handle relationships effectively. The model used for this study was developed by Goleman in 1995, to understand the performance of employees in the workplace, the EI had played a highlighted factor and that model gained the widely acceptance among the others (Goleman, 1995). This model is spread over four clusters which are self-awareness, self-management, social awareness and relationship management (Goleman, 1995). Masrek et al. (2015) added in their research that with the contribution of emotional intelligence, an organization can achieve teamwork and can develop talent within the employees.

Goleman (1995) refers self-awareness an ability of a person to recognize and understand emotions and to sense one's feelings, acts and emotions of others. It involves noticing others emotional reactions and being able to discern the emotions rightly. Self-awareness is considered one of the most crucial competencies associated with workplace emotional intelligence. Grayson (2013) described self-awareness as the cognitive ability to recognize one’s feelings, to rationalize between them, to understand the reason of the feeling, and to know how the feeling came in. Goleman (1998) defined self-awareness as a way by which one can identify a person’s emotions and how its effects. “Yeung (2009) in his research stated that the only possible way of become emotionally intelligent is to become self-aware first”. The researcher further stated that in a journey of becoming emotionally intelligent self-awareness acts as a skill of navigation and understanding.

Self motivation or self-management mentions time, and time is a rare resource, and not only in the hospitality industry but in other industries as well that applies self-management. Self-management is a personal fulfilling life needs; it demands time and mindfulness too. Learning self-motivation to balance work-life is challenging, it also has a visible difference to the working environment. In nutshell it can be summed like: all the goals and tasks given at workplace can be achieved if an employee prepares himself for the environment of the work place he/she can change the environment at work place and can achieve goals and objectives of an organization (Grobelna, 2019). Goleman (1995) defined that self-motivation is the state controlled emotional tendency which assists others to reach their goals. Self-motivation also refers to the ability to set goals and to push harder to achieve and also to remain focused and maintain positivity during any setbacks that may occur during setting or achieving of goals. Wolmarans & Martins (2001) suggested that one way that defines self-motivations is carrying someone’s responsibilities for successes and failures.

Social awareness or self-regulation as a dimension of emotional intelligence involves the manner of expressing their emotions. It includes being flexible, adopting changes and coping with conflicts. It also refers to managing difficult situations and being able to calculate how much one's action can affect others emotionally (Goleman. 1995). In Golemans cluster of core competencies Social Awareness or Self-regulation or self-management has got second place and the concept of social awareness is though the ability to remain calm during hyper or provocative or conflict situation, while maintaining defensiveness to a minimum and ultimately encouraging rationality (Wolmarans & Martins, 2001). According to Schunk (2003), social awareness would encourage people to take a considerable role in their thoughts, emotions, and performances.

Relationship management is also termed as social skills and as per Goleman (1995), it refers to communication within the group or with peoples, it also involves application of understanding with respect to emotions of ours and others while interaction and communicating with co-workers or others in our day to day lives and at work place. Relationship skills include Active listening, and communication skills (verbal and non verbal), and quality of leadership and develop harmony in relations. It also can describe a person's skills in managing old relationships with others and building new ones as well. The social skills set is considered of: respect and love for others, mutual regard, commitment, openness, maturity, empathy, flexibility, communication etc. (Schröder–Abé & Schuetz, 2011).

It involves the openness of exchanging information and thoughts about feelings, capacity of fulfilling each other's legitimate needs related to work and non-work matters. Social interaction may help employees in many ways and can prove with many advantages like: it can build confidence and sociability, it can help to achieve targets timely by teams even those not possible to do alone, hence can help in improvement in team tasks (Khalid et al., 2018).

Job satisfaction in this research is defined as “an overall measure of the degree to which the employee is satisfied and happy with the job” (Hackman & Oldham, 1976: 10). Researchers have developed various interpretations of job satisfaction, with two most common definitions are: "The pleasurable emotional state that arises when one evaluates their job as aligning with or aiding the accomplishment of their job values" and "The degree to which individuals enjoy (satisfaction) or dislike (dissatisfaction) their jobs" (Kessler et al., 2020). Various theories explaining human motivation share significant common base with those focusing on job satisfaction. Key theories in this realm encompass Maslow's needs hierarchy theory (1943), Herzberg's Motivator-Hygiene Theory (1966), the Job Characteristics Model (Hackman & Oldham, 1976). Job satisfaction is a complex concept triggered by individual emotions and their perceived significance. Ensuring employee contentment and minimizing stress poses a formidable challenge, particularly in service-oriented sectors like hotels. The hospitality industry is just one pillar of the broader service industry, which has become the first step of contemporary society, evolving from agrarian background and industrial roots. This expansive service sector covers various fields such as Airlines, Railways, Telecommunications, Utility Services, Hairdressing, Tailoring, and more. Essentially, a service defines a benefit delivered to satisfy the customer who pays for it.

It represents a service encounter, subject to interpretation, positive or negative based on the customer expectations. Globally, studies have linked EI to improved employee performance, job satisfaction, and retention, especially in consumer-facing sectors like hospitality. Wong & Law (2002) established that emotionally intelligent employees are better equipped to handle workplace pressures, leading to enhanced job performance. Similarly, Prentice et al. (2020) found that EI helps employees navigate the emotional demands of hospitality roles, fostering job satisfaction and reducing turnover. However, Cho et al. (2006) highlighted that the hospitality industry continues to struggle with high employee turnover, emphasizing the need for innovative retention strategies. Despite its significance, EI's application in addressing employee turnover is underexplored in culturally diverse and conflict-affected regions. Research by Clarke (2006) underscored the importance of context in developing EI-driven interventions, while Hofstede (1993) highlighted cultural differences in emotional expression and management. Yet, limited studies examine how these cultural factors influence EI's effectiveness in South Asia, particularly in Kashmir—a region where socio-political instability and environmental challenges exacerbate workforce retention issues. In the Indian context, studies on EI remain sparse and often overlook region-specific challenges. Bar-On (1997) emphasized the need for culturally adaptive EI strategies, while Jordan & Troth (2021) demonstrated that EI improves conflict resolution and team dynamics across various sectors. However, these insights have rarely been applied to the hospitality industry in Kashmir, where employee turnover undermines operational efficiency and service quality.

This study addresses these gaps by examining the relationship between EI dimensions and job satisfaction among hospitality employees in Kashmir. By focusing on this unique setting, the research not only builds on global findings but also introduces novel insights into EI's role in managing employee turnover in conflict-prone regions.

The study contributes to the literature by exploring the applicability of EI in a culturally and economically significant region, offering practical recommendations for fostering emotionally intelligent workplaces in the hospitality industry.

Table 1. Select works on EI and comparison with present work

Aspect	Existing Literature	Present Study	References
Focus of Emotional Intelligence	Primarily focuses on general workplace performance, leadership, and stress management (e.g., healthcare, education).	Focuses specifically on the hospitality industry's high turnover rates and job satisfaction.	Goleman (1998); Clarke (2006); Prentice et al. (2020); Nawaz et al. (2024); Badshah et al. (2025).
Industry Context	Studies often conducted in corporate, healthcare, artificial intelligence in tourism or education sectors.	Addresses the hospitality industry in a culturally unique setting, i.e., Kashmir, India.	Wong & Law (2002); Jordan &Troth (2021); Hofstede (1993); Fallah et al. (2023); Nawaz et al. (2024).
Dimensions of EI	Explores EI dimensions like self-awareness, self-regulation, and empathy broadly.	Examines four specific EI dimensions (self-awareness, self-management, social awareness, relationship management) in relation to job satisfaction.	Mayer et al. (2001); Bar-On (1997); Rodrigues & Silva (2024).
Methodology	Uses surveys, interviews, and psychometric tools to assess EI but often lacks a focus on job satisfaction metrics.	Incorporates quantitative analysis using Cronbach's alpha for reliability and correlational analysis between EI dimensions and job satisfaction.	Cherniss & Goleman (2001); Robinson et al. (1994); Garcia & Domínguez (2024).
Geographic and Cultural Context	Studies conducted in Western or urbanized settings, emphasizing generalized strategies.	Investigates EI in a localized, culturally rich context (Kashmir), highlighting region-specific workforce challenges.	Hofstede (1993); Cho et al. (2006); Senćanski at al. (2024).
Impact on Job Satisfaction	Highlights indirect effects of EI on job satisfaction through improved team dynamics and leadership.	Establishes a direct correlation between EI dimensions and job satisfaction metrics in hospitality.	Jordan & Troth (2021); Prentice et al. (2020); Li et al. (2024).
Retention Strategies	Focuses on broad organizational strategies like training, religious spirituality and recognition programs.	Advocates EQ-centric retention strategies tailored for high-stress hospitality roles.	Wong & Law (2002); Bar-On (1997); Ayad & Hasanein (2024); Salihy & Sharma (2024).
Novelty	Limited application of EI specifically to the hospitality sector and high turnover challenges.	Bridges the gap by directly linking EI dimensions with retention challenges in the hospitality industry of Kashmir.	Present study

Employee turnover remains a persistent challenge in the hospitality industry due to its demanding work environment, seasonal fluctuations, and high-pressure roles (Nawaz et al., 2024). Emotional Intelligence (EI) has emerged as a crucial factor influencing job satisfaction and employee retention, with research indicating that employees with higher EI exhibit better stress management, teamwork, and job commitment (Prentice et al., 2020; Badshah et al., 2025). However, existing literature largely focuses on general workplace performance and leadership, often overlooking its direct role in reducing turnover within hospitality settings (Clarke, 2006). Previous research on EI primarily examines its impact on leadership effectiveness, stress reduction, and job performance in sectors such as healthcare, education, and corporate settings (Goleman, 1998; Clarke, 2006). While these studies establish EI as a vital workplace skill, they do not explicitly explore its effect on high-turnover industries like hospitality (Rodrigues & Silva, 2024). Our study bridges this gap by investigating how specific EI dimensions—self-awareness, self-management, social awareness, and relationship management—affect job satisfaction and employee retention in the hospitality industry of Kashmir, India.

MATERIALS AND METHODS

This study adopts a quantitative research design to explore the relationship between emotional intelligence (EI) and employee retention in the hospitality industry. A structured questionnaire based on a five-point Likert scale was employed to collect data, focusing on the four dimensions of EI: self-awareness, self-management, social awareness, and relationship management, as well as job satisfaction.

Development of the Questionnaire

The questionnaire was developed following an extensive review of the literature on emotional intelligence and its application in organizational behavior. Established frameworks, such as those by Goleman (1998); Wong & Law (2002), informed the inclusion of validated constructs for measuring the dimensions of EI.

The questionnaire comprised 35 items: Emotional Intelligence (18 items); Self-awareness (5 items); Self-management (5 items); Social awareness (4 items); Relationship management (4 items); Job satisfaction (17 items); Career development (7 items); Career rewards (5 items); Workplace environment (5 items); Each item was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Sampling and Data Collection

The target population consisted of employees working in the hospitality industry in Kashmir. A sample size of 300 individuals was identified using a simple random sampling technique to ensure representativeness. The questionnaire was distributed electronically and in person to the respondents. Of the 300 questionnaires distributed, 190 valid responses were received, resulting in a response rate of 63.33%. The sample included participants from diverse demographic and professional backgrounds, ensuring the robustness of the findings.

Data Analysis

The collected data were analyzed using SPSS software. Descriptive statistics were calculated to summarize the demographic characteristics of the respondents. Reliability analysis was performed using Cronbach’s alpha to ensure the internal consistency of the scales, with all dimensions demonstrating acceptable reliability values ($\alpha > 0.7$). Pearson’s correlation analysis was used to examine the relationships between the dimensions of EI and job satisfaction. The correlation coefficients were interpreted to understand the strength and direction of these relationships. Additionally, regression analysis was employed to evaluate the predictive impact of EI on job satisfaction and employee retention.

Ethical Considerations

The study adhered to ethical research practices. Informed consent was obtained from all participants, and anonymity was assured. Participants were informed that their responses would be used solely for academic purposes and kept confidential. This methodological approach ensures the reliability and validity of the findings while contributing novel insights into the role of emotional intelligence in addressing employee retention challenges in the hospitality industry of Kashmir.

RESULTS AND DISCUSSIONS

Demographic Profile

The demographic profile of the respondents reveals a diverse sample with a majority of male participants (81.57%), while 18.42% were female (Table 2). The age distribution indicates a younger workforce, with 20% of respondents in the 18 to 25 age group, 21.05% in the 26 to 34 age range, and the largest proportion (25.26%) falling in the 35 to 43 age group.

The remaining respondents were spread across the older age categories, with 15.78% in the 44 to 52 range and 17.89% above 52 years. In terms of ethnicity, a vast majority of participants (89.47%) identified as Kashmiri, while 10.52% were from other racial backgrounds. Regarding educational qualifications, 31.57% held a master's degree, 60% had a bachelor's degree, and 21.05% held a diploma. Experience-wise, the respondents were fairly spread out, with 6.3% having 1 to 2 years of experience, 23.1% with 3 to 5 years, 26.3% with 6 to 8 years, 15.7% with 9 to 11 years, and 28.4% with 12 or more years of experience. This demographic profile suggests a well-balanced mix of younger and more experienced employees, as well as a strong representation of local Kashmiris with varied educational backgrounds and work experience, which adds depth to the study's findings on emotional intelligence and job satisfaction in the hospitality industry.

Table 2. Demographic profile of respondents

	Characteristics	Frequency	Percentage
Gender	Male	155	81.57
	Female	35	18.42
Age	18 to 25	38	20
	26 to 34	40	21.052
	35 to 43	48	25.26
	44 to 52	30	15.78
	Above	34	17.89
Race	Kashmiri Others	170 20	89.47 10.52
Academic Qualification	Master Degree Bachelor Degree Diploma Others	30 60 40 60	15.78 31.57 21.052 31.57
Work Experience in Years	1 to 2 3 to 5 6 to 8 9 to 11 12 and above	12 44 50 30 54	6.3 23.1 26.3 15.7 28.4

Correlational Analysis

This study aimed to explore the relationship between emotional intelligence (EI) and job satisfaction, along with its four dimensions: self-awareness, self-management, social awareness, and relationship management. The results of the correlation analysis are summarized in this subsection, addressing each hypothesis.

H1: There is a significant relationship between emotional intelligence and job satisfaction.

The analysis reveals a significant positive correlation between overall emotional intelligence and job satisfaction ($r=0.475$, $p<0.01$ $r = 0.475$, $p < 0.01$ $r=0.475$, $p<0.01$), supporting H1. This finding underscores the pivotal role of emotional intelligence in enhancing job satisfaction among employees in the hospitality industry.

H1a: There is a significant relationship between self-awareness and job satisfaction.

The results show a positive and significant correlation between self-awareness and job satisfaction ($r=0.252$, $p<0.01$ $r = 0.252$, $p < 0.01$ $r=0.252$, $p<0.01$), validating H1a. Employees with higher levels of self-awareness tend to experience greater job satisfaction, likely due to their ability to recognize and manage their emotions effectively.

H1b: There is a significant relationship between self-management and job satisfaction.

Self-management demonstrates a significant positive correlation with job satisfaction ($r=0.380$, $p<0.01$ $r = 0.380$, $p < 0.01$ $r=0.380$, $p<0.01$), supporting H1b. This result indicates that employees who can regulate their emotions and maintain composure in stressful situations are more likely to report higher levels of job satisfaction.

H1c: There is a significant relationship between social awareness and job satisfaction.

Social awareness, represented by social skills in the analysis, is significantly correlated with job satisfaction ($r=0.547$, $p<0.01$ $r = 0.547$, $p < 0.01$ $r=0.547$, $p<0.01$), confirming H1c. Employees who excel in understanding others' emotions and maintaining positive interpersonal relationships are more satisfied with their jobs.

H1d: There is a significant relationship between relationship management and job satisfaction.

While relationship management was not explicitly labeled in the correlation matrix, the strong correlation between emotional intelligence dimensions like social awareness ($r = 0.547$, $p< 0.01r = 0.547$, $p < 0.01r = 0.547$, $p< 0.01$) and job satisfaction implies a substantial role for relationship management in influencing job satisfaction. H1d is thus supported.

Table 3. Relationship between the four dimensions of EI and job satisfaction

Variables	Emotional Intelligence	Self-regulation	Self-awareness	Self-management	Social Skills	Job Satisfaction
Emotional Intelligence	1	.642**	.657**	.824**	.800**	.475**
Self-regulation	.649**	1	.246**	.411**	.281*	.203**
Self-awareness	.657**	.246**	1	.352**	.423**	.252**
Self-management	.824**	.411**	.352**	1	.581**	.380**
Social Skills	.800**	.281*	.423**	.581**	1	.547**
Job Satisfaction	.475**	.203**	.252**	.380**	.547**	1

All five hypotheses (H1, H1a, H1b, H1c, H1d) are supported, demonstrating that emotional intelligence and its dimensions are positively and significantly related to job satisfaction. This highlights the potential of EI-focused interventions in enhancing employee retention and satisfaction in the hospitality industry (Table 3) and (Figure 2) reveal significant positive correlations between emotional intelligence dimensions and job satisfaction.

Figure 2.Correlational matrix of EI and its dimensions

Table 4. Reliability analysis

Variables	Number of Items	Cronbach's Alpha
Emotional Intelligence	28	0.871
Self-awareness	8	0.719
Self-management	7	0.829
Social Awareness	7	0.809
Relationship Management	6	0.714
Job Satisfaction	7	0.804

Reliability Analysis

As shown in Table 4, Cronbach's Alpha values for emotional intelligence and its dimensions ranged between 0.714 and 0.871, indicating good internal consistency and reliability of the measurement scales. The alpha values for self-awareness (0.719) and relationship management (0.714) are on the lower threshold, but they still fall within the acceptable range for Cronbach's Alpha, which typically considers values above 0.70 as acceptable for ensuring reliability (Nunnally & Bernstein, 1994). These values suggest that while the internal consistency of these dimensions is adequate, some caution should be exercised in their interpretation, particularly in comparing them with dimensions that have higher alpha values.

DISCUSSIONS

The findings of this study align with the growing body of literature emphasizing the critical role of emotional intelligence (EQ) in enhancing employee retention, particularly in high-turnover industries like hospitality. This discussion integrates empirical results with theoretical and practical insights from existing literature to provide a comprehensive understanding of the context. Emotional intelligence has been widely recognized in the literature as a key factor influencing employee satisfaction and retention. Scholars like Goleman (1998) have highlighted that EQ is essential for managing workplace stress, building strong interpersonal relationships, and fostering a positive organizational culture. The present study corroborates these findings, demonstrating a significant positive correlation between overall EQ (r = 0.475) and job satisfaction. This suggests that employees who can effectively manage their emotions and interpersonal interactions are more likely to remain engaged and satisfied, reducing the likelihood of turnover.

The analysis of EQ dimensions offers nuanced insights consistent with prior research, the strong correlation between social skills and job satisfaction (r = 0.547) echoes findings by Prentice et al. (2020), who emphasized that effective communication and teamwork are critical for enhancing employee morale in customer-facing industries. In the hospitality context, social skills enable employees to navigate complex interactions with customers and colleagues, fostering a collaborative and supportive work environment. The self-management with a correlation of r = 0.380, aligns with studies by Wong and Law (2002), which highlight the role of self-regulation in mitigating workplace stress and improving adaptability. Employees with high self-management skills can maintain composure in challenging situations, a crucial attribute in the dynamic hospitality sector. Although its correlation of self-awareness with job satisfaction was weaker (r = 0.252), self-awareness remains a foundational component of EQ, as noted by Cherniss et al. (2001). It enhances employees' understanding of their strengths and weaknesses, contributing indirectly to job satisfaction by facilitating personal and professional growth. The significant relationship between the relationship management and job satisfaction (r = 0.546) supports findings by Jordan & Troth (2021), who assert that fostering positive workplace relationships leads to higher job satisfaction and lower turnover rates. The hospitality industry, characterized by high turnover rates and demanding work conditions, stands to benefit significantly from integrating EQ into its employee management strategies. Existing literature, including studies by Cho et al. (2006), highlights that turnover rates in the hospitality sector are not only costly but also disruptive to service quality. The study findings suggest that developing EQ, particularly in dimensions like social skills and self-management, can address these challenges by enhancing job satisfaction and fostering employee loyalty.

The demographic profile of respondents indicates that the workforce is predominantly male (81.57%) and local (89.47%). This cultural specificity aligns with studies such as Hofstede's (1993) cultural dimensions theory, which suggests that localized strategies are more effective in addressing workforce challenges. For instance, EQ training tailored to the socio-cultural dynamics of Kashmir could enhance its relevance and impact, addressing unique workplace challenges in the region.

Building on the literature and empirical findings, the strategies like EQ-centric training, supportive leadership and work-life balancing policies are recommended as retention tools. As supported by Clarke (2006), training programs focusing on social skills, self-management, and relationship management can improve employee satisfaction and performance. Studies by Bar-On (1997) highlight the importance of emotionally intelligent leaders in creating a positive work environment. Hospitality businesses should train managers to exhibit empathy, effective communication, and conflict resolution skills. Aligning with Robinson et al. (1994), policies promoting work-life balance and recognition can enhance job satisfaction and reduce turnover. This study contributes to the broader discourse on EQ by validating its relevance in high-turnover industries like hospitality. The findings align with global research trends, such as those by Mayer et al. (2001), which position EQ as a critical competency for organizational success. Furthermore, this study underscores the importance of contextualizing EQ strategies to address regional and industry-specific challenges.

While this study provides meaningful insights, its scope is limited to the hospitality sector in Kashmir. Future research could expand the sample size and include longitudinal designs to explore the long-term impact of EQ interventions. Additionally, comparative studies across different regions and industries could provide a more comprehensive understanding of EQ's role in employee retention. This study is limited to particular region so the results may not be generalized to the whole industry. Kashmir is the place with very distinct features considering seasons, availability, and accessibility. Multiple studies should be conducted at different places that could provide additional insight into the proposed relationship. The employee turnover and rates vary across hotel and tourism industry in different countries. Organizational demands, conflicts and culture are likely to vary from hotel to hotel. Investigation across the hotel chains and in different countries, without distinguishing between organizations and hotel chains, can limit the generalizability of research findings. The integration of emotional intelligence into employee management strategies holds significant potential for addressing turnover challenges in the hospitality sector. By fostering a culture of emotional intelligence, organizations can enhance job satisfaction, reduce turnover, and improve overall performance, as evidenced in this study and supported by the broader literature.

CONCLUSION

This study concludes that emotional intelligence (EI) is a critical factor in addressing employee turnover in the hospitality industry, particularly in the unique socio-cultural context of Kashmir. The findings demonstrate strong correlations between the four dimensions of EI—self-awareness, self-management, social awareness, and relationship management—and job satisfaction, which significantly influences employee retention. By fostering EI competencies through targeted training and emotionally intelligent leadership, organizations can create a more supportive and satisfying work environment. This research not only validates the role of EI in enhancing organizational outcomes but also offers valuable regional insights, paving the way for future studies to explore its application in diverse settings. The implications of the present study are:

- Every hotel organization must use Emotional intelligence related programs to enhance organizational capacity and performance in order to bringing best out of the peoples and constructing powerful workplace environment. With this will help to increase engagement, trust and integrity and can be used best retention tool.
- Various skills could be developed like, creativity, comprehension, rational, communication and management skills etc.

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METHODS FOR OPTIMIZING PROPERTY RELATIONS AS A KEY ASPECT OF STIMULATING THE DEVELOPMENT OF THE TOURISM INDUSTRY

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Abstract: The optimization of property relations is a crucial factor in promoting economic growth and advancing tourism development. This study explores the impact of different property ownership structures on key economic indicators, focusing on the relationship between public sector ownership, GDP per capita, and the Travel & Tourism Development Index. Data from OECD countries, the World Bank, the World Economic Forum, and the Statistical Agency of Uzbekistan is evaluated using a mix of theoretical analysis, empirical research and statistical modeling. Regression models, including log-log and semi-log approaches, are applied to measure the elasticity coefficients between variables. The results show a negative correlation between public sector ownership and both GDP per capita and tourism development, suggesting that excessive government control over property relations leads to economic inefficiencies. Additionally, the study reveals that a high share of public sector employment limits tourism growth and slows overall economic expansion, whereas private investment, foreign trade, and government efficiency play a significant role in ensuring economic stability. The research critically evaluates Karl Marx's idea of abolishing private property, demonstrating that in practice, such an approach has historically resulted in economic stagnation rather than progress. The study underlines the need for a well-balanced property ownership structure and supports the best mix of public and private sector involvement. Securing property rights, encouraging private sector involvement, and enacting investment-friendly policies will help nations improve their tourism industry and increase long-term economic resilience. These findings contribute to the broader discourse on economic governance, illustrating how efficient property management can serve as a driver for economic and tourism sector growth. The study provides practical insights for policymakers, emphasizing the need for well-structured property relations to ensure economic stability, improve competitiveness, and create a sustainable environment for tourism development.

Keywords: Marxism, communism, private property, property relations, tourism industry, economic development, public sector, private sector, investments

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INTRODUCTION

The tourism industry is becoming a powerful driver of economic growth and social development around the world (Robina-Ramírez et al., 2024). In addition to creating new jobs, developing infrastructure and promoting cultural exchange, the sector is recognized as an important source of sustainable income for national economies (Ilieș et al., 2024; Wendt et al., 2021; Caciora et al., 2023; Hassan et al., 2024; Josan et al., 2024; Safarov et al., 2024). However, the effective development of the tourism sector is directly dependent on many factors, in particular the proper management of property rights (Wang & Xu, 2014). The cardinal changes that took place on our planet in the field of science and socio-economic

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development in the second half of the 19th century and throughout the 20th century are directly related to the name of Karl Marx. The scientific doctrine he created was widely spread worldwide and attracted the attention of many politicians, scientists, heads of state, and the general population. Researchers explain the popularity of the teaching created by Marx by his unique personal qualities: the genius of the thinker, his insightful mind, his titanic work, and his understanding of his duty to the workers (McLellan, 1973; Green, 1978). All this allowed him to create what was beyond the power of others (Osinskiy, 2018). No doctrine created in the history of human society can compete with the doctrine created by Marx in its scope and ability to influence the masses. The main criterion for the validity of any theory is practice.

Only a theory proven in practice can be recognized as a scientific innovation that benefits society. However, Marx's teaching, which cost human society dearly, could not prove its scientific nature and truth in practical experience (Lukichev, 2022). After futile experiments, Marx's teachings fell into complete decline. As a result, the states that chose to build a communist society embarked on the path of transition from a system that strictly observed all the golden rules of socio-economic development to a modern market economy.

However, the paradoxical side of the issue is that even after Marx's teaching was in complete crisis and was rejected by practice, it continued to hold its position, influencing the worldview of the public. His views remain of great interest among various strata of the population. General Secretary of the Communist Party of China Xi Jinping said at the celebration of the 200th anniversary of Marx's birth: "Two hundred years have passed, and despite the enormous and profound changes in society, the name of Karl Marx is respected throughout the world, and his theory still shines like a diamond with the light of truth" (Fuchs, 2021). According to Osinskiy (2018), "The current situation in Russia, and the world as a whole, testifies to the vitality and relevance of Marx's teachings." These opinions indicate that, in principle, Marx's teaching on building a communist society based on the abolition of private property is still recognized and supported. For this reason, the importance of scientific research on the nature and significance of private property from the perspective of human society is growing. In particular, the issues of achieving economic development and a sustainable tourism industry through effective management of property relations are becoming increasingly relevant.

In this context, the article aims to analyze the methods of optimizing property relations in the development of the tourism industry. The main purpose of the article is to study the possibilities of achieving economic growth and stability in the tourism sector by optimizing property relations, developing cooperation between the state and the private sector, and proposing modern approaches to the management of property rights. At the same time, the article aims to demonstrate the practical impossibility of the idea of eliminating private property and to prove that socio-economic development can be ensured through the effective use of the huge potential of property relations.

LITERATURE REVIEW

The tourism sector plays an important role in stimulating economic growth and development (Safarov et al., 2024). The effective development of this sector depends on many factors (Safarov & Janzakov, 2021), and optimizing property relations is one of them (Wang & Xu, 2014; Wijburg et al., 2024). Effective management of property relations serves to develop tourism infrastructure, attract investments, and improve the quality of service provision. In this regard, studying methods for optimizing property relations in the tourism sector has become a pressing issue.

The organizational, political and scientific activities of K. Marx had an unprecedentedly strong influence on the socio-economic development of human society. The eminent Nobel Prize-winning economist Vasily Leontiev articulated the profound impact of Marx's theories, characterizing them as a series of self-fulfilling prophecies that modern economic science, despite its intricate apparatus, has been unable to refute (Osinskiy, 2018).

Jacques Attali, former head of the European Bank for Reconstruction and Development, stated: "No person has had a greater influence on the world than Karl Marx in the 20th century" (Osinskiy, 2018). Consequently, many scientific articles have been published, and symposiums and conferences have been organized to address his organizational, political and scientific activities. A detailed, comprehensive and profound analysis of the biography of Karl Marx, his political activities and achievements in the field of science has been undertaken.

Theoretical studies conducted on the basis of the analysis of extant literature have enabled the division of researchers actively participating in such discussions into two groups. The first group consists of those who favor Marx and regard his economic theories as exceptional and unparalleled. In contrast, the second group comprises those who treat Marx's economic teachings in a decidedly negative light, perceiving it as a utopian ideal and asserting its unviability. These critics also subject his economic theories to rigorous scrutiny and criticism. Scientific literature emphasizes that discussions between these two groups are widespread and have become an eternal problem. As Karchagin (2018) observes, "It would not be an exaggeration to say that the entire political theory and social philosophy of the 20th century is a direct or indirect reflection of the disputes between Marxists and anti-Marxists". Despite recent changes like these disputes, their overall number remains constant. This phenomenon is indicative of two key factors.

Firstly, it underscores the profound significance of the theoretical framework that has been developed.

Secondly, it highlights the intellectual and economic prowess of Karl Marx, the theorist behind this framework.

The origins of this recognition can be traced back to Marx's formative years. In his essay on choosing a profession, written during his time at school, Marx expressed the opinion that: "If an individual's professional endeavors are solely driven by self-interest, they may achieve renown in fields such as science, philosophy, or poetry. However, they are unlikely to attain the highest standards of virtue and excellence that define a truly great person" (Marx & Engels, 1835). From an early age, Marx aspired to become a scientist, not only for his benefit but also for the benefit of others, with the ultimate goal of attaining world fame and renown as a truly exceptional and illustrious individual. The recognition of the division of society into Marxists and anti-Marxists, the existence of opinions that Marx is the great thinker of the millennium, the celebration of the most important dates of his life in the world, the appearance of thousands of scientific works dedicated to him, the recognition of him as the greatest philosopher of our time, the publication of a large number of works and articles written by Marx - this is a real triumph of the popularity that Marx dreamed of in his youth.

The renowned American economist and Nobel Prize winner Wassily Leontief asserts that Marx's conclusions represent an exceptional series of fulfilled predictions, a claim that modern economic science, despite its sophisticated apparatus, is unable to refute (Iaroshevskii, 2018). The Chairman of the Russian Communist Party, Gennady Zyuganov, underscores the profound contributions of Marx as a scientist and revolutionary, lauding him as the architect of communist theory and the progenitor of significant advancements in human society.

He further elaborates on this sentiment, underscoring the profound impact of Marx's theories on the trajectory of human history. Marx's contributions, in his view, have been instrumental in the emancipation of humanity from the yoke of exploitation, and have catalyzed the ascendancy of socialism. Moreover, he posits that Marx's ideological framework has provided the workers with the necessary tools to dismantle the oppressive and complex mechanisms of capitalism (Zyuganov, 2018). Some sources interpret the emergence of Marx's teachings as a necessity that arose in society at the time when he lived and worked. For example, according to researcher Osinskiy (2018), "A completely new approach to history was needed, to understanding the processes of historical development and the role of individual social classes, individuals and the masses in it. And this new approach was developed by Marx".

Consequently, it can be deduced that had Marx not pioneered the concept of constructing a communist society through revolutionary means, it is probable that another economist would have done so.

In our opinion, if Karl Marx had not existed, the theory of building a communist society by abolishing private property would not have emerged in the mind of any other economist. Even if such a concept had been conceived and exhaustively developed, it is improbable that it could have been realized through the mass mobilization of millions of people following a flawed scientific theory, ultimately leading to a proletarian revolution.

Conversely, researchers who endorse Marxist theory regard Karl Marx as a visionary whose discoveries possess universal significance for the future of human society. In their attempts to explain the crisis of Marxist theory, researchers point to subjective factors, while maintaining a firm belief in the bright future of Marx's ideas. However, they do not acknowledge that the crisis of Marx's doctrine is the inevitable downfall of a pseudo-theory, which lacks a solid scientific foundation and was fundamentally flawed from its inception. Conversely, scholars who oppose Marxism interpret his teachings as a utopian concept lacking a scientific basis and, therefore, as never realizable. They contend that the implementation of Marxist ideology has exerted considerable detrimental influence on human society.

During Marx's lifetime, his doctrine of building a communist society was rejected by the majority of economists and was not recognized as a viable or sustainable reality. His ideas did not gain widespread popularity among his contemporaries, nor did they attract significant attention from leading intellectuals of his time.

The works produced by Karl Marx did not bring him the fame he had hoped for, nor did they elevate him to the level of a truly great and accomplished figure, as he had envisioned in his youth. At his funeral in 1883, only 11 people were in attendance (Nureev, 2013), a clear indication that Marx's scientific contributions and the doctrine reflected in them were not widely supported or recognized by contemporary economists.

Historical sources indicate that renowned scholars such as Georg Lukács, Jean-Paul Sartre, Antonio Gramsci, Herbert Marcuse, Louis Althusser, and Jürgen Habermas initially found Marx's ideas compelling and believed in their validity. However, after deep reflection and further analysis, many of them later reversed their stance (Jay, 1984), a shift that was not due to a failure to understand the significance of Marx's works or his contributions to human society. Rather, it stemmed from their growing doubts about the theoretical soundness of his ideas. Upon re-evaluating their initial perspectives, they ultimately refuted the foundations of Marx's theory. Given this, we have the right to argue that the economic reasoning of these scholars holds greater validity than that of Marx himself.

Turning to the issues of managing property relations in the tourism sector, Yan (2020) emphasized in his article the importance of the public-private partnership (PPP) model in the development of tourist zones. He notes that the PPP model can reduce the financial burden in the development of tourism infrastructure and improve the quality of services.

Optimization of property relations also plays an important role in attracting investments. Rose-Ackerman & Tobin (2005) emphasize in their scientific work the need to create a favorable property legal environment for foreign investment. They prove that the guarantee of property rights and transparent procedures increase the interest of foreign investors. Many scholars have studied methods for optimizing property relations in the tourism sector, and there are various approaches to this. An analysis of the literature shows that public-private partnerships, guaranteeing property rights, and creating a favorable environment for investments are key factors in the development of the tourism sector. At the same time, the scientific heritage of Karl Marx also plays an important role as a theoretical basis for analyzing and optimizing property relations.

MATERIALS AND METHODS

This study uses theoretical analysis, empirical and statistical analysis methods to assess the economic impact of optimizing ownership relations in the tourism sector. The study aims to assess the impact of state ownership of properties in the economy on economic growth and tourism development. To achieve this, we utilized data from the OECD (2024) report titled "Ownership and Governance of SOEs" and the 2023 World Bank dataset to analyze the relationship between public sector ownership in market capitalization and GDP per capita. Additionally, using data from the World Economic Forum, we examined how public sector ownership in market capitalization is connected to the Travel & Tourism Development Index.

The impact of the share of employment in the public sector on tourism development and economic growth indicators is also assessed. This indicator allows us to determine the impact of the balance between the public and private sectors on tourism development and economic growth. For this, log-log and semi-log regression models were used. This allows us to estimate the elasticity coefficients between the variables. The data used in the analysis are from the Statistical Agency of the Republic of Uzbekistan and the World Bank. The data cover the period from 2010 to 2023, including key indicators affecting tourism and economic development (Table 1).

Table 1. Overview of variables and data sources

Indicator (Acronym)	**Indicator name**	**Unit of measure**	**Data Source**
PubEmp	Share of employment in the public sector of the economy (annual)	Percentage	Statistics Agency
Invest	The volume of investments in fixed assets (annual)	Billion UZS	Statistics Agency
GovEff	Government effectiveness index	Index (-2.5 to 2.5)	World Bank
ForTrade	Volume of foreign trade turnover (annual)	Million USD	Statistics Agency
EntrOrg	Number of operating enterprises and organizations (annually)	Unit	Statistics Agency
AccFoodVol	Volume of accommodation and food services	Billion UZS	Statistics Agency
GDPCap	GDP per capita (by expenditures method, at constant prices, annual)	Thousand UZS	Statistics Agency
TotalTour	Total number of domestic and inbound Tourists (annual)	People	Statistics Agency

The selected variables and their data sources are presented in Table 1. The selected variables cover economic, institutional and infrastructural factors that directly affect the tourism industry and economic growth.

The statistical classification of these variables is presented in Table 2.

Table 2. Summary of descriptive statistics for variables (Source: Calculated by the authors)

Variable	Mean	Std. Dev.	Min	Max
GPDCap	11470.73	8725.869	2351.272	29374.369
TotalTour	533373.79	205598.11	198339	966274
PubEmp	18.592	0.904	17.295	20.727
Invest	120640.76	111884.4	16463.7	356071.4
GovEff	-0.62	0.207	-0.93	-0.26
ForTrade	33867.143	11893.738	22199.2	63528.6
EntrOrg	320764.29	126887.92	200951	592371
AccFoodVol	4779.143	5600.671	292.7	19343

During the study, we will test the following hypotheses:

Null Hypothesis **(H0):** PubEmp has no statistically significant impact on economic growth (GDPCap) and tourism development (TotalTour). This implies that the effect of PubEmp on GDPCap and TotalTour is not significantly different from zero, indicating that the inclusion of this variable in the model does not lead to substantial changes in the results.

Alternative Hypothesis **(H1):** The share of employment in the public sector (PubEmp) has a statistically significant impact on economic growth (GDPCap) and tourism development (TotalTour). If this hypothesis is accepted, it would mean that PubEmp plays a crucial role in influencing GDPCap and TotalTour, demonstrating its relevance and significance within the model. Two regression models are constructed to test the above hypotheses. The model for assessing the impact of the share of employment in the public sector on economic growth (1):

$$\ln(GDPCap) = \beta_0 + \boldsymbol{\beta_1 \ln(PubEmp)} + \beta_2 \ln(Invest) + \beta_3 GovEff + \beta_4 \ln(ForTrade) + \beta_5 \ln(EntrOrg) + \varepsilon \qquad (1)$$

where β_0 – the regression model intercept (constant term); β_1, β_2, β_4, β_5 – elasticity coefficients of the independent variables; β_3 – marginal effect of the relevant independent variable; ε – random error term.

Model for assessing the impact of public sector employment on tourism development (2):

$$\ln(TotalTour) = \gamma_0 + \boldsymbol{\gamma_1 \ln(PubEmp)} + \gamma_2 AccFoodVol + \gamma_3 \ln(ForTrade) + \varepsilon \qquad (2)$$

where γ_0 – the regression model intercept (constant term); γ_1, γ_3 – elasticity coefficients of the independent variables; γ_2 – marginal effect of the relevant independent variable; ε – random error term. When estimating the impact of the share of public sector employment (PubEmp), other independent variables that may affect GDP per capita (GDPCap) and total number of tourists (TotalTour) were used in the model as auxiliary indicators to ensure model reliability. This approach allowed for a more accurate assessment of the indirect effects of the public sector on the economy and tourism development.

RESULTS

This section presents the empirical findings of the study, analyzing the relationship between public sector ownership and economic performance through correlation and regression methods. The results provide insights into the effects of state intervention in the economy, particularly in the context of Karl Marx's theories on state ownership and private property. Marx argued that eliminating private ownership would lead to a more just and prosperous society. However, empirical evidence challenges this notion by examining the impact of public sector dominance on economic growth.

A negative correlation is evident between public sector ownership in market capitalization and GDP per capita in OECD countries for 2023. The scatter plot reveals a negative correlation between these two variables, with a correlation coefficient of -0.2951 and a two-tailed p-value of 0.0852 (Figure 1).

This finding indicates that countries with a higher share of public sector ownership in market capitalization tend to have lower GDP per capita. This result can be considered statistically significant at the 90 percent level of significance.

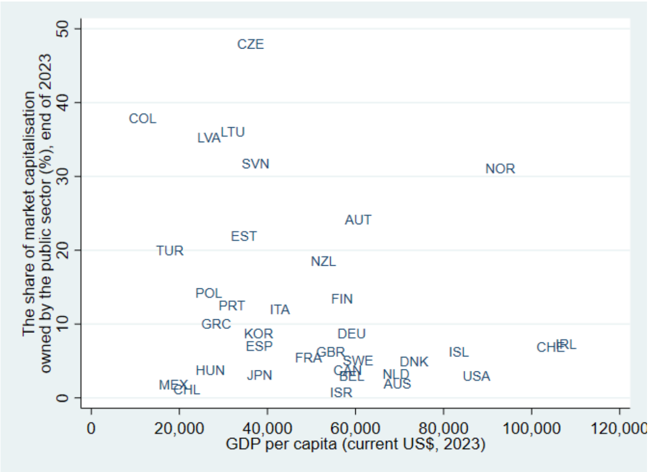

Figure 1. Relationship between public sector ownership in market capitalization and GDP per capita (2023) for OECD countries. Note: corr = -0.2951, p = 0.0852 (two-tailed) (Source: Created by the authors)

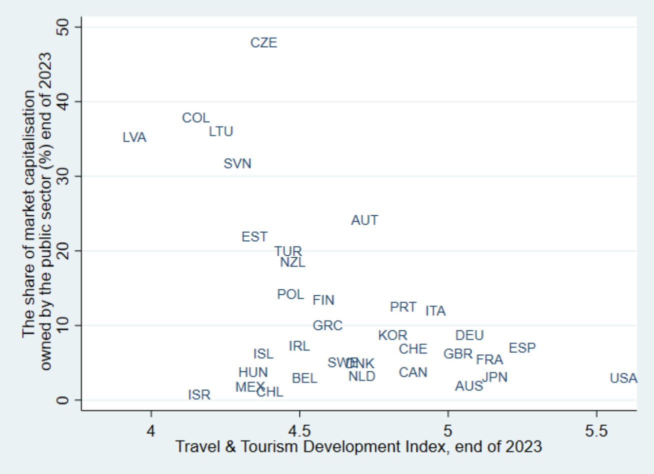

Figure 2. Relationship between public sector ownership in market capitalization and Travel & Tourism Development Index (2023) for OECD countries. Note: corr = -0.5033, p = 0.0024 (two-tailed) (Source: Created by the authors)

Figure 2 shows the relationship between public sector ownership in market capitalization and the Travel & Tourism Development Index for OECD countries. The results show that a high share of the public sector in the economy is negatively correlated with tourism development (corr = -0.5033, p = 0.0024). This negative correlation suggests that excessive state involvement in the economy can limit the competitiveness of the private sector and tourism. In particular, countries such as the Czech Republic (CZE), Latvia (LVA) and Colombia (COL) have high levels of public ownership, which are associated with low tourism development indices. On the contrary, countries such as the United States (USA) and Spain (ESP) have low levels of public ownership and high tourism development indicators. These results indicate the need to strengthen the role of the private sector in tourism and optimize state involvement.

This finding contributes to the ongoing debate on the impact of state ownership on economic performance. While state participation in strategic sectors may enhance economic stability and address market failures, excessive government control over market capitalization may reduce private sector incentives, limit competition, and slow economic growth.

The Soviet Union (USSR) is widely regarded as the most significant historical exemplar of implementing Karl Marx's theoretical concepts in practical terms. However, following its dissolution in 1991, the former Soviet states, including Uzbekistan, underwent a transition towards market-oriented economies, with a strong emphasis on privatization. In recent years, Uzbekistan has continued this transition by implementing large-scale privatization programs. Notably, in 2023, state-owned asset privatisation efforts led to the public sale of over 5,300 assets, including government shares, real estate properties, and land plots, with a valuation of approximately 20.9 trillion UZS. Of these, 2,008 assets were successfully sold for a total of 11.4 trillion UZS (UzSAMA, 2024).

The present study aims to examine the validity of Karl Marx's ideas on property and state ownership. Therefore, this study examined the impact of the share of employment in the public sector (PubEmp) on economic growth (GDPCap) and tourism development (TotalTour).

The present study has been designed to provide empirical evidence on the role of public sector employment in economic growth and tourism development, whilst taking into consideration other influencing factors. By analyzing the relationship between public sector employment and GPDCap as well as TotalTour the study will contribute to the broader discussion on state intervention in the economy and its long-term effects on economic development.

To test the above hypotheses, we first analyzed the relationships between the studied variables by constructing a correlation matrix (Table 3). This step is instrumental in identifying potential multicollinearity issues, which, before estimating the regression equation, must be addressed.

Table 3. Correlation matrix of variables. (Source: Calculated by the authors)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ln(GPDCap)	1.000							
(2) ln(TotalTour)	0.443	1.000						
(3) ln(PubEmp)	-0.483	-0.356	1.000					
(4) ln(Invest)	0.994	0.446	-0.430	1.000				
(5) GovEff	0.815	0.452	-0.213	0.813	1.000			
(6) ln(ForTrade)	0.890	0.565	-0.174	0.897	0.800	1.000		
(7) ln(EntrOrg)	0.946	0.402	-0.257	0.936	0.879	0.940	1.000	
(8) AccFoodVol	0.862	0.565	-0.227	0.853	0.850	0.938	0.939	1.000

According to Chaddock's (1925) scale, a correlation coefficient of 0.7 or higher indicates a strong relationship between variables. The analysis revealed that ln (Invest), GovEff, ln(ForTrade), ln(EntrOrg) and AccFoodVol had correlation coefficients greater than 0.7 with each other, suggesting a high degree of multicollinearity among them. To ensure the accuracy and reliability of the regression model, highly correlated independent variables were expressed in separate regression equations. In addition, the robust standard error method was used to reduce the problem of heteroscedasticity and stabilize the results. This approach helped to ensure the reliability and accuracy of the relationships between the variables. The results of the regression analysis are presented in Table 4.

Table 4. Regression analysis results (Source: Calculated by the authors)

Variables	ln(GPDCap)	ln(GPDCap)	ln(GPDCap)	ln(GPDCap)	ln(TotalTour)	ln(TotalTour)
ln(PubEmp)	**-1.153** (-2.56)**	**-5.531* (-2.18)**	**-5.773*** (-5.42)**	**-4.377*** (-6.85)**	**-2.226* (-2.19)**	**-2.011* (-3.61)**
ln(Invest)	0.739*** (31.83)					
GovEff		2.93*** (8.49)				
ln(ForTrade)			2.171*** (8.91)		0.664*** (3.39)	
ln(EntrOrg)				2.027*** (16.36)		
AccFoodVol						0. 00004*** (5.75)
Constant	4.133** (2.82)	27.033*** (3.67)	3.381 (0.81)	-3.725 (-1.29)	12.726*** (3.13)	18.819*** (6.61)
Prob > F	0.000***	0.000***	0.000***	0.000***	0.002***	0.000***
R-squared	0.991	0.765	0.903	0.957	0.388	0.3745
Mean VIF	1.23	1.05	1.03	1.07	1.03	1.05
Note: *** p<0.01, ** p<0.05, * p<0.1						

According to the results of the regression analysis presented in Table 4, it was found that the share of employment in the public sector (ln(PubEmp)) has a negative impact on economic growth (ln(GDPCap)). In all models (1–4), the coefficient of ln(PubEmp) is statistically significant ($p < 0.1$), with values of -1.153, -5.531, -5.773 and -4.377, respectively. This means that an increase in the share of employment in the public sector can slow down economic growth. In particular, the variable Invest (ln(Invest)) has a significantly positive impact on economic growth ($\beta = 0.739$, $p < 0.01$), which indicates that private investment plays an important role in the economy. It was also observed that government efficiency (GovEff) and foreign trade volume (ln(ForTrade)) both have a positive impact on GDP per capita growth ($\beta = 2.93$ and 2.171, $p < 0.01$). When assessing the impact on tourism development (ln(TotalTour)), the share of employment in the public sector (ln(PubEmp)) also has a negative impact ($\gamma = -2.226$ and -2.011, $p < 0.1$).

On the contrary, the volume of accommodation and food services (AccFoodVol) and foreign trade volume (ln(ForTrade)) show a positive impact on tourism development ($\beta = 0.0004$ and 0.664, $p < 0.01$). These results indicate that excessive participation of the public sector in the economy and tourism can reduce economic efficiency, and the development of the private sector and foreign trade can stimulate growth. The high explanatory power (R^2) of the model confirms that the selected variables have a significant impact on economic and tourism indicators.

The economic thought of Karl Marx had a profound impact on political movements and global debates on private property and social justice. His vision of abolishing private ownership to create a fairer society inspired millions and led to the establishment of socialist states. However, subsequent events have demonstrated that his theoretical framework was not applicable in a practical sense. While Marx espoused the notion that the abolition of private property would engender equality, historical experiments, such as the Soviet Union, demonstrated that state ownership frequently resulted in inefficiency, economic stagnation, and resource misallocation. A fundamental weakness in Marx's theoretical framework pertains to the supposition that the distribution of wealth would be determined by need rather than by productivity. In reality, economic resources are limited, and human desires are boundless. This has been evidenced by the persistent pursuit of economic growth by the wealthiest individuals in market economies, thereby demonstrating that the attainment of complete economic equality is neither realistic nor sustainable. The absence of incentives for innovation and diligence has been demonstrated to result in diminished productivity and the stagnation of economic growth.

While acknowledging the shortcomings of market economies, it is important to recognize their superiority in promoting innovation, rewarding hard work, and enhancing overall living standards. In contradistinction to the economic provisions espoused by Marx, market-driven economies empower individuals to achieve success based on their endeavors, as opposed to the utilization of state control. The imposition of artificial equality through forced redistribution has frequently resulted in economic collapse rather than prosperity. The objective of achieving a just society, as espoused by Marx, is laudable. However, historical evidence has demonstrated that the presence of private ownership and the operation of free markets are indispensable for achieving economic prosperity. The historical record demonstrates that economies under state control have consistently fallen short of achieving long-term growth and prosperity. Instead of the complete elimination of private property, societies have realized greater success in achieving a balance between market efficiency and social protections, thereby ensuring both economic growth and fairness.

DISCUSSION

The results of this study allow us to reassess Karl Marx's theories on the economic relationship between private property and state property in the context of modern economic and tourism development. The idea of 'abolition of private property', put forward by Marx and Engels (1848) in 'The Communist Manifesto', has been the subject of much theoretical discussion. However, practical analyses and empirical results, especially those obtained in this study, require a reconsideration of the impact of this idea on economic growth and tourism development.

Maslow (1943) hierarchy of needs theory suggests that humans need to satisfy their basic physiological and social needs. Marx's idea of abolishing private property denies these needs and contradicts human nature. Recent studies by Lähteenmäki-Uutela et al. (2021) and Ilies et al. (2023) emphasize the importance of private property rights in maintaining economic and social structures. This study assessed the impact of the share of public sector employment on economic growth and tourism development. According to the results of regression analysis, the impact of the share of public sector employment on economic growth is negative and statistically significant. This suggests that an increase in the level of state ownership can slow down economic growth. This is explained by the low efficiency and high risk of resource misuse in the public sector. A similar negative effect was observed for the tourism development indicator. This result suggests that a high share of state ownership in tourism can limit innovation and competitiveness. In particular, the role of the private sector in improving tourism infrastructure and service quality is shown to be important (Vail & Hultkrantz, 2000).

In addition, the regression model revealed a positive effect of indicators such as investment, foreign trade volume and government efficiency. For example, the ln (Invest) variable had a significant positive effect on economic growth, indicating that private sector investment activity contributes to economic stability.

Graphical analyses (Figure 1 and Figure 2) showed the relationship between the share of state-owned assets in market capitalization and economic growth and tourism development. In particular, in the case of OECD countries, an increase in the share of the public sector in the economy was accompanied by a decrease in economic growth and a lower tourism development index. The main reason for this was shown to be the inefficient use of resources by the public sector and the creation of barriers to private sector innovation.

Overall, the results of this study provide evidence against Karl Marx's idea of the abolition of private property and confirm that in a modern market economy, private property and free competition are important factors for economic growth and tourism development. This implies the need to ensure a balance between the state and the private sector, effective management of state property, and the creation of a favorable business environment for the private sector.

CONCLUSION

The theoretical and empirical research conducted has led to the conclusion that the concept proposed by Marx, which suggests the feasibility of the complete abolition of private property through revolutionary means, and the subsequent establishment of a communist society founded on public property, is a theoretical construct that lacks practical viability.

The true greatness of K. Marx lies not in his creation of a new teaching on the transition to communism through his three-volume work "Capital", but rather in his ability to persuasively disseminate a false and unscientific theory to millions of people. The public, having accepted his utopian scholastic ideas, participated actively in revolutionary upheavals, and many people even gave their lives in the fields of such battles.

The outcome of this period was the establishment of the USSR and the socialist camp, comprising 14 countries worldwide. Following almost 70 years of unsuccessful attempts to implement Marx's conceptions of the equitable distribution of income among the general population, based on the destruction of the means of production, such a system has reached a complete crisis. The primary cause of the collapse of this theoretical framework, which was implemented in a forced manner, can be attributed to the initial failure to acknowledge the fundamental economic principles that govern societal dynamics. This oversight occurred during the formulation of the aforementioned doctrine.

The theory developed by Marx is predicated on a fundamental contradiction to the underlying economic law of perpetual growth in human needs. This theoretical inconsistency proved to be a significant contributing factor to the eventual collapse of the theory. The notion of establishing a communist society through the complete eradication of the institution of private property is theoretically unsound and, consequently, lacks a viable future. Despite this, there are ongoing attempts to attribute the crisis of Marx's teachings to subjective factors and faith in its future, which is indicative of a lack of economic understanding.

Consequently, it is imperative to refrain from the complete abolition of private property, instead advocating for its effective utilization by the demands of the contemporary era. The rational distribution of private property, the strengthening of its integration with the state, and the improvement of the legal framework for its development are crucial. Large-scale scientific research in these areas is essential for addressing the remaining issues.

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ENHANCING ENVIRONMENTAL SUSTAINABILITY THROUGH THE SUSTAINABLE URBAN TOURISM: CASE STUDY OF NORTHERN TEHRAN, IRAN

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Abstract: Environmental degradation has emerged as a critical global challenge, demanding urgent research into effective strategies for mitigation and sustainable development. This study investigates the intricate relationship between tourism and environmental sustainability in North Tehran, Iran, a region renowned for its natural attractions yet facing significant ecological pressures. By integrating Landsat satellite imagery with comprehensive field surveys, the research employs a mixed-method approach, combining descriptive and analytical techniques, SWOT analysis, and inferential statistics to assess the environmental impact of tourism activities. The findings reveal a troubling trend: while tourism-driven economic activities and improved amenities have bolstered the region's appeal, they have also exacerbated environmental degradation. Notably, the conversion of agricultural lands into commercial developments has led to a dramatic decline in vegetation cover, with satellite data indicating a loss of over 130 square kilometers of green space between 1985 and 2022. This transformation has resulted in soil erosion, deforestation, and biodiversity loss, threatening the region's ecological balance. The study underscores the dual role of tourism as both an economic driver and an environmental stressor, highlighting the need for sustainable practices that balance economic growth with ecological preservation. By identifying key factors contributing to environmental degradation, such as unregulated construction and land-use changes, the research provides actionable insights for policymakers. Strategic recommendations include the implementation of sustainable tourism policies, enhanced community involvement, and the promotion of eco-friendly infrastructure. The findings emphasize the importance of integrating environmental conservation into tourism planning to mitigate resource depletion, protect biodiversity, and ensure long-term socio-economic benefits. This study not only contributes to the growing body of knowledge on sustainable tourism but also offers a tailored framework for addressing the unique ecological and socio-economic challenges of North Tehran, serving as a model for other regions grappling with similar issues. The research also highlights the potential of ecotourism as a sustainable alternative, emphasizing the need for strategic planning, stakeholder collaboration, and community engagement to preserve natural resources while fostering economic growth. By leveraging tools like the CAMP model and SWOT analysis, the study proposes actionable strategies to mitigate environmental risks and enhance tourism resilience.

Keywords: tourism, sustainability, environmental stability, preservation, development, human activities, SWOT, Landsat data

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INTRODUCTION

Tourism is a powerful catalyst for travel, offering opportunities to explore nature, embark on adventures, and engage with diverse cultures. It fosters cultural exchange, social engagement, and participation in new traditions, making it essential for developing a sustainable tourism industry (Baloch et al., 2022). Environmental sustainability plays a key role in this context, focusing on preserving socio-cultural heritage and natural resources to protect ecosystems while benefiting individuals and the economy (Ziari et al., 2015). This sustainability is reflected in various natural landscapes, biodiversity, and cultural sites that showcase local hospitality toward tourists. The relationship between tourism growth and environmental sustainability is crucial, as increased tourism can affect eco-friendly practices (Azam et al., 2018; Hassan et al., 2020; Sun et al., 2021; Ziari & Vansan, 2024). Notably, the World Tourism Organization (UNWTO) highlights that tourism contributes over 10% to the global GDP (UNWTO, 2017). International tourism has grown significantly, increasing from 25 million tourists in 1950 to 1.442 billion in 2018, with projections estimating 1.8 billion by 2030. While tourism generates employment and economic benefits, it also causes environmental pollution, including air and noise pollution, waste accumulation, and depletion of natural resources. Overcrowding can lead to serious ecological issues such as soil erosion, resource depletion, and threats to biodiversity and cultural environments (Shaheen et al., 2019; Andlib & Salcedo-Castro, 2021). Sustainable tourism aims to use natural and human resources responsibly, preventing their exploitation and ensuring the protection of the environment and cultural heritage. Effective sustainable tourism development requires clear policies and principles, including sustainable resource use, waste reduction, diversity preservation, strategic planning, local community involvement, stakeholder engagement, and responsible marketing in the tourism industry.

The growth of tourism has notable ecological costs that often outweigh the socio-economic benefits for local communities (Pulido-Fernández et al., 2019; Simo-Kengne, 2022). Ecotourism, which aims to develop infrastructure while

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conserving natural resources, holds potential for economic development in such regions. The Lashkark-Dizin axis in northern Tehran, Iran, is a prominent ecotourism destination, featuring a mix of historical, cultural, and natural attractions that attract visitors year-round. However, this area faces significant environmental degradation, which poses challenges for sustainable tourism development. Addressing infrastructural issues - such as road conditions and facility maintenance - alongside environmental preservation efforts is vital for enhancing the tourism experience and supporting growth. Strategically establishing tourist-recreational complexes can significantly increase tourist numbers and benefits while prioritizing environmental sustainability. In light of recent environmental disruptions in northern Tehran, a comprehensive strategy is necessary to mitigate further damage and foster sustainable tourism practices.

Environmental degradation, intensified by human activities, is a critical concern, especially in relation to tourism in sensitive ecological areas. Research highlights the complex relationship between tourism and economic development; for instance, Gupta et al. (2024) points out that tourism can boost local economies but also threatens environmental integrity without sustainable practices. Rimba et al. (2021) discuss how increased tourism often leads to harmful land-use changes, worsening environmental decline. Dwyer (2023) emphasizes the need for integrated policies that balance economic growth and ecological sustainability but notes that assumptions about stakeholder cooperation may not hold in practice. Mustafa & Prasad (2024) focus on biodiversity loss from land-use changes but overlook crucial elements like water management and climate resilience. While these studies provide valuable insights, significant gaps persist, particularly regarding local case studies linking tourism to environmental degradation specifically in North Tehran.

Most existing research tends to focus on established tourist destinations, frequently ignoring emerging markets like North Tehran and lacking longitudinal data to assess environmental changes over time. Furthermore, in light of this, the present study aims to critically assess the natural attractions in North Tehran and analyze the effects of human activities, particularly tourism, on the local environment. By combining Landsat data with field surveys and employing both descriptive and analytical methods alongside SWOT analysis, this research seeks to evaluate environmental sustainability and tourism indicators specifically in the context of North Tehran. The goals are to identify effective mitigation strategies that balance economic benefits and environmental protection, outlining pathways for sustainable tourism development tailored to the unique ecological and socio-economic conditions of the area.

MATERIALS AND METHODS

Study area

Tehran province covers approximately 18,909 square kilometers and is divided into 15 cities, with Shemiran city accounting for around 1.1 thousand square kilometers. The Lashkarak-Dizin axis is vital for tourism activities, necessitating a geographical study of the Lavasan region, whose administrative center is Lavasanat. Located in northeast Tehran, Lavasan shares a similar summer climate with the city and features numerous natural attractions that attract visitors year-round from Tehran and Alborz provinces (Tehran Province Management and Planning Organization, 2020). However, environmental diversity poses challenges for tourism planning, including poor road conditions, insufficient facilities, and significant environmental degradation, which hinder tourism. Establishing tourist-recreational complexes could enhance the area's appeal and provide necessary services such as accommodations and catering. Addressing recent environmental issues is essential for sustainable tourism development and the well-being of local communities. This research emphasizes the need to tackle these challenges to ensure a sustainable future for tourism in the Lavasan region. Figure 1 shows the location of Lashkarak-Dizin axis.

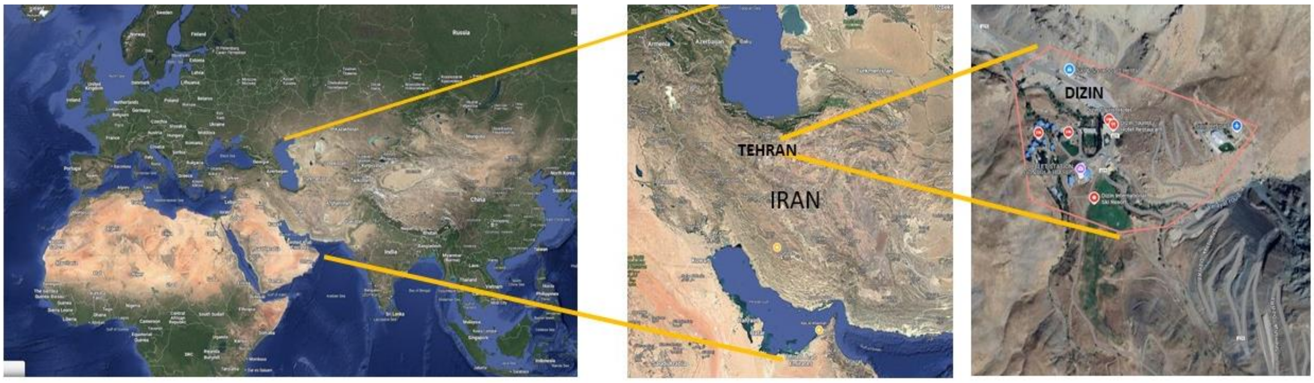

Figure 1. Study area - Iran, Tehran, Lashkarak-Dizin axis

Research methodology

This study employs a descriptive and analytical research methodology (Figure 2) to explore tourist attractions and facilities in the Lashkar-Dizin area, focusing on the environmental state and the impact of tourism on physical-spatial development and resource sustainability. It aims to establish relationships between independent and dependent variables using correlation methods and combines quantitative and qualitative approaches. Satellite data from Landsat 8 and Landsat 1-5, along with NDVI analysis, are utilized to assess vegetation cover changes up to 2022 and evaluate the environmental impact of tourism, particularly concerning unregulated constructions.

The research involves field surveys targeting three groups: tourism experts from Tehran and Alborz, residents of the study area, and visiting tourists, with sample sizes of 30, 200, and 150, respectively. The validity and reliability of the questionnaires will be assessed using the Cronbach's alpha method. The Pralong method is used in 2022 to evaluate tourism expansion indicators, while SWOT analysis assesses the current environmental and tourism situation.

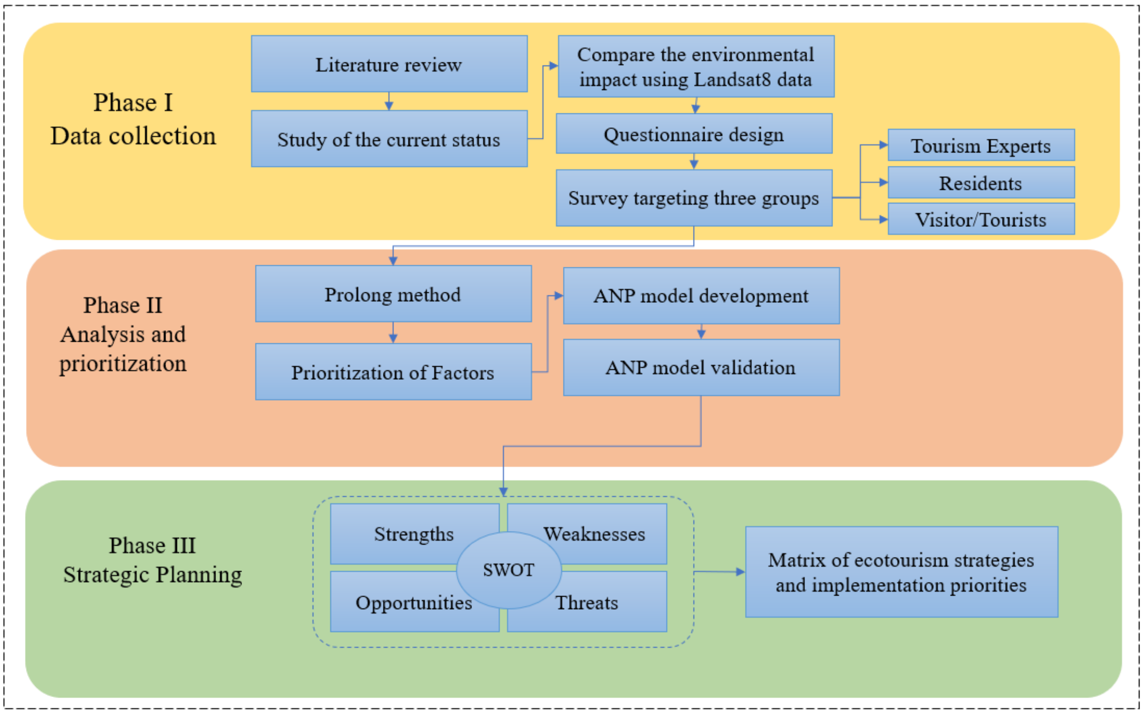

Figure 2. Research Methodology flowchart

Inferential statistical analyses, including correlation and regression coefficients, will examine the relationships between variables. The study also incorporates network analysis techniques to evaluate criteria related to tourism, justified by the model's ability to incorporate control hierarchies and interrelationships among components (Higgs, 2006). By analyzing research objectives and relevant literature, the study operationalizes key variables for experimental testing.

RESULTS AND DISCUSSION

The analysis of instability and destruction of the natural environment

The analysis of instability and environmental degradation of natural habitats is conducted using satellite data analysis from Landsat 8 and the utilization of the analytical tool, NDVI vegetation coverage index, in the landviewer system. The preparation of vegetation coverage charts for the years 2013 to 2022 demonstrates the time series data based on the spectral index values of satellite images with a minimum percentage of cloud cover in the designated area. Additionally, the display of charts divided by year allows for the comparison and evaluation of temporal dynamics using the available data for the selected period. The results of this analysis indicate the destruction of natural landscapes, deforestation, and a decrease in vegetation coverage in the study area (Figure 3).

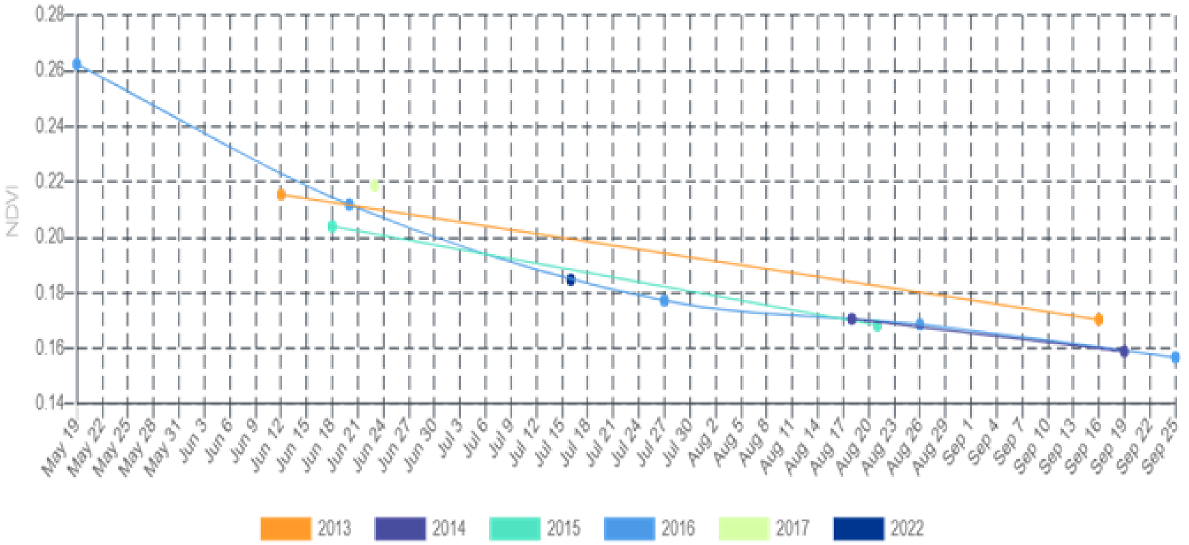

Figure 3. The decrease in vegetation coverage index NDVI (Source: Landviewer)

Over the past few decades, uncontrolled spatial and physical development, as well as construction, have caused irreparable damages, including soil erosion, landslides, deforestation, floods, and more. These issues will be further elaborated on in the following sections. By utilizing Landsat 1-5 MSS and Landsat 8 images in the time intervals of 1985 and 2022, processed in Google Earth Engine using the NDVI (Normalized Difference Vegetation Index) index for assessing and analyzing vegetation cover changes, it was evident that in the 1985 image, the total area of green spaces amounted to over 192.5 square kilometers, a figure that decreased to 62.5 in the same selected area in 2022 (Figure 3). This indicates a significant environmental disaster and destruction of over 130 square kilometers of vegetation cover in the selected area, namely Lavasan County. The images clearly depict how, over the span of 37 years, a decrease of 130 square kilometers in vegetation cover in the region has occurred due to deforestation, spatial development, urbanization, and other factors (Figure 4).

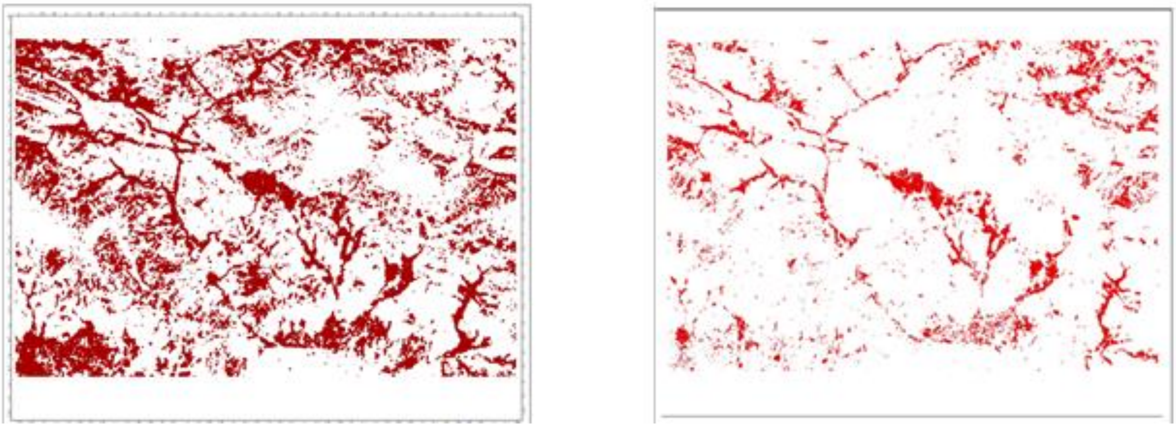

Figure 4. Vegetation coverage in 1985 (left) vs. 2022 (right) showing loss of vegetation over time in Lashkarak-Dizin axis in North Tehran. Data (Source: Landsat8 data)

Evaluation of the worth of the tourist attractions and competences of Lashkark-Dizin axis

We used Prolong method to identify the worth of the waterfalls along the route, green tourism paths and athletic places of the Lashkark-Dizin axis as the most visited ecotourism spatial elements in the axis (Table 1).

Table 1. Evaluation of criteria for determining the value of ecotourism elements using the Prolong method (Source: Survey and results of the current study)

Value	Criterion-score		0	0.25	0.5	0.75	1
Attractiveness	V1	Age of Elements	50	100	150	200	>200
	V2	Climate	Dry	Cold and dry	Mild	Mild and hot	Mild and humid
	V3	Area	-	Small	Average	Large	Very large
	V4	Water Resources	Very low	Low	Moderate	High	Very high
	V5	Soil Resources	Very low	Low	Moderate	High	Very high
	V6	Vegetation	Very low	Low	Moderate	High	Very high
Facilities, services, and environment	V1	Water and sanitation	-	No	Well	Spring	Pipe
	V2	Parking and guarding	No	-	-	-	Yes
	V3	Accommodation	-	No	-	-	Yes
	V4	Security	Very low	low	Average	High	Very high
	V5	Access routes	-	Earthy	Cobblestone	Sand	Asphalt
	V6	Perception of environment	Very low	Low	Average	High	Very high
	V7	Natural resources protection encouragement	Very low	Low	Average	High	Very high
Social standards	V1	As a health base	Zero	Weak	Medium	Intense	Very intense
	V2	Respect for local culture	Zero	Weak	Medium	Intense	Very intense
	V3	The right behavior with the environment	Zero	Weak	Medium	Intense	Very intense
	V4	Space of interaction	Zero	Weak	Medium	Intense	Very intense
	V5	Recreational base	Zero	Weak	Medium	Intense	Very intense
Economic	V1	Number of tourists per year	<100	100-200	200-500	500-1000	>1000
	V2	Daily accommodation	Zero	Less than 3	3-6	6-9	More than 9
	V3	Creating service employment	Zero	Low	Medium	High	Very high
	V4	As a sport base	Very low	Low	Medium	High	Very high

We obtained the average indicators of attractiveness, facilities and services, social and economic, which are scored from 5 different levels - Likert scale. In this method, the current productivity value of spatial elements has been evaluated. In other words, the amount and quality of productivity evaluates the productivity value of ecotourism-oriented elements in order to determine the potential and actual abilities of these elements in the sustainable development of tourism. Ecotourism includes all the natural phenomena that exist on the planet and people are interested in seeing them, getting to know them and getting information about their existence and characteristics.

The final assessment and examination of the waterfalls, green tourist paths, and athletic amenities along the Lashkark-Dizin axis reveal that the economic index stands at 0.859, and the welfare and service facilities criterion is at 0.842. These factors have significantly contributed to attracting tourists and meeting investment objectives. This suggests a potential for expanding financial events linked to ecotourism expansion in the area. However, without proper environmental protection planning, the transformation of agricultural and garden lands into economic ventures could alter the pristine natural setting and trigger weather variations in the area. Overall, the Lashkark-Dizin tourism axis is highly valued by tourists and requires increased investment to ensure the preservation of the natural environment through a sustainable approach.

Based on the research findings, it is evident that a two-way association between nature tourism and environmental preservation is beneficial and offers hope for its sustainability. Moreover, it is crucial to anticipate the present and forthcoming needs of the host population, ensuring that future generations also reap the benefits. Hence, for the persistence of ecotourism in the Lashkark-Dizin route, certain conditions must be met. These include the support of residents, the engagement of local societies in managing this movement, and the reasonable spreading of profits amongst individuals.

Prioritization of the important factors using the ANP model

This study pinpoints the key factors that contribute to the depletion of environmental resources in the Lashkark-Dizin axis due to tourism development. Various criteria and indicators have been taken into account when examining the impact of tourism activities on the environment in Lashkar-Dizin. By establishing intra-group and out-group relationships between elements and indicators, the influence of each factor on the environmental degradation of the Lashkark-Dizin axis is determined. The study categorizes the criteria into four clusters: economic activity development, land use change, tourist attraction, and tourist behavior characteristics. Each cluster comprises several key elements that not only facilitate communication within the group but also demonstrate inter-cluster interdependence (Table 2).

Table 2. Pairwise comparison matrix and weight of clusters (Source: Authors)

Title	Economic activities	Land uses change	Tourist attraction	Behavioral characteristics	Relative weight	Final weight
Economic activities	1	1.38	3	2	0.637	0.184
Land uses change	3	1	0.81	0.95	0.748	0.131
Tourist attraction	3	1.41	1	2	0.804	0.217
Behavioral characteristics	0.034	0.46	3	1	0.412	0.103

Pairwise comparisons and matrices are utilized to determine the relationships between all criteria and clusters. These comparisons are made using scales of preference or importance, with each judgment being assigned a number from 1 to 9. It is important to note that pairwise comparisons are conducted for both criteria and options. The results of these pairwise comparisons aim to identify the factors that influence the destruction of environmental resources (Table 2).

Table 3 specifically highlights the inconsistency rate of the judgments, which is calculated to be 0.03101. It is worth mentioning that in this method, the inconsistency value should not exceed 1. However, considering the large number of judgments and the potential error caused by the survey, this level of error is deemed acceptable.

Table 3. Rate of inconsistency in ANP network model (Source: Authors)

Indicators	Economic activities	Land uses change	Tourist attraction	Behavioral characteristics	Average rate of inconsistency
Rate of inconsistency	0.0535	0.0228	0.01067	0.01067	0.03101

Based on Table (4), the clusters' relative weight is determined by comparing the even matrix. The even matrix assigns a score that represents the relative importance of a component in row i compared to column j. Specifically, the ratio wj/wi=aij indicates equal importance when the score is one. If a component is 9 times more important than component j, it is reflected in the score. Subsequently, the network analysis process involves comparing the elements within one cluster, calculating the relative weight of the matrix elements, and normalizing the table's elements. It is important to note that clusters can depend on elements from other clusters. In such cases, a pairwise comparison matrix is created based on control criteria, and the matrix elements are compared in pairs to obtain the weight of the matrix. This result is then incorporated into the primary supermatrix, which ensures that the sum of each column's elements in the supermatrix exceeds one.

Table 4. Final weight of study indicators in environmental resources destruction

Indicators	General weight	Cluster weight	Final Weight
Economic activities	0.854	0.184	0.157
Land uses change	0.749	0.131	0.098
Tourist attraction	0.405	0.217	0.087
Behavioral characteristics	0.281	0.103	0.028

The network analysis model indicates that factors promoting economic activities, such as the establishment of inns and motels, business facilities, highway centers, tourist campsites, and urban amenities, significantly impact environmental resource degradation along the Lashkar-Dizin axis, with a coefficient of 0.157.

Additionally, changes in land use patterns—such as converting agricultural land to commercial use and transforming green spaces into housing and tourism hubs—also significantly contribute to environmental degradation, with a coefficient of 0.098. These land use changes can lead to considerable weather variations in the region. The influx of tourists attracted by local amenities and natural attractions correlates with the depletion of environmental resources, as increased services risk the ecological capacities of densely populated areas. Furthermore, tourists' behaviors that neglect environmental health and preservation can exacerbate the destruction of biological resources in the region.

Strategic planning to empower ecotourism boom in Lashkark-Dizin axis

The initial phase of developing a strategic plan to enhance ecotourism in the Lashkark-Dizin axis involves identifying the key factors that impact the expansion of this particular form of tourism. It is essential to begin by extracting the strengths, weaknesses, opportunities, and threats associated with ecotourism in this region.

A. Strengths: 1. Beautiful and unique views; - 2 sports and entertainment attractions; 3- Being close to Tehran; 4 sample tourism areas along this axis, the closest summer climate areas to Tehran; 5- increasing the income of rural households along the axis; - 6 creating job opportunities; 7- Changes in the traditional educational model of children; 8- Increasing trade between residents and tourists; 9- Increasing the level of literacy and awareness of the people; -10 having a calm environment to relax; 11. The existence of heights and high peaks for mountain sports, especially in the Dizin area (the presence of an international track);

B. Weaknesses: 14. Inadequate health facilities and services along the axis. - 15 - Conflict between the culture of tourists and residents, especially in the villages in the axis - 16 - Improper environmental and physical infrastructure in the study axis - 17 - Increase in garbage and accumulation in the existing environment - 18 - Pollution of water sources - 19 - Soil erosion. 20- Acquaintance of local people with new ideas and wrong ways of behavior. - 21 - Unauthorized construction in agricultural and agricultural lands along axis - 22 - Spread of environmental pollution. 23 - People's unwillingness to invest in the tourism sector. -24 changing the natural landscape. 25- Loss of quality lands due to expansion without tourism plan. - 26 Lack of trained and specialized forces - 27 Construction of a new villa and house in the gardens along the axis

C. Opportunities: 28 - Increasing the motivation for travel and recreation in the villages along the axis. 29- Increasing private incentives to invest. 30- Relative improvement of communication roads in the region. 31- Generating income through uses suitable for tourism. 32- Increasing the attractiveness of entering and staying in the city. 33- Creating new uses that suit the needs of tourists. 34- The existence of a large pole of the population opened near these areas. 35-Decreasing the migration rate of young people from surrounding villages to Tehran. 36- The existence of expert and experienced forces in the vicinity of these areas. - 37 - The possibility of using local crossings to promote pedestrian movement - 38 - Improving the quality of life in the region. - 39 - Increasing the area's vegetation to attract more population - 40 - Preventing soil erosion by increasing the area's vegetation. 41- Raising the level of awareness of the natives of the region. 42- Improving the conditions of the public transportation system in the region due to the increase in traffic and the increase in the level of tourism in the region

D. Threats: 43- Increase in social violations with the arrival of tourists in these areas. 44 - Destruction of trees and vegetation. 45- Disappearance of local culture and tradition. 46-Destruction of agricultural lands and longitudinal farms. 47- Contamination of water and soil resources, in this axis. - 48 Construction in the lands of gardens and farms - 49 Risk of earthquakes due to the existence of faults. - 50. Abandoning the virgin space and green paths in the axis as a place of accumulation of pollution. 51- Increasing environmental problems due to tourism activity. 52- Low social status of some social jobs. 53 - Misrecognition of environmental resources. 54- Overpopulation and overcrowding of this area in certain seasons. 55- Lashgarak road is one of the most dangerous roads. 56- Local landslides are in the form of small and large blocks. 57- Change of agricultural land use.

Based on the research data regarding ecotourism and environmental capabilities in the Lashkar-Dizin axis, 57 variables were standardized on a scale of 1 to 10 to assess strengths, weaknesses, opportunities, and threats (SWOT). The analysis revealed that weaknesses and threats in ecotourism development had the highest coefficients, at 41.8 and 36.8, respectively, while strengths and opportunities were lower, at 12.6 and 54.7. These coefficients helped identify the internal (strengths and weaknesses) and external (opportunities and threats) factors affecting the area's environmental capabilities for ecotourism development. The results, shown in Table (5), summarize the percentages assigned to each SWOT component based on expert opinions. Ultimately, these findings inform strategies for developing ecotourism while ensuring environmental protection and enhancing environmental capabilities in the Lashkar-Dizin area.

Table 5. Calculating the percentage of strength and weakness, opportunities and threats (Source: Authors)

Type of strategy	SWOT									
	SWOT	Negative	Positive	Internal	External	T	O	W	S	Subject
		W/T	S/O	O/T	S/W					
Second and third	71.32	50.8	49.1	52.6	47.3	26.3	26.3	24.5	22.8	Lashkarak-Dizin

Based on the data presented in Table (5), Lashkar-Dizin is currently facing a number of threats to its environmental state and capabilities, accounting for 26.3 percent. In the realm of tourism, it is imperative to prioritize environmental conservation and prevent the resurgence of detrimental activities in order to safeguard the existing resources and maintain environmental integrity. By addressing these weaknesses and threats, strategic measures can be implemented to promote the growth and advancement of tourism while upholding environmental preservation in the pivotal Lashkar-

Dizin region. This is crucial for Tehran province as it contributes to sustainable job creation and revenue generation within the tourism sector of the province and the city of Shemiranat. The research identifies several strategies for enhancing ecotourism in the Lashkar-Dizin axis, categorized into five types. (1) Strengthening Positive Aspects Strategy: Aimed at reinforcing both internal and external strengths of tourism areas. (2) Overcoming Strategy: A conservative approach designed to align internal strengths with existing opportunities to address weaknesses.

Environmental Control Strategy: Implemented when facing significant external threats, leveraging strengths and opportunities to mitigate their impact. (3) Control of Negative Factors: This combines elements of both the overcoming and environmental control strategies to address multiple challenges. (4) Internal and External Factors Control Strategy: Applied in situations where strengths and opportunities are abundant (Mousavi et al., 2013). For strategic planning in ecotourism on the Lashkar-Dizin axis, the second and third strategies are emphasized. This approach utilizes internal and external positive factors to minimize internal weaknesses.

The strategy matrix establishes thresholds for evaluating internal and external factors. For internal factors, scores range from 1 to 1.99 indicating weakness, 2 to 2.99 indicating average status, and 3 to 4 indicating strength. Similarly, external factors are evaluated on a scale where a score of 1 to 1.99 signifies weakness, 2 to 2.99 indicates average conditions, and 3 to 4 indicates a strong system (Modiri et al., 2012). The SWOT analysis results suggest that, along with leveraging strengths to overcome weaknesses, a competitive strategy should be adopted to enhance tourism attractions. This strategy aims to attract both domestic and foreign tourists while ensuring the preservation of environmental resources for future generations (Figure 5).

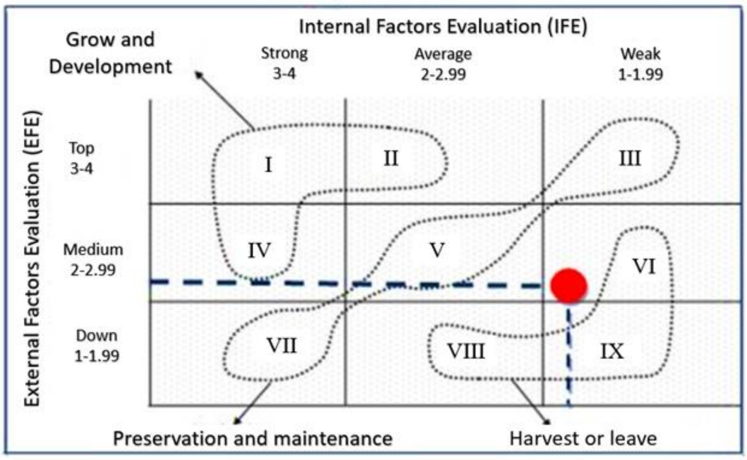

Figure 5. Matrix of Lashkark-Dizin ecotourism strategies and implementation priorities

The development of tourism through natural resource and environmental management has superseded industrial growth, emphasizing the need for sustainable natural landscapes and ecotourism. Ecotourism focuses on leveraging natural tourism to develop infrastructure while preserving environmental resources, fostering economic growth in regions. The Lashkark-Dizin axis in northern Tehran, Iran, exemplifies this approach. This research investigates ecological challenges, their harmful impacts, and potential tourist attractions in the area. Analysis using the Pralong model highlights the importance of integrating sustainable ecotourism concepts into development plans while considering its economic, social, and environmental impacts. Additionally, the preservation of natural and cultural heritage, promotion of local benefits, involvement of local communities as investors, and efforts to increase education and awareness for better resource maintenance are crucial. Prioritizing these aspects is essential for effectively developing ecotourism in the Lashkark-Dizin axis.

Economic viability continues to be a challenge for ecotourism, particularly for small businesses, despite its benefits. The development of various infrastructures can boost tourism growth (Baker, 2024; Alsahafi et al., 2023), but sustainable practices need financial support mechanisms to encourage broader adoption (Saarinen, 2013). The study indicates a high economic index of 0.859, suggesting robust potential for attracting tourists and investment, but warns that this growth may threaten natural landscapes and alter the local climate. Key indicators for financial development include the construction of lodging, businesses, road facilities, tourist campsites, and urban amenities.

However, issues like overtourism and land use changes, such as converting agricultural land to commercial use, significantly impact ecological resources and may lead to climate alterations. To mitigate these challenges, successful strategies include promoting green transportation, renewable energy, and sustainable tourism practices, as seen in initiatives like the "Copenhagenize" cycling campaign and Barcelona's management of visitor numbers.

The CAMP model (Competitive Advantage, Attraction, Management, and Partnerships) can be employed to develop and sustain tourism strategies by addressing these key components (Baker, 2019).

Figure 6 shows strategies for tourism development in lashkarak -Dizin Based on the CAMP model approach.

According to the SWOT methodology used in this study, several strategies for sustainable ecotourism in the Lashkar-Dizin axis are recommended. Competitive and offensive strategies include developing attractions and facilities, collaborating with experts for community organizations, coordinating institutions for integrated tourism functions, focusing on natural attractions for employment, and encouraging private sector investment in tourism. To address internal weaknesses while leveraging external opportunities, strategies involve enhancing planning and government support for tourism, optimizing the distribution of tourism facilities and services, revising land laws for tourism development, increasing community participation in tourism initiatives, and reforming educational institutions regarding tourism benefits.

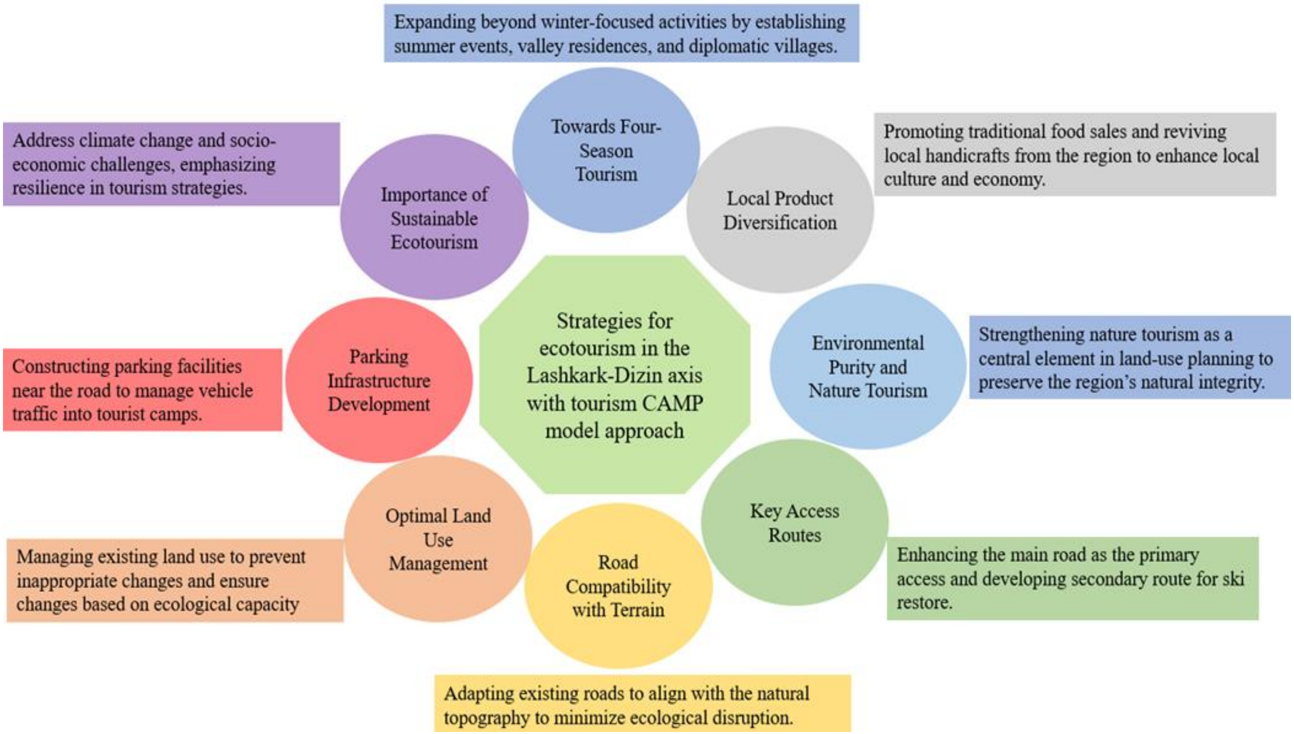

Figure 6. Strategies for tourism development in lashkarak -Dizin Based on the CAMP model approach

The analysis highlights the importance of diversifying tourist activities and services, enhancing tourist routes with signage and guidebooks, implementing innovative advertising strategies, ensuring security in tourist destinations, managing crowd density in entertainment venues, and using regulations to mitigate environmental risks. Defensive strategies include investing in tourism, engaging stakeholders through seminars, promoting community participation in tourism development, providing cultural education for locals and tourists, and legislating for the sustainable use of tourist attractions.

CONCLUSION

The development of tourism through the channel of natural resources and environmental management has taken the place of industrial development, and the world is supposed to be viewed not from the point of view of industry and machine hardware, but from the perspective of natural landscapes, sustainable natural resources, and ultimately sustainable ecotourism. One of the ecotourism axes in North Tehran is the Lashkark-Dizin.

The aim of this study is to explore ecological matters, its critical impacts, abilities in fascinating tourists. In this study, we used the Prolong method and the network examination model to examine the efficiency of several indicators in the expansion of Lashkark-Dizin center. Incidentally, the concluding assessment of the value of the waterfalls along the route and the green tourist paths and athletic points in this area, demonstrate that the financial index and the standard of facilities have played the greatest part in appealing tourists. The lack of ecological preservation causes extensive land use changes that affects the area. It can alter the face of pristine and natural settings and cause the climatic alteration in the area. The outcomes of the network examination model similarly demonstrate that the indicators of the expansion of financial actions had a great impact on the demolition of the ecological resources of the area.

The impact of these land use alteration is so important that it can cause climate alteration in the area. Using CAMP model and SWOT can bring opportunities to come up with strategies helping decision-making and strategic planning to preserve such unique environment as well as enhancing the tourism industry benefits.

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FACTORS INFLUENCING THE VISITOR SATISFACTION OF INTANGIBLE CULTURAL HERITAGE MUSEUMS IN CHINA: A CROSS-SECTIONAL QUANTITATIVE STUDY

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Abstract: This study investigates the factors influencing visitor satisfaction in Intangible Cultural Heritage (ICH) museums. It focuses on identifying how specific elements such as service management, facilities and environment, business atmosphere, and exhibition content contribute to visitors' perceived value, experience, and overall satisfaction. A quantitative research approach was employed, utilizing a questionnaire survey administered to 329 visitors from three ICH museums in China. The survey collected data on visitors' perceptions of museum attributes and their impact on satisfaction. Statistical analyses were conducted to examine relationships among variables, identifying key factors that enhance or hinder visitor experiences. The findings reveal that service management, facilities and environment, and business atmosphere positively influence visitors' perceived value and visiting experience. Business atmosphere significantly enhances visitor satisfaction directly, highlighting its critical role in shaping museum engagement. While exhibition content positively impacts perceived cognitive value, it shows no significant direct effect on the visiting experience. These results underscore the varying roles of museum attributes in shaping visitor perceptions and experiences, offering key insights into museum management strategies. The study provides actionable recommendations for enhancing visitor satisfaction in ICH museums. By prioritizing service quality, improving facilities, fostering an engaging business atmosphere, and curating cognitively enriching exhibitions, museum management can better support preservation and dissemination efforts. Furthermore, attention to these factors can help create a more immersive and educational environment, fostering deeper connections between visitors and cultural heritage. Strengthening service standards and optimizing museum environments will enhance visitor engagement, ultimately contributing to long-term sustainability. Additionally, this research contributes to the broader understanding of visitor behavior in heritage tourism, offering valuable guidance for future strategies in ICH museum operations. The findings can serve as a foundation for policymakers and museum administrators to develop visitor-centered strategies that ensure both cultural preservation and economic viability. By integrating these insights, ICH museums can improve their role in cultural transmission while meeting the evolving expectations of modern visitors.

Keywords: intangible cultural heritage, intangible cultural heritage museum, perceived value, visitor satisfaction

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INTRODUCTION

In recent years, there has been a surge in concepts surrounding the preservation and promotion of Intangible Cultural Heritage (ICH). Indeed, society has acknowledged the significance of cultural diversity and cultural heritage sustainability (Gilman, 2022). Traditionally, museums are places where tangible artifacts are preserved, but have recently evolved into indispensable institutions that contain dynamic and living elements of culture, including ICH. At its Extraordinary General Assembly in Prague on August 24, 2022, the International Council of Museums (ICOM) provided a new definition of museums: *Museums are nonprofit and permanent and have a mission to study, collect, conserve, interpret, and present cultural heritage* (Wang et al., 2024). This transition underlines museums' critical role in the preservation, interpretation, and dissemination of ICH. Handayani et al., 2024 emphasized the vital role of museum research activities in unravelling the historical and social values of cultural heritage and offering a scientific foundation for its preservation and transmission.

Nevertheless, the success and impact of museums largely depends on visitor satisfaction as it influences visitor retention and overall educational and cultural mission (Trihandayani et al., 2022). Previous studies have suggested that understanding visitor satisfaction with museums requires a multidimensional perspective. Museum architecture, program design, accessibility, and communication skills are important aspects of the overall visitor experience that influence visitor satisfaction and determine engagement and loyalty (Hu et al., 2021). Using structural equation modeling (SEM), Ballantyne et a examined the short- and long-term impacts of the visiting experience and provided robust theoretical and methodological support. In an extensive study on tourism satisfaction, Durman & Nadlifatin (2024) highlighted the significance of destination image, emotional connection, and personal engagement in affecting tourist satisfaction and loyalty. This theoretical background is equally applicable to the context of intangible cultural heritage museums.

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Likewise, Carvache-Franco et al. (2022) explored the correlation among the quality of experience, perceived value, satisfaction, and behavioral intention in cultural heritage tourism, indicating that quality of experience and perceived value are important factors that directly influence tourist satisfaction. Through their research Sustacha et al. (2023) further suggested that inbound tourists' satisfaction primarily depends on four dimensions, i.e., charm, knowledge/pleasure, tradition, and value, which together reflect tourists' positive assessment of ICH.

Based on their research on the National Archaeological Museum of G.A. Sanna (Sardinia, Italy), divulged the role of motivation, experience, duration of visit, and sociodemographic factors in creating overall satisfaction. However, Situmorang et al. (2020) elucidated the impact of exhibition communication media on visitor satisfaction and willingness to revisit, accentuating the positive role of communication media in augmenting the visiting experience. Furthermore, Hyun et al. highlighted the significance of enhancing the physical environment of art museums in the Gangwon region to augment the visiting experience. Trunfio et al. (2022) explored the Bandung Geological Museum and emphasized that the choices made by visitors when making decisions markedly influenced their satisfaction levels. Meanwhile, Wang et al., (2024) investigated older visitors' perceived value from the perspective of cultural heritage sites, mainly in the use of immersive technologies to enhance the museum experience, emphasizing the potential of technology in enhancing the museum experience. Cheng et al. (2022) further corroborated the key role environmental factors in influencing visitor assessments by measuring the influence of museum recreational areas on visitor satisfaction and perceived emotional quality. In their research on the Mandala Wangsit Silliwangi Museum, Rasoolimanesh et al. (2022) recognized factors influencing visitors' perceived quality, with a special emphasis on the importance of service interactions, evidence of services, product features, and product richness on visitor satisfaction. Furthermore, Siu et al. investigated the impact of reference effects and customer engagement in museum visits, and concentrated on the role of disconfirmation, self-identification, and customer engagement in influencing customer experience and satisfaction.

Overall, existing studies have comprehensively examined various factors influencing visitors' museum satisfaction, covering extensive dimensions from the physical environment of museums to communication media, cultural interactions, and visitors' decision-making, thereby enriching the theoretical basis of museum research and offering valuable insights into museum practice. This study focuses on a specific type of museum, but there is little research on ICH museums. Therefore, three comprehensive ICH museums in China were taken as the example to perform a visit satisfaction study and examine the factors influencing ICH museums' satisfaction. Meanwhile, construct a more comprehensive satisfaction evaluation model was constructed to determine key factors influencing visitor satisfaction, and offer insights for augmenting the visiting experience at ICH museums. Notably, it is essential to understand key factors influencing visitor satisfaction for ICH museum management policymakers and cultural practitioners working on ICH preservation and promotion. Furthermore, this study contributes to the wider discussion of museology and heritage management and provide practical suggestions to increase the role of ICH museums in contemporary society.

The aim of this study is to investigate the factors influencing visitor satisfaction in Intangible Cultural Heritage (ICH) museums, with a focus on identifying the critical elements that enhance the perceived value and overall visiting experience. By selecting three prominent ICH museums in China—the Nanjing Museum of ICH, the Zhejiang Museum of ICH, and the Grand Canal Museum of ICH—this research seeks to explore how these institutions, which showcase both provincial and national ICH, fulfill their dual role of cultural preservation and public engagement. Particular attention is given to the Grand Canal Museum of ICH, which uniquely integrates ICH elements from eight provinces along the Grand Canal Basin, offering a comprehensive representation of regional cultural diversity. The study aims to analyze the impact of service management, facilities and environment, business atmosphere, and exhibition content on visitor perceptions. It seeks to uncover how these factors contribute to cognitive and emotional engagement, shaping visitors' overall satisfaction with their museum experience. Additionally, the research aims to provide actionable insights for museum management to optimize their strategies, ensuring that ICH museums remain vibrant centers of cultural education and preservation. Through a detailed examination of these dynamics, this study aspires to enhance the understanding of visitor satisfaction in ICH museums and contribute to the sustainable development of these cultural institutions.

LITERATURE REVIEW

ICH preservation and diffusion have been an area of much interest in the recent past because they play a very critical role in maintaining cultural identity and promoting community engagement. ICH museums, therefore, provide an essential outlet for this preservation process, engaging the visitor in immersive experiences that connect him or her with cultural traditions. Visitor satisfaction as a predictor of success for the museum has long been associated with increased visitor repeat visits, successful outcomes of visit experiences, and respect for various cultures.

Several characteristics have been suggested as critical toward creating positive visit experiences-these include mostly service quality and attractions and, to a great degree, exhibits. However, still, this remains a knowledge gap in terms of how these interface with notions of cultural engagement as per modern expectations, especially under the context of ICH museums, which interface both tangible and intangible culture.

Service management is a literature determinant of visitor satisfaction. In museums, the service quality is multidimensional in that it covers aspects such as interaction with the staff, provision of information, and response to visitor needs. The physical environment, encompassing the facilities and ambiance of the museum, impacts the visitors' emotional responses and experience. Aesthetic, accessibility, and environmental comfort are the determinants that create memorable visits, according to recent studies. The business climate of museums also is an important characteristic, with commercial activities -- such as shops selling souvenirs and themed cafes -- needed to be included. Although sometimes considered a secondary role to cultural and educational missions, it is increasingly recognized that they can contribute to a more holistic cultural experience for visitors by improving visitor engagement and satisfaction.

1. Service management and visitors' perceived value and experience

Service management is very crucial in shaping the perceptions and experiences of visitors in museum settings. Various studies have proven that effective service management, including well-trained staff, responsive services, and efficient operations, positively impacts the perceived value and satisfaction of visitors. For example, Abusaada & Elshater, (2021) noted that personalized interactions and prompt resolution of queries greatly improve visitor retention and satisfaction. However, these studies often miss the cultural uniqueness of ICH museums, where service management must align with the preservation of intangible heritage. A limitation of existing research is the lack of a comprehensive model linking service management directly to perceived value and visiting experiences, particularly in culturally significant settings like ICH museums.

2. Environmental facilities and visitors' cognitive value and experience

The environmental facilities in a museum, from the spatial arrangement to accessibility and comfort, play a crucial role in shaping cognitive engagement and the overall experience. Previous studies, such as Vassiliadis et al. (2021), suggest that visitors are more cognitively engaged when facilities are constructed to facilitate exploration and interaction. Still, the studies rarely distinguish between the effects of physical and digital facilities, which are increasingly a part of modern museum experiences. Most of the previous studies do not address the contextual needs of ICH museums. This gap indicates the need to probe deeper into the impact of environmental facilities.

3. Exhibition content and its influence on visitors' perceptions

The content of exhibitions is the heart of the cognitive and emotional engagement of visitors. Research by Damanik & Yusuf (2022) shows that the relevance, interactivity, and narrative coherence of exhibition content significantly impact the cognitive value and emotional experiences of visitors. However, the most common drawback is the emphasis on traditional exhibits, with less focus on integrating technology to make the content more dynamic and accessible. In addition, ICH museums tend to lack scientific studies on how the content in exhibitions directly relates to the visit experience, wherein cultural narratives hold a significant importance.

4. Commercial atmosphere and visitor experience

The commercial atmosphere in the form of retail offerings, dining options, and other services makes the entire museum experience whole. According to Geng et al. (2021), a commercial atmosphere like this will allow the visitors to create an unforgettable experience. Indeed, research done recently, such as by Sustacha et al. (2023), suggests that a rich commercial atmosphere improves visitors' sensory and emotional experiences. However, these studies primarily focus on general tourism and do not investigate the subtle dynamics of cultural and heritage contexts. The ICH museums provide a specific context in which commercial activities may support cultural diffusion.

5. Linking experience and perceived value to satisfaction

Visitor satisfaction often sums up the perceived value and the quality of experience of visitors. Research by Tubillejas-Andrés et al. (2020) suggests that the perceived value, which is primarily driven by cognitive and emotional experiences, has a strong correlation with visitor satisfaction. However, most of these studies are generalized and do not focus on the interaction of particular factors, such as cultural significance and authenticity, in ICH museums. Furthermore, the role of intangible factors, such as emotional attachment and cultural pride, is often underrepresented.

6. Interconnections between exhibition content, commercial atmosphere, and satisfaction

The content of an exhibition can indirectly affect visitor satisfaction through its influence on the commercial atmosphere. According to Rivero et al. (2023) , interesting exhibitions attract more visitors, which in turn creates a vibrant commercial atmosphere that boosts satisfaction. However, there is limited empirical evidence that links exhibition content with commercial atmosphere in ICH museums. Furthermore, while commercial aspects may be added to make the experience more enjoyable, over-commercialization threatens to compromise the authenticity of cultural heritage.

RESEARCH METHODOLOGY AND DESIGN

A quantitative method was adopted and simple random sampling was used for questionnaire data collection during June 11, 2024–July 2, 2024. The questionnaire measurement scale was extracted from the evaluation dimensions of the existing tourists' assessments. Afterwards, combined with the previous research, the two elements of satisfaction and perceived value were introduced to the questionnaire design. It is worth noting that assessment dimensions can be easily extracted from existing visitor evaluations to measure the average visitor; furthermore, this is widely supported by existing research. These evaluation dimensions were obtained from the actual visit experience and are illustrative and generalizable because they can be used to depict visitors' perceptions of critical elements. Besides, the dimensions derived from experience feedback are stable and consistent and exhibit similar effects across contexts (Chen et al. 2022).

Moreover, the methodology for deriving these dimensions is simple and straightforward, which increases the efficiency of the study and reduces the time and resources required to create new dimensions as shown in Figure 2. Mu et al. (2021) used natural language processing techniques to derive semantic information about tourist attractions from travel blogs, thus improving tourist information depiction and comprehension effectiveness. Although the assessment dimensions obtained from actual visit experiences are descriptive and stable, they can also simplify the research process, improve the efficiency of the study, and provide a solid theoretical and empirical foundation for assessing ordinary tourists.

In this study, the evaluation dimensions were extracted by selecting the visit evaluation of China Meituan.com about the ICH hall of Nanjing Museum. With its large user base and comprehensive coverage, as well as China's leading local life service platform, Meituan is an effective source for collecting visitor evaluation data. Besides, the platform's user evaluation system is comparatively mature, and users are required to register for an account and log in before posting their evaluations, a mechanism that reduces false evaluations and thus enhances the authenticity and reliability of evaluation data. Furthermore, the evaluations on Meituan.com are usually more comprehensive, including tourists' evaluations of service, environment, price, etc., which provides rich information for the study.

In order to safeguard the relevance of the evaluation content and nonlegacy, the keyword Nanjing Museum (Figure 1) was entered into the Meituan.com platform, yielding 29,274 evaluations as of May 30, 2024. In addition, the evaluations with the keyword "ICH" were performed per the assessment of tourists' experience of the non-heritage museum of Nanjing Museum, yielding 2007 evaluations.

Figure 1. Geographical location of study area

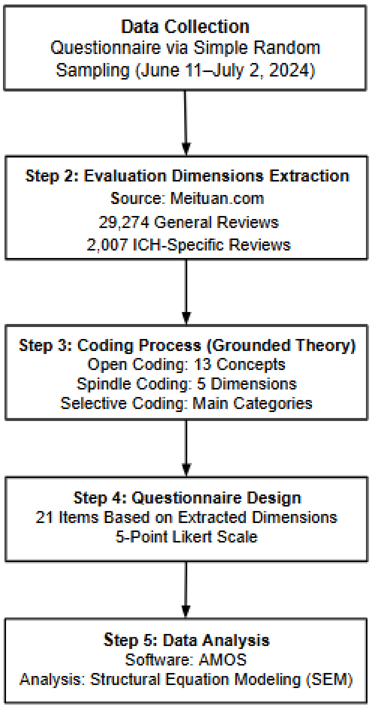

Figure 2. Flow of Methodology

In addition, the evaluation content of visitors of the ICH Exhibition Hall of Nanjing Museum using the grounded theory, an inductive approach that enables making theories based on observations and involving systematic coding, memo writing, and theoretical sampling, was explored and extracted and involves . Thus, measurement dimensions were not set before analysis. Through open coding, principal axis coding, and then selective coding, the structured analysis of the evaluation data was completed to summarize the rows of concepts, corresponding categories, and main categories sequentially. First, open coding primarily simplified the evaluation content into keywords and critical sentences and created keyword labels without emotional coloring to develop 13 essential concepts (Table 1).

Table 1. Example of open coding for evaluation indicators for visitors to an ICH museum

Concept	Item	Original Statement
A1 Quality of Service and Management	Service Attitude	"I have never seen worse work attitudes than here."
	Management Chaos	"Few guides, chaotic order."
	Humanized Management	"Humanized management needs improvement; waiting time to enter the museum is over 30 minutes, and there are no rain shelters on rainy days."
A2 Facilities and Environment	Poor Environment	"Do not go recently; there is construction noise."
	Comfortable Environment	"There is a vintage tea house inside; when you are tired, you can have a pot of tea and listen to music."
A3 Education and Cultural Communication	Cultural Education	"You can learn about Su embroidery and Suzhou women workers."
		"It allows kids to experience the knowledge from their history textbooks in reality."
		"Listening to the guide and bringing kids to learn in the museum was eye-opening for them."
		"The most direct witness to thousands of years of Chinese civilization history."
	Cultural Display	"Dynamic display of ICH."
		"There are also operatic excerpts, velvet flowers, Yun brocade, dough figurines, embroidery, etc."
		"Inviting inheritors to demonstrate ICH skills live."
	Cultural Experience	"The folk art in the ICH Museum amazed me; these handicrafts still shine despite the passage of time."
		"The museum displays folk crafts like woodblock printing, gold foil, lanterns, and also features Kunqu Opera, Baiju, and storytelling."
A4 Guidance and Indication System	Unclear Guidance	"The signs are unclear; it is hard even to ask the staff."
	Poor Guidance Experience	"No guides; everything relies on tourists lining up voluntarily; people are cutting in line."
		"Do not go recently; there is construction noise."

A5 Visiting Experience	Negative Experience	"Poor experience."
		"Poor experience: two entrance lanes, the I.D. card verification at the turnstile is extremely slow."
	Positive Experience	"Very impressive. It took the kids to learn about history and culture."
A6 Additional Services	Additional Services	"In the vintage tea house, savoring a cup of fragrant tea and listening to a piece of storytelling."
		"Need to sell some small ICH items."
		"I bought a small sachet in the Museum (10 yuan each). It was not expensive and very nice."
A7 Exhibits and Display Methods	Diverse Display Methods	Dynamic display of ICH items.
		Free 3D movies, craftspeople explaining on site.
	Rich Exhibits	"Master craftsmen, folk tea houses, paper cutting, lantern folk crafts."
		"The museum displays folk crafts like woodblock printing, gold foil, and lanterns."
A8 Time and Crowd Management	Large Crowds	"Too many people cannot see everything."
	Visiting Time	"Just skimming through takes over 3 hours."
		"Recommend more than three hours for a visit; the museum is big."
A9 Transportation and Accessibility	Inconvenient Transportation	"Hard to find parking; nearby spots are all full."
	Convenient Transportation	"The subway is the most convenient; just walk 500 meters after getting off."
A10 Location and Fatigue Management	Location and Fatigue	"The ICH Museum is at the exit, can only exit, not enter."
		"The museum can only be exited, not entered; this layout is the first I have seen."
		"The ICH Museum is at the exit. After three hours of walking, I was too tired to visit this Museum."
A11 Visiting Priority	Visiting Priority	"The ICH Museum and the Digital Museum can be skipped."
		"The ICH Museum is unnecessary if time is limited."
		'The last museum feels like it is just there to make up the numbers, not meaningful."
		"The ICH Museum is not necessary to visit."
A12 Commercial Atmosphere	Commercial Atmosphere	"The folk museum also has an ICH, but it is like a pure commercial center."
		"For educational purposes, watching a few short videos on ICH is better. I originally planned to visit the Museum, but it was all about selling things, although it is indeed ICH."
		"The museum is not big, selling traditional items like herbal medicines and calligraphy materials."
A13 Cultural Experience	Cultural Experience	"I booked a theatre show at the small theatre in the evening. It was great. I fell in love with such national ICH."
		"The folk art in the ICH Museum amazed me; these handicrafts still shine despite the passage of time. This visit gave me a deeper understanding and respect for Chinese culture and made me cherish and protect our cultural heritage even more."

Second, spindle coding linked the extracted concepts to re-abstract, enhance and synthesize them to validate the correlation between the concepts of ICH museum experience. Based on the abovementioned 13 core dimensions revolving around the thread of the ICH museum experience, selective coding was reconducted to extract and integrated, constituting five main categories, among which each category represented a different dimension (Table 2)

Table 2. Results of spindle coding and selective coding

Core dimensions	**Corresponding categories**	**Value connotations**
Service and management (A1, A4)	Staff service attitudes	The Museum's service delivery influences visitors' evaluation of the overall visiting experience.
	Management order	
	Humanized management	
Facilities and environment (A2, A9, A10)	Environmental Quality	The location and facilities of the ICH museum directly influence visitors' experience and display of ICH items.
	Facility Support	
	Convenience of transportation	
Exhibition content and educational significance (A3, A7, A13)	Cultural and educational experience	The ICH exhibition content can enable visitors to comprehensively understand and experience the ICH culture.
	Mode of cultural dissemination	
	Cultural content display	
Visiting experience (A5, A8, A11)	Visiting Experience	Visiting experience: Visitors' value and satisfaction with the ICH depict their overall evaluation.
	Visiting hours and crowds	
	Guided tours and directions	
Balance between culture and commerce (A6, A12)	Cultural communication	Cultural communication: Balance between presenting culture and offering commercial activities at the ICH
	Value-added experience	
	Sale of ICH products	

In consumer behavior research, cognitive value is an essential concept because it influences consumers' assessment of products and services, whereas perceived value is a critical concept and has significant implications for product and service evaluation. Tubillejas-Andrés et al. (2020) defined perceived value as the consumers' overall assessment based on the content received and provided; and Trunfio et al. (2022) expanded this concept to include the satisfaction of technological learning. Using latent structure multidimensional scaling, Xie et al. (2021) examined the fundamental dimensions of perceived value across brands and market segments. Anasrul & Sutrisno (2023) investigated the effect of extrinsic cues, such as price and branding, on consumers' perceived quality, sacrifice, and value. Ashrafi & Easmin (2023) explored the effect of perceived product quality and risk in Slovenia, whereas Li et al. (2021) examined the role of emotional factors on the value of the cruise vacation experience. Later, Adamska (2020) developed a scale to assess the overall perceived value of travel purchases, and recognized six dimensions of perceived value in the banking industry. Sulaiman et al. (2023) investigated service quality, perceived value, and behavioral intentions of airline passengers, performed a literature review on perceived value in the service industry, Marx (2023) involved perceived value in the theory of planned behavior, and explored the perceived value of wearable devices and demonstrated a more significant impact of perceived benefits. Overall, these studies demonstrated that perceived value affects consumer behavior in different industries. For non-heritage museums, we defined their perceived value as visitors feeling the charm of ICH and creating new perceptions during their visit. Furthermore, we added three question items based on scale.

Finally, visitor satisfaction is deemed as the core category from the grounded theory, which is a crucial attribute of museum services, particularly in a competitive tourism industry (Simonin et al., 2022). To date, several factors of visitor satisfaction with museums have been explored, including cognitive value, place attachment, and word-of-mouth recommendations (Torres, 2022). Othman et al. examined and developed scales like the Museum Experience Scale (MES) and the Multimedia Guided Tour Scale (MGS), which quantitatively measured visitor engagement, learning, and emotional connection. Factors influencing satisfaction comprise service quality, edutainment, and tangible aspects like cleanliness and ticketing processes. Demographic aspects like nationality, gender, and education also influence satisfaction levels. Indeed, multimedia-guided tours have been established to markedly enhance visitor engagement. Although satisfaction measures help determine improvement areas, such as tour guide knowledge and desk setup, high satisfaction levels correlate with visitors' willingness to recommend the museum to others, which is essential for museums to increase their market base to international visitors. Thus, the questionnaire design was modified by a measurement questionnaire comprising four questions about satisfaction with visiting the ICH, based on the questionnaire scale of Stemmer et al. Initially, a 21-item questionnaire was designed using the grounded theory to measure visitors' evaluations of their experiences with the Nanjing Museum's ICH Hall. The questionnaire items were measured using a five-point Likert scale (1 = strongly disagree, 3 = average, and 5 = strongly agree). Table 3 presents the specific questionnaire.

Table 3. Satisfaction measurement items for the ICH museum visiting experience

Core Dimension	Item
Service and Management (SM)	I am satisfied with the service attitude of the staff at the ICH Museum.
	I am satisfied with the management order of the ICH Museum.
	I am satisfied with the humanized management measures of the ICH Museum.
Facilities and Environment (FE)	The environment of the ICH Museum is perfect.
	The supporting facilities of the ICH Museum are complete.
	The location of the ICH Museum is easy to find.
Exhibition Content (EC)	The exhibition content of the ICH Museum is rich.
	The exhibition content of the ICH Museum is very educational.
	The ICH display methods in the ICH Museum are diverse.
Visiting Experience (VE)	I feel good about the fact that I can experience and interact with the ICH Museum.
	The visiting time arrangement and crowd management of the ICH Museum are reasonable.
	The guidance and indication system of the ICH Museum is apparent.
Commercial Atmosphere (CA)	The ICH Museum can sell handicrafts that reflect cultural characteristics.
	The balance between cultural display and commercial activities at the ICH Museum is good.
	The pricing of ICH products at the ICH Museum is reasonable, and the quality is good.
Perceived Value (PV)	The ICH Museum is a place for pursuing knowledge and providing mental relaxation and entertainment.
	The ICH Museum is a place for pursuing knowledge and providing mental relaxation and entertainment.
	The ICH Museum is an effective source of ICH knowledge.
Visitor Satisfaction (VS)	When I want to find a quiet place to visit, the ICH is my first choice.
	I am satisfied with this visit to the ICH Museum.
	This visit to the ICH Museum met my expectations.

Thus, the following research hypotheses was proposed based on the dimensions explained above, as shown in Figure 2.

- H1. Service management directly and positively influences visitors' perceived value.
- H2. Service management directly and positively influences visitors' perception of their visit.
- H3. Environmental facilities directly and positively influence visitors' cognitive value.

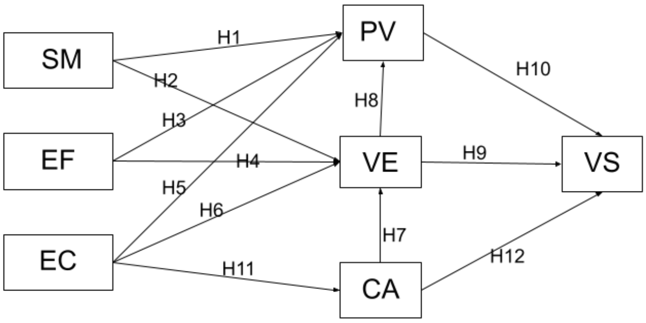

Figure. 2. Conceptual assumptions hypothetical model diagram

- H4. Environmental facilities directly and positively influence visitors' experience.
- H5. Exhibition content directly and positively influences visitors' perceived value.
- H6. Exhibition content directly and positively influences visitors' experience.
- H7. Commercial atmosphere directly and positively influences the visitors' sense of experience.
- H8. Sense of visiting experience directly and positively influences visitors' perceived value.
- H9. Visiting experience directly and positively influences visitor satisfaction.
- H10. Perceived value directly and positively influences visitor satisfaction.
- H11. Exhibition content positively influences the commercial atmosphere.
- H12. Commercial atmosphere positively influences visitor satisfaction.

Before the formal survey, a small-scale online pilot test was conducted, collecting 50 responses. The reliability analysis revealed Cronbach *a* coefficient of 0.915, which signifies that the scale has a very high internal consistency and, thus, fulfills the criteria for conducting a formal test. Per Nunnally Cronbach *a* coefficient of ^{3}0.70 is considered reliable for the scale, whereas DeVellis stated that a coefficient of 0.80–0.90 is considered good, with >0.90 signifying excellent reliability. Hence, the internal consistency of our scale was significantly higher than the recommended standard, validating its suitability for subsequent formal testing. Participants were tourists who had visited the ICH Museum and 329 questionnaires were collected (Figure 3). There is a wide age distribution of participants, with 4.6% aged <18 years, 38.3% aged 18–25 years, 24.6% aged 26–30 years, 17.3% aged 31–40 years, 8.2% aged 41–50 years, 4.3% aged 51–60 years, and 2.7% aged >60 years. The occupation of participants was diverse, with 26.4% company employees, 2.1% freelancers, 4.9% retired, 10.6% students, 14.3% researchers, 8.2% governmental organizations, 18.2% enterprises and institutions, and 15.2% other occupations. Thus, the widely distributed age and occupation of the participants rendered the questionnaire data highly representative. Overall, the collected data was quantitatively analyzed and verified through descriptive statistics and SEM to validate the hypotheses proposed above.

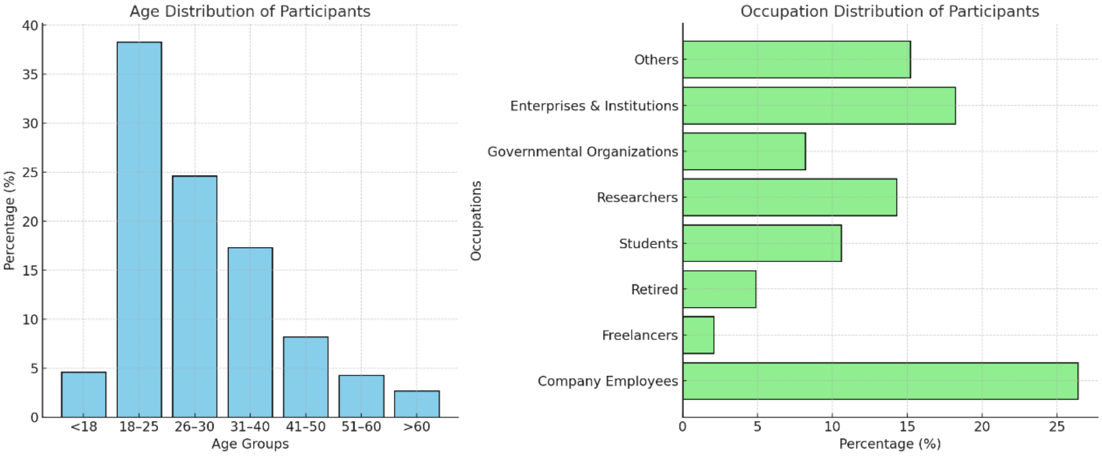

Figure 3. Demographic profile of respondents

RESULTS

1. Exploratory factor analysis

First, the exploratory factor analysis was conducted using SPSS 25.0 to derive the factor structure. The results revealed a KMO value of 0.896, indicating the suitability of data for factor analysis. Per Kaiser' criteria, a KMO value 0.8–0.9 denotes a "good" range, and the significance level of Bartlett's test of sphericity is <0.05, suggesting a sufficient correlation between the data to be suitable for factor analysis (Lorenzo-Seva & Ferrando, 2021).

In the factor extraction process, the variance-maximizing orthogonal rotation method was used and the feature root >1was selected as the basis for factor formation, based on Kaiser's criterion that a factor with a feature root >1 can describe more variance than a single variable. Finally, 77.46% of the total variance contribution was extracted, suggesting that the extracted factors could explicate the variance of the original data better (Hossain et al., 2024). Table 4 presents the results of the exploratory factor analysis. The loadings of each factor exceeded 0.5, and most of the factors loaded >0.6, signifying good convergent validity of these factors; this result corroborates the coding relationship explained per the grounded theory, which preliminarily proves the reasonable validity of the satisfaction measurement scale.

Table 4. Results of the exploratory factor analysis

Rotated Component Matrix							
	Component						
	1	2	3	4	5	6	7
SM1	**0.873**				0.113		
SM2	**0.845**	0.139	0.118	0.168		0.117	
SM3	**0.844**			0.148	0.165	0.135	
FE1			0.145		0.186	0.12	**0.813**

FE2		0.135	0.206	0.104	0.131		**0.798**
FE3	0.147	0.157	0.163	0.2		0.187	**0.756**
EC1	0.137	**0.855**		0.151		0.125	
EC2		**0.831**	0.119	0.178	0.131		0.126
EC3		**0.833**		0.155	0.139	0.146	0.133
VE1	0.135	0.188	0.214	0.175	**0.795**	0.184	0.135
VE2	0.158	0.123		0.191	**0.803**	0.185	0.217
VE3	0.148	0.123	0.231	0.209	**0.746**	0.212	0.145
CA1		0.122	0.146	0.113	0.106	**0.821**	0.173
CA2	0.171	0.107	0.164	0.183	0.206	**0.774**	
CA3	0.17	0.139	0.143		0.203	**0.764**	0.124
PV1	0.154	0.15	0.14	**0.797**	0.179	0.103	0.19
PV2	0.186	0.238	0.18	**0.772**	0.187	0.176	0.122
PV3	0.137	0.181	0.13	**0.807**	0.18	0.13	0.118
VS1			**0.81**	0.16	0.136	0.22	0.148
VS2	0.146	0.107	**0.797**	0.129	0.187		0.186
VS3	0.111		**0.799**	0.122	0.128	0.168	0.199

Besides, as shown in Table 5, the analysis using the average variance extracted (AVE) presented that the AVE values ranged from 0.611 to 0.729, which were all greater than 0.5, and the square root was more critical than their correlation coefficients with other variables, thereby fulfilling the criteria for discriminant validity. In addition, the Cronbach *a* coefficient and compositional reliability (C.R.) were used to measure the reliability level of the model. The results showed that Cronbach *a* coefficient was 0.810–0.875 and the constitutive reliability (C.R.) was 0.830–0.890, signifying high reliability of the measurement model (Karácsony et al., 2023).

Table 5. Pearson correlation matrix and average extraction variation Note: the oblique angle is AVE; **P < 0.005

Item	**SM**	**FE**	**EC**	**VE**	**CA**	**PV**	**VS**
SM	0.729						
FE	0.254**	0.623					
EC	0.287**	0.359**	0.705				
VE	0.392**	0.458**	0.403**	0.611			
CA	0.357**	0.376**	0.362**	0.514**	0.619		
PV	0.408**	0.424**	0.469**	0.535**	0.423**	0.627	
VS	0.314**	0.476**	0.306**	0.483**	0.442**	0.436**	0.643
CR	0.890	0.832	0.878	0.825	0.830	0.835	0.844
Cronbach *a*	0.875	0.810	0.868	0.865	0.819	0.863	0.843

4.2. Validated factor analysis and measurement model of satisfaction with visits to ICH museums

To further substantiate the scientific validity of the exploratory factor analysis, a confirmatory factor analysis (CFA) was performed using AMOS 24.0. CFA was primarily used to determine whether the correlation between potential variables and observed variables in a theoretical model corroborates the expectations, as well as validate the applicability and accuracy of the model. Briefly, the method considers the residuals and assesses whether the correlations between the factors and the corresponding indicators conform to the researcher's theoretical model. Furthermore, the reliability and fitness of the measurement model were depicted through a series of goodness-of-fit indicators (e.g., CFI, TLI, and RMSEA) (Byrne et al., 2021), the results are shown in Table 6.

Table 6. Overall fit coefficients of the ICH museum visitor satisfaction model

Item	**CMIN/DF**	**RMSEA**	**GFI**	**AGFI**	**CFI**	**IFI**	**TLI**
Coefficient value	1.415	0.036	0.937	0.916	0.98	0.98	0.976

As can be seen from Table 6, the results revealed that the absolute fit indices of model had a CMIN/DF value of 1.415, indicative of a good model fit, as a range of 1–3 is typically considered appropriate (Byrne et al., 2021). The RMSEA value was 0.036, <0.05, suggesting an excellent model fit; the GFI value was 0.937, >0.9, exhibiting a good model fit ; the AGFI value was 0.916, >0.9, further supporting the suitable model fit; the CFI value was 0.98, >0.95, indicating an excellent model fit; the IFI value was 0.98, >0.9, showing a good model fit; and the TLI value was 0.976, >0.95, further demonstrating an excellent model fit (Lorenzo-Seva & Ferrando, 2021).

Overall, these results suggest an excellent fit of the model developed in this study for measuring the satisfaction of visiting ICH museums, thereby confirming the reliability and validity of the model. Hence, these results not only underscore the solidity of the study but also guarantee the credibility of the findings.

Table 7 presents the results obtained after examining the level of the model path coefficients, demonstrating the path relationship between the variables in the developed model and their significance. According to Anderson and Gerbing's criteria, the C.R. value is more significant than 1.96 and $P < 0.001$ (***), indicating the statistical significance of the path. In addition, Table 7 and Figure 4 show that service management (SM) has a significant positive effect on perceived value (PV) and visit experience (VE); facilities and environment (FE) has a significant positive effect on PV and VE; exhibition content (EC) has a significant positive effect on PV and business atmosphere (CA); CA has a significant positive effect on VE; PV has a significant positive effect on VE; and VE has a significant positive effect on visitor satisfaction (VS). In addition, PV has a significant positive effect on VS and CA has a significant positive effect on VS.

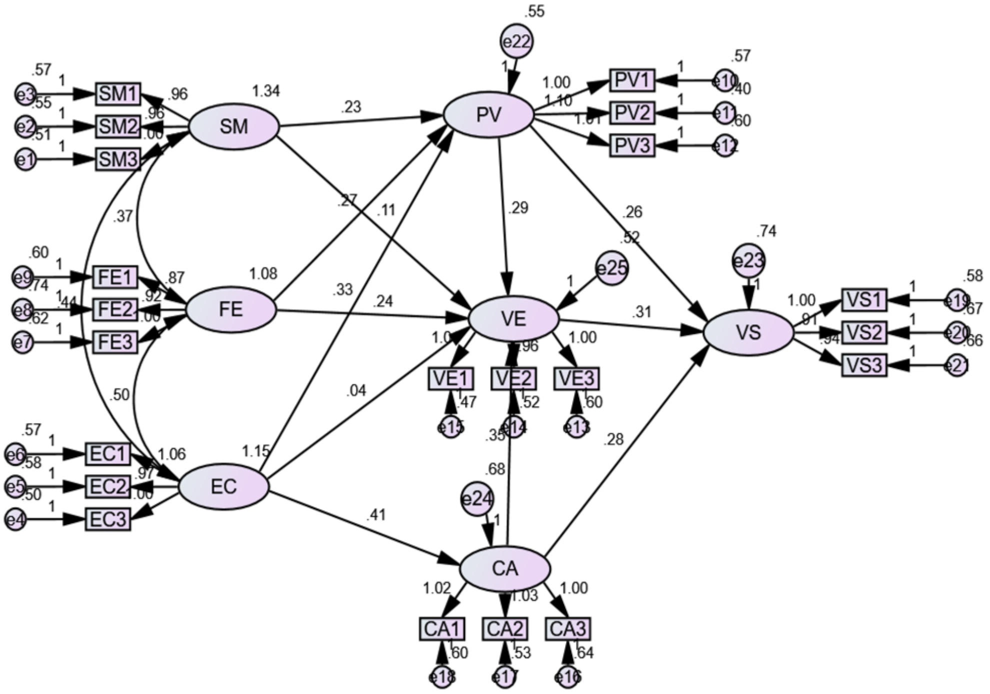

Figure 4. Results of hypothesized relationship test for ICH museum visitor satisfaction

Nevertheless, EC exerts no significant impact on VE. Furthermore, $P > 0.05$ and C.R. < 1.96 suggest that the display content exerted no significant direct impact on VE. This can be attributed to that some aspects of the content did not completely satisfy visitors’ expectations (Hung & Tuan, 2024).

Table 7. Results of hypothesized relationship tests for satisfaction with ICH museums

Hypothesize			**Estimate**	**S.E.**	**C.R.**	***P***	**Hypothesis results**
SM	→	PV	0.268	0.05	4.66	***	Accepted
FE	→	PV	0.276	0.063	4.291	***	Accepted
EC	→	PV	0.347	0.06	5.426	***	Accepted
EC	→	CA	0.468	0.057	7.061	***	Accepted
SM	→	VE	0.127	0.052	2.166	0.03	Accepted
FE	→	VE	0.24	0.066	3.613	***	Accepted
EC	→	VE	0.042	0.071	0.572	0.567	Rejected
CA	→	VE	0.319	0.071	5.023	***	Accepted
PV	→	VE	0.284	0.077	3.754	***	Accepted
VE	→	VS	0.294	0.088	3.537	***	Accepted
PV	→	VS	0.238	0.078	3.292	***	Accepted
CA	→	VS	0.241	0.081	3.513	***	Accepted

DISCUSSION

ICH museums play a crucial role in sustaining and publicizing ICH and upholding cultural diversity. Using grounded theory, we identified key dimensions influencing visitor satisfaction at ICH museums and validated our hypotheses through CFA and AMOS. The key indicators of visitor satisfaction include service management, facilities and environment, exhibition content, cognitive value, visit experience, and commercial atmosphere, all positively influencing visitor satisfaction. Notably, visiting experience has the greatest impact on visitor satisfaction.

First, we found a significant positive impact of service management on both perceived value and visiting experience, aligning with (Chatzigrigoriou et al. (2021) findings that quality services enhance cognitive value and visiting experience. This confirms the key role of service management in augmenting visitor satisfaction in ICHs.

Second, facilities and environment also significantly positively impact perceived value and visiting experience. The quality of these directly influences visitors' perceptions and experiences, as observed by Cong, (2021) Optimizing facilities and environment can markedly augment visitors' cognitive value and visiting experience in ICHs.

Third, exhibition content, while not significantly impacting visiting experience directly, has a significant positive impact on perceived value and commercial atmosphere. ICH museums offer content-rich and diversified exhibitions, enhancing visitors' knowledge base and cultural identity. The system of knowledge behind the objects is vital for culture's survival, as highlighted by Wang et al., 2024. Nikolakopoulou et al. (2022) claimed that display content is indispensable for a museum's attractiveness, though its impact must be evaluated in the context of the overall experience.

Fourth, the commercial atmosphere significantly positively impacts visiting experience and visitor satisfaction. High-quality exhibition content augments visitors' cultural identity, enhancing their visiting experience and overall satisfaction. Policies, public participation, and continuous innovation can balance commercialization and heritage preservation. Visitors gain unique experiences through ICH snacks and techniques, increasing engagement by selling souvenirs and providing ICH activities, while upholding cultural authenticity. Museums have effectively preserved traditional crafts and skills through interactive training programs, promoting visitor participation, experience, and ICH sustainability.

CONCLUSION

This study empirically verifies the remarkable effects of service management, facilities and environment, exhibition content, and cognitive value on visiting experience and visitor satisfaction of ICH museums. A surge in perceived value directly amplifies visitors' experience and satisfaction, corroborating Geng et al. (2021) assertion that customers' cognitive value is a vital factor influencing their satisfaction. Overall, this study provides empirical support for ICH museums to enhance their service quality and optimize display content, offering an essential theoretical basis for subsequent research.

Limitations

This study has limitations: geographical and cultural sample bias affecting generalizability, cross-sectional design lacking dynamic causality insights, and heavy reliance on questionnaires potentially causing social desirability bias. Future research should extend samples across regions and cultures, adopt a longitudinal design and integrate qualitative methods.

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