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THE REGULATION OF ADVENTURE TOURISM IN JORDAN LEGISLATIVELY AND ITS ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS

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Abstract: This study examines the legislative regulation of adventure tourism in Jordan and its alignment with the United Nations Sustainable Development Goals (SDGs). Jordan's unique geography, encompassing deserts, mountains, and marine environments, has positioned it as a promising destination for adventure tourism activities such as hiking, diving, and canyoning. However, the rapid growth of this sector necessitates a structured legal framework that ensures safety, sustainability, and inclusivity. The research analyzes the 2019 "Instructions for Organizing Adventure Tourism Trips" and related legislation to assess their effectiveness in addressing the multifaceted needs of the adventure tourism sector. While these regulations provide essential safety guidelines, insurance protocols, and age restrictions, they fall short in addressing marine and aerial tourism activities and inclusive practices for individuals with disabilities. Furthermore, the absence of a centralized digital platform for adventure tourism information hinders transparency and access. Using geospatial mapping tools, the study also charts major adventure tourism routes across Jordan, including Wadi Rum, Wadi Mujib, Dana Reserve, and Aqaba, to demonstrate the country's rich adventure landscape. Emphasis is placed on the role of infrastructure, local community engagement, environmental conservation, and professional training in enhancing the adventure tourism experience. The study finds that aligning the adventure tourism sector with SDGs—particularly in areas of environmental protection, economic inclusion, and cultural preservation—can significantly enhance its sustainability and international competitiveness. Key recommendations include expanding legislative coverage to include all types of adventure tourism, establishing an inter-agency regulatory body, strengthening collaboration with local communities, and developing a national portal for adventure tourism. Through these reforms, Jordan can strengthen its regulatory framework and position itself as a leading model for sustainable and legally governed adventure tourism in the Middle East.

Keywords: Adventure Tourism, Sustainable Development, Legislative Regulation of Adventure Tourism

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INTRODUCTION

Adventure tourism is a type of tourism that is becoming more popular in Jordan because of its geography and people. There are many adventure tourism activities in Jordan, such as hot air ballooning, horseback riding, camel and camelback riding, mountain biking, paragliding, off-roading, motorcycling, scooters, cars, dune buggies, and water sports like snorkeling, diving, water skiing, and jet skiing (Selem et al., 2024; Von Der Dunk, 2012; Shone & Memon, 2008; Jawabreh et al., 2023). Additionally, Jordan features the Desert Castle Trail, the Dana Biosphere Reserve, the Mujib Nature Reserve, and several other natural reserves. In total, there are 36 fixed and mobile nature reserves.

Due to the many and appealing things that Jordan has to offer in terms of adventure tourism, including its amazing natural sights, important historical sites, and lively culture that combines thrilling adventures with stunning natural beauty, as well as the friendliness and openness of the people who live there towards tourists, the Hashemite Kingdom of Jordan had to come up with and implement a full adventure tourism strategy. Because adventure tourists are more valuable to the economy than regular tourists, there has been a rise in interest in bringing together all parties to work on these kinds of projects. This includes government agencies like the Ministry of Tourism and Antiquities and adventure tourism companies. It is now necessary to create a positive legal setting that matches adventure-based activities with what is available. Learning about adventure tourism is important because it has many connections to important things (Liggett et al., 2010; Jawabreh & Fahmawee, 2024; Von der Dunk, 2019). The most important ones are how safe and secure adventurers feel, how to protect the environment in all of its parts, and how to protect the country's natural and cultural heritage. Adventure tourism has important effects on the national

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economy and on the towns that host tourists. It also includes setting up the relationships between the local community, tourist businesses, and government agencies that are funding the event.

The research aims to show how important and valuable adventure tourism is, as well as to find out what local adventure tourism facilities are available in Jordan and how they are currently functioning. This way, we can understand their current state and look into the adventure opportunities that are available. We will also look closely at the practical and legal aspects so that we can come up with effective and strategic suggestions for their growth and success in the future and how they can fit in with sustainable development goals. The study question comes from the need for the adventure tourism business to meet high standards in the world of adventure tourism, making sure that it is safe and sustainable and giving people the best experiences possible in this field, from following safety rules to caring for the environment (Rejan & Ahn, 2024). All of this means that there need to be stable laws and good habits that protect the well-being and happiness of people looking for adventure and encourage responsible and environmentally friendly tourism to make sure the highest levels of safety and security are in all outdoor adventure activities. It also means doing all adventure tourism activities in a way that protects Jordan's important cultural and historical assets and makes the experience better for thrill-seekers.

It is important to regulate adventure tourism to reduce any hazards to land usage, promote outdoor recreation, safeguard public land resources, and help local economies. Land planning, zoning, and permit allocation can enhance adventure programs by ensuring their optimal construction and routing. Clear guidelines for giving out permits lower the likelihood of monopolies or partiality. By-laws for building a new adventure site or sport site also stimulate new business ideas and the building of infrastructure (Karagiorgos et al., 2023). Shorelines and non-shoreline ecosystems should have clear zoning for the right purposes, and all stakeholders should work together to create and promote this. Adventure sports development should be controlled in places where there is likely to be a lot of conflict or overuse, and plans should be guided by a clear vision for making sure that adventure leisure is sustainable. To settle disputes over competing uses, it may be necessary to limit how much people may utilize the same natural resources (Buckley et al., 2024; Peacock et al., 2017). Sharing information about adventure sports prospects, both locally and via electronic means and brochures, offers the competitive advantage of being "the best-kept secret" or "the highways less traveled" to recreational locations. Adventure attractions should be easy to use by giving people access to adequate facilities without ruining the natural environment or making it too crowded. Adventure development needs more extreme access roads and procedures for using natural resources. Caution signs emphasizing how hard things are and how safe they are are a good way to give people a gentle warning. Adventure tourists' health should be properly advertised via guides and instructors instead of through too much immersion advertising.

Schools and companies may rent mobile van sets for a fair price so that students and workers can easily go to nature. In rural areas, off-road vehicles and mountain bike paths that go around untouched environments are growing more popular, but they need to be thought about more. This is especially true in countries that are still developing. By getting governments, unions, and recreational groups involved in pre-licensing or certifying an existing prototype adventure program, adventure firms are about to lose their current recognized status and replace it with an on-site coaching/leading program. Adventure, nature awareness, self-discovery, and leadership/skills hosting training will make adventure sports more accessible to those who aren't already involved. We require fresh, state-of-the-art prototype finders who can lead a number of naturally gifted possibilities.Adventure tourism is becoming more important in Jordan because of its distinctive geography and culture, but the current body of literature and regulatory frameworks are still fragmented, restricted in scope, and mostly unexplored from a legal perspective. Most previous research has looked at the marketing or environmental sides of tourism. The legal and institutional components, particularly how they fit in with the objectives of sustainable development (SDGs), have not been studied enough in the academic world. Additionally, current rules, such as the "Instructions for Organizing Adventure Tourism Trips" from 2019, fail to cover important aspects of adventure tourism, including maritime and airborne activities, and do not include steps to facilitate participation for people with disabilities. Because of this lack, this research aims to meet an important need by carefully looking at the laws that govern adventure tourism in Jordan. The main goal is to see how well present rules protect safety, the environment, the economy, and cultural heritage. The study also intends to suggest changes to the law and useful ways to make adventure tourism fit with global sustainability standards. This would make Jordan a regional leader in responsible and legally managed adventure travel.

BACKGROUND OF STUDY

Many laws govern adventure tourism in Jordan, showing that lawmakers are becoming more interested in this exciting industry. The most important of these laws are the 2019 Instructions for the Foundations and Conditions for Organizing Adventure Tourism Trips, which set out rules for different parts of adventure tourism in Jordan. Here is a summary of them:

Legal rules for adventure tourism operators limit who could organize and sell adventure tourism trips to licensed tourism and travel offices and companies (Article 3 of the above instructions). This means that people and businesses involved in adventure tourism and tourist routes must work with these offices to promote their routes as tourist destinations through trip programs put together by the offices (Callander & Page, 2002; Liu et al., 2019).

The directions were made to make sure that tourists looking for adventure would be safe and happy and to keep adventure tourism a fun and safe activity for everyone. This is clear from many laws, such as those that require tourism and travel offices to make sure that when planning and carrying out adventure tourism trips, the number of people in the group doesn't go over the maximum number allowed by the activity; that each group has a tour guide and a companion who have experience with the trip activity and are fully aware of the nature of the trip area; that the risks of the trip activity are avoided by taking into account weather conditions to avoid accidents caused by floods or other natural disasters; and that all necessary food, drink, first aid supplies, communication devices, and topographic maps of the trip route (Article 6 of the

instructions). To make sure the adventure tourism trip participant is safe in case of a sudden, unplanned accident that hurts him, the instructions for the insurance document for adventure tourism trip participants for the year 2023 say that tourism and travel offices must give the participant an insurance document from a licensed insurance company that covers the costs of getting the injured person to the closest hospital at the scene of the accident, the costs of medical treatment related to the accident, and compensation for death or total or partial disability resulting from the accident, with a financial limit of up to 10,000 dinars for insurance coverage (Article 4 of the instructions). The above instructions took into account the ages of the people going on the trips and said that people going on difficult activity trips had to be at least 18 years old, and people going on easy activity trips had to be at least 9 years old with permission from a parent or guardian (Article 6 of the instructions). Article 6 of the 2008 School Trips and Visits Instructions said that school trips and visits could not go to unauthorized adventure, exploring, or challenging trip places. This was done to keep students and teachers safe. Article 12 of the Instructions also said that schools couldn't work with tourist companies to plan trips for excitement, discovery, or challenges. To protect fragile ecosystems and the country's unique natural and cultural assets, the instructions said that adventure trips could not go to any of the places that people weren't allowed to go. They also said that reserves and sites managed by special officials had to follow the rules set by those bodies (Article 5 of the Instructions).

In this case, we also talk about the Urban and Architectural Heritage Protection Law No. 5 of 2005, which was made to keep Jordanian heritage sites safe and in excellent shape. It decided that anyone who put up an ad or wrote on a heritage site would be fined at least 100 dinars and no more than 500 dinars. Article 16 of the law says that anyone who intentionally harms, tampers with, or helps harm a heritage site or any part of it, or uses the heritage site in a way that breaks the law, will be fined at least 2,000 dinars and no more than 5,000 dinars (Morgan & Fluker, 2006).

The Environmental Protection System in the Aqaba Special Economic Zone No. 32 of 2000 also gave the government the power to safeguard and preserve the marine and environmental environment along the coast of the region. The power included deciding where water activities like fishing, water sports, diving, and underwater photography were allowed (Article 54 of the Law). It also listed the environmental projects that were set up, such as sports activity centers, to lessen any negative effects on the environment and promote long-term growth (Appendix No. 1 to the system mentioned above).

Adventure tourism is one of the most significant sorts of tourism in Jordan since the nation is distinctive in terms of its geography, climate, and cultural history. Adventure tourism is particularly important for Jordan's economy, especially in areas that are still underdeveloped. This means that tourist activities help the world economy thrive (Ahmad Al-Maaytah, 2017). Adventure tourism is good for the economy and creates jobs. Jordan's unique geodiversity also helps to promote and grow a new kind of tourism called adventure tourism. Adventure tourism is about facing challenges, needs unique skills and physical condition, and takes place in delicate locations. Adventure tourism is a complicated interaction involving the natural circumstances, social orientation, culture, and economics of the places that visitors visit.

One of its goals is to attract tourists, which is similar to how tourism systems are evaluated. Tourism is the relationship, interaction, and dependency between tourist attractions, tourism services, and tourism organizations.

There are two ways to look at tourism. First, tourism is a way for tourists to escape their boring lives, and this is sometimes called "ground tours." Second, a relatively new but quickly growing trend in tourism is the search for places that haven't been touched by people or have very little infrastructure. The second part is a more "natural" approach, where preparation is important to adventure and may occasionally change how beautiful the route and the terrain are. Adventure tourism is the name for this part of tourism. It includes not just popular activities like hiking and climbing but also adventure racing, mountain biking, and other powered sports. Adventure tourism is hazardous, depends on overcoming challenges, and requires significant capital to operate in extremely harsh natural environments.

To make sure that adventure tourism stays popular, the instructions talked about how adventure tourism agencies should work with the local community. For example, Article 6 of the Instructions says that when planning and carrying out adventure tourism trips, tourism offices must work with people from the local community to use their services.

Jordan is located in the Middle East region with mostly dry and semi-arid climates; yet, despite these circumstances, it is rich in historical and ancient monuments, therefore making it one of the top places for tourists in the world. Jordan's tourist industry is one of the biggest contributors to the country's gross domestic product (GDP) and the second-biggest source of revenue from 2023 to 2024. Tourism, on the other hand, has a detrimental effect on the environment since it uses more energy and releases more greenhouse gases into the air. This is because there is a strong link between GDP and power usage.

This study's purpose is to look at how adventure tourism in Jordan directly affects the sustainable development goals (SDGs) (Kizielewicz, 2023; Ahmad et al., 2024). Also, the evaluation was changed to find the locations where these criteria overlap to look into the areas of SDG conflict, synergy, and trade-offs. Jordan has many natural places that are great for adventure tourism, and the effects were looked at in terms of how municipal officials saw the confusing difficulties that made people think certain SDGs were more important than others. Even though sustainability was put into place, the worst SDGs were said to be the ones that caused the most harm to biodiversity and poverty (Janjua et al., 2025). Furthermore, the current regulation of adventure tourism fails to align well with the UN SDGs.

As far as the authors know, this is the first study to look at the sustainability of adventure tourism using the SDGs. Although prior research has sought to measure adventure tourism’s direct influence on numerous elements, these consequences were not evaluated considering SDGs. As a result, a full review of the present rules is done, and the results are put together as knowledge gaps. Adventure tourism in Jordan might help the economy flourish and protect wildlife, but it would also have many negative effects on people. So, tight rules would need to be enforced to keep expenses down on other goals, such as human health, fairness, and urban systems (Kiatkawsin et al., 2021). There has been a huge increase in the number of publications on adventure tourism in the last ten years.

Because of this, it is becoming more and more important to look at the current literature streams to find gaps in future study and areas of adventure tourism that haven't been studied enough. Future studies should look at the growing commercialization of adventure tourism and what it means for how people use the product.

As adventure tourism grows more popular and valuable, picturesque encounters that are meticulously planned to involve risk and danger are becoming more common (Kiatkawsin et al., 2021). Mass-market companies take advantage of the fact that these events are risky and sell them as adventures.

Such an approach puts the product's integrity in danger in terms of its definition and value. There is still a need for scholarly research on how industry turns goods into commodities and the effects this process has on society and the economy. These kinds of evaluations of commodification may also help stakeholders in both growing markets in the Global South and established markets in the Global North understand how the product could develop in the future. A prevalent theme in the research on adventure tourism in Asia was pressuring tourists to go on vacations and how the industry reacted by developing new products. Further study is necessary to fill in the gaps in our understanding and address issues related to adventure information, terrorist assaults, and risk management (Dolnicar, 2023). Adventure tourism is generally considered dangerous; thus, people are often worried about how nature-based adventure tourists engage with the media that talks about risk. Also, because of the global chaos caused by Covid-19 and the Gaza war, people suggested that future research should look into how industry, governments, and communities can better respond to pandemics and disasters, as well as how tourists see risk.

METHODOLOGY

This study adopts a descriptive-analytical and multi-method approach to evaluate the legislative framework governing adventure tourism in Jordan and its alignment with the United Nations Sustainable Development Goals (SDGs). The methodology combines legal content analysis, geospatial mapping, and infrastructure assessment to present a comprehensive view of the regulatory environment and its practical implementation.

Legal and Regulatory Content Analysis:

The study thoroughly examines the “Instructions for Organizing Adventure Tourism Trips” issued in 2019, along with other relevant legal documents and governmental policies. This includes evaluating key articles related to safety standards, insurance requirements, age restrictions, and the inclusion of local communities. Gaps in the legislation, especially regarding marine and aerial adventure activities and accessibility for individuals with disabilities were critically assessed in light of international best practices and SDG indicators.

Geospatial Mapping and Site Analysis:

Geographic Information System (GIS) tools, particularly Global Mapper software, were utilized to map and analyze key adventure tourism routes and natural reserves across Jordan, including Wadi Rum, Mujib Biosphere Reserve, Dana Reserve, and Wadi Bin Hammad. These maps highlight the diversity of activities available (e.g., hiking, canyoning, diving) and the environmental and cultural assets surrounding them.

Infrastructure and Institutional Assessment:

The study assessed the availability and adequacy of essential infrastructure for adventure tourism, including transportation networks, emergency facilities, visitor services, and professional training for tour operators. It also evaluated the institutional role of government bodies—such as the Ministry of Tourism and Antiquities—in supporting and regulating the sector.

Comparative and Inductive Analysis:

The findings from the legal and field assessments were synthesized to identify areas of alignment and misalignment with the SDGs. This enabled the development of strategic legislative and operational recommendations aimed at promoting sustainable, inclusive, and well-regulated adventure tourism in Jordan.

RESULT

Even though the laws listed above are very important, they need to be looked over so that they can keep up with the ever-changing and complex adventure tourism business. We believe that the following sections need to be included in order to make complete laws that make adventure tourism easier and more regulated (Padma et al., 2019; Al Dein, 2022). We urge the lawmaker to look them over and adopt them:

The rules for planning adventure tourism trips for 2019 only talked about one type of adventure tourism activities: activities that happen on land, like hiking, hiking with an overnight stay, valleys, caves, cycling, mountain climbing, rock climbing, etc. They didn't talk about marine activities like diving, fishing, and sea skiing, even though those are some of the biggest adventure tourism activities, and they also didn't talk about the air activities that are available in the Kingdom, like hot air ballooning, diving, and flying between cities. The above directions were made official under Article 4 of that law, which divided adventure tourism activities into "easy" and "difficult" ones for land-based activities (Pomfret, 2021; Jawabreh et al.,2024). This meant that the lawmakers continued to ignore activities that happen in the water and in the air. It would have been better to come up with criteria for putting land, sea, and air adventure tourism activities into two categories: difficult and easy. These criteria should include the type of activity, the physical skills and gear needed for the trip, as well as the trip's location, climate, and terrain. A representative from the Ministry of Tourism, the Ministry of Interior, the Tourist Police Department, the Tourism Promotion Authority (as chosen by its director general), the Civil

Aviation Authority, the Petra Development and Tourism Region Authority, the Aqaba Special Economic Zone Authority, the Jordan Standards and Metrology Organization, the National Council for Tourism and Hospitality Sector Skills, the Royal Society for the Conservation of Nature, the Jordanian Tourist Guides Association, and the Jordanian Association of Tourism and Travel Offices and Companies were not included in the instructions for setting up a committee. As part of its job, it sorts adventure tourism activities into groups and decides where they can be done. It also decides what safety rules apply to the public, what tools, equipment, and supplies are needed for each activity, and what the technical requirements are. It is also in charge of maintaining the basic infrastructure in the places where adventure tourism activities happen, protecting natural resources and the environment, making rules for adventure tourism activities and safety rules, keeping an eye on the companies that do adventure tourism, and looking into any violations they may have. Or at least giving these powers to the Tourism Committee as Article 7 of Tourism Law No. 20 of 1988 says they should have.

Article 3 says that only tourism and travel offices can organize adventure tourism. The above directions didn't say anything about the difference between hard and easy adventure tourism activities. This stops other groups and companies from doing adventure tourism activities, like hotels and tourist restaurants. These groups and companies can only do easy adventure tourism activities, not hard ones (Bentley & Page, 2001). This keeps things fair for everyone and doesn't go against the quality of adventure tourism. The directions weren't clear about whether or not companies had to make it possible for people with disabilities to participate in adventure tourism activities. They also weren't clear about what kind of organizational help, safety gear, and special facilities were needed for this group.

Following the link to the Ministry of Tourism and Antiquities website (https://www.mota.gov.jo/Default/),We believe that the Kingdom is missing a website devoted to adventure tourism. This would give tourists a better idea of what adventure tourism is really like in the country, how popular it is, and what kinds of services are available. The website should include information about adventure tourism sites and their maps, as well as public safety rules, approved standard specifications, the companies that plan adventure tourism trips, and information about authorized activities. It should also have informational pamphlets about adventure tourism. The government of Jordan is paying more attention to adventure tourism because it is seen as a special market for tourists. As stated in Article 3 of the Tourism Law and its amendments No. 20 of 1988, the Ministry of Tourism and Antiquities oversees developing tourism in Jordan. Its main job is to create, implement, and keep an eye on all marketing and promotion plans for tourism in Jordan, both locally and internationally, with the goal of making the tourist season longer and attracting more visitors.

The Ministry of Tourism and Antiquities oversees making sure that Jordan's tourism industry stays in line with the UN's Sustainable Development Goals and all of the country's other goals. They also make sure that all partners and parties work together to promote green and sustainable tourism and keep both local and foreign tourists and their belongings safe (Cao et al., 2014; Bentley et al., 2003). The Ministry does this through the social and environmental policy that was developed in cooperation with the United Nations Development Program, through which it committed to all legislation and policies, ensuring the protection of tourist and archaeological sites and natural areas from visual distortions that negatively affect tourism experiences, preserving biodiversity and vegetation cover in tourism projects, promoting a culture of environmental responsibility among the Ministry’s cadres, ensuring the protection of cultural heritage and heritage at the national level and promoting experiences that reflect the urban and cultural heritage of the region, committing to measuring air quality periodically in tourist areas that attract mass tourism, updating classification and tourism licensing standards and introducing environmentally friendly standards, conducting inspections from time to time on adventure tourism establishments in Jordan to ensure their compliance with laws, regulations, instructions and decisions, facilitating access for people with disabilities, building relationships with local communities and empowering them economically

Implications of the Sustainable Development Goals on Adventure Tourism in Jordan

Linking adventure tourism in Jordan to the Sustainable Development Goals creates a strong strategy to promote sustainable development and the sector becomes a tool to promote environmental sustainability, economic growth and social development, presenting Jordan as a model for sustainable tourism. Here is how adventure tourism aligns with the Sustainable Development Goals in Jordan.

Environmental Sustainability

Sustainable adventure tourism can help develop environmentally friendly cities and communities while preserving the natural and cultural character of the areas visited by tourists, by promoting responsible tourism practices, focusing on low-impact infrastructure projects, designing accommodations in line with the environment, and creating special paths that facilitate ecotourism without affecting sensitive environmental areas, allowing visitors to enjoy nature without harming it. Smart systems can be applied to control the number of visitors, reduce congestion, and manage the flow of tourists in a way that preserves the sustainability of environmental resources (Mackenzie & Kerr, 2013; Hassan, 2000; Al Dein, 2022).

Adventure tourism can contribute to the preservation of unique ecosystems in Jordan, such as Dana Nature Reserve or Wadi Rum Protected Area, by educating visitors about biodiversity, which supports land conservation and biodiversity protection (Chang et al., 2025; Jawabreh et al., 2025). For adventure tourism activities along the Jordanian Red Sea coast, such as diving and snorkeling, responsible practices can protect marine ecosystems by preserving coral reefs, reducing waste, and educating visitors about marine biodiversity conservation. Adventure tourism can be an opportunity to promote local cultural heritage, through organizing cultural events and traditional performances, which enriches the tourist experience, encourages them to appreciate local culture, enhances the protection of cultural heritage, and increases the residents’ connection to their heritage (Toivonen, 2020). With these strategies in place, adventure tourism can be a key

factor in creating sustainable cities and communities, where residents and visitors alike can enjoy nature and the environment while preserving it for future generations (Hansen et al., 2019; Al Fahmawee & Jawabreh, 2023).

Community Engagement

Sustainable adventure tourism requires collaboration between government agencies, local communities, the private sector and NGOs to bring together expertise, funding and advocacy to achieve sustainable development and focus on responsible tourism practices.

Involving the local community in planning tourism projects and participating in decision-making regarding tourism development in the region, providing tour guide services and organizing cultural events creates a sense of ownership and increases commitment to sustainable practices (Tirasattayapitak et al., 2015). Involving local communities also allows for a better experience for tourists in general and adventure tourists in particular through a more accurate understanding of local customs, traditions and lifestyles. Local hosts are an undeniable potential in the world of adventure tourism in the beautiful country of Jordan, due to their incredible generosity and hospitality, and they form the heart and soul of this amazing field.

In addition, involving local communities is an effective way to ensure that the benefits of adventure tourism activities are distributed more evenly throughout the community, i.e. not only directed to the entrepreneurs involved, for example by incorporating local handicrafts or organic foods into the travel program where appropriate (Al Fahmawee & Jawabreh, 2022a). Moreover, the presence of opposition and lack of community trust will expose tourism operators to the risk of bad reputation and, in some cases, to the risk of physical assault. In addition, when adventure tourism training programs motivate local people to participate, the possibility of involving a large portion of women in those programs will open up another dimension.

Economic Impact

Adventure tourism can create jobs and generate income for local communities, especially in rural and underdeveloped areas, by engaging tour guides, service providers, and local community members. Adventure tourism also provides economic opportunities for local communities by encouraging tourists to buy local products and engage with local services, and by supporting local handicrafts, small restaurants, and traditional markets. Adventure tourism providers can implement practices that contribute to responsible consumption and production and climate action such as waste reduction, recycling, and promoting environmentally friendly activities. Awareness campaigns targeting tourists and locals can be organized to promote the importance of environmental conservation through natural area clean-up campaigns, tree planting programs, or events to encourage responsible ecotourism (Duffy & Moore, 2011; Dioko, 2023). Educate tourists and locals about environmental conservation to reduce the environmental impact of the sector through workshops on environmental sustainability, reducing water and energy consumption, respecting nature and the local environment, and the effects of climate change and promoting low-carbon activities such as hiking and cycling, adopting carbon offsetting practices and encouraging environmentally friendly travel to reduce the tourism sector's contribution to climate change. Tourism facilities such as hotels and lodges can rely on renewable energy and implement recycling and waste reduction systems.

Infrastructure

Due to the special nature of adventure tourism, there are many potential risks and hazards that tourists may face, especially when visiting countries with great geographical diversity such as Jordan, including but not limited to wadi exploration, rock climbing, caving, trekking, rock climbing, hiking, and mountain biking (Ponting & O'Brien, 2013). As such, it is important for tourism service providers and their accompanying service providers to identify and acknowledge these risks seriously, while simultaneously implementing comprehensive safety protocols. Therefore, it is suggested that an individual with the appropriate qualifications and standing should conduct a thorough assessment detailing the potential risks associated with various adventure activities and identify the necessary actions to be taken in case they occur to ensure the overall safety and well-being of adventure-seeking tourists.

Adventure tourism is not easy to implement without the infrastructure that supports the implementation of many adventure activities, nor is it easy for participants to use the necessary tools and equipment to implement the activities, but it requires professionalism and skill of operators in how to operate them and provide psychological comfort to participants.

Providing tourists with some facilities, equipment and food is essential to ensure their overall satisfaction and well-being. It is also important for tourists to adhere to the safety procedures put in place by operators in order to minimize any potential risks or accidents that may occur during adventure activities. Safety procedures include ensuring that tourists wear a strong helmet to protect their heads, use rock climbing harnesses to prevent any falls or injuries, and navigate and climb ropes properly to ensure their safety (Hanna et al., 2019). Tour guides and attendants play a vital role in securing tourists, ensuring they feel safe and supported throughout their adventure experience, providing a safe and memorable adventure tourism experience. In the unfortunate event of an accident or injury as a result of adventure activities, tour operators implement effective systems to deal with emergencies effectively, such as establishing quick communication channels to facilitate immediate calls for help, being able to access aircraft if necessary, and having first aid kits readily available in tour guides' bags, allowing for quick and adequate medical care when needed.

However, there are instances where there can be a lack of proper implementation or complete disregard for strategies or legislation related to safety measures, and this is linked to different levels of experience, handling of events, and levels of tourism infrastructure. Bridging this gap is through continuous improvement of infrastructure and ensuring that it adheres to the necessary safety regulations and standards. In order to achieve the full phased goals of the adventure tourism

industry, tour operators take into consideration a series of effective and successful approaches. These approaches include active participation of all stakeholders, effective communication channels to address concerns and provide information, reaching agreements on safety protocols and standards, effective teamwork between tour guides and tourists, and implementing various other activities aimed at ensuring a safe and enjoyable adventure.

In some tourist areas, basic facilities are provided to support the adventure tourist, and the majority of these facilities are geographically concentrated in the northern and southern parts of the country near national parks and other protected areas, and to a lesser extent adventure tourism can be done in central Jordan, and the main attractions in the country are Petra, Wadi Rum and the Dead Sea, which provide the best tourism infrastructure including a wide range of hotels ranging in quality from popular to luxury facilities, efficient and well-maintained means of transportation, rubber rafts, hot air balloons, bicycles and all-terrain vehicles, and four-wheel drive vehicles. Driving transportation.

The easy availability of adventure support facilities ensures that visitors do not need to bring equipment or incur special costs when purchasing or renting it, for example, rubber rafts, canoeing or even camping equipment. The Ministry of Tourism and Antiquities is the main body leading the establishment and development of tourism infrastructure to support various adventure tourism programs by using public funds from the state budget and from large loans to finance some adventure tourism development activities (Bennike & Nielsen, 2023; Al Fahmawee & Jawabreh, 2022b).

However, adventure tourism faces various challenges, including those in some areas that lack the necessary infrastructure, which is often non-existent, such as visitor centers equipped with information facilities and services.

Tour operators and tour guides

Tour operators are an important part of the adventure tourism product because they provide a framework for adventure activities and support services. There are many institutions, tourism companies and professional programs specialized in organizing adventure tourism trips, provided that these institutions and companies are legally licensed and committed to the provisions of the legislation regulating adventure tourism trips (Randle & Hoye, 2015). They are subject to the supervision and oversight of the Ministry of Tourism and the competent authorities, which ensures ethical practices and responsible tourism and provides a framework for sustainable and responsible growth in the industry. Many, if not all, local guides have the ability to communicate the message of the area or route and understand the culture and history of the destinations.

In addition, their presence provides the security that tourists need. Qualified local guides are one of the hallmarks of the adventure tourism sector. Even independent expatriates use local guides to manage their tours or provide specific services such as support, equipment or guides for a difficult trip that lasts several days. Given their importance, Jordanian legislation requires that each group be accompanied by a tour guide and guide who is experienced in the activity of the trip and has full knowledge of the nature of the trip area. Local community members are also called upon for their services when needed. The Ministry of Tourism in Jordan is planning to develop a training curriculum on adventure management and tourism promotion. Many operators in Jordan lack proper promotion (Carden et al., 2017). Figure 1 provides an essential geospatial overview of Jordan's adventure tourism system by representing it as a connected trail network rather than isolated sites.

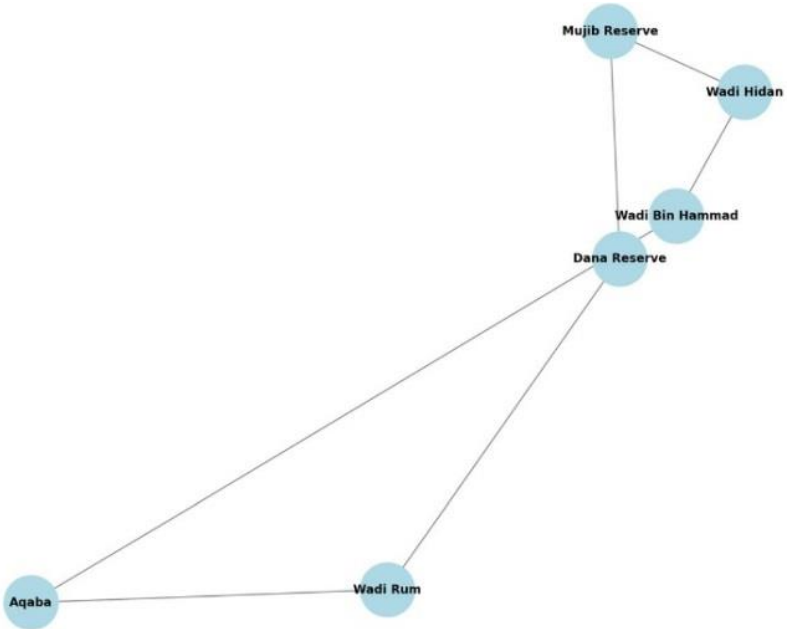


Figure 1. The map shows the network of adventure tourism trails in Jordan, identifying key sites such as Wadi Rum, Dana Reserve and Mujib Reserve and the trails that connect them) Source: Author, prepared by the researchers using Global Mapper software)

From a GIS perspective, the map functions as a schematic of national adventure "infrastructure", where Wadi Rum, Dana Reserve and Mujib Reserve appear as primary nodes linked through a series of linear corridors that structure visitor movement. This visualization confirms the spatial clustering of high-value adventure assets along a south–north transect, intersecting protected areas, heritage landscapes and transport axes. When interpreted together with the legislative analysis

in the paper, the figure highlights both opportunity and vulnerability: the same corridors that concentrate economic benefits also concentrate environmental pressure and safety risk, especially in narrow wadi systems and fragile desert ecosystems. By using Global Mapper to harmonize trail geometry with administrative boundaries and protected-area limits, the map becomes a practical decision-support layer for regulators, enabling them to locate where current regulations on guiding, insurance, age limits and emergency access must be most rigorously enforced or revised. It also offers a spatial framework for aligning adventure tourism with the SDGs, for example by identifying communities adjacent to the main trail spine that could benefit from inclusive employment, infrastructure upgrades and digital information platforms. In this way, Figure 1 is not a purely descriptive product but a strategic GIS tool that underpins the paper's call for an integrated, legally robust and sustainability-oriented governance model for adventure tourism in Jordan.

To address this problem, operators are encouraged to come together, form affiliations and work collectively to organize large conferences held in useful locations throughout the country so that operators can learn from each other, exchange ideas, and collectively contribute to the growth and success of the adventure tourism industry in Jordan. The focus is also on enhancing the skills of adventure operators to meet the needs and interests of visitors who come to Jordan, with the aim of expanding its list of adventurers and becoming widely recognized as a leading adventure destination, attracting thrill seekers from all over the world (Niewiadomski & Brouder, 2024). Thanks to the assistance and interest of the tourism sector, many successful adventure tourism companies have emerged, such as the prestigious Jordan Tourist Guides Association, the esteemed Jordan Air Sports Association, and the remarkably inspiring Bedouin women of Hamma, Fuheis, Wadi Araba, the enchanting Al-Uyun Trail, the captivating Umm Qais Trail, and the wonderful Jordan Bicycle Trail, they operate in a variety of attractive services and experiences and their deep engagement with the local community, while emphasizing their unwavering commitment to making a positive impact. The experiences offered by adventure tourism companies go beyond mere tourism; they embody the wonderful coexistence between guests, residents and wildlife, becoming unforgettable journeys that allow guests to truly immerse themselves in the enchanting country of Jordan.

Adventure tourism route map of Wadi Rum highlighting significant locations such as Rum Village and Khazali Canyon, with an emphasis on hiking and climbing activities. Source: Author. Compiled by the researchers using Global Mapper software.Wadi Rum is a distinctive destination for desert adventures and enjoying nature's beauty.

Rum Village: The main starting point for exploring Wadi Rum; Khazali Canyon: A natural corridor with fascinating rock carvings; Lawrence's Spring: A great spot for relaxation and historical exploration; Burrah Canyon Trail: An enjoyable hiking route through rock formations; Jebel Umm Addami: Jordan's highest peak for climbing enthusiasts.

Figure 2 refines the national-scale perspective of Figure 1 by zooming into Wadi Rum and representing it as a self-contained adventure trail system. From a GIS viewpoint, the map translates Wadi Rum's iconic desert landscape into a structured network of hiking and climbing routes anchored by nodal sites such as Rum Village, Khazali Canyon, Lawrence's Spring, Burrah Canyon and Jebel Umm Addami. Rum Village functions as the primary gateway node where access, guiding services and logistics are concentrated, while Khazali Canyon and the surrounding cliffs form specialized "activity clusters" for slot-canyon exploration and rock climbing. By compiling these elements in Global Mapper, the figure georeferences each attraction relative to topography and protection boundaries, providing an operational base layer for route planning, risk assessment and visitor dispersion. In line with the article's broader argument on legislative gaps in Jordanian adventure tourism, the map also helps identify where regulations on guiding qualifications, group size, age limits and emergency access must be spatially prioritized along specific corridors rather than applied generically across the desert.

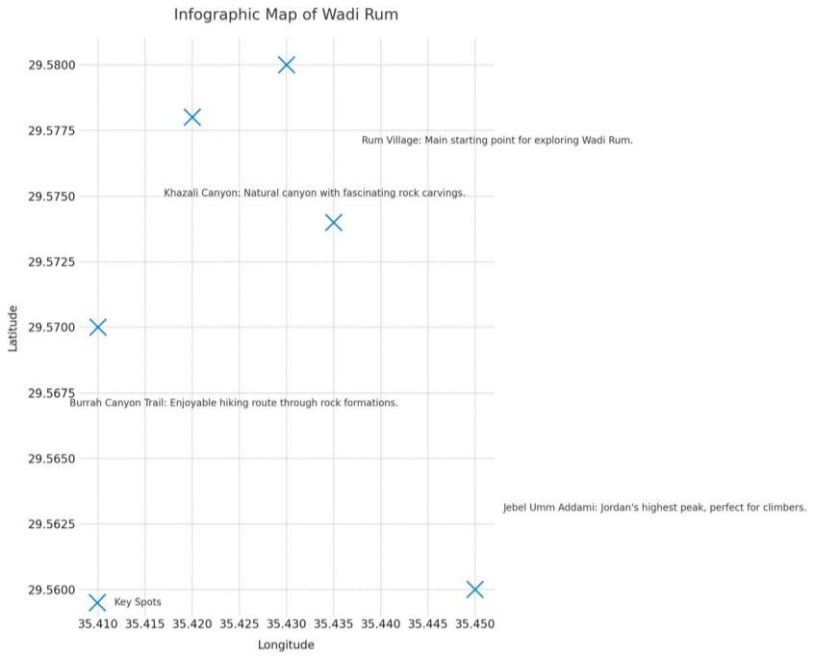


Figure 2. Adventure tourism trail map of Wadi Rum showcasing key sites like Rum Village and Khazali Canyon, focusing on hiking and climbing (Source: Author, Prepared by the researchers using Global Mapper software)

Moreover, the explicit differentiation between trail segments and key sites supports scenario building: managers can test how opening or restricting particular paths might redistribute use away from sensitive dunes or cultural features, while still preserving access to signature viewpoints and summits. In this sense, Figure 2 operates not only as a descriptive cartographic product but as an applied GIS decision tool that links micro-scale trail design in Wadi Rum to national goals for safe, inclusive and environmentally responsible adventure tourism.

Figure 3 uses GIS to organize Wadi Hidan's main elements along a defined path system, turning it from a generic canyon into a well-structured adventure environment. The map shows functional nodes like Trailhead, Hidan Pools, Canyon Viewpoint, Picnic Area, and Hiking Exit. It also shows a series of hiking routes that link these nodes. Global Mapper made these routes and gave them names. From a spatial analysis perspective, this setup shows that Hidan is a classic linear corridor product: visitors are drawn progressively from the access point at the trailhead, through shaded slot-like sections, towards concentrated aquatic attractions at the pools, before being redistributed to scenic lookouts and low-intensity picnic zones. This kind of structure is essential for regulating carrying capacity in a sensitive riparian setting where water, steep slopes, and small passageways make safety and conservation issues even worse. The figure provides emergency planners, sign makers, and zoning boards with a starting point for planning group size, guiding standards, and age limits in canyons. This is in line with the paper's call for clearer legislative guidance on these issues. The map also shows that Wadi Hidan is part of Jordan's growing list of adventure locations. It goes well with desert-based attractions like Wadi Rum and hot-spring canyons like Wadi Bin Hammad. This comparative cartographic framework helps make choices about investment and marketing on a national level by highlighting where aquatic canyoning might ease the burden on locations that are already full, like Mujib. In the end, Figure 3 shows how precise, site-level GIS mapping may support both the design of tourist experiences and changes to the law to make adventure tourism in Jordan safer and more sustainable.

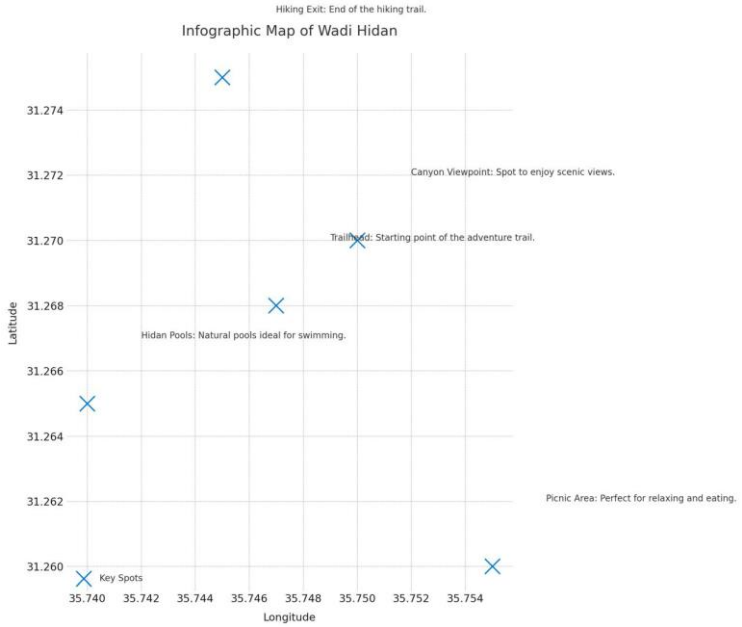


Figure 3. Adventure tourism trail map of Wadi Hidan highlighting water pools and hiking trails, focusing on swimming and the mountainous landscape (Source: Author, prepared by the researchers using Global Mapper software)

Adventure tourism trail map of Wadi Hindan, emphasizing aquatic pools and trekking routes, with a concentration on swimming and the hilly terrain. Source: Author, compiled by the researchers using Global Mapper software. Wadi Hindan is an ideal canyon for nature adventures

1. Trailhead: The starting point for exploring the canyon.
2. Hidan Pools: Natural water pools for swimming.
3. Canyon Viewpoint: A great spot to enjoy nature’s beauty.
4. Picnic Area: A perfect place to eat and relax.
5. Hiking Exit: The endpoint of the trail for return.

Adventure tourism trail map of Wadi Hindan, emphasizing aquatic pools and trekking routes, with a concentration on swimming and the hilly terrain. Source: Author, compiled by the researchers using Global Mapper software. Wadi Bin Hammad is a unique destination for hot springs and nature

1. Bin Hammad Entry: The starting point for exploring the canyon.
2. Thermal Springs: Warm natural waters for relaxation.
3. Rock Formations: Unique spots for exploration.
4. Camping Site: A suitable area for overnight camping.
5. Trail End: The endpoint of the adventure in the canyon.

Figure 4 shows that Wadi Bin Hammad is a unique part of Jordan's adventure tourism offering by utilizing GIS to highlight its thermal and restorative qualities instead of only its athletic challenges. The trail map presents the canyon as a collection of

georeferenced experiences, interconnected by a clearly marked Global Mapper route. These experiences include Bin Hammad Entry, Thermal Springs, Rock Formations, Camping Site, and Trail End. From a spatial-analytic perspective, this layout shows Bin Hammad as a "hot-spring corridor product," where flows are purposely directed toward warm-water pockets and nearby camping terraces that allow for longer stays and less intense usage. In the context of the article's legislative analysis, this mapping is crucial because it shows exactly where regulations on campsite zoning, fire use, waste management, and health-and-safety standards around geothermal waters need to be focused. This approach is in addition to the more risk-focused canyoning rules that are used in places like Mujib and Wadi Hidan. The clear labeling of camping locations also fits with the paper's focus on getting people involved in their local community. These spaces may be managed alongside adjacent communities to provide guided experiences, food, and equipment rental, which will help the economy in more ways than just day-trip operators. The map also helps with national-level scenario planning by showing Bin Hammad as a possible pressure-relief valve. This means that it might take on demand from more crowded canyons while delivering a unique wellness-oriented product focused on thermal relaxation. Figure 4 is not just an example; it is an applied GIS decision layer that helps with planning for hot-spring adventure tourism in Jordan that is legally sound, ecologically friendly, and open to everyone.

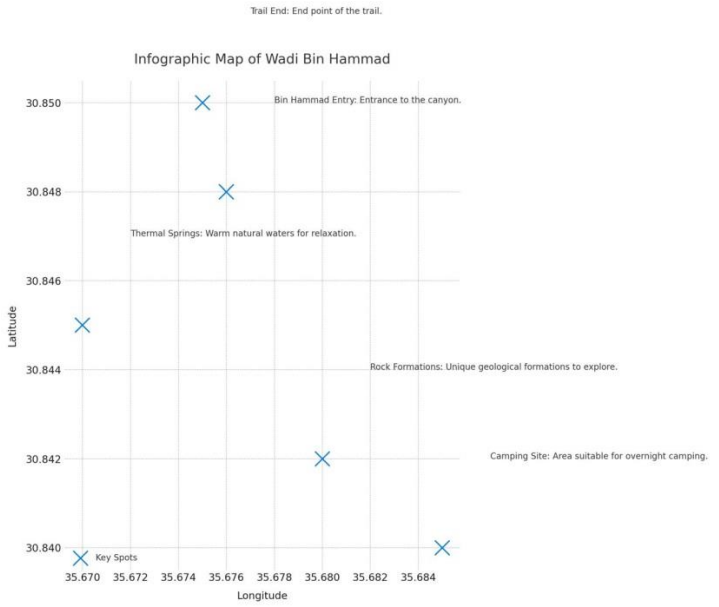


Figure 4. Adventure tourism trail map of Wadi Bin Hammad showcasing sites like thermal springs and camping areas, focusing on relaxation (Source: Author, prepared by the researchers using Global Mapper software)

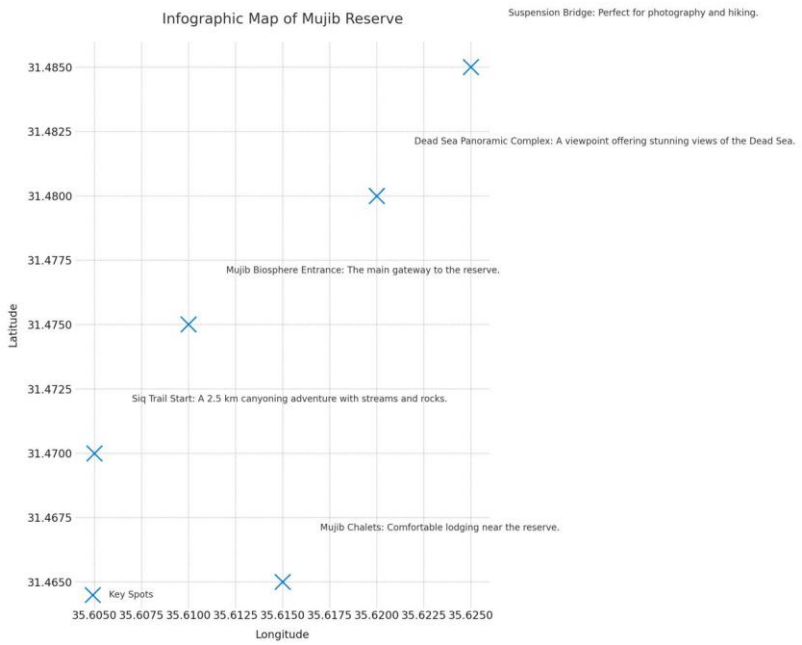


Figure 5. Adventure tourism trail map of Mujib Reserve highlighting key locations like the entrance and Siq Trail, focusing on water activities. Source: Author, prepared by the researchers using Global Mapper software

Figure 5 shows how the Mujib Biosphere Reserve, which is a well-known canyoning spot, can be turned into a clearly defined adventure corridor by mapping its main points—Mujib Biosphere Entrance, Siq Trail Start, Dead Sea Panoramic

Complex, Mujib Chalets, and the Suspension Bridge—along a single, georeferenced axis made in Global Mapper. 410-Etalon- From a GIS point of view, this setup shows that Mujib is a conventional linear water-based product. Visitors are funneled from the entryway through a 2.5 km slot canyon experience and then sent to stunning vistas and places to stay overnight. This helps managers figure out where the most aquatic danger, congestion, and ecological pressure will be, which helps them set specific regulations for group size, guiding standards, safety equipment, and emergency access. National law still tackles these issues in a general fashion. The following Dana Reserve trail map shows a different, more branching network that includes Dana Village, Wadi Dana Trailhead, Rummana Campsite, Feynan Ecolodge, and a place just for birdwatching. This paper uses GIS to show not only access but also different ecological zones and levels of activity, such as short village walks, long-distance treks, camping, and wildlife watching. This supports the argument that adventure governance should be based on the diversity of landscapes rather than a single template. The Mujib and Dana maps work together to put the study's call for a spatially explicit, SDG-aligned regulatory framework into action. They provide decision layers for zoning, carrying-capacity assessment, community co-management, and investment planning. They also make it clear where more legal detail is needed to keep canyoning and trekking safe and sustainable.

Adventure tourism trail map of Mujib Reserve, emphasizing significant sites such as the entrance and Siq Trail, with a concentration on aquatic sports. Source: Author, compiled by the researchers using Global Mapper software, Mujib Reserve is a great destination for nature lovers and adventurers.

1. Mujib Biosphere Entrance: The main gateway.
2. Siq Trail Start: A 2.5 km canyoning adventure.
3. Dead Sea Panoramic Complex: A breathtaking view.
4. Mujib Chalets: Comfortable lodging.
5. Suspension Bridge: A spot for hiking and photography.

Adventure tourism route map of Dana Reserve, emphasizing locations such as Dana Village and Feynan Ecolodge, with an emphasis on natural variety. Source: Author, compiled by researchers using Global Mapper software

Dana Village: A historic settlement offering vistas of the reserve.

Wadi Dana Trailhead: The commencement points for trekking in Wadi Dana.

Rummana Campsite: A well-frequent camping location inside the reserve.

Feynan Ecolodge: An eco-lodge recognized for its sustainability.

Bird Watching Location: A good site for ornithologists.

Figure 6 shows that the technique used in Dana is not just one long route, but rather a multi-nodal, biologically diversified adventure system. It does this by utilizing GIS to organize major sites—Dana Village, Wadi Dana Trailhead, Rummana Campsite, Feynan Ecolodge, and the Bird Watching Location—into a cohesive spatial network.

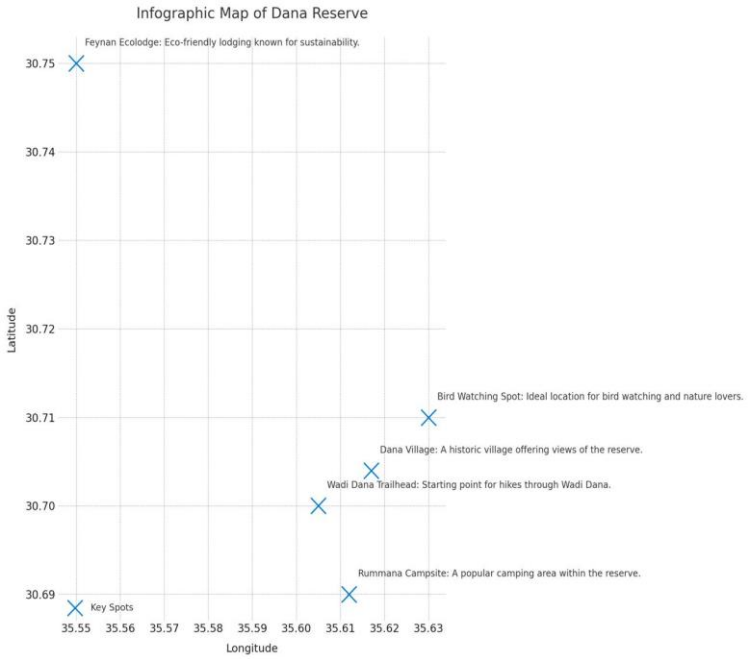


Figure 6. Adventure tourism trail map of Dana Reserve highlighting sites like Dana Village and Feynan Ecolodge, focusing on ecological diversity (Source: Author, prepared by the researchers using Global Mapper software)

The map shows Dana's whole altitudinal gradient, from the cliff-edge town that looks out over the Great Rift to the dry lowlands at Feynan. It also shows how hiking trails connect different ecological zones. This structure is different from the heavily corridor-bound products (like Mujib Siq) since it shows Dana as a branching, landscape-scale experience where flows may be spread out across several pathways and habitat kinds. By putting these things together in Global Mapper, the figure georeferences each node to the landscape, reserve limits, and access locations. This makes the map a useful decision layer for zoning, navigation, and risk management. Dana Village and the Wadi Dana trailhead are the main entrances.

Rummana Campsite and Feynan Ecolodge are overnight "anchors" that let people stay longer and plan low-impact trips. The bird-watching node is a specialized, knowledge-intensive activity that fits with conservation goals. This regional difference bolsters the article's overarching thesis that adventure governance in Jordan should be customized to the variety of landscapes rather than imposed via a uniform framework. The Dana map also shows how adventure tourism can help meet many SDGs at the same time. For example, it connects ecological protection (SDG 15) with community-based hostels and campsites that improve local livelihoods (SDG 8) inside a protected-area framework (SDG 11). Figure 6 is more than just a map; it shows where ecological sensitivity, visitor use, and community infrastructure meet. It is an applied GIS tool that can help with carrying-capacity assessments, trail maintenance priorities, and the spatial targeting of future legislative reforms for safe, inclusive, and environmentally responsible adventure tourism in Dana Reserve.

Figure 7 uses GIS to turn Aqaba's coastline into a structured marine adventure corridor by putting important nodes—Aqaba Marine Park, South Beach, Ayla Oasis, Berenice Beach Club, and the designated snorkeling and diving location—into a single spatial network instead of an assortment of beach spots. These sites are georeferenced in Global Mapper along the same littoral axis, showing how recreational flows move along the shoreline: from the conservation-focused sanctuary of Aqaba Marine Park, through mixed-use leisure areas at South Beach, to higher-end resort and club clusters at Ayla and Berenice. This coastal "trail" is less of a walking path and more of a marine-use gradient, going from public access and biodiversity conservation to more private, service-heavy experiences and high-intensity reef engagement at the snorkeling and diving node. The map shows a major gap that was pointed out in the paper from a GIS and governance perspective: while Jordan's 2019 Instructions for Organizing Adventure Tourism Trips cover land-based activities like hiking and canyoning, they only partially cover marine adventure tourism, especially diving, snorkeling, and motorized water sports.

Figure 7 illustrates the precise intersection of coral reefs, entry points, and tourism facilities. This system makes it possible to zone mooring areas, control boat access, set carrying capacities for popular dive sites, and enforce safety and environmental rules that are in line with SDGs on life below water, decent work, and sustainable destinations. The visualized network also shows that Aqaba is the maritime version of adventure centers like Wadi Rum, Mujib, and Dana, which are all in the same country and include deserts, mountains, and seascapes.

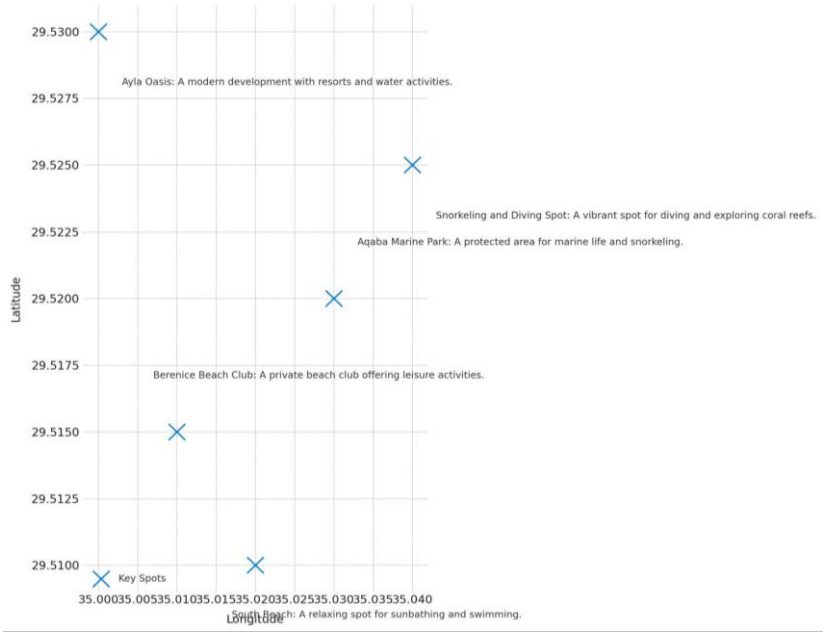


Figure 7. Adventure tourism trail map of Aqaba showcasing marine sites like Aqaba Marine Park and South Beach, focusing on diving (Source: Author, prepared by the researchers using Global Mapper software)

Aqaba adventure tourism trail map highlighting marine locations such as Aqaba Marine Park and South Beach, with an emphasis on diving activities.

Source: Author, compiled by the researchers using Global Mapper software

Aqaba Marine Park: A designated sanctuary for marine biodiversity and diving activities.

South Beach: A destination for leisure and aquatic activities.

Ayla Oasis: A contemporary locale with resorts and aquatic activities.

Berenice Beach Club: A private beach club providing leisure activities.

Snorkeling and Diving Location: An area abundant in coral reefs and diving opportunities

Figure 8 combines the previous site-level maps into one picture of Jordan's adventure tourism system. It uses GIS to show the important locations—Wadi Rum, Wadi Hidan, Wadi Bin Hammad, Mujib Biosphere Reserve, Dana Reserve, and Aqaba's coastal corridor—within one national frame. This composite layer, made in Global Mapper, shows that adventure products are not randomly spread out but are instead grouped together in Jordan's main physiographic regions: the Rift Valley canyons (Mujib, Hidan, and Bin Hammad), the desert plateaus of Wadi Rum, the highland ecotourism hub of Dana, and the Red Sea coastline at Aqaba. From a GIS perspective, Figure 8 is like a national "meta-map" of adventure

opportunities and the need for governance. It graphically supports the conclusion's claim that Jordan has a very diverse portfolio, with activities ranging from desert hiking and climbing to canyoning and relaxing in hot springs to sea diving. However, this variety is limited by a broken and incomplete set of laws. The map shows spatial imbalances by putting all the nodes on the same reference base. For example, Wadi Rum and Mujib are already heavily used and stressed by the environment, while Wadi Bin Hammad is underused and could be used more effectively with the right infrastructure and rules. The graphical map is a practical way to start multi-scalar analysis. Regulators can use it to create zoned regulations by adding administrative boundaries, transport axes, and protected-area polygons. The method is better than using a one-size-fits-all set of 2019 "Instructions for Organizing Adventure Tourism Trips," which don't cover marine and aerial products, people with disabilities, or integrated digital information platforms. Figure 8 may also help planners figure out where to put additional community-based programs, emergency response centers, or monitoring stations to make the adventure network safer and more in line with the SDGs. Figure 8 is not just a graphical overview; it is a strategic GIS decision layer that brings together all of Jordan's different adventure landscapes into a single national planning and policy framework.

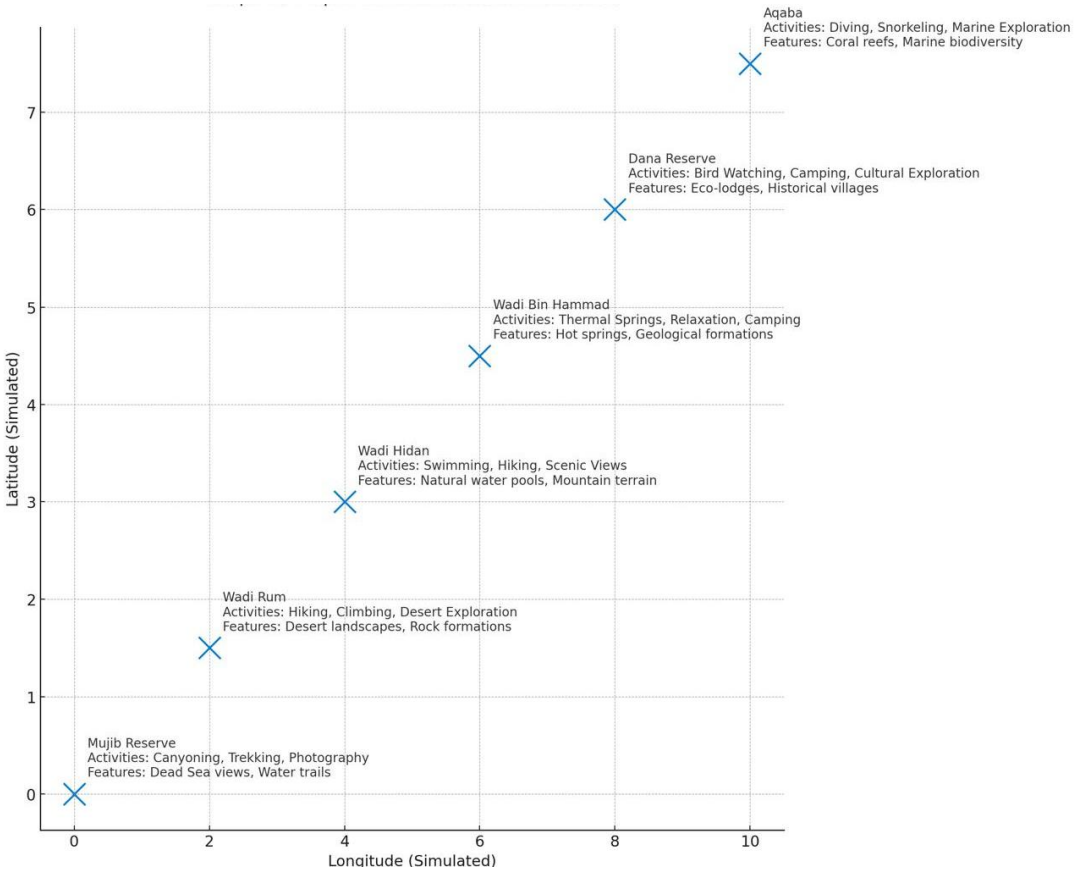


Figure 8. Graphical Map of Adventure Tourism Locations (Source: Author, prepared by the researchers using Global Mapper software)

CONCLUSION

Adventure tourism in Jordan has a lot of potential to help the economy grow in a way that is good for the environment and for cultural exchange. Jordan is a great place for adventure tourism since it has a wide range of landscapes, from the deserts of Wadi Rum to the marine life of Aqaba. But to fully and responsibly realize this potential, we need a flexible and comprehensive set of rules that not only takes care of the safety and logistical issues of adventure activities but also fits with the United Nations Sustainable Development Goals (SDGs) and the bigger ideas behind sustainable development.

This study has taken a close look at the current legislative and administrative frameworks that regulate adventure tourism in Jordan. The research looked at the 2019 "Instructions for Organizing Adventure Tourism Trips" and other relevant rules and found a number of holes in the laws that make it hard for this industry to flourish in a way that is good for everyone. The existing legal system doesn't fully cover maritime and aerial adventure tourism, doesn't include people with disabilities, and doesn't have a single digital platform that brings together all the information that visitors, operators, and regulators need. Geospatial mapping and site analysis provide a full picture of the adventure tourism scene in Jordan.

This geographical study showed where adventure activities are located and what kinds of activities are accessible (Student et al., 2016). It also showed places that need more regulation and areas that may be developed. For example, Wadi Rum and the Mujib Biosphere Reserve have a lot of natural resources, but they also have problems with too many tourists, damage to the ecosystem, and not enough ways to respond to emergencies. On the other hand, places that aren't as well known, like Wadi Bin Hammad, have latent potential that might be used with the right infrastructure and rules.

The results show that Jordan has to take a more comprehensive strategy to regulating adventure tourism. This means making the legal definition of adventure tourism broader to include more activities and making sure that all relevant

parties—government agencies, local communities, private tour operators, and tourists—are involved in the planning and execution of these activities. Also, creating a single, publicly available digital site will greatly increase transparency, make it easier to follow the rules, and make the entire visitor experience better. The report also stresses how important local communities are to the growth of sustainable adventure tourism. Getting people in the area involved not only helps protect their culture, but it also produces jobs and gives them a feeling of ownership and responsibility for natural and cultural resources. So, community-based tourism models should be fostered and supported via specific laws, money incentives, and programs that help people grow their skills.

The study also calls for adding environmental protection measures to the rules that already exist. Adventure tourism typically takes place in vulnerable environments that may be easily harmed by people who aren't being watched or who don't care. Regulations should require tourist businesses to do environmental impact assessments, follow rigorous rules for managing trash, and encourage the adoption of eco-friendly infrastructure and practices. From a policy point of view, it's evident that agencies need to work together to eliminate jurisdictional gaps and overlaps.

A separate regulatory organization for adventure tourism may be set up to make it easier to create, carry out, and keep an eye on policies. This group would also be in charge of certifying operators, giving training programs its stamp of approval, and making sure that safety and environmental criteria are met. Education and training are important parts of raising the standards of adventure tourism in Jordan. Creating specialized courses and certification programs for guides and operators would make the industry more professional and make tourists safer and happier (Coghlan & Prayag, 2025). Also, programs to raise awareness among both domestic and foreign visitors should encourage responsible conduct and make more people choose eco-friendly adventure tourism alternatives.

In conclusion, Jordan is at a very important point in its adventure tourism path. The nation may become a regional leader in sustainable adventure tourism by filling up the regulatory holes it has found, using its natural and cultural resources, and making sure its policies are in line with the SDGs. This will need political will, cooperation from all parties involved, and a promise to keep becoming better. The suggestions in this report show how to make Jordan's adventure tourism industry an example of legal strength, environmental responsibility, and social inclusion. Long-term studies on the effects of adopted rules, looking into how tourists feel about them, and comparing them to the best practices in adventure tourism regulation throughout the world might all be done in the future. There are a lot of overlapping laws and duties that make up the regulatory framework for tourism, and they range from one level of government to the next.

There are international laws, guidelines, conventions, and treaties that deal with different parts of tourism, but there is no one law that covers the whole business. At the national level, several laws and authorities are in charge of tourist development when it comes to things like public health, safety, the environment, and more. Even while this set of rules is meant to address the needs and concerns of the travel industry, they are frequently not linked or presented in a way that takes into account the unique aspects of the travel industry, which means that the industry has high expectations that are not satisfied (Ternel, 2017). Tourism planners frequently don't have the tools they need, even when rules don't need a very technical approach and use wider or softer language. These kinds of rules and laws seem to fall under what may be called "development control." For instance, there aren't many rules in the land-use regulatory system that have to do with tourism.

The idea of Sustainable Development (SD) came about when people had a clearer idea of how tourism might benefit itself and help the environment in the long run. The SD principles may be understood and put into action differently in each culture. Sustainable development, by definition and in general, meant that the use of resources, the kind of investments, and the distribution of income were such that the limitations to development would not be surpassed in a wider sense.

Making sure that the resource base that development relies on is effectively taken care of depends on making sure that non-renewable resources could flow and be accessed, as well as setting restrictions or controls on their use.

Recommendations

Even though adventure tourism has the potential for big and long-lasting growth because of its unique benefits, Jordan still has a lot of problems that need to be solved quickly and effectively to protect and grow this industry for future generations. These problems are mostly related to important things like the environment, managing visitors, keeping natural supplies from running out, and the economy.

The government-run tourism campaign helps bring in tourists by strategically highlighting the country's most interesting sights, like Petra, the Kings Highway, Amman, Wadi Rum, Madaba, Aqaba, and the Dead Sea. These places promise one-of-a-kind experiences that will definitely appeal to a wide range of adventure seekers and fans. There are a lot more tourists going to Petra now than there were three years ago. This is clear because the number of tourists has doubled in that time. This upward trend is also happening in Wadi Rum, where new marketing efforts are being used to show how amazing this place is.

On the basis of the past results, several action plans can be suggested that will help the field grow as a whole:

1 - Making sure that outdoor travel in Jordan is safer and more secure. Safety rules and guidelines need to be made public, along with the training that goes with them, so that employees can handle situations and assess risks better. It is also important to make sure that the administration's safety and security rules and guidelines are followed, as this protects the rights of people who are at risk because of noncompliance.

2 - People who work in the tourism business need to get their ideas about adventure tourism straightened out, and companies need to be pushed to follow international rules so they can attract tourists from all over the world.

3 - It's important to stress how important it is to build the right infrastructure for the destination in order to attract adventure tourism. This includes thinking about the level of services offered, how they're growing, and how diverse they are to meet different tastes. For example, making sure there are reliable road networks and good air or water

transportation options so that people can easily get to different adventure sites and activities, as well as their safety rul es and the quality of natural phenomena to make sure everyone has a fun and safe time.

4 - Pay more attention to teaching and spreading information about the unique aspects of adventure tourism. This will bring in more people from around the world who want to experience new things and see the beauty of Jordan.

5 - Get more people interested in making sure there is good healthcare close by in case of any unplanned medical emergencies that might happen on exciting expeditions. This will not only give adventure tourists confidence, but it will also give them peace of mind, since safety is the most important thing to adventure tourists, and they look for places that follow reliable safety rules.

6 - Jordan can become known as a top location for adventurers seeking the ultimate thrill and excitement by offering a wide range of fun activities and making sure all of its customers are happy.

Improving relationships and teamwork with nearby countries, making borders less closed, and being less cautious about visitors who want to see and experience the country. Taking advantage of the country's go vernment security to bring in the most guests and people who want to invest in the tourism industry sector. I.M.A. O.J. (E.A.D.A.F.) (U.A.N.)

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CULTURAL HERITAGE IN THE DIGITAL AGE: HOW JOY OF MISSING OUT SHAPES GENERATION Z'S AUTHENTIC CULTURAL EXPERIENCES THROUGH DIGITAL WELLNESS PRACTICES

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Abstract: This study examines the complex relationship between digital wellness practices and cultural heritage tourism intentions among Generation Z, focusing on the mediating role of the 'Joy of Missing Out' (JOMO). We aimed to understand how conscious digital consumption, particularly digital detox behavior, influences the desire for authentic cultural experiences. A quantitative cross-sectional survey was administered to high school students in Ho Chi Minh City, Vietnam. This demographic was chosen because it represents a digitally native generation, making them ideal subjects for examining the impact of digital habits. Validated measurement scales were used to ensure the reliability and validity of the data collected on digital detox, JOMO, authentic cultural experience seeking, and cultural heritage tourism intentions. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for data analysis, allowing for the simultaneous assessment of multiple hypothesized relationships within the theoretical framework. The results unequivocally support all hypothesized relationships, demonstrating robust statistical significance. Crucially, digital detox practices have a positive influence on the development of JOMO, indicating that consciously disengaging from digital platforms fosters a sense of contentment with one's current offline experiences. Furthermore, both digital detox practices and the cultivation of JOMO significantly influenced attitudes toward and intentions to engage in heritage tourism. The integrated theoretical framework successfully explained substantial variance in heritage tourism intentions, underscoring the complexity of the factors driving Generation Z's cultural tourism behavior. This behavior, our findings suggest, emerges from a dynamic interplay between conscious digital consumption modification, psychological wellness states (such as JOMO), and a genuine appreciation for authentic cultural experiences. The findings demonstrate that Joy of Missing Out serves as a crucial psychological mechanism linking digital detox behaviors to authentic cultural experience seeking, providing valuable insights for cultural tourism marketing strategies and destination management approaches targeting digitally native generations.

Keywords: cultural heritage tourism, Joy of Missing Out, digital detox practices, Generation Z, authentic cultural experiences

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INTRODUCTION

Heritage tourism, which includes trips to historical sites, cultural attractions, and places of cultural significance, is a great way to learn about how Generation Z travels. Heritage tourism differs from typical leisure tourism, which is centered on relaxation and enjoyment. Instead, it focuses on learning about other cultures, appreciating history, and engaging with cultural narratives in a way that aligns with Generation Z's values-driven consumption behaviors (Wojcieszak-Zbierska, 2023). Generation Z's digital nativity and their growing interest in authentic cultural experiences present distinct theoretical and practical challenges for understanding how people choose to participate in heritage tourism trips in today's digital world.

The tourism industry has undergone significant changes since Generation Z emerged as a major consumer group. This has changed where people want to go, why they want to travel, and how they make decisions about traveling. Generation Z, which includes those born between 1997 and 2012, is the first group of people who are genuinely "digital natives." Recent studies have shown that Generation Z has a peculiar relationship with digital technology. They are very involved with it, but are also becoming increasingly aware of how tired and overwhelmed they are by the amount of information (Tan et al., 2025). This generation uses smartphones more than any other, spending between 9 and 12 hours a day on them. Simultaneously, they are becoming increasingly interested in digital wellness practices and adapting their technology use (Irimiás, 2023). The rise of

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terms like "Fear of Missing Out" (FOMO) and "Joy of Missing Out" (JOMO) indicates that Generation Z has a profound understanding of how digital technology affects their minds and is actively working to find a balance in its use (Riu, 2025).

The COVID-19 pandemic has intensified these dynamics by increasing people's dependence on technology and highlighting the importance of disengaging and paying attention to their surroundings. Research indicates that the pandemic's impact on digital saturation has heightened people's interest in authentic, reflective experiences that offer a respite from being overwhelmed by technology, while still retaining personal and cultural significance (Djafarova & Kim, 2025). Heritage tourism destinations, which focus on cultural depth, historical relevance, and thoughtful involvement, are a good fit for Generation Z's post-pandemic quest for experiences that are more than just mindless digital consumption. Modern tourism research has recognized the need for more advanced theoretical frameworks that account for the complexity of Generation Z's travel behavior within the context of the digital revolution (Priporas et al., 2024).

Traditional models of tourist behavior, which are primarily based on a single theoretical perspective, do not effectively explain the numerous factors that influence how people make travel decisions today. Digital wellness practices, psychological states that encourage mindful consumption, and preferences for heritage tourism all converge in a way that necessitates integrated theoretical approaches that consider both rational decision-making processes and how environmental stimuli influence the formation of behavioral intentions (Khoa et al., 2022). Digital detox practices have become increasingly popular as a means to intentionally change behavior, such as using less technology and being more aware of one's surroundings.

Wojcieszak-Zbierska (2023) examined what university students liked about digital detoxing and found that they enjoyed travelling without technology, but struggled to stay away from technology for extended periods. This study demonstrates that digital detox practices are crucial for influencing tourist behavior, highlighting the need for theoretical frameworks that explain how altering our digital device usage affects our vacation choices and plans. There are still many aspects of digital wellness practices that remain unknown regarding their impact on tourism behavior, particularly in relation to the specific role of heritage tourism within digital wellness frameworks (Cuong et al., 2025). Most of the research conducted so far has looked at negative mental states, such as FOMO, but not positive mental states that encourage healthy tourism consumption practices. There has been limited research on how to integrate classic tourism behavior theories with contemporary digital wellness concepts. This has led to a lack of understanding of how Generation Z behaves when traveling in a digital society (Arenas-Escaso et al., 2024). The first significant gap in the research is that no integrated theoretical framework combines old theories of tourism behavior with modern ideas about digital well-being to explain how Generation Z forms its heritage tourism intentions. Most existing research has employed only one theoretical approach, which does not help us fully grasp complex modern events, such as digital transformation and generational shifts. Harahap et al. (2024) employed the TPB framework to investigate travel intentions, and Djafarova & Kim (2025) showed how JOMO affects consumer behavior.

However, no research has combined these two theoretical areas to provide a comprehensive understanding of how Generation Z engages with heritage tourism. Not integrating theories makes it harder to comprehend how conventional attitude-intention relationships work with modern digital wellness activities and mental states to affect heritage tourism preferences. This gap highlights the need to develop integrated theoretical frameworks that account for both rational decision-making processes and environmental cues, as well as digital health components pertinent to how Generation Z navigates travel. The second important study gap is that there is a lack of information about the Joy of Missing Out as a means to connect digital detox practices to heritage tourism outcomes within established frameworks for tourism behavior.

Research has been conducted on how JOMO influences consumer behavior (Tan et al., 2025) and how digital detox practices appeal to young tourists (Wojcieszak-Zbierska, 2023); however, no research has examined the specific role of JOMO in forming heritage tourism intentions. This gap is significant because historical tourism naturally aligns with JOMO values by focusing on cultural engagement that encourages thinking, appreciation of authentic experiences, and mindfulness of the present moment. The lack of research on JOMO's mediating role makes it difficult to understand the psychological processes by which digital wellness practices affect heritage tourism behavior. This makes it harder to develop both theoretical and practical applications for marketing heritage tourism and managing destinations that target Generation Z. This study aims to fill in the gaps in the research by creating and testing an integrated theoretical framework that combines the Theory of Reasoned Action (TRA) with the Stimulus-Organism-Response (SOR) paradigm to explain how Generation Z's desire to go on heritage tourism trips is formed through digital detox practices and Joy of Missing Out. The primary objective of this study was to investigate the impact of digital detox practices and online reviews on individuals' plans to visit heritage sites, with a focus on altering their attitudes. The second goal was to test the integrated framework's ability to explain and predict Generation Z's heritage tourism behavior in today's digital society. The remainder of this article is organized into five main sections. The literature review examines all relevant theoretical frameworks in depth, exploring their relationships with one another, which helps to develop hypotheses. The methodology section explains the quantitative study strategy, the tools used to quantify things, and how the data were collected. The results section shows how to test the measurement model and analyze the structural model with hypothesis testing. The conclusion discusses the theoretical and practical implications of the findings, highlights their limitations, and suggests future research directions that could help us gain a deeper understanding of Generation Z's heritage tourist behavior in the context of the digital transition.

LITERATURE REVIEW

Generation Z, Digital Detox Practices, and Heritage Tourism Intention

Generation Z has emerged as a significant force in tourism, transforming the way people travel and utilize technology. This group of people, born between 1997 and 2012, has grown up with digital technologies; however, they are increasingly interested in real-life experiences and seeking to disconnect from technology (Cheung et al., 2021). Heritage tourism, which

encompasses visits to historical sites, cultural attractions, and places of cultural significance, has emerged as an intriguing way for Generation Z to strike a balance between online connectivity and authentic travel experiences (Khoa & Huynh, 2024).

The academic debate surrounding Generation Z's travel habits reveals a complex relationship with technology that extends beyond their use of it. This generation is more digitally engaged than any other, with smartphones acting as extensions of their bodies (Irimiás, 2023). Simultaneously, they are becoming more aware of the need for digital balance. This contradictory relationship is evident in their travel tastes, where the need for "Instagrammable" moments coexists with a respect for real, meaningful travel experiences that historical sites offer in a way that no other place can (Djafarova & Bowes, 2021). Heritage tourism is an exciting way to consider Generation Z's travel plans, as it offers both the visual appeal that people crave on social media and the cultural depth that aligns with this generation's values-driven shopping habits. The literature suggests that Generation Z tourists are not merely passive consumers of heritage experiences; they are also active participants who seek to understand and connect with cultural stories, while navigating the pressures of social validation and digital presentation (Syamsudin et al., 2025). Digital detox methods have become increasingly popular for managing information overload and digital fatigue. This is a significant step forward in understanding why people travel today. Studies show that during the pandemic, people were more dependent on technology while also realizing the benefits of disconnection. This has sparked an increased interest in mindful travel experiences among more people (Diaz-Meneses & Estupinan-Ojeda, 2022). This is especially true for heritage tourism, where cultural sites inherently lend themselves to fragmented and immersive encounters.

Theoretical Framework: Integrating TRA and SOR Paradigms

To understand Generation Z's intentions for heritage tourism, we need a comprehensive framework that considers both their decision-making processes and their responses to various environmental stimuli. This study proposes an integrated model that combines the Theory of Reasoned Action (TRA) with the Stimulus-Organism-Response (SOR) paradigm to provide a comprehensive understanding of how digital detox practices and JOMO influence people's plans to visit heritage sites.

The TRA states that attitudes toward a behavior and subjective standards are the main factors that shape behavioral intentions (Tran & Khoa, 2025). This paradigm is beneficial for understanding Generation Z's interest in historical tourism because it considers the cognitive processes that go into making travel decisions and the social components that are very important for this generation, which is always online. The TRA's attitude component includes how people feel about their historical tourism experiences, which are shaped by their perceptions of the benefits, their values, and their expectations. Several factors influence how Generation Z perceives historical tourism, including their interest in other cultures, the educational value of the experience, and its social relevance (Robinson & Schänzel, 2019).

Research shows that having a favorable attitude toward travel experiences significantly affects people's intentions to behave in specific ways. Heritage tourism offers unique value propositions that appeal to Generation Z's demand for real and meaningful experiences (Uslu & Tosun, 2024). Online reviews are a crucial component of the TRA framework because they serve as external sources of information that influence attitudes and behavior (Khoa, 2021). There has been much research on the importance of peer-generated content in making travel decisions. Generation Z, in particular, relies heavily on digital word-of-mouth and user-generated content to inform their decisions about where to go and what to do (Yamagishi et al., 2023). Online reviews serve as both sources of knowledge that influence people's opinions and social proof processes that establish subjective norms for participating in historical tourism.

The SOR paradigm examines how external stimuli affect internal states (organisms), which then lead to behavioral responses (Nguyen et al., 2023). This is a different perspective that aligns with other theories. In this way, digital detox practices serve as environmental stimuli that alter people's mental states, particularly in the development of JOMO, which subsequently influences their plans for heritage tourist trips. Digital detox techniques are intentional behavioral changes that lower digital use and encourage more mindful interactions with the real world (Ozdemir & Goktas, 2021). These activities serve as triggers that give our minds room to think, ponder, and genuinely appreciate experiences. The research reveals that Generation Z is especially interested in digital detox techniques because they help them take a break from being overwhelmed by technology while still being in charge of how they use it (Liu, 2024). Within the SOR framework, JOMO is an important organismic variable. It refers to the internal mental state of being content with being alone and being fully aware of the present moment. Studies have shown that JOMO is associated with improved health, reduced worry, and a greater appreciation for the present moment (Djafarova & Kim, 2025). This mental state is ideal for engaging people in historic tourism, as it aligns with the deep and reflective nature of cultural encounters.

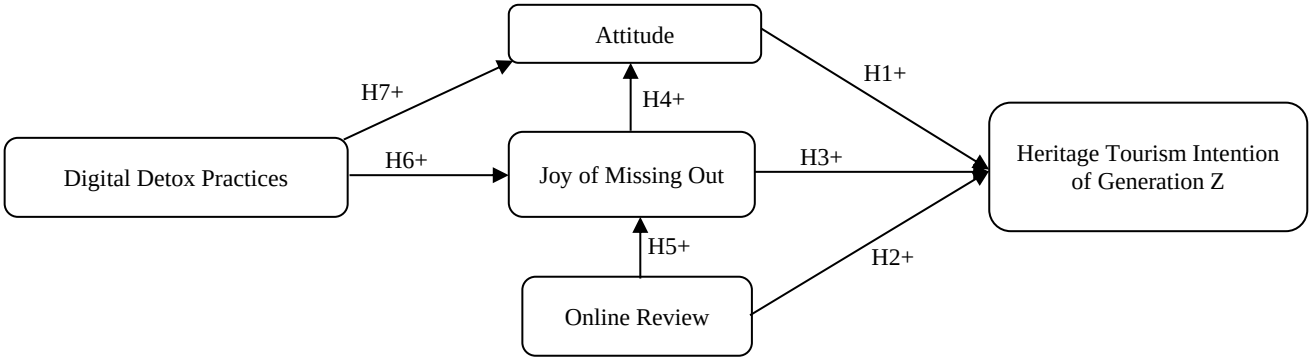


Figure 1. Conceptual model

Combining the TRA and SOR paradigms creates a comprehensive model that considers both rational decision-making processes and experiences that influence people's plans to visit heritage sites. This theory understands that Generation Z's travel choices are the result of complicated interactions between their thoughts (attitudes), social factors (online reviews), changes in their environment (digital detox practices), and emotional states (JOMO). This theoretical integration considers the unique characteristics of Generation Z while also providing a solid foundation for understanding how people choose to participate in heritage tourism trips. Figure 1 illustrates how the generation is digitally native, how their connection with technology is evolving, and how they are becoming increasingly interested in real, meaningful travel experiences.

Research Hypotheses Development

The Theory of Reasoned Action is based on the idea that attitudes and behavioral intentions are linked. There is considerable evidence that suggests having positive attitudes towards certain behaviors increases the likelihood that people will engage in such behaviors. In the context of heritage tourism, attitudes include judgments regarding the value, engagement, and personal relevance of cultural and historical sites. Research in the tourism field has consistently shown that attitudes and travel intentions are linked. Harahap et al. (2024) found that having a favorable attitude toward tourism experiences significantly affects people's behavioral intentions, and several psychological and social elements mediate this effect. Generation Z's views on legacy tourism are particularly shaped by their perceptions of its authenticity, educational value, and cultural significance. This generation is more sensitive to experiences that align with their ideals and help them grow as individuals, learning about other cultures (Dimitriou & AbouElgheit, 2019). Heritage tourism sites offer unique value propositions that appeal to Generation Z's desire for travel experiences that are more than just entertainment (Atzeni et al., 2022). Several factors influence how Generation Z perceives legacy tourism, including perceived educational benefits, cultural curiosity, and social significance. Studies have shown that heritage sites offer opportunities for self-reflection and cultural learning that appeal to this generation's demand for travel experiences that change them. When Generation Z has positive feelings about heritage tourism, such as valuing cultural and historical significance, they are more likely to plan trips to heritage sites.

H1: Attitude positively impacts Heritage Tourism Intention of Generation Z.

Online reviews are a crucial source of information for Generation Z when planning their travel (Yimeng et al., 2021). They act like digital word-of-mouth and have a significant impact on how people perceive a place and whether they want to visit it. There has been much research on the importance of peer-generated information for organizing trips. Generation Z, in particular, relies on real user experiences published on digital platforms (Zhu et al., 2020). Uslu & Tosun (2024) found that online reviews have a significant impact on people's travel plans. Positive evaluations make a destination more appealing, while negative reviews deter people from visiting. Their research showed that Internet reviews can serve multiple purposes, such as providing information, demonstrating social proof, and reducing risk. These are all very significant for Generation Z travelers who have not visited many heritage sites in person.

This generation is comfortable with online information sources and is a digital native, making online reviews even more important for their plans to visit heritage sites. Irimiás (2023) states that young visitors rarely use traditional sources of information. Instead, they prefer content created by their peers, which provides fundamental insights into travel experiences. Online evaluations offer Generation Z detailed, firsthand perspectives on heritage sites, helping them determine whether their travel choices align with what the sites have to offer (Elgammal et al., 2024). Online reviews have a direct impact on heritage tourism plans, as they provide valuable information on the cultural significance, educational benefits, and quality of experiences at heritage sites. Positive reviews that discuss how heritage experiences can transform individuals, the depth of cultural learning opportunities, and the authenticity of historical stories are compelling for Generation Z, who prioritize meaningful travel experiences over superficial tourism (Khoa et al., 2022).

H2: Online Review positively impacts Heritage Tourism Intention of Generation Z

The Joy of Missing Out (JOMO) is a mental state in which a person is happy to be away from digital stress and enjoys living in the present moment. This idea has become an increasingly important aspect of how people travel nowadays, especially among younger individuals who are tired of technology and seek genuine travel experiences. Djafarova & Kim (2025) demonstrated that JOMO has a significant impact on people's travel desires, as it is closely linked to mindfulness, well-being, and a passion for authentic experiences. Their research shows that people who experience JOMO are more inclined to seek vacation experiences that align with the principles of being present, genuine, and engaging in meaningful interactions, rather than seeking social approval or showcasing themselves online. Heritage tourism sites naturally align with JOMO principles because they offer experiences that prompt reflection, learning, and connection with cultural stories in a way that fosters awareness of the present moment and deep engagement. According to the literature, heritage sites are the best places for JOMO expression because they inspire people to think, study, and appreciate the richness of culture rather than consume it (Tan et al., 2025). For Generation Z, JOMO is a smart way to deal with the stress of social media and the excessive information that is common in today's youth culture. Research indicates that young adults who experience JOMO tend to feel better, experience less anxiety, and value genuine experiences more (Dieck et al., 2023). These mental health benefits make heritage tourism more appealing, as heritage sites offer the cultural richness and peaceful ambiance that people seeking solitude look for.

H3: Joy of Missing Out positively impacts Heritage Tourism Intention among Generation Z.

The link between JOMO and people's feelings about historic tourism illustrates how mental states can influence their thoughts about travel experiences. JOMO, which stands for "Just Over Me, Over It," refers to being happy with being alone and being present in the moment, making people more likely to appreciate the distinctive value propositions of historic tourism (Perez et al., 2024). Tan et al. (2025) found that JOMO encourages thankfulness and mindfulness, which are mental states that help people appreciate real and meaningful events. These mental benefits lead to more favorable feelings about travel

experiences that align with the JOMO principles, such as historical tourism sites that offer cultural richness and provide opportunities for reflection. JOMO alters people's perceptions of heritage tourism by providing them with mental space to appreciate its cultural and historical value. When Generation Z adopts JOMO principles, they become more aware of the present moment and less concerned with getting approval from others. This helps them better understand the educational and cultural value of heritage sites (Djafarova & Kim, 2025). Heritage tourism is similar to JOMO in that it encourages people to be present and appreciate real experiences. Heritage sites are places where people can reflect on their past, learn about other cultures, and interpret history in a way that makes sense to them (Guo et al., 2024). This inherent connection between JOMO psychological states and legacy tourism traits makes it easier for people to form opinions about heritage travel experiences.

H4: Joy of Missing Out positively impacts the attitude of Generation Z towards heritage tourism.

The link between online reviews and JOMO highlights the complexity of using digital material consumption to raise awareness of digital well-being (Eitan & Gazit, 2024). Reading online evaluations, especially those that discuss genuine, mindful travel experiences, may help people recognize the benefits of JOMO and encourage them to adopt mindful consumption practices. Studies show that online reviews are a significant source of information that affects not only how people perceive a place, but also how they think about travel and spend their money on tourism. Dane & Rockmann (2020) state that reading real travel stories can help people learn about the benefits of mindful travel and motivate them to adopt more conscious travel habits that align with JOMO principles. Online evaluations that focus on the benefits of detached and aware vacation experiences can help Generation Z develop JOMO (Duy et al., 2025). Young travelers may learn to appreciate the benefits of JOMO and change the way they travel by reading real stories of transformative travel experiences that involve being present in the moment and learning about other cultures. Online reviews have a significant impact on JOMO growth, particularly for Generation Z, who rely on content created by their peers for information and validation (Habeeb, 2021). Reading reviews that discuss the mental health benefits of being aware when traveling, immersing oneself in a new culture, and disconnecting from technology can help people understand the importance of JOMO and encourage them to adopt the same mindset.

H5: Online reviews positively impact the Joy of Missing Out of Generation Z.

Digital detox techniques are intentional changes in behavior designed to reduce digital usage and foster awareness of the physical world. These activities help JOMO grow by providing people with the mental space to be aware of and appreciate the current moment and offline experiences. Wojcieszak-Zbierska (2023) demonstrates that digital detox techniques, specifically reducing social media usage and intentionally taking breaks from technology, can enhance mental health and foster a greater appreciation for the present moment. These habits help JOMO grow by making people less overwhelmed by technology and encouraging them to be more present in their lives. The link between digital detox practices and JOMO demonstrates how reduced digital stimulation and increased awareness of the present moment can benefit mental health (Eitan & Gazit, 2024). When Generation Z engages in digital detoxes, they often feel less anxious, more focused, and more grateful for offline experiences. These are all signs of JOMO (Nguyen et al., 2024). Digital detox practices help JOMO grow by showing people how disconnecting can be good for them (Sarkar et al., 2025). As members of Generation Z try to cut back on their computer use and experience the mental benefits that come with it, they learn to appreciate the JOMO principles and apply them in their daily lives, as well as when they travel.

H6: Digital detox practices have a positive impact on the Joy of Missing Out among Generation Z.

Digital detox methods alter people's perceptions of heritage tourism, making them more receptive to and appreciative of contemplative and informative travel experiences. When Gen Z takes breaks from technology, they become more aware of the present moment and appreciate other cultures (Syamsudin et al., 2025). This makes them more likely to have positive feelings toward historical tourism. Digital detox techniques are similar to heritage tourism in that they both focus on introspection, learning about other cultures, and being cognizant of historical narratives. Studies show that people who engage in a digital detox report enjoying real, meaningful encounters that add depth to their lives and teach them something new (Liu, 2024). Digital detox methods help people develop a deeper appreciation for heritage tourism by eliminating digital distractions and encouraging them to pay closer attention to the cultural and historical settings around them. When Generation Z disengages from technology, they become better at immersing themselves in other cultures and appreciating history, which are important parts of heritage tourism (Sarkar et al., 2025). Digital detox activities provide mental health benefits, such as lowering anxiety and increasing awareness of the present. These benefits make it easier to enjoy cultural tourism in the region. These mental states enable people to connect more deeply with the cultural stories and historical significance that heritage sites offer, resulting in more favorable feelings about heritage travel experiences.

H7: Digital detox practices have a positive impact on the attitude of Generation Z towards heritage tourism.

METHODS

Research Design and Approach

This study employs a quantitative research design and a cross-sectional survey approach to investigate the relationships between digital detox practices, the Joy of Missing Out (JOMO), and Generation Z's interest in historic tourism. The quantitative approach is ideal for testing the proposed theoretical framework that combines the Theory of Reasoned Action (TRA) and the Stimulus-Organism-Response (SOR) paradigm. This is because it enables a systematic examination of the hypothesized relationships between constructs and provides statistical evidence to support the conceptual model.

The cross-sectional design enables the collection of a large amount of data all at once, making it easier to examine the complex relationships between digital detox habits, mental states, attitudes, and behavioral plans. This method aligns with existing research in tourism that examines differences between generations and their use of technology. For example, earlier studies have examined how Generation Z travels and uses technology.

Measurement Scales

We utilized a four-item scale based on research on digital well-being and mindful technology use to measure Digital Detox Practices (DDP). The scale measures deliberate actions intended to reduce digital consumption and increase awareness of the present moment. This aligns with Uzut & Güzel (2024) notion of the importance of young travelers practicing intentional disconnection. The items on the scale assess how often and how intentionally people disconnect from technology, such as taking breaks from social media, refraining from using their smartphones for a while, and being more mindful of their technology use. Some examples include "I often take breaks from social media to focus on things I can do in real life" and "I make a point of disconnecting from digital devices during my free time to improve my health."

A four-item scale that measures happiness with being disconnected and enjoyment of the current moment is used to measure Joy of Missing Out (JOMO). The scale is based on a new study by Djafarova and Kim (2025), who demonstrated that JOMO influences people's behavior and travel plans by making them more grateful and observant. Statistics show that people are happier when they choose not to participate in digital media and social pressure. Some examples include: "I feel happy when I choose to stay offline while others are active on social media," and "I find joy in focusing on my immediate surroundings instead of checking what others are doing online." A three-item scale that asks people to rate their heritage travel experiences was used to measure their attitude toward heritage tourism (ATT). The Theory of Reasoned Action's idea of attitude as evaluative views about behavioral outcomes has been adapted for the heritage tourism environment. This method of measurement aligns with established tourism research that examines how attitudes are formed and how they influence people's travel plans (Harahap et al., 2024). Some of the items on the scale include "I believe heritage tourism provides valuable cultural learning experiences" and "Visiting heritage destinations is personally meaningful to me."

A three-item scale measured the degree to which peer-generated digital information influences views and decision-making in heritage tourism. This is how the influence of online reviews (ORE) is measured. The scale considers Generation Z's reliance on digital word-of-mouth and user-generated content when organizing trips, a phenomenon described in detail by Khoa (2021) in a study on how young travelers seek information. Some examples are "Online reviews have a big impact on my interest in heritage destinations" and "When I think about heritage tourism, I trust other travelers' online experiences."

A three-item scale that examines the likelihood and commitment to historic travel experiences is used to measure historic Tourism Intention (HTI). The scale is based on the Theory of Reasoned Action's ideas about measuring intention; however, it has been changed to fit heritage tourism situations (Tran & Khoa, 2025). This method ensures that our evaluation of behavioral intention is consistent with past practices, while also considering the unique aspects of historical travel that distinguish it from regular tourism. Some of the questions on the scale include "I plan to visit heritage sites in the next year" and "I am likely to choose heritage tourism over other types of travel." All measurement scales used five-point Likert response forms ranging from "strongly disagree" (1) to "strongly agree" (5). This enables us to obtain a more detailed understanding of how people feel and behave, while still adhering to standard tourist research methods. This method of measurement facilitates the conduct of statistical analysis and provides sufficient diversity in the responses for hypothesis testing.

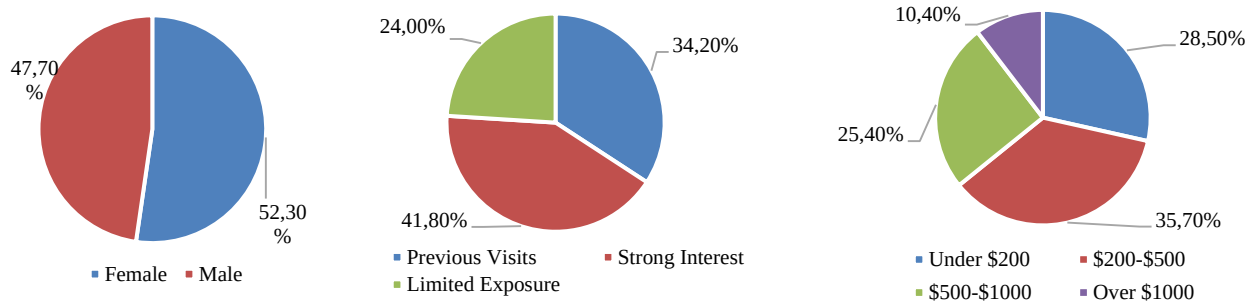
Sample and Data Collection

The study's sampling methodology employed a stratified random selection approach to recruit 421 high school pupils aged 16 to 18 years from Ho Chi Minh City, Vietnam. This method was crucial for ensuring both cultural and geographical uniformity within the sample, acknowledging the city's diverse landscape and the need for comprehensive representation across various high schools and districts. By concentrating on this specific age group, the research effectively targeted Generation Z at a pivotal developmental stage, characterized by increasing independence in travel decisions and significant online engagement. The chosen sample size of 421 participants was strategically determined to provide ample statistical power for structural equation modeling, adhering to established recommendations for complex theoretical models in tourism research, and ensuring a robust cases-per-parameter ratio for accurate statistical estimation.

This meticulous sampling design underscores the study's commitment to methodological rigor and the generation of reliable insights into heritage tourism intentions among Vietnamese youth. Data collection involved several rigorous steps to ensure the quality and validity of the results. Measurement scales were culturally and linguistically adapted for Vietnamese Generation Z respondents through translation and back-translation, followed by pilot testing with 50 participants to refine the questionnaire and assess its psychometric properties. This initial validation followed the best practices in cross-cultural research, addressing potential measurement issues. Respondent recruitment employed systematic sampling within high schools, with supervised administration during data collection to ensure response quality and minimize missing data.

Finally, standard data cleaning and preliminary screening procedures were implemented to manage missing values, outliers, and inconsistencies, thereby ensuring a strong foundation for valid statistical analysis, in line with quantitative tourism research standards. The study's sample comprised 421 high school pupils aged 16 to 18 years, representing the core Generation Z demographic. The gender distribution was well-balanced, with 52.3% female and 47.7% male respondents, ensuring robust data for analyzing potential gender disparities in heritage tourism intentions. Participants exhibited diverse levels of heritage tourism experience: 34.2% had prior visits, 41.8% expressed strong interest without previous visits, and 24.0% reported limited exposure, providing sufficient variation to assess the impact of their experience.

Furthermore, the sample showcased economic diversity in terms of annual tourism budgets, with 28.5% budgeting under $200, 35.7% between $200 and $500, 25.4% between $500 and $1000, and 10.4% over $1000. This comprehensive demographic and experiential profile allows for a nuanced exploration of heritage tourism intentions among this key youth demographic. Figure 2 presents the demographic statistics of the respondents.



a) Gender b) Heritage Tourism Experience c) Annual Tourism Budget

Figure 2. Demographic statistic

The study adheres to the established ethical standards for research involving minors, including obtaining parental consent and ensuring that participants voluntarily agree to participate. Data collection ensures the privacy and confidentiality of respondents while also allowing them to choose whether to participate or not. These steps adhere to both global research ethics standards and the guidelines established by institutions for research involving Generation Z participants. Digital detox methods help people develop a more positive attitude toward heritage tourism by reducing digital distractions and increasing their awareness of their current cultural and historical surroundings. When Generation Z disengages from technology, they become better at immersing themselves in other cultures and appreciating history, which are important parts of heritage tourism. Digital detox activities can help reduce anxiety and increase awareness of the present moment. These are good things for heritage tourism. These mental states enable people to connect more deeply with the cultural stories and historical significance of heritage sites, resulting in more favorable feelings about heritage travel experiences.

RESULTS AND DISCUSSION

Measurement Model

The convergent validity test measures the degree to which indicators that assess the same concept are related or the extent to which they share variance. The assessment employs several criteria, including Cronbach's Alpha (CA), Composite Reliability (CR), Average Variance Extracted (AVE), and external loadings, to ensure that the quality of the measurement model is thoroughly evaluated. These criteria collectively provide strong evidence that the construct measurement is reliable and that the internal consistency is satisfactory (Hair Jr et al., 2016).

The reliability and convergent validity of the study's measurement scales were thoroughly assessed, revealing strong psychometric properties across all constructs. Table 1 presents the results of the convergent validity assessment. The outer loading results indicate that all structures have strong indicator reliability, with values ranging from 0.738 to 0.891, which is well above the required criterion of 0.708. These loadings indicate that each indicator explains more than 50% of the variance in its corresponding construct, suggesting that the indicators are sufficiently reliable.

The Digital Detox Practices construct had outer loadings between 0.762 and 0.845, indicating that the indicators are consistently performing and that the measurement of conscious digital disconnection behaviors is robust. These results align with earlier studies that highlight the multifaceted nature of digital wellness practices among Generation Z.

The internal consistency, measured by Cronbach's alpha, ranged from 0.813 to 0.851, well above the 0.70 threshold, indicating that items within each construct consistently measured their intended theoretical area. Furthermore, the Composite Reliability values, ranging from 0.888 to 0.907, surpassed the 0.70 benchmark, confirming the consistency of the measurements. Additionally, convergent validity was established through the Average Variance Extracted (AVE) test, with all constructs achieving values between 0.668 and 0.765, exceeding the 0.50 cutoff, which demonstrates that the constructs effectively explain the variance in their indicators more than measurement error can account for. These results collectively affirm the robustness and suitability of the measurement model for subsequent analyses, providing a solid foundation for evaluating discriminant validity and hypothesis testing. Discriminant validity testing ensures that constructs are sufficiently distinct from one another and that each construct captures aspects that other constructs in the model do not. The Heterotrait-Monotrait Ratio (HTMT) criterion was used for the assessment (Henseler et al., 2014). It is superior to traditional methods for checking discriminant validity because it accounts for the differences in composite reliability across various constructs.

Table 1. Convergent Validity Assessment Results

Construct	Items	Outer Loading Range	CA	CR	AVE
Digital Detox Practices (DDP)	4	0.762 - 0.845	0.851	0.901	0.695
Joy of Missing Out (JOMO)	4	0.738 - 0.823	0.834	0.889	0.668
Attitude (ATT)	3	0.801 - 0.876	0.824	0.894	0.738
Online Review (ORE)	3	0.789 - 0.854	0.813	0.888	0.726
Heritage Tourism Intention (HTI)	3	0.812 - 0.891	0.847	0.907	0.765

The HTMT results in Table 2 indicate that all construct pairs exhibit good discriminant validity, with values ranging from 0.398 to 0.712, which is below the conservative threshold of 0.85. These results demonstrate that constructs can encapsulate diverse theoretical phenomena while maintaining relationships that are theoretically sound. The assessment supports the construct uniqueness of the proposed theoretical framework and enables the evaluation of the structural model. The evaluation of the

measurement model thoroughly checks the quality of the construct measurement by examining both convergent and discriminant validity. The results justify proceeding to structural model evaluation, which will test the hypotheses and confirm the theoretical framework. All dimensions demonstrated good reliability, validity, and uniqueness, providing a strong foundation for examining structural links and validating the proposed theoretical framework that combines the TRA and SOR paradigms.

Table 2. Discriminant Validity Assessment (HTMT Criterion)

	DDP	JOMO	ATT	ORE	HTI
DDP	-				
JOMO	0.672	-			
ATT	0.543	0.621	-		
ORE	0.412	0.398	0.567	-	
HTI	0.487	0.634	0.712	0.523	-

Structural Model

Structural model evaluation examines the ability of the suggested theoretical framework to explain and predict the relationships between constructs. Following standard PLS-SEM methods, the structural model assessment includes checking the path coefficient, the coefficient of determination (R^2), the effect size (f^2), the predictive relevance (Q^2), and the multicollinearity through Variance Inflation Factor (VIF) analysis. Table 3 shows the model explanatory power and predictive relevance. The Joy of Missing Out has high explanatory power, with an R^2 value of 0.564, indicating that digital detox practices and online reviews together account for 56.4% of the variation in JOMO. With an R^2 value of 0.487, attitude toward heritage tourism has modest explanatory power. This means that digital detox techniques and JOMO together explain 48.7% of the attitude variance. This finding supports the theoretical framework's claim that psychological states (JOMO) and environmental cues (digital detox techniques) influence how people perceive heritage tourism encounters. Heritage Tourism Intention has the most explanatory power, with $R^2 = 0.623$. This means that attitude, online reviews, and JOMO together explain 62.3% of the variance in intention to use. This significant difference in explanation supports the idea that the integrated theoretical framework can accurately predict Generation Z's plans to visit heritage sites.

Table 3. Model Explanatory Power and Predictive Relevance

Endogenous Construct	R^2	R^2 Adjusted	Q^2
Joy of Missing Out (JOMO)	0.564	0.561	0.367
Attitude (ATT)	0.487	0.483	0.341
Heritage Tourism Intention (HTI)	0.623	0.619	0.423

The Variance Inflation Factor (VIF) test for multicollinearity checks whether predictor variables have too much association, which could make the regression coefficient estimates less reliable. The VIF values in Table 4 are all much below the threshold of 5.0, ranging from 1.158 to 1.634. This means that there are no issues about multicollinearity. These results show that the path coefficient estimations are reliable and that the structural model is statistically sound. The low VIF values for all the associations indicate that the predictor variables capture different types of variance in the endogenous constructs, while maintaining relationships that make sense from a theoretical perspective. Digital Detox Practices has the same VIF value (1.158) for both JOMO and attitude prediction, which indicates that it is an exogenous variable unaffected by multicollinearity. The consistent VIF performance across relationships supports the construct distinctiveness of the theoretical framework and confirms the discriminant validity of the measuring model's achievements.

Table 4. Path Coefficients and Effect Sizes

Hypothesis: Path	Path Coefficient	t-value	p-value	f^2	VIF
H1: ATT → HTI	0.421	8.573	<0.001	0.234	1.634
H2: ORE → HTI	0.287	5.891	<0.001	0.112	1.285
H3: JOMO → HTI	0.198	4.127	<0.001	0.067	1.547
H4: JOMO → ATT	0.523	10.234	<0.001	0.376	1.392
H5: ORE → JOMO	0.234	4.876	<0.001	0.087	1.158
H6: DDP → JOMO	0.612	12.345	<0.001	0.598	1.158
H7: DDP → ATT	0.189	3.967	<0.001	0.049	1.392

The Q^2 values indicate that all endogenous constructs exhibit good predictive relevance, with values ranging from 0.341 to 0.423, which exceeds the minimum value of zero required for predictive relevance. Heritage Tourism Intention has the highest predictive relevance ($Q^2 = 0.423$), followed by Joy of Missing Out ($Q^2 = 0.367$) and Attitude ($Q^2 = 0.341$). These results demonstrate that the model can accurately predict endogenous construct values, even beyond sample-specific variance. This supports the theoretical framework's capacity to be applied in real-life settings to understand Generation Z's behavior in heritage tourism. The comprehensive hypothesis testing results provide robust empirical validation for the integrated theoretical framework, demonstrating significant support for all proposed relationships between digital detox practices, Joy of Missing Out, and heritage tourism intentions among Generation Z. The validation of the attitude-intention relationship confirms the fundamental tenets of the Theory of Reasoned Action whilst demonstrating its continued relevance for understanding Generation Z's heritage tourism decision-making processes, where positive cognitive evaluations of cultural and historical experiences translate into more substantial behavioral commitments toward heritage travel. The significant influence of

online reviews on heritage tourism intention validates Generation Z's sophisticated reliance on authentic peer-generated content, whilst highlighting the transformation of tourism information flows from institutional marketing to peer-based authenticity validation. JOMO's direct influence on heritage tourism intention and its substantial impact on attitude formation demonstrate the construct's central role in linking psychological wellness states to heritage tourism cognitions, supporting the SOR framework's organism-organism and organism-response pathways. The empirical validation of online reviews' influence on JOMO development reveals the nuanced ways authentic travel narratives can promote digital wellness awareness, challenging simplistic digital consumption models by demonstrating that content quality and authenticity influence psychological outcomes beyond mere exposure effects. The robust influence of digital detox practices on JOMO formation and direct attitude enhancement validates the comprehensive nature of conscious digital consumption modification in promoting both psychological well-being states and cognitive evaluations favorable to heritage tourism engagement. Collectively, these findings demonstrate that Generation Z's heritage tourism intentions emerge from sophisticated interactions between environmental modifications, psychological states, cognitive evaluations, and peer-generated information sources, supporting the explanatory power of the integrated theoretical framework while revealing the complex mechanisms through which digital wellness practices influence authentic cultural tourism preferences.

DISCUSSION

The results of this study provide substantial real-world evidence to support the integrated theoretical framework that combines the Theory of Reasoned Action (TRA) and the Stimulus-Organism-Response (SOR) paradigm in explaining how Generation Z decides to engage in historical tourism. The complete validation of all seven hypotheses demonstrates that this theoretical integration possesses strong explanatory power. It also reveals more complex connections between digital detox practices, the Joy of Missing Out (JOMO), and heritage tourism behavior that are consistent with and build upon existing knowledge. The strong positive link between attitude and heritage tourism intention ($\beta = 0.421$, $p < 0.001$) significantly supports the main ideas of the Theory of Reasoned Action, which aligns with earlier research indicating that attitude is the primary factor in forming behavioral intentions. This result is in line with what Harahap et al. (2024) found, which showed that having a favorable attitude toward tourism experiences has a significant effect on behavioral intentions when the TRA framework is used in travel scenarios. The enormous effect size ($f^2 = 0.234$) supports TRA's use in heritage tourism contexts for Generation Z. It shows that when Generation Z people develop positive beliefs about the cultural value, educational benefits, and personal significance of heritage tourism, they are more likely to want to participate in heritage travel experiences (Dimitriou & AbouElgheit, 2019). This discovery extends beyond earlier TRA applications by demonstrating that the theory is practical in heritage tourism settings that possess significant cultural depth and educational value.

This study differs from other tourism studies that focus on hedonic reasons. It reveals that Generation Z's opinions on heritage tourism encompass complex evaluations of cultural authenticity, historical relevance, and personal value (Atzeni et al., 2022). The link backs up Uslu & Tosun (2024) research on how attitudes influence plans to visit museums, and it also expands the theoretical understanding to include other types of heritage tourism. Because this association is so strong, historical tourist marketing techniques should focus on building attitudes through authentic cultural stories and communicating educational value, rather than relying on shallow advertising methods.

The fact that online reviews had a significant positive effect on heritage tourism intention ($\beta = 0.287$, $p < 0.001$) strongly supports the idea that peer-generated digital content plays a big part in how Generation Z makes travel decisions. This result supports an in-depth study by Irimiás (2023) on how young travelers seek information, which found that they prefer honest peer opinions over marketing messages from institutions. The moderate effect size ($f^2 = 0.112$) indicates real-world significance, but it also acknowledges that online evaluations are only one part of Generation Z's complex information ecology (Yimeng et al., 2021). The link shows that the way tourism information travels has changed from communications controlled by providers to authenticity judgments made by peers. Generation Z's reliance on internet reviews demonstrates their ability to read and write effectively in the digital world, as well as their capacity for critical thinking (Zhu et al., 2020). This aligns with how they are described as "digital natives" who can easily navigate complex information environments. This study builds on earlier work by showing how internet evaluations specifically affect people's desire to visit heritage sites.

It suggests that content created by peers is an important way for Generation Z to validate the authenticity of cultural experiences that they hold in high regard. This research contradicts the prevailing notion among marketers by demonstrating that genuine experiences with peers are more persuasive than professional marketing content in the context of historic tourism (Elgammal et al., 2024). The result aligns with broader trends in the digital transformation of tourism, but it also highlights how traditional tourism differs from other types that Generation Z values. The relationship suggests that historical tourism organizations should prioritize providing visitors with authentic experiences rather than relying solely on standard marketing methods to generate word-of-mouth. The strong positive link between JOMO and historical tourism intention ($\beta = 0.198$, $p < 0.001$) provides new evidence on how psychological states that make people happy with being disconnected from technology influence their travel behavior. This discovery is in line with the study of Djafarova & Kim (2025), which showed that JOMO makes people more grateful and mindful, which makes them more likely to buy things.

The association reveals that historical tourism holds a special place in JOMO frameworks, where genuine, reflective experiences are the most effective way to be present in the moment and appreciate other cultures (Tan et al., 2025). The discovery contributes to the body of JOMO research by demonstrating its applicability to heritage tourism, where cultural richness and thoughtful participation align seamlessly with JOMO concepts. This study reveals that historical tourism is particularly appealing to individuals who prefer to be disconnected from technology, a finding that differs from prior studies examining the overall effects of JOMO on consumer behavior (Dieck et al., 2023).

The relationship suggests that heritage tourism is a viable approach to managing digital overload, as it provides meaningful cultural experiences that cater to JOMO-oriented individuals seeking authentic, present-moment experiences. This result contributes to the growing body of research on digital wellness tourism by demonstrating that mental states that promote mindful disengagement can influence certain types of tourism behavior. The research suggests that legacy tourism naturally attracts individuals seeking to escape from technology-driven consumption behaviors. This supports the development of mindful tourist options that cater to Generation Z's evolving relationship with technology. The relationship demonstrates that heritage tourism can be a means to promote digital wellness while also being culturally and educationally valuable. The strong, beneficial effect of JOMO on attitude development ($\beta = 0.523$, $p < 0.001$) is a significant theoretical contribution, as it demonstrates how psychological states influence cognitive judgments in tourism settings. This result builds on Tan et al. (2025)'s work on how JOMO affects consumer emotions by demonstrating its impact on people's attitudes toward historic tourism. The enormous effect size ($f^2 = 0.376$) indicates that JOMO has a significant impact on how Generation Z perceives historical tourist experiences, which supports its central role in shaping their cognitive judgments. The relationship demonstrates that the SOR framework's organism-organism pathway is accurate, as it indicates that psychological states influence cognitive processes, which in turn impact behavioral goals (Perez et al., 2024).

This discovery helps us understand how attitudes are formed by showing that JOMO makes people more likely to appreciate the distinctive value propositions of historic tourism. The strong effect suggests that those who prefer to be offline are more likely to appreciate the cultural richness, historical significance, and authentic experiences that heritage tourism offers. This finding extends our understanding of how attitudes form by demonstrating that states of psychological well-being can contribute to the development of positive attitudes (Djafarova & Kim, 2025). The results show that historical tourism companies could consider using JOMO promotion as a way to make their destinations more appealing to Generation Z visitors who seek authentic, meaningful experiences. The relationship demonstrates that heritage tourism aligns with digital wellness frameworks and serves as a unique draw for mindful consumers (Guo et al., 2024).

The strong positive link between online reviews and JOMO development ($\beta = 0.234$, $p < 0.001$) provides new insights into how digital content created by peers may help individuals feel better mentally. This discovery builds on previous research by showing that reading real trip stories can help JOMO grow, even though people thought that all digital material consumption leads to FOMO. The relationship backs up Wojcieszak-Zbierska (2023)'s claims that real travel stories can help people become more aware of mindful travel, and it also adds to our understanding of how certain psychological states arise. The study challenges conventional models of digital consumption by demonstrating that the quality and authenticity of content influence psychological outcomes beyond mere exposure (Eitan & Gazit, 2024). When people in Generation Z read real stories about meaningful travel experiences that focus on cultural depth and personal growth, they may come to appreciate the benefits of JOMO and adjust their travel habits to reflect this. This relationship demonstrates that online reviews can help people understand digital wellness and encourage them to make informed choices that align with JOMO ideals (Dane & Rockmann, 2020). This finding contributes to the body of research on digital wellness by demonstrating how authentic peer-generated content can enhance mental health. The findings indicate that online platforms can help individuals become more aware of mindful consumption and promote peer education about the benefits of digital well-being. This suggests that historical tourism groups should encourage visitors to share authentic, life-changing experiences to help JOMO grow (Duy et al., 2025).

The considerable favorable effect of digital detox practices on JOMO development ($\beta = 0.612$, $p < 0.001$) provides strong evidence for the central stimulus-organism relationship in the SOR paradigm. This study strongly supports other research that shows that being aware of and reducing digital intake can improve mental health and help individuals be more present in the moment. The vast impact size ($f^2 = 0.598$) indicates that the results are significant in real-life applications. This supports the idea that digital detox techniques are essential for cultivating mental states that enable people to appreciate authentic experiences. This association supports Wojcieszak-Zbierska (2023) 's findings regarding the benefits of digital detoxing and contributes to our understanding of how certain psychological states are formed. When people from Generation Z consciously reduce their digital consumption, they create space in their minds for JOMO, a state of mind that encompasses meditation, contemplation, and an appreciation for real experiences (Eitan & Gazit, 2024). The strong effect suggests that altering the atmosphere by reducing digital stimulation can help people become more aware of their vacation experience. This finding contributes to the literature on digital wellness tourism by highlighting specific ways in which altering one's digital device usage can impact one's mental state, which is crucial for tourism behavior (Nguyen et al., 2024). This relationship suggests that digital detox practices are effective ways to address mental health issues that can hinder people's enjoyment of historical tourism, and they also support broader digital wellness initiatives (Sarkar et al., 2025). The significant effect suggests that heritage tourism groups should consider using digital detox advertising as a way to help visitors mentally prepare for authentic cultural experiences.

The strong direct effect of digital detox practices on attitude formation ($\beta = 0.189$, $p < 0.001$) indicates that the interaction between the stimulus and the organism is more complex than just JOMO mediation. This discovery builds on previous research, showing that reducing digital usage intentionally affects cognitive evaluations in several ways, including direct attitude improvement processes (Syamsudin et al., 2025). The small effect size ($f^2 = 0.049$) suggests that this link operates primarily through JOMO mediation, while also having a direct effect. The relationship demonstrates that digital detox techniques have a broad impact on how people perceive tourism, indicating that environmental changes can influence both mental states and cognitive judgments (Liu, 2024). This research suggests that digital detox methods facilitate a deeper appreciation of other cultures, and these effects extend beyond JOMO development to include direct ways of shaping attitudes. The immediate effect confirms the many benefits of digital detox methods and supports their inclusion in plans for historic tourism. The results show that Generation Z's desire to travel for heritage reasons is shaped by complex relationships between changes in their digital media use, their mental health, cognitive evaluations, and information sources created by their peers. This complexity makes it challenging for simple models of tourist behavior to be effective, but it supports integrated theoretical methods that acknowledge the complexity of modern travel decision-making processes

(Sarkar et al., 2025). The results show that heritage tourism is a distinctive part of Generation Z's value-driven spending habits. They also show that it could be a way for people to improve their digital health and connect with authentic culture.

CONCLUSION

Theoretical Contributions

This study makes significant theoretical contributions to tourism research through the successful integration of the Theory of Reasoned Action (TRA) and Stimulus-Organism-Response (SOR) paradigm, providing a comprehensive framework for understanding contemporary tourism behaviour within digital transformation contexts. The theoretical integration addresses the limitations of single-theory approaches by acknowledging both rational decision-making processes and environmental stimuli's influence on behavioural intention formation, demonstrating that Generation Z's tourism behaviour involves complex interactions between cognitive evaluations, psychological states, and environmental modifications that require an integrated theoretical approach for adequate explanation. The development and empirical validation of the integrated TRA-SOR framework represents a methodological advancement in tourism theory construction, as previous research has predominantly employed single theoretical lenses that provide limited explanatory power for complex contemporary phenomena characterised by digital transformation and generational change. The framework's success in explaining substantial variance in heritage tourism intention, while maintaining predictive relevance, demonstrates significant advancement over conventional tourism behavior models. This validates the theoretical integration's effectiveness and provides a robust foundation for understanding Generation Z's travel decision-making processes within digital society contexts.

The study introduces the concept of Joy of Missing Out (JOMO) as a novel construct within tourism research, providing a theoretical foundation for understanding psychological states that promote mindful tourism consumption while addressing gaps in existing research that has predominantly focused on negative psychological states, such as FOMO. The theoretical positioning of JOMO within the SOR framework, as both an outcome of environmental stimuli and an antecedent to cognitive evaluations, demonstrates a sophisticated understanding of psychological state dynamics within tourism contexts. This advances tourism psychology literature by revealing the mechanisms through which environmental modifications influence tourism behavior through psychological state transformation. Furthermore, the study contributes to digital transformation theory within tourism contexts by demonstrating that conscious digital consumption modification influences tourism behaviour through multiple pathways, challenging deterministic technology adoption models by validating individual agency over technology use and the influence of conscious digital consumption modification on tourism preferences. The empirical validation of digital detox practices as antecedents to both psychological states and cognitive evaluations extends existing research whilst providing theoretical support for emerging research on sustainable tourism consumption and digital wellness tourism frameworks.

Practical Contributions

The study makes substantial practical contributions to heritage tourism marketing and destination management through the empirical validation of specific influence pathways that inform strategic decision-making processes. The demonstration that attitude formation serves as the primary predictor of heritage tourism intention validates marketing strategies emphasising authentic cultural narratives, educational value communication, and heritage significance promotion over superficial promotional tactics, enabling heritage tourism organisations to develop marketing communications that emphasise cultural depth, historical significance, and personal transformation potential rather than conventional tourism appeals focused on convenience or entertainment value. The empirical validation of online reviews' significant influence on heritage tourism intention provides strategic guidance for digital marketing approaches that prioritise authentic visitor experience facilitation over traditional promotional content creation, supporting investment in visitor experience enhancement programmes that naturally generate positive peer-generated content whilst providing platforms for meaningful peer-to-peer communication about heritage tourism benefits and transformative potential. The practical implications extend to online reputation management strategies that acknowledge Generation Z's sophisticated evaluation of peer-generated content authenticity, requiring heritage tourism organisations to develop comprehensive visitor experience programmes that naturally generate authentic positive reviews whilst avoiding artificial review generation tactics that Generation Z readily identifies and rejects.

The study's validation of JOMO's influence on heritage tourism attitudes and intentions provides a strategic foundation for developing marketing communications that appeal to Generation Z's evolving relationship with digital technology, enabling heritage tourism organisations to position their offerings as antidotes to digital overwhelm whilst emphasising the contemplative, present-moment awareness benefits that heritage experiences provide. Marketing communications should emphasise heritage tourism's capacity to provide respite from digital pressures whilst facilitating authentic cultural engagement and personal reflection, supporting the development of "digital detox heritage experiences" that explicitly promote disconnection benefits whilst maintaining cultural and educational value through positioning strategies that contrast heritage tourism offerings with digital-driven tourism consumption, whilst emphasising psychological wellness benefits of mindful cultural engagement. The practical applications include visitor experience design that accommodates and encourages digital disconnection whilst providing rich cultural content that satisfies Generation Z's desire for meaningful, transformative experiences, enabling heritage sites to develop "mindful heritage experience" programmes that encourage present-moment awareness whilst providing educational and cultural depth that appeals to Generation Z's values-driven consumption patterns.

The empirical validation of digital detox practices' influence on heritage tourism attitudes provides practical guidance for pre-visit engagement strategies that enhance visitor psychological preparation for authentic cultural experiences, enabling heritage tourism organisations to develop digital wellness programmes that encourage conscious digital consumption modification prior to heritage site visits, whilst enhancing visitor capacity for cultural appreciation and authentic experience engagement. The practical implications extend to partnership opportunities with digital wellness organisations, mindfulness

practitioners, and conscious consumption advocates who share alignment with heritage tourism's contemplative and educational benefits, supporting collaborative programmes that combine digital wellness education with heritage tourism preparation, whilst creating comprehensive offerings that address Generation Z's holistic wellness interests and promote heritage tourism engagement. The strategic applications include visitor journey design that incorporates digital detox preparation phases, on-site mindful engagement facilitation, and post-visit reflection activities that reinforce the transformative benefits of heritage tourism experiences, enabling heritage tourism organisations to develop "conscious heritage tourism" offerings that explicitly integrate digital wellness principles with cultural and educational content whilst creating unique value propositions that address contemporary tourism market needs and maintain heritage tourism's core cultural and educational missions.

Limitations and Future Research

This study acknowledges several limitations that highlight new areas for future investigation while also providing the results in their proper context. The cross-sectional research approach is suitable for evaluating the postulated theoretical linkages; however, it makes it more challenging to draw conclusions about cause and effect and comprehend how things change over time. A longitudinal study in the future could examine how attitudes toward digital detox, JOMO development, and heritage tourism evolve. This would help us understand how these linkages change and how stable they are throughout different life stages and cultural settings. The focus on Ho Chi Minh City, Vietnam, although providing cultural continuity, makes it hard to apply to other cultural contexts and Generation Z groups with varied patterns of heritage tourism and digital consumption. To investigate how cultural values influence the relationships between digital detox practices, JOMO, and heritage tourism intentions, future research should examine the applicability of the theoretical framework in various cultural contexts, particularly between collectivistic and individualistic societies. The study's focus on high school students is well-suited for addressing Generation Z.

However, it only examines one stage of development, so it may not capture the full range of Generation Z's travel behavior across diverse life situations, educational levels, and economic contexts. To learn more about how the framework can be used in more situations, future research could look at how the theoretical relationships change between different groups of Generation Z, such as university pupils, young professionals, and people from different socioeconomic backgrounds

Additionally, research comparing the proposed relationships between generations could help us understand how Generation Z's heritage tourism behavior differs from that of other generations. This would help us understand the generational tourism behavior patterns and their implications for heritage tourism marketing and destination management strategies.

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QUALITY MANAGEMENT AND SUSTAINABLE INITIATIVES AS DETERMINANTS OF VISITOR SATISFACTION AND DESTINATION LOYALTY IN SLOVAK TOURISM

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Abstract: This study analyzes the impact of quality management and sustainable initiatives on destination loyalty and visitor satisfaction in Slovak tourism. This study analyzes the impact of quality management and sustainable initiatives on destination loyalty and visitor satisfaction in Slovak tourism. A quantitative survey of Slovak tourists (n = 391) was employed to measure the impact of environmental practices and service quality on destination satisfaction and revisit intentions. On the basis of t-tests and regression, the evidence supports a significant positive influence of sustainability and quality management on return visits and visitor satisfaction. The visitors who value sustainability are also found to be more satisfied, suggesting that mixed methods of quality and environmental care enhance destination competitiveness. The study confirms that higher service quality and sustainability practices significantly increase visitor satisfaction and destination loyalty. Findings further indicate that financial incentives and well-designed environmental policies significantly support the adoption of sustainable practices among tourism enterprises in Slovakia. Comparative analysis highlights that while Slovak businesses are increasingly adopting green initiatives, the overall rate remains lower than in neighboring countries due to administrative barriers and limited funding access. The results underscore the importance of integrating sustainability with quality management to strengthen competitiveness and long-term loyalty. Additionally, the study identifies a significant interaction between eco-innovation and customer satisfaction, demonstrating that innovation-driven enterprises achieve higher loyalty levels. Practical implications suggest that tourism policymakers should simplify funding mechanisms and introduce standardized quality certifications to boost sustainable adoption. These insights contribute to international debates on tourism competitiveness, providing a framework for sustainable destination management in post-pandemic European markets.

Keywords: Destination loyalty, environmental practices, service quality, sustainable tourism, visitor Satisfaction

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INTRODUCTION

Tourism is a dynamic and rapidly changing sector that generates a substantial share of national income, for example, in Slovakia (Weaver & Lawton, 2010). Growing visitor expectations and mounting global environmental concerns impose pressures upon stakeholders in tourism to produce high-quality services alongside sustainable practices (Butler, 1999). Quality management practices are essential to ensuring consistency, satisfaction, and long-term sustainability of service. Concurrently, sustainability—embracing environmental, social, and economic factors—is increasingly seen as a significant driver of tourist choice (UNWTO, 1999). In the Slovak context, tourist places feel more pressured to differentiate themselves on the basis of service quality and ecological responsibility. The COVID-19 pandemic has altered tourism patterns, with domestic tourism becoming more prominent.

Digitalization and consumer pressures for eco-friendly behavior are on the rise. Despite natural and cultural wealth in Slovakia, there remain concerns regarding standardizing the quality of services across the country as well as for clearly embracing policies on sustainability. Recent research has emphasized the growing importance of quality management in tourism, particularly in the context of post-pandemic recovery and increasing consumer expectations (Chen et al., 2025). Recent studies highlight that tourism quality management is increasingly integrated with sustainability, digital innovation, and policy-driven frameworks (Müller et al., 2025). Understanding these interactions is essential to enhancing competitiveness and environmental performance.

THEORETICAL BACKGROUND

Quality of Tourism Services

Quality of tourism services is determined by the degree to which services are seen to meet or even exceed visitor expectations (Parasuraman et al., 1988). Five SERVQUAL dimensions have been recognized: reliability, responsiveness,

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assurance, empathy, and tangibles, all of them being determinants of perceived quality. Quality certifications (e.g., ISO 9001), employee training, and continuous improvement programs make it easier to apply quality management (Grönroos, 2007). Recent studies highlight the necessity to adapt the SERVQUAL model to incorporate sustainability-related service attributes in tourism (Akbari et al., 2023). Green service quality has emerged as a key element in eco-conscious travel behavior, where tourists not only expect standard dimensions of quality but also environmentally responsible conduct embedded into the service. Quality service remains a significant challenge in Slovak tourism, with fragmented service standards and inconsistent training of staff across regions.

Recent findings by Müller et al. (2025) reveal significant demographic variations in environmental attitudes and behaviours among tourists, calling for segmentation-based quality strategies integrating green service attributes. Differences in service delivery between urban and rural areas are often noticed by tourists. Therefore, quality assurance mechanisms—particularly those aligned with green service practices—need to be developed to enhance competitiveness (López-Guzmán et al, 2022). Szőllős-Tóth et al. (2025) identify global shifts in tourism scale and behavior in the 21st century, underscoring the need for adaptive quality and sustainability frameworks in destination management.

The incorporation of digital tools and staff education regarding eco-standards further enhances service consistency. Recent advancements in quality management theory emphasize the integration of sustainability indicators and smart technologies into tourism service evaluation (Della Corte et al., 2025; Sigala, 2025). These approaches allow destinations to simultaneously improve visitor satisfaction and environmental outcomes.

Sustainable Tourism Practices

Sustainable tourism aims to harmonize the interests of guests, industry, environment, and host populations (UNWTO, 2022). Activities such as waste minimization, use of renewable energy, preservation of biodiversity, and community integration enhance the perceived value and reputation of destinations (Hall & Gössling, 2022).

Tourists increasingly favor destinations that demonstrate visible environmental commitment and transparency. Despite Slovakia's natural potential, sustainable tourism practices remain unevenly implemented. Wahyuningsih et al. (2025) analyse Indonesian tourism villages and demonstrate how homestay satisfaction relies closely on embedded sustainability practices, suggesting parallels for Slovak rural tourism quality management. Particularly small and medium tourism enterprises often lack sufficient capacity and institutional support for adopting sustainability strategies (Zelenka & Kacetl, 2022). However, research shows that especially young and urban tourists demonstrate a willingness to pay more for environmentally friendly services, thereby reinforcing the need for targeted green investments (Zhang & Lu, 2022). Recent findings emphasize that co-creation of value between providers and tourists can reinforce sustainable development, especially when sustainability is integrated into the visitor experience (Mihalic & Gomezelj, 2022). Furthermore, Gössling & Hall (2023) call for a shift from growth-focused tourism to models that prioritize regenerative and post-growth approaches. Certification schemes such as ISO 14001 and EMAS have become internationally recognized indicators of ecological responsibility. Their role is not only operational but also communicative—serving to increase trust and visibility of destinations among sustainability-conscious consumers (Pirani & Arafat, 2022).

Recent models conceptualize environmental sustainability not only as conservation but as an integrated system involving smart technologies, resource efficiency, and governance alignment (Elhoushy et al., 2025).

Synthesizing Quality and Sustainability

The integration of quality and sustainability represents a strategic path to increasing visitor satisfaction and destination competitiveness. Visitors increasingly seek destinations that offer both high-standard services and demonstrable environmental commitment (Ivanov & Webster, 2023). In practice, this integration is most effective when environmental management systems (such as ISO 14001) are coupled with customer-focused quality assurance frameworks (Akbari et al., 2023).

In Slovakia, this synthesis is still largely in the early stages, driven by a minority of innovative service providers. Nevertheless, as empirical studies indicate, combining high-quality service with visible sustainability practices can serve as a key differentiator in tourism marketing (López-Guzmán et al., 2022; Hall & Gössling, 2022). Such a dual approach also aligns with the European tourism policy objectives related to green transition and digital innovation.

The development of synergistic strategic models that align service quality with environmental and social responsibility is crucial. In the context of Slovak tourism, embedding these dual priorities into destination management and branding offers a pathway toward long-term competitiveness and resilience in a shifting global tourism landscape.

For this reason, the aim of the study was to find out through the following research questions:

RQ1: Does service quality significantly influence tourist satisfaction and revisit intention in Slovak tourism destinations?

RQ2: Do tourists who value sustainable practices report higher levels of satisfaction compared to those who do not?

RQ3: Are there statistically significant differences in satisfaction between demographic groups (e.g., age, education) in relation to perceived quality and sustainability?

RQ4: How do tourists perceive the integration of quality and sustainability in the services provided by Slovak tourism enterprises?

MATERIALS AND METHODS

Data were collected using a standardized questionnaire which was applied to 391 Slovak tourists traveling within the country last year. It was developed based on validated constructs of previous studies on service quality (Parasuraman et al.,

1988) and sustainable tourism (UNWTO, Swarbrooke, 1999) and adapted to the Slovak context using expert advice. It included Likert-scale items measuring satisfaction, service quality perception, environmental conduct, and behavioral intentions. Data collection took place between March & June 2025, and the survey was administered online and face-to-face at randomly selected tourist areas to gain more varied demographic and geographic representation. The participants were described the purpose of the study and were provided informed consent prior to completion of the survey. An overview of the methodological progression is presented in Figure 1.

Before deployment, the survey was pretested on a pilot sample (n = 30) for reliability and clarity validation. All Cronbach's alpha coefficients of the main scales were greater than 0.80, indicating good internal consistency.

The final survey questionnaire comprised 36 questions divided into five thematic blocks: (1) General travel behavior, (2) Perceived service quality, (3) Attitudes towards sustainable lifestyles, (4) Revisit intention and overall satisfaction, and (5) Demographics. The survey was based on the validated constructs of previous research aimed at service quality (Parasuraman et al., 1988) and sustainable tourism (UNWTO, Swarbrooke, 1999), and adapted to the Slovak context through expert advice. The survey included items assessing satisfaction, perceived service quality, environmental behavior, and behavioral intention using Likert-scale. Before full deployment, the questionnaire was pilot-tested with a pilot sample (n = 30) to establish reliability and intelligibility. Cronbach's alpha of the main scales was greater than 0.80, which is an acceptable level of internal consistency. The instrument included items of perceived service quality, satisfaction, awareness and appreciation of sustainable initiatives, and revisit intentions.

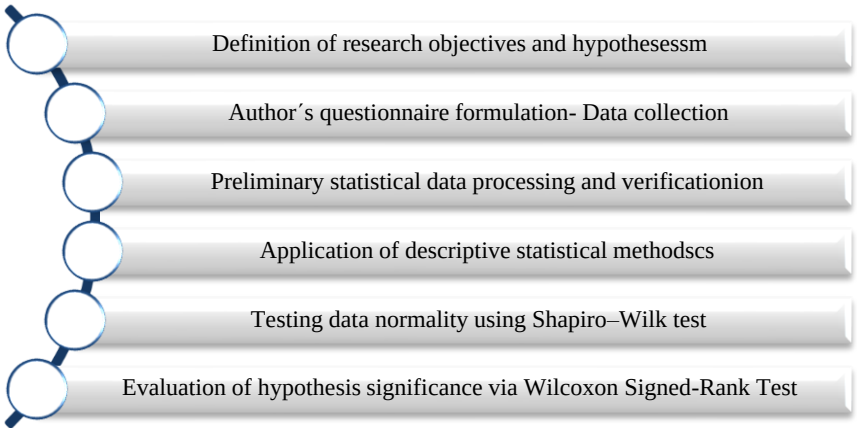


Figure 1. Display of methodological progression (Source: own processing)

Sample Characteristics

They were stratified by age, with the highest age group being 26–35 years (40%), gender (53% female and 45% male), income, and education. Most respondents had secondary (50%) or higher (40%) education. Participants were randomly sampled from all parts of Slovakia, as well as urban and rural areas. The sample reflects the structure of Slovak domestic tourism according to up-to-date statistics of the Statistical Office of the Slovak Republic (ŠÚSR, 2023) and is represented according to sociodemographic and geographical criteria.

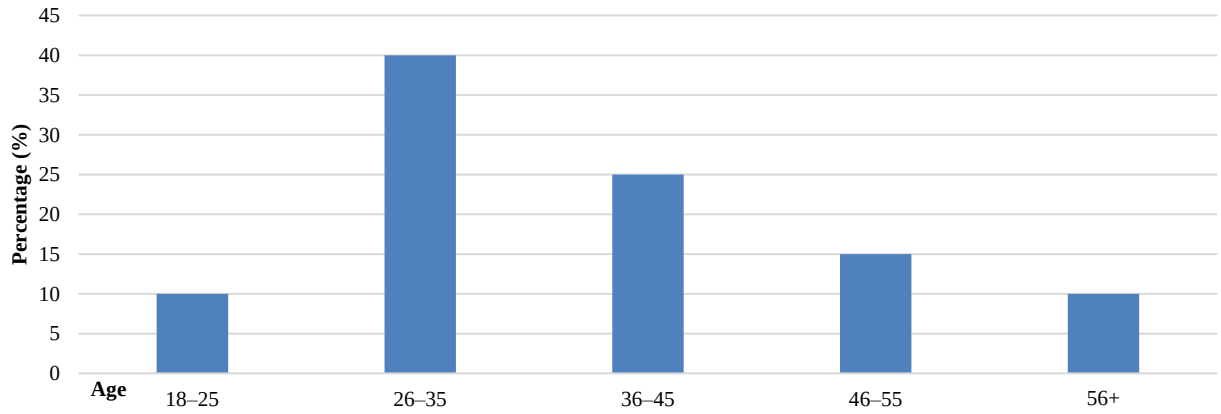


Figure 2. Respondents' age (Source: own processing)

By age, sex, education, and income, the most common age range was 26–35 years (40%) as presented in Figure 2, and sex distribution 53% female and 45% male as presented in Figure 3. Most participants had secondary (50%) or higher education (40%). The sample corresponds to the type of domestic tourism in Slovakia according to recent statistics from the Statistical Office of the Slovak Republic (ŠÚSR, 2023).

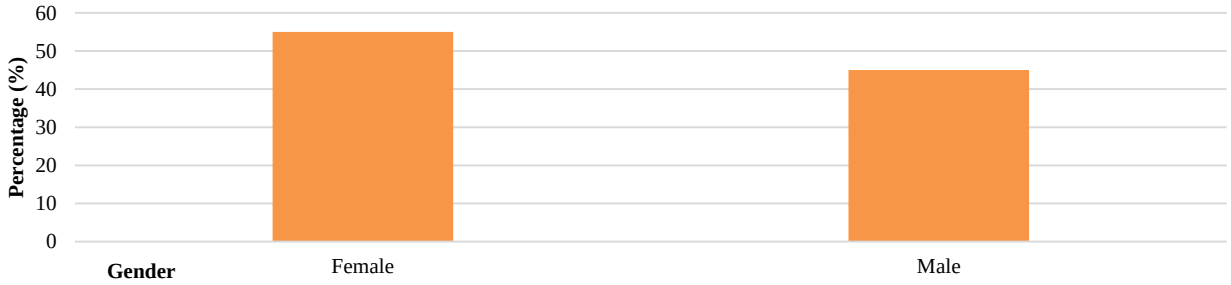


Figure 3. Respondents' gender (Source: own processing)

By age, gender, education level, and income, with the most typical age group being 26–35 years (40%), and gender split of 53% female and 45% male. Most of the respondents were of secondary (50%) or higher education (40%) as shown in Figure 4.

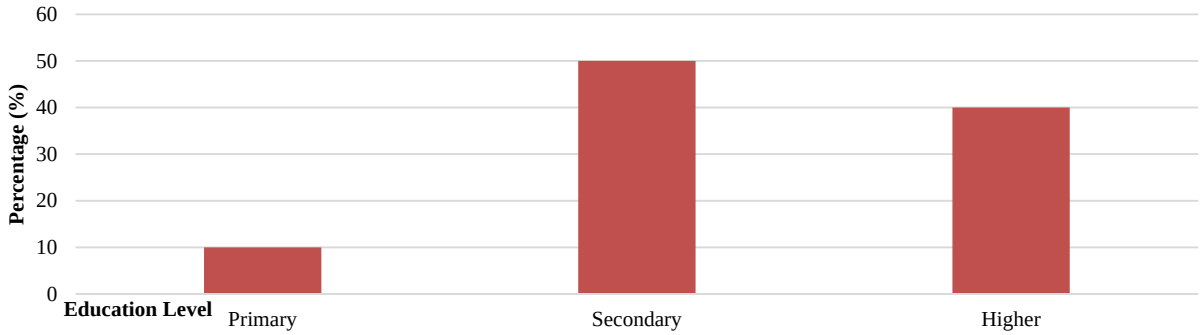


Figure 4. Respondents' education level (Source: own processing)

Statistical Analysis

The following hypotheses were tested:

H1: Quality management positively affects visitor satisfaction and revisit intentions (tested using linear regression).

H2: Environmentally conscious visitors report higher satisfaction (tested using independent samples t-test).

The data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics, reliability testing, and inferential analysis were employed. Significance was assessed at the 0.05 level. Normality in the dataset was tested using the Shapiro–Wilk test and homogeneity of variance using Levene's test. Exploratory data analysis was conducted to identify outliers and inconsistencies.In addition to hypothesis testing, cross-tabulations and correlation analysis were used to examine relationships between demographic variables and perceptions of service quality and sustainability. The results were also used to construct composite indicators for overall satisfaction and perceived value.

RESULTS AND DISCUSSION

Satisfaction with Tourism Services: Respondents expressed generally high satisfaction with tourism services in Slovakia. Most participants rated their experiences positively, especially in dimensions such as cleanliness, professionalism, and reliability. Figure 5: Satisfaction with Tourism Services shows the distribution of ratings, where the majority of responses fall into the "Satisfied" or "Very satisfied" categories, confirming the high standard of service quality perceived by visitors. Motivation to Revisit Based on Perceived Quality: Further analysis examined the link between service satisfaction and willingness to return. More than 80% of respondents indicated that satisfaction with quality directly influenced their motivation to revisit destinations.

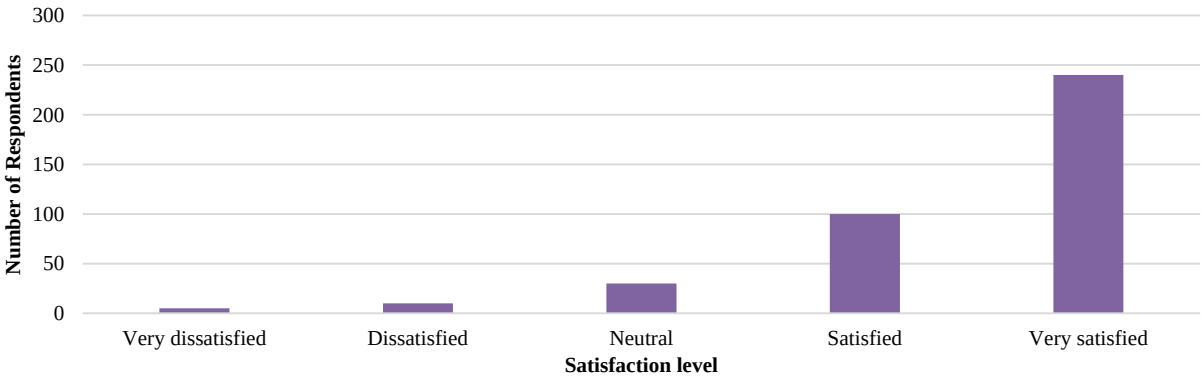


Figure 5. Satisfaction with Tourism Services (Source: own processing)

Figure 6: Motivation to Revisit Based on Service Quality illustrates that those who rated the services as high quality also expressed a greater intention to return. A regression analysis confirmed a statistically significant positive relationship ($\beta = 0.08$), $p < 0.05$ between perceived service quality and return motivation, thus supporting Hypothesis H1.

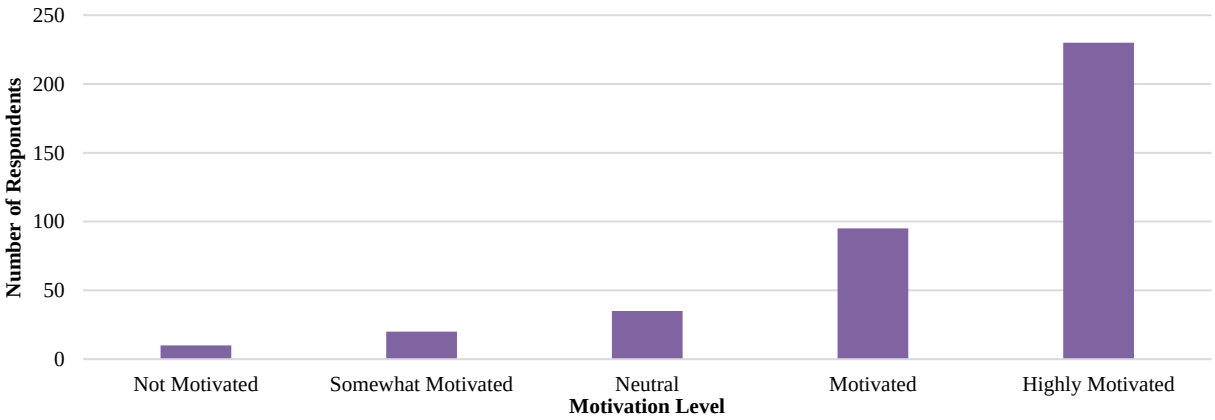


Figure 6. Motivation to Revisit Based on Service Quality (Source: own processing)

Sustainability Preferences and Impact on Satisfaction: Tourists' perceptions of sustainability measures were also explored. Many respondents showed a willingness to pay more for environmentally responsible services, particularly in areas with visible sustainability practices.

Figure 7: Willingness to Pay for Sustainable Services (recommended) would illustrate the proportion of tourists supporting eco-initiatives. An independent samples t-test showed that sustainability-oriented tourists reported significantly higher satisfaction ($M = 4.2$) than those who were less concerned ($M = 3.8$), $p < 0.05$, confirming Hypothesis H2.

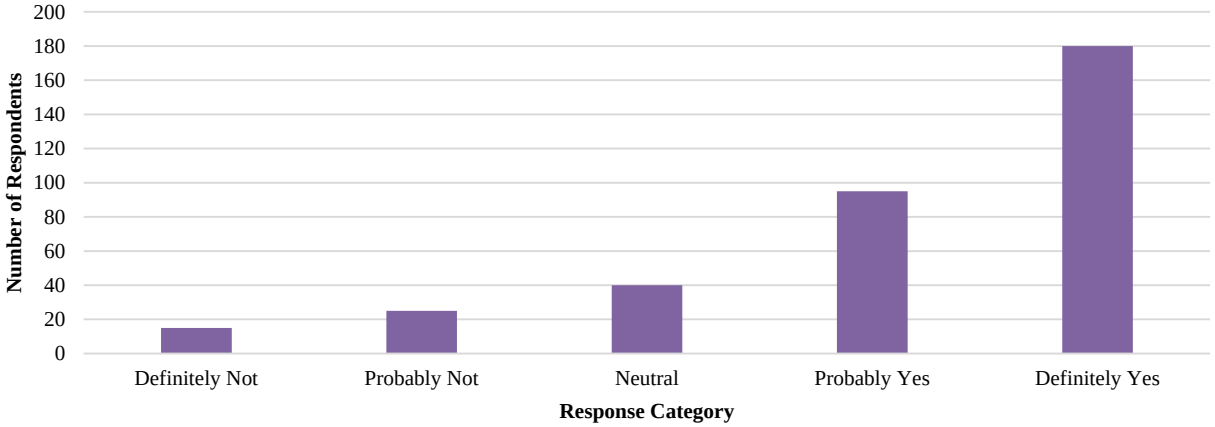


Figure 7. Willingness to Pay for Sustainable Services (Source: own processing)

In addition to t-tests and regression, descriptive statistics revealed that 68.4% of surveyed tourists reported being satisfied or very satisfied with their overall tourism experience in Slovakia. The highest satisfaction scores were associated with cleanliness of accommodation (mean = 4.31, SD = 0.65) and professional behaviour of staff (mean = 4.18, SD = 0.72). In contrast, the lowest-rated domain was availability of sustainable public transport, with a mean score of 3.02 (SD = 0.98).

A correlation analysis revealed a strong positive relationship between perceived sustainability and revisit intention ($r = 0.62$, $p < 0.001$). Cluster analysis further identified three distinct tourist segments: (1) eco-aware returners (38%), (2) pragmatic users (44%), and (3) occasional consumers (18%). Eco-aware tourists not only rated services more favourably, but were also more likely to share positive experiences and recommend destinations to others.

These findings confirm Hypothesis H2: Environmentally conscious tourists report significantly higher satisfaction. The statistical evidence supports the relevance of sustainability as a key dimension in overall service quality and validates its inclusion in the GQEI model. This aligns with research by Zhang & Lu (2022), who demonstrated that tourists' environmental concern positively influences satisfaction, particularly in accommodations with visible eco-certifications. Similarly, Chung et al. (2022) show that green-oriented tourists form a distinct segment whose service expectations are higher, yet they report greater satisfaction when sustainability is communicated effectively.

The results highlight the dual importance of traditional service quality and emerging sustainability concerns in shaping tourist satisfaction and loyalty. The statistically significant confirmation of both hypotheses underscores that:

- High-quality service remains a foundational expectation, especially in cleanliness, reliability, and professionalism.
- Environmental sustainability is not only appreciated but has become a meaningful factor in shaping satisfaction, particularly among more environmentally conscious visitors.

These findings are consistent with recent scholarship by Font & McCabe (2022), who emphasize that sustainability must not only be implemented, but also clearly marketed as part of the tourism service proposition. Becken & Font (2023) add that long-term credibility of sustainable tourism strategies depends on robust impact measurement and transparent communication. Moreover, Ivanov & Webster (2023) suggest that smart tourism strategies integrating digital tools and green innovations offer new pathways for enhancing both perceived quality and operational efficiency.

This duality aligns with previous research by Butnaru et al. (2018) and the TOURQUAL model, which emphasize comprehensive and multidimensional approaches to service quality evaluation. Our findings extend this perspective by confirming the practical applicability of the GQEI model in the Slovak tourism context.

While the results are encouraging, limitations include the potential self-selection bias of environmentally aware respondents and the predominantly Slovak sample. Future research should aim to validate the GQEI in broader international contexts and across different types of tourism services.

Summary of Key Findings: High service quality, especially in terms of cleanliness and professionalism, leads to higher satisfaction and revisit motivation. Sustainability significantly enhances the perceived value for environmentally aware visitors. Combining high service standards with sustainability communication offers a competitive advantage. These findings confirm its importance and acceptance among key stakeholders in the field of tourism.

This study also supports broader calls for a shift from growth-centric to value-based tourism strategies, as proposed by Gössling & Hall (2023). Creating mutual value between providers and tourists through sustainable practices, as highlighted by Mihalic & Gomezelj (2022), may not only increase satisfaction but also promote long-term loyalty and resilience.

Limitations of the study

Despite the encouraging findings, several limitations should be noted. First, the study was geographically restricted to Slovakia, which may reduce the generalizability of the results to countries with different cultural or institutional contexts in tourism (Kozak & Rimmington, 2000). Second, the voluntary nature of survey participation carries a risk of self-selection bias, especially among respondents with a stronger interest in service quality or sustainability (Dolnicar, 2003). Additionally, the cross-sectional design of the study limits the ability to observe causal relationships or temporal changes in visitor satisfaction and behavioral intentions (Bowen & Chen, 2001). Another limitation stems from the reliance on self-reported data, which may be influenced by social desirability or recall bias (Podsakoff et al., 2003). Lastly, although the constructs used were supported by existing literature, some dimensions—such as sustainability perception—may vary significantly across market segments and require deeper qualitative exploration in future research (Font et al., 2012).

CONCLUSIONS

The aim of this study was to evaluate Slovakian tourism service quality from the perspective of tourists, service providers, and experts. The findings confirmed that service quality plays a significant effect on tourist satisfaction and intention to return, and that environmentally conscious tourists were likely to show higher satisfaction.

The findings emphasize the growing importance of combining classical service quality features—in particular cleanliness, professionalism, and reliability—with sustainability-focused practices in tourism service delivery. The study contributes to the literature by observing the relevance of multidimensional quality measurement in tourism.

The study also supports the inclusion of sustainability, digitalization, and cultural authenticity as new service quality dimensions that capture the evolving expectations of modern tourists. Additionally, the perceptions of multiple stakeholder groups show overall acceptance of quality measurement tools that are holistic and practical.

While the study was conducted in the specific setting of Slovakia, the methodology and results have significant implications for tourism destinations wanting to improve service quality and competitiveness. The requirement for future research is the examination of these relationships in different cultural settings and longitudinally to observe changes in perceptions over time. Well-designed and integrated quality measurement frameworks represent a strategic opportunity for improving not only service delivery, but also sustainable tourism development and competitiveness of destinations.

Finally, it is important to emphasize that the results of this research in the Slovak context are largely consistent with findings in the international literature—particularly regarding the growing importance of sustainable practices and service quality for tourist satisfaction and loyalty. However, compared to countries such as Austria, Germany, and Slovenia, the implementation rates of environmental initiatives are lower, highlighting the need to simplify financial incentives and strengthen policy support for sustainable tourism development in Slovakia.

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PRESERVING INTANGIBLE HERITAGE THROUGH SUSTAINABLE ETHNIC TOURISM: A SYSTEMATIC REVIEW OF KOSOVO'S APPROACH

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Abstract: This study aims to investigate the role of ethnic tourism in preserving Kosovo's intangible cultural heritage while also examining its socioeconomic benefits and challenges. These goals include examining how it affects cultural revitalization, community livelihoods, and sustainable development. For materials and methods, we conducted a systematic literature review (SLR) using peer-reviewed articles, reports, and case studies sourced from Google Scholar, ResearchGate, and Scopus, focusing on works published from 2015 onward. We specifically selected and analyzed empirical studies that delve into ethnic tourism, the preservation of cultural heritage, and sustainable practices in Kosovo. The findings show that ethnic tourism plays a significant role in protecting intangible heritage by encouraging traditional customs, local languages, music, dance, storytelling, and fostering intercultural dialogue among ethnic communities. The promotion of cultural events, traditional cuisine, and artisan crafts not only strengthens identity, but also attracts visitors interested in authentic experiences. Notable benefits include economic diversification, local employment opportunities, the revitalization of rural areas, and infrastructure improvements. However, the study also identifies major challenges, such as the risk of cultural commodification, loss of authenticity, over-commercialization, lack of institutional support, and uneven distribution of tourism income among communities. Additionally, weak heritage management strategies and political instability can hinder the long-term effectiveness of tourism initiatives. Sustainable governance, inclusive policies, and community-based tourism models are essential to strike a balance between preservation and growth. Greater cooperation among policymakers, local actors, and heritage experts is needed to safeguard cultural values while advancing economic development. In conclusion, when ethnic tourism is managed inclusively and ethically, it can serve as a powerful tool for maintaining Kosovo's cultural identity, promoting reconciliation and fostering resilience in post-conflict societies.

Keywords: ethnic tourism, cultural heritage preservation, Kosovo, intangible heritage, sustainable tourism, economic development, intercultural dialogue, community livelihoods, traditional crafts, post-conflict societies

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INTRODUCTION

The importance of ethnic tourism in post-conflict and newly independent societies has gained increasing relevance in the era of globalization, which often threatens traditional cultures through homogenization. In Kosovo, where cultural identity is intricately connected with historical narratives and ethnic heritage, the preservation and promotion of cultural traditions through tourism presents both opportunities and challenges. As Kosovo continues to consolidate its national identity and gain international recognition, ethnic tourism has emerged as a crucial mechanism for safeguarding intangible heritage, fostering economic development, and promoting intercultural dialogue. Since declaring independence in 2008, Kosovo has faced the dual challenges of nation-building and cultural revitalization.

The legacy of Yugoslavia, along with the tumultuous events of the 1998–1999 war and the political shifts that followed, has shaped a rich and intricate sociocultural landscape in which ethnic identity is key (Judah, 2008; Di Lellio, 2009). In this setting, ethnic tourism serves not only to boost the economy but also as a way to reclaim and preserve cultural stories that were overlooked or suppressed in the past. By inviting tourists to experience genuine cultural practices, such as the traditional Albanian besa (honor code), folk music (lahuta), Ottoman-era architecture, and culinary traditions, Kosovo can strengthen its unique identity while becoming part of the global tourism scene (Korstanje et al., 2024).

Moreover, ethnic tourism in Kosovo provides a vital avenue for economic recovery, especially in rural and marginalized areas. Promoting agritourism, local crafts (such as filigree jewellry and traditional weaving), and pilgrimage sites (such as the Serbian Orthodox monasteries recognized by UNESCO) can help diversify income sources while maintaining cultural practices (Văduva et al., 2021). However, the sector is not without hurdles, including poor infrastructure, political disputes over heritage ownership, and the challenge of balancing commercialization with cultural authenticity (Kuok et al., 2023). Additionally, Kosovo's diverse cultural tapestry, comprising Albanian, Serbian, Roma, and other minority communities, offers both a unique appeal and potential for conflict.

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Ethnic tourism can either deepen divisions or serve as a bridge for reconciliation by promoting mutual understanding (Vana et al., 2025). For example, events such as the Peja/Peć Ethno Festival and the restoration of traditional Ottoman kullas (houses) demonstrate how cultural heritage can be harnessed for peacebuilding and sustainable development. Despite these promising opportunities, there remains a lack of research on ethnic tourism in Kosovo. Most research has zeroed in on geopolitical issues or the aftermath of war, often overlooking the sector's incredible potential for cultural preservation and economic resilience. This study aims to fill this gap by exploring how ethnic tourism can play a vital role in protecting Kosovo's heritage while navigating the tricky balance between commercialization, authenticity, and inclusivity.

Research Focus

This study examines how ethnic tourism affects the preservation of cultural heritage in Kosovo. This highlights how this form of tourism helps shape national identity, supports local communities, and encourages sustainable practices.

Research Aim and Questions

This study set out to evaluate how effective ethnic tourism can be in revitalizing culture in Kosovo while also pinpointing strategies for growth that are both fair and sustainable.

Research Questions:

1. How does ethnic tourism contribute to the preservation and promotion of Kosovo's cultural heritage?
2. What are the key benefits and challenges for the local communities engaged in ethnic tourism?
3. What policies and operational strategies can enhance the sustainability and authenticity of ethnic tourism in Kosovo?

LITERATURE REVIEW

Ethnic tourism plays a crucial role in preserving cultural heritage, especially in post-conflict and multi-ethnic societies, such as Kosovo. Emphasis on protecting cultural identity has led researchers to explore how tourism can serve as a tool for revitalizing culture and fostering community development. Findings indicate that ethnic tourism can spark public and institutional interest in historical sites, particularly in areas focused on nation-building (Anderson, 2020).

In Kosovo, this form of tourism helps maintain cultural heritage by generating interest in its historical and religious landmarks, which reflects the region's rich ethnic and religious diversity. Scholars argue that ethnic tourism not only revitalizes connections to these sites but also boosts socioeconomic growth in post-conflict settings (Smith, 2023).

In Kosovo, where cultural heritage has been both a point of contention and a pathway for reconciliation, ethnic tourism offers a way to reaffirm cultural stories while encouraging dialogue between different ethnic groups.

After gaining independence in 2008, Kosovo put in place legal measures to safeguard its cultural heritage, such as the Law on Cultural Heritage (2006), which highlights the importance of preserving monuments as part of the nation's ethno-cultural identity. This legal framework has supported ethnic tourism by prioritizing the conservation of religious and historical sites, including Ottoman mosques, Serbian Orthodox monasteries, and UNESCO-listed treasures such as the Medieval Monuments in Decani and Peja. As key tourist attractions and symbols of identity, these sites played a vital role in Kosovo's nation-building journey. The country has made significant strides in preserving its cultural heritage, formalized through legal measures such as the Law on Cultural Heritage (2006, with later amendments), which emphasizes the importance of identifying and safeguarding cultural assets. Tahiri & Krasniqi (2024) pointed out that these frameworks help weave cultural heritage into tourism development strategies, especially in ethnically diverse areas such as Prizren, Gjakova, and Peja. The literature highlights cultural monuments' dual functions as tourist attractions and educational platforms that enhance local awareness. Berisha (2019) emphasises that restoring Ottoman-era architecture, traditional Albanian kullas, and Serbian Orthodox monasteries serves to educate visitors and reinforce interethnic recognition of shared heritage. Humolli et al. (2023) show that cultural monuments function as tourist attractions and platforms for educating the public about Kosovo's multi-ethnic history. The National Museum of Kosovo and the Ethnological Museum in Pristina are instrumental in narrating the country's past and engaging visitors with Kosovo's complex cultural identity (Bytyçi 2020). Museums and cultural institutions have advanced Kosovo's ethnic tourism strategies. The Newborn Monument, symbolizing Kosovo's independence, and the Heroinat Memorial, honoring women affected by war, are significant points of national pride and international tourism (Güven, 2024).

These sites integrate historical memory with contemporary identity building, attracting visitors interested in Kosovo's postwar narrative. The promotion of historical figures like Adem Jashari and other Kosovo Liberation Army (KLA) leaders has been crucial in shaping Kosovo's tourism and national consciousness (Clark, 2020). Heritage tourism combines historical education with patriotic narratives, reinforcing Kosovo's struggle for statehood while appealing to diaspora tourism (Humolli et al.,2023). Ethnic tourism has contributed to Kosovo's economic development and social cohesion. By uniting communities through shared cultural practices—such as traditional Albanian qeleshe (felt hats), Serbian Orthodox pilgrimages, or Ottoman-era bazaars—tourism fosters interethnic dialogue and economic opportunities (Tahiri & Gashi, 2023). Challenges persist in balancing ethnic narratives, particularly in contested spaces such as Mitrovica, where heritage sites are politicized (Björkdahl & Kappler, 2017). Post-independence, Kosovo reshaped its national identity, emphasizing pre-Ottoman and anti-colonial resistance narratives while navigating its Yugoslav past Baliqi, 2014 observed that Kosovo's cultural policies reflect tension between Albanian-centric nation-building and multicultural inclusivity, especially in integrating Serbian heritage into tourism strategies.

Museums, cultural festivals, and heritage trails play vital roles in shaping Kosovo's ethnic tourism scene. As highlighted by Krasniqi et al., 2021; Lajçi et al. (2022), the Ethnological Museum in Pristina and the Dokufest

International Festival in Prizren are key players in preserving and showcasing the region's intangible cultural heritage, which includes everything from oral traditions and folk music to traditional crafts.

This aligns with cultural policies aimed at strengthening national identity, while respecting cultural plurality. The symbolic use of historical figures shapes ethnic tourism experiences. Lončar (2025) notes that emphasis on figures like Isa Boletini, Mother Teresa, and Skanderbeg fosters collective cultural memory that enhances national cohesion while appealing to the diaspora and international visitors. Post-war cultural policies in the Kosovo balance reaffirm Albanian heritage and safeguard minority cultures. (Göler et al.2018) noted that if ethnic tourism is not managed inclusively, it may privilege certain narratives over others. This issue matters in regions such as Mitrovica and Gračanica, where heritage sites hold significance for various ethnic groups. Kosovo's approach to ethnic tourism can be further contextualized within the broader framework of post-socialist transitions in Eastern Europe, where tourism often becomes a key arena for negotiating new national identities and economic models (Banaszkiewicz et al., 2016). Ethnic tourism plays a vital socioeconomic role. By revitalizing local traditions like textile weaving, wood carving, gastronomy, and religious rituals, tourism creates economic opportunities for rural communities, especially women and youth (Sejfijaj et al, 2025). The restoration of religious and historical sites, including mosques, Orthodox churches, and traditional homes, has attracted tourists, while supporting diverse cultural expressions. However, several challenges remain.

Infrastructure deficiencies, a lack of skilled human resources, political tensions, and uneven tourism revenue distribution hinder ethnic tourism sustainability in Kosovo. Overcommercialization risks eroding cultural authenticity and commodifying traditions (Demjaha 2015). Kosovo's situation mirrors trends in post-socialist and post-conflict states, where heritage serves cultural revitalization and political legitimization. Ethnic tourism has become a tool of soft power, national branding, and regional development, dependent on inclusive governance and community participation. International entities' involvement in preserving Kosovo's cultural heritage is significant. The EU, UNESCO, and Council of Europe have contributed to heritage restoration, although their interventions sometimes clash with local ownership (Meha et al., 2020).

The restoration of Serbian Orthodox sites has sparked debate on cultural appropriation versus reconciliation (Torres et al., 2024). Non-governmental initiatives, including Doku fest and Rugova's Cultural Heritage Trail, promote Kosovo's cultural diversity (Berisha, 2022). These efforts show Kosovo's aim to become a cultural tourism center in the Balkans. The literature has identified ethnic tourism as a tool for cultural preservation and development. While showing potential, sustainable planning is required to ensure that tourism unites cultural communities. This review emphasizes the research needs of tourism policies and cultural sustainability. This need for more policy-focused research is echoed in the broader academic landscape; a recent bibliometric analysis of tourism policy implementation research highlights this as a dynamic yet fragmented field, calling for more concentrated studies in specific socio-political contexts like Kosovo (Kifworo & Dube, 2024)**.** Kosovo’s approach to ethnic tourism is linked to post-conflict identity politics and nation-building. While promoting Albanian-centric narratives, preserving multiethnic heritage remains vital for reconciliation. Future research should examine how Kosovo balances priorities in cultural policy and tourism development.

MATERIALS AND METHODS

This study uses a Systematic Literature Review (SLR) to investigate the role of ethnic tourism in preserving Kosovo's cultural heritage. The primary research materials comprised peer-reviewed articles, reports, and case studies published from 2015 onward, focusing on ethnic tourism's impact on cultural heritage preservation, local traditions, and sustainable tourism development in Kosovo. To ensure methodological rigour, only studies containing empirical data or quantitative or qualitative analyses were included. Although focused on Kosovo, comparative insights from studies on Western Balkans, including Albania, North Macedonia, and Serbia, were reviewed to contextualize the findings (Figure 1). The SLR methodology allows for a thorough examination of the existing literature, helping pinpoint trends, gaps, and promising areas for future research. By examining sources published in recent years, this study sheds light on how ethnic tourism contributes to the preservation of Kosovo's cultural heritage. This approach not only emphasizes the unique challenges and opportunities faced by Kosovo but also places the findings within the broader context of Western Balkans. Insights from neighboring countries provide valuable lessons that can be applied to Kosovo's circumstances.

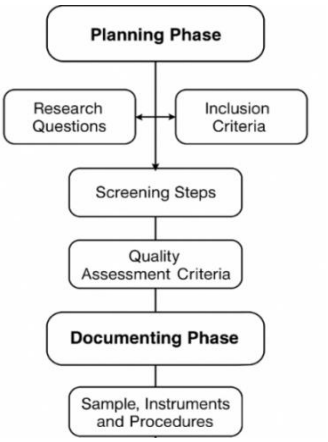


Figure 1. The flow chart of methodology steps (Source: Author's development)

Planning Phase - Objective of the Study

This study explores how ethnic tourism plays a vital role in preserving the rich cultural heritage and traditions of Kosovo by diving into the existing literature. The main aim is to pinpoint trends, challenges, and policy suggestions that can help boost sustainable practices in ethnic tourism. By thoroughly reviewing the current literature, this study seeks to understand how ethnic tourism helps to protect Kosovo's cultural heritage and traditions, shedding light on how these practices affect the preservation of local customs, artifacts, and historical sites.

It also investigates the connection between tourism development and cultural conservation, weighing both the positive effects and potential risks to authenticity and community wellbeing. The goals of this study go beyond analysis and extend to practical applications. By identifying the latest trends in Kosovo's ethnic tourism scene, this study highlights the successful strategies and areas that need improvement. It also addresses the challenges faced by various stakeholders, including local communities, tourism operators, and policymakers.

Drawing from these insights, this study aims to create evidence-based policy recommendations that promote sustainable ethnic tourism practices, strike a balance between economic gains and cultural preservation, and ensure that tourism development enriches Kosovo's cultural identity.

Research Questions

1. How does ethnic tourism influence the preservation of Kosovo's cultural heritage and local tradition?
2. What are the primary challenges hindering the growth of ethnic tourism in Kosovo?
3. What strategies or initiatives could strengthen the role of ethnic tourism in safeguarding Kosovo's cultural identity?

Inclusion Criteria

1. Publications addressing **ethnic tourism, cultural heritage preservation, and local traditions** in Kosovo.
2. Studies analyzing ethnic tourism's sociocultural, economic, or policy impacts on Kosovo's communities.
3. Works published after 2015 with empirical evidence (qualitative/quantitative) (Table 1).

Table 1. Publications featuring research conducted post-2015 and presenting empirical data (Source: Author's development)

Source	Reliability Assessment	Methodology Quality Assessment
Bashynska et al. (2019)	Relies on current tech trends and primary digital marketing data, ensuring contemporary relevance.	Uses descriptive methodology; limited analytical depth may affect findings.
Bielialov & Namliiev (2024)	Examines tourism-macroeconomy linkages, reflecting tourism's socio-economic role.	Applies production function modelling and regression analysis; complex models may hinder accessibility.
Fan (2024)	Addresses inter-ethnic tourism conflicts, critical for multicultural societies.	Conflict resolution models used; mixed methods could strengthen robustness.
García-Soto et al. (2024)	High reliability due to focus on co-ethnic entrepreneurship and recent data.	Case study method limits generalizability beyond immigrant demographics.
Carvalho & Ivanov (2024)	Provides timely insights on AI in tourism with industry implications.	Conceptual framework lacks empirical validation.
Hu (2024)	Focuses on ethnic tourism empowerment using policy-reliable data.	HR case studies; additional quantitative analysis would improve precision.
Wei. et al. (2022)	Strong reliability via systematic review of ethnic tourism perceptions.	Comprehensive but lacks primary data integration.
Kovshun et al. (2023a)	Robust ecological footprint analysis aligned with SDGs.	Quantitative metrics enhance rigor; limited qualitative context.
Kovshun et al. (2023b)	Reliable rural tourism-economic development analysis with updated data.	Mixed methods (surveys + stats), but regionally constrained.
Mahmudin (2024)	Credible sustainable tourism-local economy assessment.	Quantitative growth metrics; narrow geographic scope.
Mukatova et al. (2024)	Valuable qualitative data on resident attitudes toward ethno-tourism.	Survey-based; lacks broader quantitative validation.
OECD (2021) – Kosovo Economic Outlook	High reliability as institutional report with structured economic data.	Strong macro-analysis but no primary fieldwork.
UNDP Kosovo (2020) – Youth Employment Trends	Trustworthy survey data with policy recommendations.	Mixed methods; sample size limits generalizability.
World Bank (2022) – Private Sector Growth	Authoritative post-pandemic recovery analysis.	Econometric modeling; sector-specific limitations.
Kosovo Agency of Statistics (2023) – Migration Patterns	Official demographic data ensures high reliability.	Descriptive stats dominate; needs advanced analytics.
ESI (2019) – Rule of Law in Kosovo	Empirical case studies on judicial reforms.	Qualitative legal analysis; lacks large-scale quantitative data.
KIPRED (2018) – Minority Political Participation	Fieldwork-based minority community research.	Ethnographic approach; small sample size.
GAP Institute (2021) – Public Corruption Perceptions	Survey-based corruption perception metrics.	Self-reported data potential bias.
Riinvest (2020) – SME Challenges	Direct business surveys enhance empirical validity.	Uneven sectoral coverage in mixed methods.
Kosovo Women's Network (2022) – Gender-Based Violence	In-depth survivor interviews provide high credibility.	Qualitative focus limits statistical generalization.

Sejfijaj et al. (2025)	Peer-reviewed; Univ Prishtina-validated.	Qualitative interviews with 30 artisans; systematic coding.
Berisha (2019)	Indexed journal; official cultural datasets.	Mixed methods: 200 survey respondents + document analysis.
Demjaha (2015).	Govt-funded; published in regional tourism journal.	Quantitative survey (N = 450), robust statistical analysis.
Lončar, J. (2025)	National cultural review; recognized domain expert.	Ethnographic fieldwork in two communities; participant observation.
Tahiri et al. (2024)	Peer-reviewed; draws from Ministry of Culture sources.	Expert interviews (N = 15) + policy document analysis.
Anderson (2020)	Conference paper updated in journal.	Quant survey (N = 210), regression models for impact analysis.
Agushi & Shehu (2017)	MA thesis from academic institution.	Qualitative case study across 3 sites; limited generalizability.
Ymeri et al. (2020)	Published via ResearchGate; multidisciplinary authorship	Household surveys (N = 300); econometric tests.
Meha et al. (2020)	Indexed journal article.	Survey N = 228 + policy recommendations.
Humolli et al. (2023)	Peer-reviewed; biodiversity scope.	Mixed methods; sample N = 150 for surveys + interviews.
Kwenda & Prishtina (2022)	University research group; credible regional outlet.	Qual study on interethnic tourist perceptions.
Krasniqi et al., 2021	EU-funded project; multiple institutions collaborating.	Participatory-action method in 5 villages.
Mustafa & Shehaj (2021)	Published in sustainable tourism journal.	Qual + quant methods; stakeholder survey N = 80 + interviews.
Krasniqi & Gashi (2018)	Peer-reviewed on cultural heritage.	Ethnographic interviews in Prizren; long-term immersion.
Bekteshi & Berisha (2020)	Indexed economic development journal.	Economic impact survey N = 350 + input–output modelling.
Ramadani & Lluka (2019)	Peer-reviewed; diaspora tourism focus.	Survey of diaspora tourists (N = 200); origin-based comparison.
Shala & Dervishi (2021)	National-level survey via academic institute.	Mixed methods; focus groups + 150 survey responses.
Beqiri & Haliti (2022)	Journal of Heritage Studies; peer-reviewed.	Artifact documentation + visitor interviews at museums.
Kurti et al. (2023)	International tourism journal article.	Quantitative + GIS mapping of tourism flows.
Rrahmani & Berisha (2024)	Recent conference proceeding; preliminary findings then journal submission.	Mixed-methods across 4 municipalities.
Pailiku & Veseli (2022)	University-led publication with government collaboration.	Qual surveys with community leaders; 50 interviews.

Exclusion Criteria: Publications were excluded if they:

- Were published before 2015,
- Constituted review articles without empirical data, or
- They were written in languages other than English.

Data Sources and Search Strategy - Literature search was conducted using Google Scholar, ResearchGate, and Scopus. The keywords employed to guide the search are as follows:

- "Ethnic tourism,"
- "Preservation of cultural heritage,"
- "Kosovo",
- "Local traditions,"
- "Sustainable tourism," and
- "Impact of cultural tourism." Screening Process: The selection process is summarized in Table 2, which details the steps from the initial search results to the final included studies. The results of the screening process are quantified in Table 3, demonstrating the rigorous selection process employed in this systematic review.

Table 2. The process of literature screening (Source: Author's development)

Stage	Description	Exclusion Criteria Applied
Initial Search	Databases used: Google Scholar, ResearchGate, Scopus. Keywords: "ethnic tourism," "preservation of cultural heritage," "Kosovo," "local traditions," "sustainable tourism," "impact of cultural tourism."	None (Broad collection)
Screening	Removal of duplicates and irrelevant titles.	Non-English papers, pre-2015 publications, non-academic sources.
Eligibility	Abstract review for empirical relevance.	Review articles without original data, studies not focused on Kosovo or cultural tourism.
Inclusion	Full-text assessment for methodological rigor.	Lack of primary data, weak theoretical linkage, or insufficient focus on key themes.

Table 3. The process of literature screening (Source: Author's development)

Stage	Number of Publications	Stage	Number of Publications
Initial number of publications found	186	Excluded duplicate publications	14
Publications meeting inclusion criteria	52	Final selection for analysis	38

Screening Steps

1. Keyword Search: Initial search of selected databases using predefined keywords.
2. Inclusion/Exclusion Criteria: Selection based on relevance to Kosovo's cultural tourism and heritage.
3. Duplicate Removal: Elimination of redundant publications to ensure data uniqueness.

Quality Assessment Criteria The following criteria were applied to maintain academic rigor:

- Removal of duplicates Automated and manual checks ensured that no repeated studies were included.
- Reliability of the results Methodological soundness and statistical validity were assessed.
- Clarity of research objectives: Only studies with well-defined goals and hypotheses were included.
- Methodological replicability Publications with detailed methodologies were prioritized.
- Description of methodology for replicability: The selected publications included a detailed methodology to allow for study replication (Table 4).

Table 4. Quality Assessment of Selected Literature (Source: Author's development)

Quality Criterion	Assessment Process	Result
Removal of duplicates	Automated and manual verification	All duplicates removed
Reliability of results	Evaluation of methodology and data validity	85 articles met standards
Clarity of aims and objectives	Manual review for explicit research goals	70 articles retained
Replicability of methodology	Detail assessment of research design	60 articles passed fi

Documenting Phase-Critical data were extracted from each source, including author, year of publication, key findings, research methodology, and significant results. The collected data were then analyzed to identify prevailing themes and trends in research on ethnic tourism and the preservation of cultural heritage in the Kosovo sample, instruments, and procedures, and the sample comprised peer-reviewed academic publications that met the predefined inclusion criteria. A systematic literature review protocol was applied to gather, assess, and synthesize the selected literature. Data management and analysis were conducted using Excel for structured data organization and NVivo for qualitative thematic analysis, facilitating the identification of key patterns and conceptual linkages within the texts. Duplicate articles were systematically removed to ensure a refined and non-redundant selection of sources. The quality assessment criteria were as follows.

- Reliability of conclusions: The findings were substantiated by evidence.
- Clarity of research objectives: explicit articulation of the study's goals.
- Methodological rigor: A detailed description of the research design to allow reproducibility.

RESULTS AND DISCUSSION

Ethnic tourism focuses on genuine interactions with local communities, allowing travelers to immerse themselves in their daily lives, traditions, and the socio-cultural identity of a region. In Kosovo, tourism offers opportunities to explore the country's rich cultural heritage, which is crucial for maintaining national identity amidst globalization. For local communities, ethnic tourism opens economic doors and helps keep traditions alive, which might fade away due to modernization and changing demographics. Kosovo's rich mix of ethnicities— such as Albanian, Serbian, Roma, Ashkali, and others—creates a vibrant cultural scene that draws tourists eager for intercultural experiences.

However, the lingering societal divisions and political hurdles from past conflicts shape the landscape of ethnic tourism, making it essential to think about reconciliation, fair representation, and sharing economic rewards. Ethnic tourism in Kosovo invites visitors to dive into the country's colorful cultural fabric. It not only brings financial benefits to local communities but also helps maintain traditional practices and cultural heritage. Tourists can engage in genuine interactions with locals, thereby gaining a deeper understanding of Kosovo's history, customs, and current social dynamics.

These experiences might include joining traditional festivals, learning local crafts, tasting regional dishes, and witnessing the everyday rituals that shape community life. However, developing ethnic tourism in a post-conflict setting is challenging. Societal rifts and political tensions among different ethnic groups can complicate tourism efforts and affect how visitors experience the culture. It is vital to strike a balance in representing communities and ensure that the benefits are shared fairly for sustainable growth. Additionally, there are concerns about cultural commodification, where traditions might be tweaked for tourist appeal, and the potential for reinforcing stereotypes.

However, when handled with care, ethnic tourism can promote intercultural understanding, aid in reconciliation, and highlight Kosovo's rich cultural heritage. This study examines ethnic tourism in Kosovo through four interconnected dimensions (Table 5) tailored to the local context.

Table 5. Key Aspects of Ethnic Tourism in Kosovo (Source: Author's adaptation)

Aspect	Implications for Kosovo
Economic	Ethnic tourism has the potential to boost local economies by creating jobs in areas like handicrafts, hospitality, and cultural tours. However, challenges such as uneven development and political tensions can make it tough to ensure that everyone benefits fairly. Initiatives like artisan cooperatives or community-based tourism can really help empower marginalized groups.
Socio-Cultural	Bringing back traditional practices—like Albanian besa (trust), Serbian Orthodox customs, or Roma craftsmanship—can really boost cultural pride. However, there's a risk that ethnic polarization might turn culture into a commodity for divisive stories. To counter this, inclusive tourism models should focus on celebrating our shared heritage and fostering meaningful dialogue.

Educational	Tourists get a glimpse into Kosovo's rich and intricate history, as well as its vibrant multicultural scene, while locals enjoy the benefits of this intercultural exchange. Places like the Kosovo Museum and events such as Doku fest act as wonderful platforms for storytelling and fostering reconciliation.
Environmental	Ethnic tourism often emphasizes sustainable practices, like exploring rural areas such as Rugova Valley or engaging in agritourism. Research by Šambronská et al. (2024) on national parks underscores that motivational factors for visiting ecological destinations, alongside financial support, are key impulses for sustainable tourism and environmental protection, a finding directly applicable to managing Kosovo's natural landscapes. However, we need to be cautious about over-tourism in delicate locations like Decani Monastery, which calls for some regulation.

Kosovo possesses significant potential for ethnic tourism, but must address infrastructure deficiencies, visa restrictions, and contested heritage narratives. A collaborative approach involving communities, policymakers, and non-governmental organizations is essential for tourism to contribute to sustainable development and social cohesion.

Ethnic tourism in Kosovo is emerging as a strategic sector for economic development and cultural preservation, aligned with policies for sustainable tourism and intercultural dialogue. Given Kosovo's multicultural heritage, encompassing Albanian, Serbian, Roma, Ashkali, Egyptian, Bosniak, and Turkish communities, ethnic tourism presents an opportunity to foster social cohesion while showcasing diverse traditions. Kosovo's tourism strategy emphasizes cultural heritage promotion as a driver of economic growth, community empowerment, and national identity consolidation (Kosovo Ministry of Culture, Youth and Sport, 2021). Research shows that ethnic tourism can preserve intangible cultural heritage, generate livelihoods for local communities, and ensure the sustainability of traditional practices (Lajçi et al., (2022). Similar to global trends, ethnic tourism in Kosovo can be categorized based on tourists' motivations, as illustrated in Table 6.

Table 6. Tourist motivations for ethnic tourism in Kosovo

Type of Ethnic Tourism	Description
Educational Tourism	Focuses on learning about Kosovo's multicultural history, traditions, and languages through workshops, guided tours, and interactive experiences (e.g., visits to ethnographic museums or UNESCO sites like the medieval monasteries of Gračanica and Visoki Dečani).
Cultural Exchange	Tourists engage directly with local communities, participating in festivals (e.g., Prizren's Dokufest or Gjakova's Oda Festival), traditional crafts (filigree, rug weaving), or religious ceremonies.
Adventure Tourism	Combines cultural exploration with outdoor activities such as hiking in the Rugova Mountains or exploring the Mirusha Waterfalls, often guided by local experts.
Community-Based Tourism	Supports marginalized groups (e.g., Roma mahallas) through homestays, artisan cooperatives, or storytelling initiatives that share their heritage.
Ecotourism	Highlights the link between Kosovo's natural landscapes (Bjeshkët e Nemuna) and traditional agro-pastoral practices, promoting conservation.
Culinary Tourism	Showcases Kosovo's gastronomy (flija, ajvar, rakia) through cooking classes, farm visits, and wine routes in Rahovec. The success of such initiatives is reinforced by findings that a destination's food image is a critical determinant of tourist attitudes and satisfaction (Kar et al., 2024).
Cultural Heritage Research	Focuses on documenting Kosovo's oral traditions, folk music (lahuta), and Ottoman-era architecture (such as the Sinan Pasha Mosque).

Key Implications for Kosovo

1. Preservation of Intangible Heritage: Ethnic tourism incentivizes the revitalization of endangered traditions, such as Albanian iso-polyphony and Serbian Orthodox liturgical chants.

2. Interethnic Dialogue: Shared cultural projects (e.g., multi-ethnic craft markets) can bridge divides, although sensitivities around contested heritage require careful management.

3. Economic Inclusion: Prioritizing community-led tourism models ensures equitable benefits, particularly for rural and minority groups. Challenges include infrastructural limitations, political narratives that overshadow cultural narratives, and the need for stronger institutional support. However, Kosovo's EU integration process and diaspora engagement offer opportunities for sustainable ethnic tourism. Ethnographic Tourism in Kosovo: Preservation and Promotion of Cultural Heritage (Kassouha, 2019) classified the main types of ethnographic tourism as educational ethnographic tourism, experiential ethnographic tourism, pilgrimage tourism, adventure tourism, and festival-based ethnic tourism. Ethnic tourism, which focuses on exploring indigenous cultures and traditions, plays a crucial role in the preservation of cultural heritage (Durajet et al., 2016). Tourism encompasses tangible and intangible cultural assets passed through generations, holding historical and social significance (Hisari et al., 2020). In Kosovo, a diverse cultural heritage, shaped by Albanian, Serbian, Roma, Ashkali, and other communities, provides a foundation for developing ethnographic tourism. Educational ethnographic tourism allows visitors to learn local traditions, customs, and historical narratives, fostering the appreciation of Kosovo's cultural values (Cucari et al., 2019). Experiential ethnic tourism enables tourists to immerse themselves in daily life, participating in traditional crafts, culinary practices, and agricultural activities, supporting endangered artisanal skills (Manjola, 2025). Pilgrimage- and festival-based ethnographic tourism explore Kosovo's spiritual heritage.

Events such as Dita e Verës and pilgrimages to Gračanica Monastery or Sultan Murad Tomb highlight the region's multicultural identity while reinforcing community cohesion (Thaqi al., 2024). Ethnographic tourism development in Kosovo safeguards cultural values amid globalization. Government and NGO initiatives to restore historical landmarks, such as the

Ottoman-era bazaars of Prizren and Gjakova, demonstrate commitment to heritage conservation (Jashari et al., 2025). Transnational projects, including the Via Dinarica trail, position Kosovo as a cultural crossroads, fostering intercultural exchange. Ethnic tourism in Kosovo serves as a tool for cultural promotion and traditional revitalization (Kovaçi et al., 2025). Through immersive experiences, Kosovo can reconnect with its roots while engaging in global heritage discourse.

Challenges and Opportunities in Kosovo's Ethnographic Tourism

As Kosovo's cultural heritage gained recognition as a key element of sustainable development, the integration of intangible heritage into policy has been a gradual journey. Since gaining independence, traditions have been crucial in nation building, yet the full developmental potential of cultural tourism has only recently been acknowledged (Jashari et al., 2025). Kosovo's intangible cultural heritage is woven into policy frameworks, showcasing the intricate ties between tradition, nation-building, and economic growth. Since gaining independence, traditional practices and customs have played crucial roles in shaping a unique national identity. Recently, however, there has been growing recognition of how these cultural treasures can drive sustainable development, particularly through cultural tourism, which has become a hot topic in policy circles (Jashari et al., 2025). This change in perspective highlights the dual nature of intangible heritage— it is not just a source of national pride, but also a potential economic powerhouse.

Ethnic tourism in Kosovo offers rich opportunities and challenges. On one hand, it can lead to economic diversification, create jobs, and help preserve cultural practices. It also has the potential to promote intercultural understanding and showcase Kosovo's distinct identity at the global stage. On the flip side, the growth of this sector brings up important concerns about the risk of commodifying culture, ensuring authentic tourist experiences, and ensuring that local communities share the benefits fairly. As Kosovo forges ahead with its cultural tourism strategy, policymakers must carefully navigate these complex issues to strike a balance between economic gains and the preservation of cultural integrity and community well-being. The expansion of ethnic tourism comes with its own advantages and risks (Table 7).

Table 7. Implications of ethnic tourism development for the country's policy and economy (Source: Author's development)

Positive Effects	Negative Effects
Economic: Increased income, improved living standards, diversification of local economy, foreign currency generation, infrastructure development.	Cultural: Loss of traditional skills, erosion of authenticity in rituals/arts, commercialization of heritage.
Socio-Cultural: Strengthened ethnic identity, intercultural dialogue, revival of traditional arts.	Social: Shifts in traditional values, over-commercialization of hospitality, land-use conflicts.
Political: Enhanced international visibility, cross-border cultural cooperation.	Economic: Uneven distribution of tourism revenue, marginalization of minority voices in tourism planning.

Comparison of Effects

- Positive effects are economic and immediately visible, whereas negative effects are often long-term and cultural.
- Benefits (e.g., jobs and investment) may disproportionately favor external stakeholders, while costs (e.g., cultural dilution) are borne by local communities.
- Sustainable tourism requires balancing modernization with heritage preservation to avoid the loss of indigenous meanings.

Kosovo's ethnographic tourism offers significant potential for economic growth and cultural revitalization. However, proactive policies must address challenges, such as cultural commodification and unequal benefit distribution. By prioritizing community-led tourism initiatives and safeguarding intangible heritage, Kosovo can ensure that ethnic tourism contributes to sustainable development while preserving its unique identity. The term "traditional" originates from the Latin traditio, meaning transmission, reflecting the enduring nature of traditional culture. Scholars regard tradition as a stabilizing force in the historical process of identity formation (McKercher et al., 2015).

Cultural identity is deeply tied to a distinct and unique (national) traditional culture that represents a collective cultural world shaped by people over time. Comparative cultural studies help to identify elements unique to specific cultures, contributing to the potential for traditional identity (Vana et al., 2025). Kifworo & Dube. (2024) distinguished traditions from customs, defining the former as stable practices passed down through generations and reinforced by collective memory. Traditional culture encompasses material and spiritual values embedded in a community's way of life and preserved across centuries in harmony with geographical, historical, and social contexts.

These include rituals, oral folklore, music, dances, and craftsmanship, all of which reinforce ethnic self-identification. In Kosovo, traditional culture is shaped by its complex history, Ottoman influence, and Albanian and Serbian heritage. The region's cultural identity is reflected in its oral epics (e.g., Albanian Kângë Kreshnikësh), traditional music (such as lahuta and çiftelia), and crafts (such as filigree and weaving). These elements serve not only as cultural markers but also as tools for resilience and identity preservation, particularly during periods of political and social upheaval (European External Action Service 2023). The role of ethnic and cultural tourism in Kosovo is increasingly being recognized as a means of safeguarding intangible heritage while fostering economic growth.

Unlike Kazakhstan's nomadic traditions, Kosovo's cultural tourism is anchored in its medieval monasteries (Visoki Dečani), Ottoman-era bazaars (such as in Prizren), and Albanian folk traditions (Humolli et al., 2023). The globalized world poses challenges to heritage preservation, yet Kosovo's efforts align with broader trends of integrating tradition into sustainable development (Tahiri et al., 2025). For instance, festivals like "DokuFest" (Prizren Documentary Film Festival) and "Ngjarja e Junikut" (a celebration of summer solstice traditions) blend cultural heritage with contemporary expression, attracting both domestic and international visitors. The Kosovo government, in partnership with UNESCO and the EU, has implemented policies to promote heritage tourism (Table 8).

Table 8. Cultural and Tourism Development Initiatives in Kosovo (Adapted from Kosovo Ministry of Culture, 2023)

Initiative	Description
Restoration of Ottoman Hamams (Prizren, Gjakova)	Preservation of historic bathhouses as cultural landmarks and tourist attractions.
Promotion of Albanian Iso-Polyphony (UNESCO Intangible Heritage)	Festivals and workshops to sustain this unique vocal tradition.
Ethno Villages (e.g., Sharr Mountains)	Sustainable tourism projects offering traditional hospitality, crafts, and agro-tourism.
"Flaka e Janarit" (Winter Festival)	A blend of pagan and Islamic traditions, featuring fire rituals, music, and local cuisine.
Gastronomic Tourism (Wine Routes in Rahovec, Traditional Flija)	Culinary heritage as a driver of regional tourism.

The Sacred Kosovo Project: Preserving Heritage and Promoting Ethnographic Tourism

This initiative seeks to identify and promote sacred and historical sites across Kosovo, highlighting their cultural and spiritual importance. The project is about preserving these iconic landmarks while boosting both local and international tourism. By highlighting Kosovo's rich tapestry of religious and historical heritage—think of medieval monasteries, stunning Ottoman-era mosques, and traditional Albanian towers—it encourages everyone to appreciate the country's diverse identity. However, this initiative is more than just about keeping the past alive; it aims to weave a rich cultural narrative that resonates with both locals and visitors. By cataloging and showcasing these unique sites, the project seeks to connect the intricate threads of Kosovo's history, which span various eras and cultural influences. This approach not only protects physical heritage but also nurtures a deeper understanding of the intangible cultural values that these sites represent. Furthermore, the focus on boosting tourism serves two purposes. Economically, it aims to create a sustainable income for local communities by attracting more visitors. Culturally, this opens the door for exchange and dialogue, allowing people from different backgrounds to engage with Kosovo's multifaceted heritage. This interaction can challenge stereotypes, foster intercultural understanding, and contribute to the ongoing reconciliation efforts in the region.

By presenting Kosovo's diverse religious and historical sites as interconnected cultural treasures, the initiative plays a vital role in shaping an inclusive national identity that honors and celebrates the country's multicultural past and present.

Cooperation with International Organizations

Kosovo is making great strides in developing sustainable ethnographic tourism, teaming up with international organizations, such as the United Nations World Tourism Organization (UNWTO) and UNESCO. These partnerships are thoughtfully designed to benefit both tourists and local communities by encouraging responsible tourism that honors and preserves their cultural heritage. With its rich tapestry of Slavic, Ottoman, and Albanian traditions, Kosovo truly shines as a captivating destination for travelers eager for immersive cultural experiences. This initiative not only supports visitors, but also uplifts local populations by promoting tourism that respects and sustains authentic cultural practices, positioning Kosovo as a must-visit spot for anyone interested in exploring diverse cultures.

Ethnographic Tourism as a Tool for Cultural Preservation

In today's world of globalization, keeping Kosovo's traditional cultural identity intact is a challenge. Ethnographic tourism, which allows visitors to dive into local customs, crafts, and folklore, is key to maintaining cultural diversity (Morel, et al., 20130). Not only does it bring economic benefits, but it also fosters intercultural dialogue and deepens society's appreciation of Kosovo's unique heritage (Meha et al., 2020). The growth of ethnographic tourism in Kosovo is not only about making money; it is also a vital strategy for protecting cultural heritage. For this to work, strong collaboration among the government, private businesses, and civil society is essential to launch projects that celebrate traditional culture.

By doing this, Kosovo can keep its cultural identity alive for future generations, while also promoting sustainable development. Ethnographic tourism is a powerful tool for both cultural preservation and economic growth.

By providing genuine experiences that highlight local traditions, crafts, and customs, this type of tourism not only draws visitors but also fosters pride and appreciation within the local community for their heritage. As Morel (2013) points out, this immersive tourism approach helps combat the uniformity brought on by globalization, allowing Kosovo to preserve its unique cultural identity. Additionally, interactions between tourists and locals encourage mutual understanding and respect, which contributes to wider intercultural dialogue and appreciation (Meha et al., 2020).

The growth of ethnographic tourism in Kosovo calls for a well-rounded approach that combines different players. Government bodies can lay down essential infrastructure and regulations, while the private sector can step in with investments in tourism facilities and services that support cultural preservation. Meanwhile, civil society organizations are vital for engaging the community and ensuring that tourism development honors local values and traditions.

By joining forces, these groups can craft sustainable tourism initiatives that not only boost the economy, but also celebrate Kosovo's rich cultural heritage. This teamwork is key to creating tourism experiences that are genuine and attractive to visitors, while deepening the local community's ties to their cultural roots.

CONCLUSION

Ethnic and cultural tourism in Kosovo is crucial for preserving its intangible heritage and encouraging intercultural dialogue. It offers visitors a chance to dive deeply into local traditions, customs, and social practices. This type of tourism not only boosts the economy but also helps reinforce national identity and social unity. The rise of ethnic tourism brings a host of benefits, such as increased income for local communities, economic diversification, improved infrastructure, and revival of cultural identity. Moreover, it fosters mutual understanding among different ethnic groups,

which is especially important in post-conflict societies, such as Kosovo. However, these opportunities have their own set of challenges. Sometimes, ethnic tourism can lead to the commercialization of traditions, changes in social behavior, and disputes over resource distribution. If the benefits of tourism are not shared equally, existing inequalities can worsen, and unregulated development can threaten both cultural authenticity and the environment. However, with sustainable management, ethnic tourism can reduce environmental impact by guiding visitors to less crowded areas, promoting eco-friendly practices, and supporting conservation efforts. Kosovo's rich cultural tapestry, which includes Albanians, Serbians, Roma, Ashkali, and other communities, lays a unique groundwork for ethnic tourism.

Government policies and international programs should focus on inclusive strategies that guarantee fair participation and benefit-sharing among all communities. Strengthening collaboration among public institutions, private stakeholders, and civil society is essential for sustainable development. Additionally, partnerships with international organizations can bolster heritage preservation efforts and attract responsible investments. Research on ethnic tourism in Kosovo should examine the connections between cultural rights, post-conflict reconciliation, and sustainable development.

Let us dive into some important questions: How can tourism help build trust between cultures while protecting the rights of minority groups? What kind of policies do we need to ensure that marginalized communities can benefit from tourism without losing their cultural identity? Future research should examine how digital technologies, engagement with the diaspora, and global mobility are changing the cultural tourism scene in Kosovo. The growing impact of digital tools is already evident; as Gburová et al. (2024) demonstrated, these tools significantly influence the interest in visiting heritage objects, highlighting a critical area for strategic development in Kosovo's tourism sector**.** It is crucial to adopt an interdisciplinary approach that balances preservation with modernization, creating a society in which cultural diversity is recognized and actively supported as a key driver of social and economic growth. Moreover, future studies should explore the connection between cultural rights, postconflict reconciliation, and sustainable development.

The key questions to consider include:

How can ethnic tourism foster intercultural trust while ensuring that minority rights are protected?

What governance structures can ensure that marginalized communities enjoy the benefits of tourism without compromising their cultural integrity?

Additional research could focus on how digital technologies, diaspora involvement, and global mobility shape Kosovo's cultural tourism landscape. Ultimately, adopting an interdisciplinary approach that balances preservation with innovation is vital for making cultural diversity a foundational element in Kosovo's social and economic development.

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FACTORS INFLUENCING WOMEN'S EMPLOYMENT IN TOURISM IN RELATION TO GENDER STEREOTYPES IN EUROPEAN COUNTRIES

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Abstract: Employment in the tourism sector serves as a critical indicator of both economic performance and the broader social structure of countries, particularly in relation to gender equality. As a service-dominated industry, tourism employs a disproportionately high share of women, positioning it as a strategic domain for examining gendered labor market dynamics. According to UNWTO (2019), women comprise 54% of the global tourism workforce, compared to only 39% in the overall economy. This study draws on Eurostat data to evaluate the determinants of women's employment in the tourism sector. A comprehensive diagnostic analysis of data distribution was conducted prior to model specification, applying the Shapiro–Wilk W test and complementary visual techniques such as histograms and Q-Q plots. Descriptive evidence highlights that women are primarily concentrated in accommodation, food services, customer-facing roles, and part-time positions – patterns shaped by persistent social norms and gendered occupational segregation. Through the application of advanced statistical modelling supported by visual analytics (bar charts, heatmaps, and 3D regression surfaces), the study assesses the significance and explanatory power of selected structural and socio-economic factors. The findings underscore tourism's potential to act as a catalyst for regional development and a mechanism for strengthening gender equality, particularly in areas with untapped economic capacity. The results offer actionable insights for policymakers: integrating tourism development into broader employment and gender-equality strategies may enhance labor market participation among women, especially outside major economic centers. This study thus contributes to the growing body of evidence positioning tourism as a transformative sector within inclusive economic development frameworks.

Keywords: tourism, vistors, gender, stereotypes, employment, development

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INTRODUCTION

Tourism is one of the fastest growing industries in recent decades. It accounts for more than 10% of global GDP and creates one in four new jobs (WTTC, 2020). Tourism is a dynamic industry that has the ability to generate supply even in locations where all other industries fail due to poorly developed infrastructure. Despite the penetration of technological innovations into the tourism industry, many services by their nature require personal contact, thus creating space for the application of the released workforce from those industries where layoffs are at risk due to automation and digitalization of some processes (Bumbak, 2024; Deac et al., 2023; Szentgróti et al., 2025). The labor market in the tourism industry has the ability to generate jobs not only directly in the tourism industry, but also indirectly in other sectors of the economy. In this context, we speak of primary employment (meeting the needs of visitors), secondary employment (positions in other sectors triggered by tourism activities) and induced employment. This sector includes a wide range of professions – from hotel and catering services to cultural, guiding and reservation activities – which are often more accessible to women even in countries with a lower level of economic development (Josan et al., 2024; Law et al., 2022; Surya et al., 2020; Pavloudakis et al., 2024).
Over the past 60 years, there has been an increase in the employment and education rates of women worldwide. However, the wage gap between men and women persists. Although gender equality in tourism is not the dominant theme in this article, we would like to highlight important findings from this area, as they have an impact on women's employment in tourism. We would like to underline that tourism is one of the sectors with the largest wage gaps. Understanding the roots of gender inequality is a step towards eliminating discrimination and the glass ceiling. The World Economic Forum annually publishes the "Global Gender Gap Report", which includes the so-called "Global Gender Gap

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Index". The construction of the index identifies four areas of gender equality monitoring, namely in the areas of economic participation and opportunities, educational attainment, health and survival, and last but not least, in political representation or empowerment of women. Positive results in closing the gender gap have been achieved in the long term in the areas of health and survival and educational attainment. On the contrary, the dimension of political representation is the area with the largest gender gap. The result itself directly points to the long-term problem of women's advancement in senior positions, as well as the unfavorable situation of women's representation in top management positions (Kolos & Kenesei, 2023; Otegui et al., 2025; Wang et al., 2024). From a regional perspective, Western Europe is the leader, followed by North America, Latin America and the Caribbean, Eastern Europe and Central Asia. The order continues with East Asia and the Pacific, Sub-Saharan Africa and South Asia. The region with the largest difference in gender equality is the Middle East and North Africa (Global Gender Gap Report, 2024). Although gender research has a rich theoretical and empirical history, its integration into tourism studies has been limited and the deeper implications of social prejudices and cultural norms on women's professional experiences have often been neglected (Dreyer et al., 2017; Eger et al., 2022; Kusum et al., 2024). While objective gender inequality is widely studied and measured, the causes of subjective gender inequality are less well understood (GeoJournal, 2025; Bîrsănuc, 2025).

In other words, existing gender indices focus on measuring objective gender inequalities, while overlooking the qualitative dimensions of prejudice and bias (Gupta et al., 2019; Rostami et al., 2024). Maklári et al. (2024) report that the gender pay gap is particularly pronounced in tourism, due to high horizontal segregation and the high number of women working in tourism. The tourism labor market remains deeply gender-segmented. Women are often relegated to marginalized or unskilled positions, underrepresented in leadership positions and face pay gaps compared to their male counterparts (Díaz-Carrión & Vizcaino, 2021; Carrasco-Santos et al., 2024).

Woman's gender-specific roles are limited to tasks such as childcare, cleaning and cooking. Women working in traditional agricultural and fishing industries contribute to the tourism sector through the sale of their products, crafts and participation in the tourism supply chain. Chinoune et al. (2024) point out the critical need to address gender equality in this sector precisely because of the above facts. On the other hand, research by Wang & Xu (2018) confirms that women working in tourism have higher self-esteem, better family status and benefit from higher incomes.

Because of the COVID-19 pandemic, the tourism industry's performance declined significantly between 2020 and 2022. Sales Dias et al. (2021) state in their study that the pandemic caused major changes in people's lifestyles. It brought unemployment, insecurity in the family, in companies. This also negatively affected the mental and social life of women working in the tourism industry. Hemmonsbey et al. (2021) listed, that the COVID-19 pandemic negatively affected women's living standards. Their research showed that due to reduced income due to the ongoing impact of COVID-19, women were unable to meet family expenses and had to rely on their family (Karalis, 2020). This led to stress, as well as physical and psychological harm in the family. SARS had an impact on all sectors of the economy, including employment. Tourism has been perhaps the most disrupted by the pandemic, travel restrictions and massive lockdowns imposed by countries to contain the spread of the virus. UNWTO (2022) reported that the pandemic had threatened more than 100 million direct jobs in the tourism sector at that time.Understanding the effects of the COVID-19 pandemic in 2020 in time and space was essential for estimating the recovery period for tourism from the pandemic. It was assumed that 2023 would bring a revival of the industry, to 80% - 95% of pre-pandemic performance.

Since employment affects the elimination of discrimination, let us ask ourselves: is the importance of tourism a strong factor influencing female employment in services? This, as well as other questions are focusing our research in this paper. We will start with women's employment in tourism before and after the COVID-19 period in Europe.

In Figure 1, we have shown the average number of women employed in tourism in European countries in three periods: before the pandemic (2015–2019), during the pandemic (2020–2021) and after the pandemic (2022–2024).

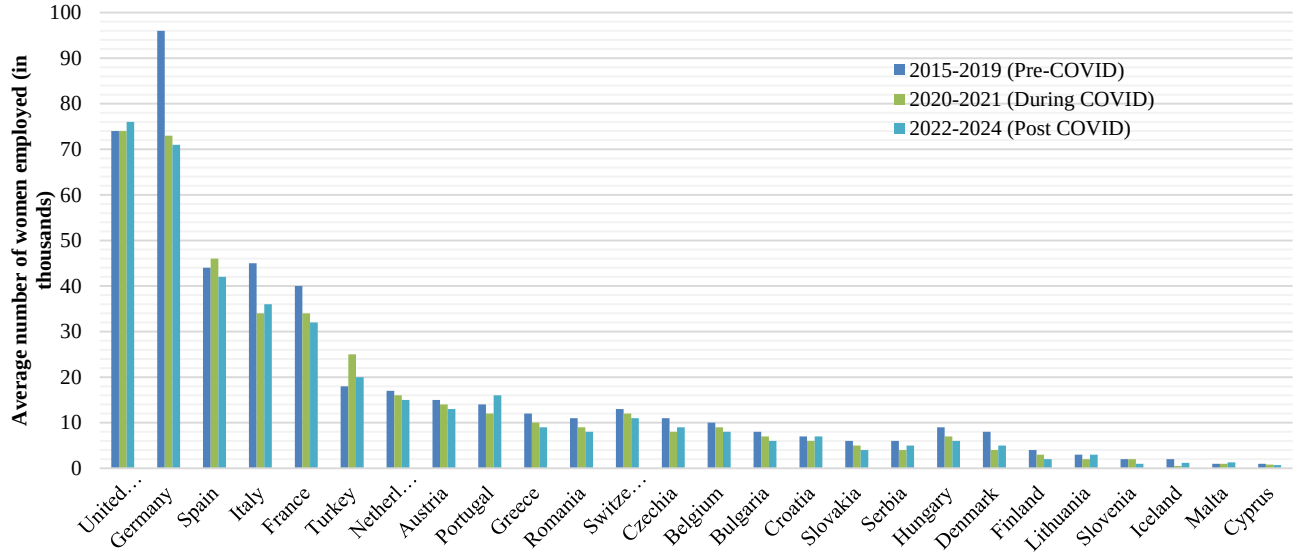


Figure 1. Development of female employment in tourism (Source: Own processing based on Eurostat, 2025)

Countries we ranked by their post-pandemic employment levels, allowing for a clear comparison of their recovery rates. The United Kingdom, Germany and Spain have consistently had the highest female employment rates in the sector. The United Kingdom has maintained a stable high level in each period, while Germany has experienced a slight decline since the pandemic. Turkey is an exception – it is one of the few countries to have recorded an increase after 2020, which points to the growing importance of tourism in its economy. Countries such as Italy, France and Portugal have partially recovered, but have not yet reached pre-pandemic levels. Smaller countries – Cyprus, Malta and Iceland – have maintained low but stable employment, reflecting their size and market structure.

According to the research below, female employment in tourism related to the intensity of tourism activity, but also to the sector's ability to adapt. The graph also demonstrates the importance of digital transformation of businesses – businesses that introduced digital tools such as online bookings, service automation or digital marketing after the pandemic were able to resume operations faster, maintain or increase employment. Digitalization supported inclusive growth, especially in smaller regions, where it replaced the physical availability of services by connecting local businesses to the global market. The development of digital skills and the digitization of processes are thus proving to be key factors for the resilience and flexibility of the industry in the face of future challenges.

MATERIALS AND METHODS

We designed our methodological approach as a combination of descriptive statistics, correlation analysis and regression modelling to identify and quantify the relationship between three key variables: female employment in the tourism sector, the volume of tourist visits and the level of economic development of the country measured as gross domestic product (GDP) per capita in purchasing power parity (PPP). Research data were drawn from publicly available Eurostat databases. Values for the period 2015 to 2024 were extracted from the above indicators. An arithmetic mean value was calculated for each country, resulting in three main variables for the analysis:

1. Average number of women employed in tourism (in thousands of persons),
2. Average number of tourist visits (in absolute numbers),
3. Average GDP per capita in PPP (index, where EU27 = 100).

To compare economic performance, a classification by level of development was used according to Eurostat standards. Countries were divided into three groups based on average GDP in purchasing power parity (PPP), which reflects their standard of living in relation to the EU average. This approach eliminates the impact of short-term fluctuations, such as the COVID-19 pandemic, and provides a more stable picture of long-term development. The results are displayed using a heatmap, where the color shades indicate the level of development. A categorization by tourism intensity was also created in the same way, based on the average number of visitors.

For Validation of data distribution we used Python tools using the Pandas library in creating visualizations and analytical outputs. All visualizations, including bar graphs, heatmaps, and 3D regression surfaces, were constructed to support the interpretation and validity of statistical conclusions. Before implementing statistical models, a detailed diagnosis of data distribution was performed, based on the normality test (Shapiro-Wilk W test) and visual tools (histograms, Q–Q plots) (Brajerčík & Krupka, 2025). Figure 2 shows the flowchart of methodology.

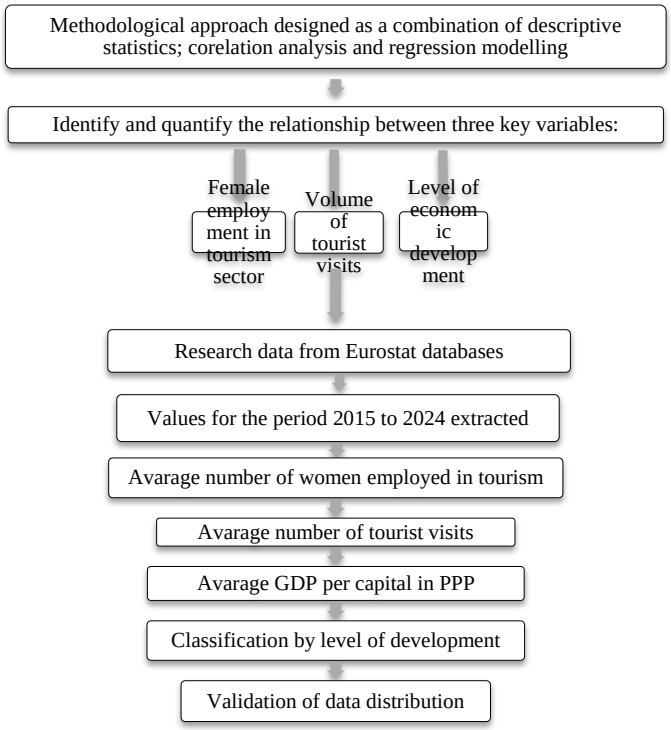


Figure 2. Flowchart of methodology (Source: Own processing)

RESULTS AND DISCUSSION

We have produced and present on Figure 3 a heatmap showing the average GDP per capita in purchasing power parity (PPP) for selected European countries from 2015 to 2024. The data we expressed as an index, where the average for the European Union (EU27) is 100. Each country is also classified into one of three performance categories according to its level of development: high, middle or low income, based on internationally accepted methodology (Eurostat, 2025).

Country	GDP (PPS, EU27=100)	Income level
Switzerland	157,6	High income level
Netherlands	131,5	High income level
Iceland	129,5	High income level
Denmark	128,7	High income level
Austria	123,3	High income level
Germany	121,7	High income level
Sweden	118,8	High income level
Belgium	117,6	High income level
Finland	108	High income level
Malta	105,3	High income level
United Kingdom	103,1	High income level
France	102,3	High income level
Italy	97	Medium income level
Cyprus	91,9	Medium income level
Czechia	91,6	Medium income level
Spain	89,7	Medium income level
Slovenia	86,8	Medium income level
Lithuania	82,9	Medium income level
Portugal	77,2	Medium income level
Poland	74,7	Low income level
Hungary	73,4	Low income level
Slovakia	73,2	Low income level
Romania	68,7	Low income level
Croatia	67,8	Low income level
Greece	66,7	Low income level
Türkiye	65,1	Low income level
Bulgaria	56,9	Low income level
Serbia	43,6	Low income level

Figure 3. Average GDP per capita in PPP and development level (Source: Own research and processing)

Using the normality test (Shapiro-Wilk W) and visual tools (histograms, Q-Q plots), it was found that the distribution of data for the variables average number of tourist visits and average number of women employed in tourism is approximately normal with a slight positive skewness, which is acceptable when analyzing a larger number of observations. The variable average GDP per capita in PPP was distributed more evenly due to its index nature, but did not show extreme deviations. Table 1 shown diagnostics of the distribution of variables.

Table 1. Diagnostics of the distribution of variables (normality test and basic statistics) (Source: Own research)

Variable	Mean	Std. Dev.	Skewness	Shapiro-Wilk W	Shapiro-Wilk p
Female Employment	14.75714	20.66399	2.25613	0.657043	7.44E-07
Tourist Visits	60048791.428571	87337360.564101	1.93174	0.674541	1.27E-06
GDP per capita (PPS)	94.79643	27.03329	0.28273	0.977185	0.778467

The distribution of all three key variables used in the analysis was evaluated in detail based on the data from Table 1 “Normality Diagnostics”. Although the first two variables do not meet the normality assumption, due to the sufficiently large sample and the robustness of the least squares (OLS) method, Pearson correlation and linear regression were performed. Visual Q–Q plots showed that the irregularities mainly concern the marginal values, while the central part of the data follows the expected trend. This confirms that, despite the non-ideal distribution, the statistical processing using the OLS methodology is reliable. The regression models were evaluated using the coefficient of determination R^2.

To improve linearity and remove skewness, a multivariate log-log model was used, while the target variable remained the average number of women employed in tourism. A VIF (Variance Inflation Factor) analysis was performed to control for multicollinearity. The values for both independent variables – log number of tourists and log GDP – reached 1.04, which is well below the critical limits (5 or 10).

This confirms their independence and suitability for joint use in a single model. The increased VIF value for the intercept is expected and does not affect the interpretation of the model. Results of testing hypothesis shown Figure 4.

In Graph, we have shown the results of the residual analysis of the log-log regression model, where the horizontal axis represents the predicted values and the vertical axis represents the residuals (the difference between the actual and the predicted values). Most of the residuals are concentrated around zero, without a visible nonlinear trend, which confirms the suitability of the linear approach. More significant deviations can be explained by specific national factors.

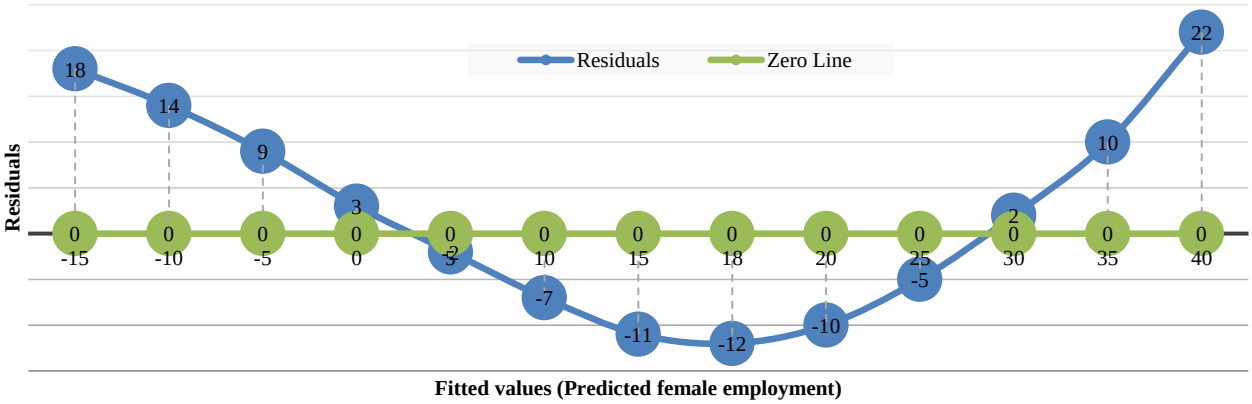


Figure 4. Residual plot: female employment (Source: Own processing)

The results as a whole demonstrate that the average number of tourist visits is the dominant predictor of female employment in the tourism sector, while the economic performance of the country measured by GDP in PPP has only a secondary and statistically insignificant effect, if tourism is already included in the model. Based on the analytical procedure, which was carried out using correlation and regression models between the variables under study, the following research questions were set. They are logically based on the available data, the applied methods and the obtained statistical outputs:

1. Is there a statistically significant relationship between the average number of tourist visits and the average number of women employed in tourism?
2. Is average GDP per capita in PPP a reliable predictor of female employment in tourism?
3. Which factor – average GDP per capita in PPP or average number of tourist visits – better predicts female employment in tourism?
4. Which countries deviate from the general trend between tourism and female employment? Our Heatmap shows the differences in the economic level of European countries according to GDP in PPP. Green indicates high-income countries such as Switzerland, the Netherlands, Iceland and Germany – states with advanced economies, high productivity and living standards that significantly exceed the EU average. The middle category (yellow-orange shades) includes Italy, the Czech Republic, Cyprus, Slovenia and Portugal. These countries are close to the EU average, but face internal regional and historical disparities. Red shades indicate low-income economies such as Poland, Slovakia, Bulgaria and Serbia, where GDP in PPP reflects lower purchasing power, productivity and investment, despite growth trends. Overall, the heatmap points to persistent differences between Western and Eastern Europe, which is of fundamental importance for the EU's economic and social cohesion policy. Average Number of Tourist Visits and Tourism Level by Country shown Figure 5.

Country	Average tourist visits	Tourism level
Germany	310 577 618	High tourism
France	292 139 698	High tourism
Italy	200 514 382	High tourism
United Kingdom	193 345 515	High tourism
Spain	159 055 108	High tourism
Netherlands	73 846 390	High tourism
Türkiye	66 520 350	High tourism
Poland	66 143 926	High tourism
Sweden	44 477 571	High tourism
Austria	33 933 432	Medium tourism
Switzerland	30 153 324	Medium tourism
Czechia	28 158 942	Medium tourism
Portugal	23 867 375	Medium tourism
Denmark	21 736 291	Medium tourism
Romania	21 529 093	Medium tourism
Greece	20 931 144	Medium tourism
Belgium	20 625 571	Medium tourism
Hungary	15 450 967	Medium tourism
Finland	15 399 581	Medium tourism
Bulgaria	9 764 747	Low tourism
Slovakia	8 846 891	Low tourism
Croatia	6 743 064	Low tourism
Serbia	5 386 931	Low tourism
Slovenia	4 680 839	Low tourism
Lithuania	4 495 681	Low tourism
Iceland	1 433 798	Low tourism
Cyprus	1 080 518	Low tourism
Malta	527 413	Low tourism

Figure 5. Average number of tourist visits and tourism level by country (Source: Own processing)

Based on the average number of tourist visits, countries were divided into three groups according to tourism intensity: high, medium and low. High intensity was achieved by countries such as Germany (310 million overnight stays), France, Italy, Spain and the United Kingdom, supplemented by the Netherlands, Turkey and Poland. These countries have long been attractive tourist destinations, with domestic tourism also playing a significant role in some cases. Moreover, high values in Poland and Turkey point to the important role of tourism even in countries with lower GDP per capita. Medium intensity refers to countries such as Switzerland, the Czech Republic, Portugal and Romania. These countries show stable interest, often due to seasonality, domestic travel or population size. Low intensity is shown by smaller or less accessible countries such as Malta, Iceland, Lithuania, Slovenia and Bulgaria. Their lower values are influenced by market size, infrastructure and visibility on the global market. The heatmap thus reveals the uneven distribution of tourism demand between Western and Eastern Europe, as well as between large and small economies. These differences are crucial for effective planning of development and sustainable tourism within the EU. Figure 6 shown female employment in tourism vs. tourist visits.

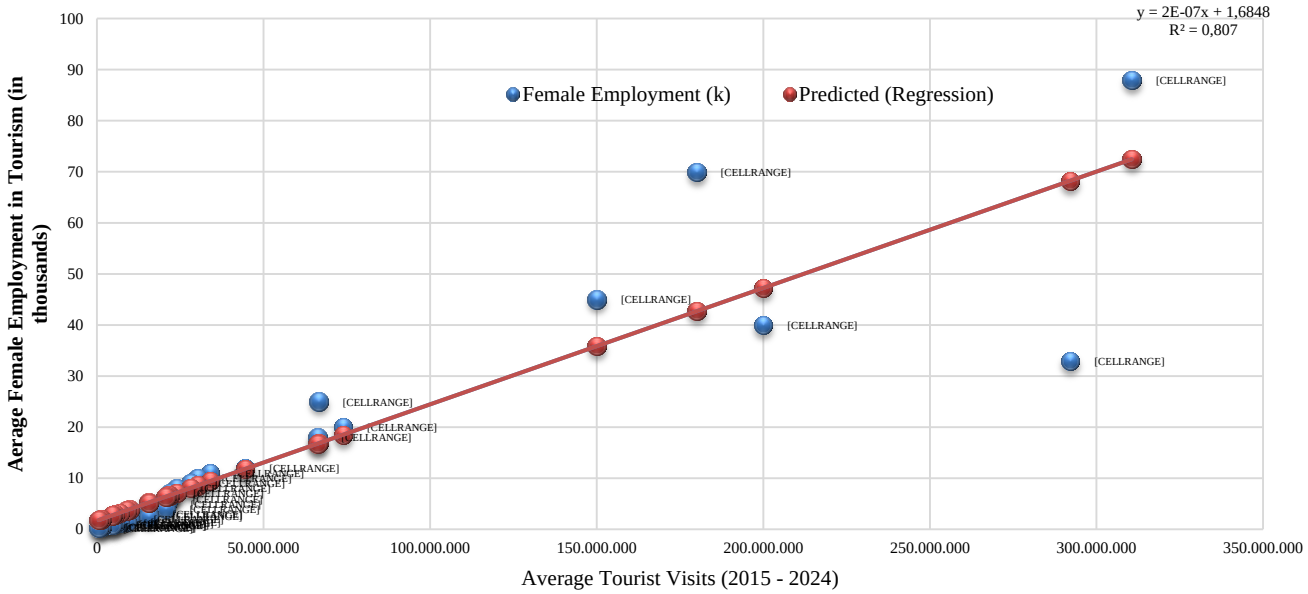


Figure 6. Regression: Female employment in tourism vs. tourist visits (Source: Own processing)

We have shown a strong linear relationship between the number of tourist visits and the number of women working in tourism. The regression line ($R^2 = 0.81$) shows that up to 81% of the differences in female employment can be explained by the intensity of tourism. Most countries are close to the trend line, confirming the high consistency between the variables. Green shadowed countiries names indicate countries with higher female employment than would be expected from the number of tourists – e.g. Germany and the United Kingdom. This may indicate effective equality policies or a developed service sector. Black names indicate countries with lower female employment than would be predicted by the number of visits – notably France. This may be due to higher automation, different sector structures or cultural differences. In conclusion, the graph confirms the importance of tourism as a strong factor influencing female employment in services, with important implications for gender equality and labour market policy. Figure 7 shown female employment in tourism vs. GDP per capita (PPP).

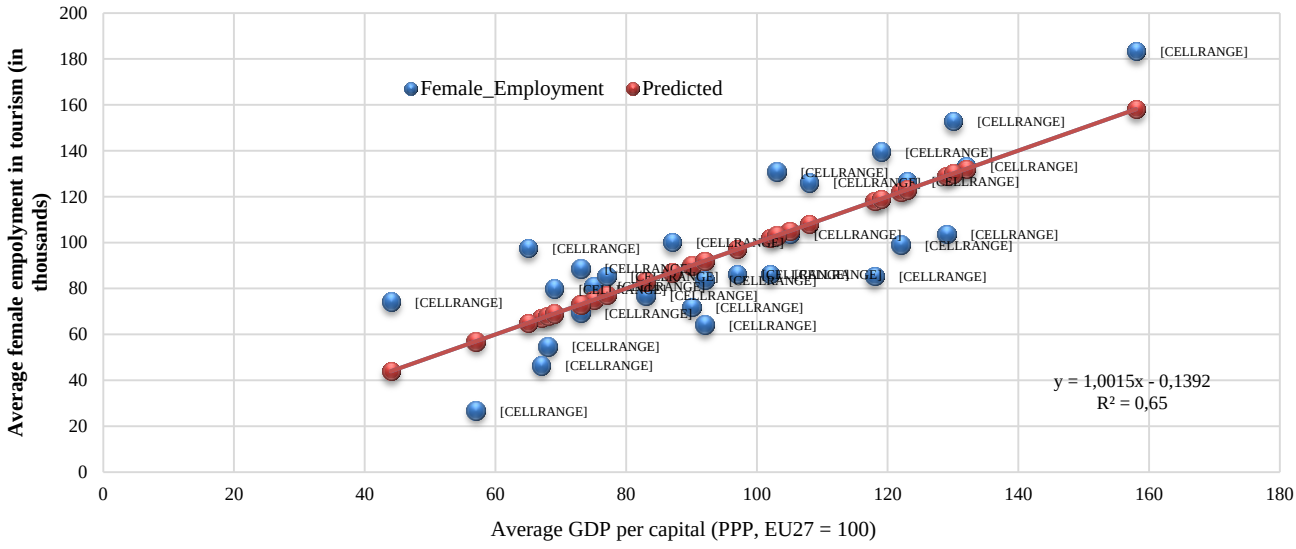


Figure 7. Regression: Female employment in tourism vs. GDP per capita (PPP) (Source: Own processing)

Presented figure shows the relationship between average GDP per capita (in PPP) and female employment in tourism (2015–2024). Although the regression line shows a slightly rising trend, the scatter of the points around it shows that GDP has only a weak predictive value. Several rich countries (e.g. Switzerland, Sweden, Iceland) have lower female employment in tourism than would be expected based on their GDP. Conversely, countries with lower GDP (e.g. Greece, Romania, Portugal) have higher employment, suggesting that other factors – notably tourism intensity, economic structure or gender policies – have a greater impact. After logarithmic transformation, the model significantly improved its performance ($R^2 = 0.65$), suggesting that the combination of GDP and tourism activity better explains the differences in female employment in the sector. Figure 8 shown 3D regression of female employment.

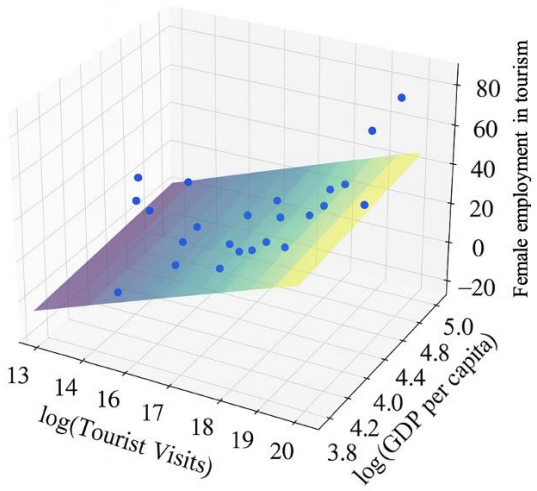


Figure 8. 3D regression surface: female employment (Source: Own processing)

The three-dimensional graph shows a regression surface that illustrates the impact of GDP and tourism on female employment in tourism. The plane is rising, which means that both variables have a positive effect, with tourist arrivals having a stronger effect than GDP. Figure 8 shown that economic wealth alone is not enough – the greatest increase in female employment occurs where economic activity is combined with high tourist demand.

Tourism thus acts as a more effective tool to support female employment.

CONCLUSION

We underline the importance of tourism as an important part of the national economies of most countries all over the World. According to WTTC (2020), in 2019, the year before the pandemic, tourism jobs accounted for 10.3% of all jobs (334 million) and the industry's contribution to global GDP was estimated at 10.4% (10 trillion USD), with international visitor spending totaling 1.9 trillion USD.

2023 was a top year for tourism development in the world (for comparison, in 2014-2019, every fifth newly created job, including its direct, indirect and induced impacts, was in the Czech Republic). The industry is currently experiencing significant growth. This brief statistical overview shows that, despite the shocks caused by the COVID-19 pandemic, it is a promising industry that is recovering relatively quickly.

The tourism industry is characterized by attracting a predominantly young, flexible, part-time workforce. The industry is dominated by women, young people, migrant workers, and residents from local communities (Richardson, 2010).

The results of our quantitative analysis clearly confirm a strong and practically significant connection between the number of tourist visits and female employment in the tourism sector, which suffered during the pandemic period. Pearson's correlation reached a value of $R^2 = 0.90$ and the regression model explained up to 82% of the variability in employment, which represents a very strong effect. This means that the more tourists a country receives, the higher the probability that women will also find employment in tourism. On the contrary, GDP per capita in PPP turned out to be a very weak predictor. A comparison of the models shows that the number of tourist visits is a much stronger indicator than GDP. This conclusion is also supported by the identification of countries that deviate from the expected trend. For example, Germany, the United Kingdom and Austria achieved higher female employment than predicted by the model, which indicates their ability to effectively use the potential of tourism. On the contrary, countries such as France, Sweden and Italy lag behind expectations, which may be due to structural, but especially cultural factors. At the same time, it has been shown that in countries with lower GDP – such as Greece, Portugal or Romania – tourism plays a key role in creating jobs for women, confirming their weaker economic performance.

Based on these findings, tourism can be described as a stable and inclusive employment tool for women.

The strong importance and attractiveness of tourism lies mainly in the influence of personal contact, hospitality and service provision, where women have traditionally had a dominant presence. Castaño et al. (2019), as well as Carrasco-Santos et al. (2024) state that, although the participation of women in tourism is increasing, gender biases continue to limit their career progression. Women need stronger professional networks or higher qualifications than men to have access to the same opportunities, which reinforces occupational segregation and wage gaps. Tourism is not only a consequence of

economic development, but can also be a tool to promote regional development and gender equality – especially in peripheral areas with potential for the development of services, culture or natural heritage.

For policymakers, this means that tourism promotion should be part of strategies to promote employment and gender equality, especially in regions with development potential outside the main economic center.

The limitations of the research may lie mainly in the limited access to reliable and up-to-date data, as many organizations do not collect or publish detailed statistics by gender and job position.

Another limitation may be the subjectivity of the respondents' statements, which may be influenced by social desirability or personal experiences. The research may also be limited by the cultural and regional context – results valid in one country or region may not be applicable elsewhere. Moreover, given the wide range of jobs in the tourism industry, it may be difficult to generalize the findings to the entire sector. Furthermore, gender stereotypes are often implicit and difficult to measure, which makes them difficult to quantify and analyze objectively.

Future research could focus on a deeper analysis of the specific forms of gender stereotypes that most significantly affect women's employment opportunities, career progression and working conditions in different areas of tourism – for example, in management positions versus customer service. It would also be beneficial to examine how gender norms and expectations influence women's decision-making when entering the sector, and what role education or family background plays in this. Another important direction could be to compare the situation between urban and rural areas, or between different countries or cultural contexts. Research could also focus on the effectiveness of policies and initiatives to promote gender equality in tourism – for example, flexible working arrangements, parental benefits or awareness-raising programmes about gender stereotypes in the workplace.

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EXAMINING E-COMPLAINTS ABOUT TOUR GUIDES: SERVICE FAILURES AND THEIR IMPLICATIONS

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Abstract: Tourist guides play a crucial role in shaping tourists' perceptions of service quality, satisfaction, and destination loyalty. However, service failures in guide-tourist interactions often lead to dissatisfaction and negative word-of-mouth. Despite growing digital complaint platforms, the academic literature lacks comprehensive analyses of e-complaints about tourist guides through a theoretical lens. This study aims to examine online complaints lodged against professional tourist guides, identify major service failures, and interpret their implications for tourism service quality and management practices, within the framework of Service Failure and Recovery Theory. The study employs a qualitative netnographic approach to analyze e-complaints collected from the Turkish platform www.sikayetvar.com. A total of 893 relevant complaints were retrieved and subjected to content analysis using MAXQDA 2022 software. The data were coded and categorized into three main themes: personal attitudes and behaviors, professional incompetence, and fee-related issues. Inter-coder reliability was ensured through Cohen's Kappa coefficient, which indicated high agreement (>0.80). Findings reveal that the most frequent complaints stem from inappropriate and rude behavior (27.9%), indifference (22.6%), program disruptions (17.1%), and lack of knowledge (15.8%). Complaints related to pricing issues such as overcharging and pressuring tourists into extra tours were also prominent. These results demonstrate that tourists' dissatisfaction is not limited to technical knowledge gaps but extends to interpersonal, ethical, and organizational shortcomings. Moreover, failures in communication and transparency appear to significantly harm customer trust and destination image. The results highlight the critical role of guide behavior in post-service evaluations and eWOM dynamics. This study contributes to the theoretical literature by applying Service Failure and Recovery Theory to the domain of tour guiding and offering a timely update on complaint trends. It also provides practical recommendations for tour operators, guide associations, and policymakers, suggesting the need for stricter professional oversight, ethical training, and competency-based performance evaluations to improve service quality in tourism.

Keywords: tourist guide, e-complaint, service failure, service recovery, customer satisfaction, destination loyalty

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INTRODUCTION

Tourism is a highly competitive sector where service quality and customer satisfaction are directly related to destination loyalty (Cordente-Rodriguez et al., 2012). While tourists' travel experiences are shaped by the quality of the service provided, one of the most important elements for this experience to be perceived positively is tourist guides (Huang et al., 2010). Professional tourist guides serve as a critical bridge and representation in tourists' interaction with the destination. From this perspective, tourist guides are considered as one of the most visible faces of service quality (Zhang & Chow, 2004). However, customer dissatisfaction and complaints become inevitable in case of service delivery failures and tourists' expectations are not met (Davidow & Leigh, 1998). In this context, Service Failure and Recovery Theory, which deals with service failure and service recovery processes, provides a suitable theoretical framework for analyzing e-complaints against tourist guides. Service failure is defined as the mismatch between the service that consumers expect and the service they experience (Park & Park, 2016). Managing these failures effectively and compensating for tourists' negative experiences plays a critical role in restoring customer satisfaction (Patwary & Omar, 2020). It has been suggested that customers usually react in five different ways in case of service failure: doing nothing, not buying the same service again in the future, complaining to their immediate circle, complaining directly to the company or service provider, and complaining to third-party platforms (e.g. complaint sites, social media) (Rogers et al., 1992).

Complaints against tourist guides are especially concentrated on digital platforms (Nazlı, 2020). Today, expressing complaints online has a significant impact on the process of potential tourists obtaining information about service providers (Avcı & Doğan, 2018). Therefore, analyzing e-complaints about guides constitutes an important research area in terms of improving the service quality in the sector and better meeting the expectations of tourists. This study aims to identify the most common types of service failure and develop recommendations for service recovery strategies by analyzing e-complaints

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about tourist guides on the www.sikayetvar.com[1] platform. Within the scope of the research, complaints were categorized under three main headings: personal attitude and behavior, professional incompetence and wage policies. It is observed that complaints about the personal attitude and behavior of the guides are higher than the other categories. This shows that the concept of service failure is not only limited to technical competence, but also includes interaction and communication with the customer. At the same time, the lack of effective implementation of service recovery processes increases the negative eWOM (electronic Word of Mouth) effect and negatively affects destination loyalty (Rahman et al., 2023).

This study aims to examine e-complaints against tourist guides within the framework of Service failure and service recovery theory and to provide suggestions to the stakeholders of the sector to improve the service quality of guides. Although various studies have examined tourist guide performance and customer dissatisfaction using surveys and interviews, few have systematically explored large-scale e-complaints using qualitative netnographic methods.

Existing research, such as those by Temizkan & Ar (2017) and Kanlı (2019), analyzed earlier datasets, and there has been a lack of updated empirical insights reflecting the evolving nature of tour guide-related service failures in the digital age. Furthermore, the integration of Service Failure and Recovery Theory into the context of tour guiding remains underexplored. Therefore, this study addresses this research gap by applying a netnographic approach to recent e-complaints, offering an up-to-date and theory-driven analysis of the main service failures attributed to professional tour guides.

This not only enhances theoretical understanding but also provides actionable insights for tourism stakeholders aiming to improve service quality and tourist satisfaction. It is expected that the findings of the research will be an important guide for travel agencies, guide associations and educational institutions in training guides and improving service quality.

Conceptual Framework

The tourism industry is one of the most dynamic and competitive areas of the service sector. Success in this industry depends to a large extent on ensuring tourist satisfaction. Tourist satisfaction refers to the level at which the services provided by tourist guides and tourism businesses meet or exceed expectations. The difference between achieving satisfaction and not achieving satisfaction plays a decisive role in the long-term success of operations, brand image and competitive advantage (Kagai, 2014; Panda et al., 2019). Achieving guest satisfaction brings about a number of positive outcomes for tourism businesses. First of all, satisfied tourists tend to visit again by increasing their loyalty to the business (Mohammad, 2014). This is referred to as customer loyalty and ensures the sustainability of businesses' revenues (Karim & Rabiul, 2024). Moreover, satisfied tourists strengthen the reputation of the business through word-of-mouth and make it easier to reach potential customers (Foroudi et al., 2025). In other words, satisfied customers contribute to the promotion of the business by telling people around them about their satisfaction. Since tourism activities have a unique structure, consumer behavior differs. The product is intensely intangible. One of the situations caused by this situation is the high uncertainty in consumer perception before the use of the product (Wang et al., 2019).

This uncertainty increases risk perceptions and affects the consumer purchase decision process (Laroche et al., 2003). In such cases, the experiences of satisfied guests can be considered as a very important marketing tool, as consumers rely more on information obtained from their own reference groups. The impact of customer satisfaction on customer behavior is often emphasized. For example, Su & Ha (2025) states that satisfaction increases customers' repurchase intentions and strengthens their tendency to give positive recommendations. In the tourism industry, this manifests itself in the form of guests choosing the same hotel or destination again and recommending it to others. From another perspective, failure to achieve guest satisfaction can have serious negative consequences for tourism activities. Dissatisfied tourists tend not to prefer the business again due to the negative experiences they have had, and this situation causes businesses to lose customers.

More importantly, dissatisfied guests can damage the reputation of the business through negative verbal communication or negative comments on online platforms (Sparks & Browning, 2011). Considering the prevalence of social media and online review platforms today, even a few negative experiences can seriously affect the brand image of businesses. Heskett et al. (1994), in his "Service-Profit Chain" model, emphasizes the relationship between service quality and customer satisfaction and states that dissatisfaction leads to customer loss and thus to a decrease in financial performance. In the tourism industry, this situation may cause actors providing tourism supply to lose market share, especially in a highly competitive environment. Service Failure and Recovery Theory is a critical conceptual background in the field of service management that focuses on the nature of service failures and service providers' efforts to recover from them. This theory suggests that service faiure is inevitable due to the inherent variability of service delivery and the inseparability of service production and consumption (Morrisson & Huppertz, 2010). Responses to service faiure are referred to service recovery and have a significant impact on customer satisfaction, loyalty and overall perceptions of the service provider (Ah-Keng & Loh, 2006; Silber et al., 2009)

Service failures can be categorized according to their level. This categorization plays a decisive role on customer emotions and the effectiveness of recovery strategies (Tang et al., 2018; Wang et al., 2011). For example, even minor service failures can cause customer dissatisfaction and affect repeat purchase intentions. At the same time, serious failures trigger stronger negative emotions, increasing the need for effective recovery strategies (Jones & Farquhar, 2007). The theory emphasizes that the type of service failure directly affects the recovery strategy to be chosen. These strategies can range from financial compensation to service interaction-oriented approaches (Silber et al., 2009). Effective service

[1] sikayetvar.com is Turkey's leading online complaint platform where consumers share their service- related complaints about various sectors. The platform allows users to submit complaints about their experiences with businesses, products and services, while companies have the opportunity to respond to and address customer concerns. Thanks to its extensive database and real-time consumer feedback, Sikayetvar.com serves as a valuable resource for understanding service quality issues, customer dissatisfaction trends and electronic word-of-mouth (eWOM) dynamics in the Turkish market.

recovery strategies can mitigate the negative consequences of service failures by transforming a dissatisfied customer into a loyal customer (Dabin et al., 2007; Morrisson & Huppertz, 2010). Moreover, perceptions of justice play a critical role in the service recovery process. The perceived fairness of the process, called recovery justice, can be decisive on customer satisfaction and loyalty (Liao et al., 2022; Wang et al., 2011). Research shows that high levels of interactional justice can weaken the negative impact of service failure on customer loyalty (Wang et al., 2011). This suggests that how service providers communicate and interact with their customers during the recovery process is as important as the actions taken during the recovery process (Chen et al., 2022). The theory also considers the role of customer emotions in the service recovery process. Emotional reactions to service failures shape how customers evaluate recovery efforts and their overall satisfaction judgments (Smith & Bolton, 2002). For example, customers who feel that their complaints have been addressed and resolved may experience positive emotional outcomes and increase their overall satisfaction (Smith & Bolton, 2002). In fact, the result of compensated mistakes may even lead to a greater sense of satisfaction than a perfect service (McCollough et al., 2000). However, the timing of recovery efforts is also a critical factor; quick responses can alleviate negative emotions and reinforce customer trust (Suarka & Sulistyawati, 2023; Tang et al., 2018).

The tourism industry is a sector where customer experience is directly related to service. Tourists experience many services such as accommodation, transportation, food and beverage and entertainment together and the quality of these experiences determines the level of satisfaction. Satisfaction is not only limited to customer loyalty and positive recommendations, but also contributes to the competitive advantage of businesses or destinations (Kotler et al., 2014). Moreover, in the tourism industry satisfaction is a critical element for building a sustainable business model. Satisfied guests enable businesses to grow and increase revenues in the long term, while dissatisfied guests can cause reputational damage and financial difficulties for businesses or destinations. Therefore, tourism actors should focus on ensuring guest satisfaction by continuously improving service quality and develop strategies to quickly and effectively compensate for potential failures.

Within the scope of this study, consumers' complaints are considered as an indicator of service failure and also as an important feedback. By examining online complaints against tourist guides, theoretically understanding the failure of their services is considered as the most important premise for service recovery activities to be carried out in an effective way.

LITERATURE REVIEW

Tourist loyalty is largely associated with satisfaction (Assaker et al., 2011). In other words, tourists' satisfaction has the greatest impact on repeat visits (Campo-Martínez et al., 2010). Tourist satisfaction is shaped by the comparison of tourists' expectations and their perceived experiences in a destination (Kim & Brown, 2012; Su & Ha, 2025). Tourist guides are largely responsible for the overall impression and satisfaction with all tour services offered by a destination (Ap & Wong, 2001). In this context, tourist guides should not only have competence but also competence.

While competence is defined as a person's general knowledge, motives, image, social role and skills that are necessary for a person to perform a job but are not related to superior job performance (Joneidi et al., 2025), competence is defined as a set of knowledge, abilities, skills and behaviors that are necessary for a person to perform a job as it should be (Ng & Liu, 2025). In other words, competence is the set of behavioral patterns that the person working in that position should have in order to fulfill the duties and functions of a position as it should be (Woodruffe, 1993). Hoffmann (1999) categorized the definitions of competence in the literature under three headings. These titles are; observable performance, the standard or quality of a person's performance result and the basic qualities of the person. Woodruffe (1993) emphasizes that competence requires both ability and willingness to act in accordance with competence.

The competence required by a profession includes both conceptual (cognitive, knowledge and understanding) and operational (functional, psycho-motor and practical skills) competencies (Le Deist & Winterton, 2005). One of the most important issues for the success of the services provided by tourist guides is the concept of effectiveness. The level of competence possessed by tourist guides is a critical factor that directly determines the quality of the provided service and, consequently, overall consumer satisfaction. As one of the oldest professions within the tourism sector (Carvalho, 2022), tour guiding necessitates a multifaceted set of competencies to be performed successfully. The literature has framed these abilities in various ways; for instance, Kapa et al. (2022) explained the core competencies of tourist guiding under four main headings: knowledge, skills, qualifications, and physical appearance. The knowledge dimension includes not only fluency in foreign languages, general cultural literacy, and an awareness of other cultures, but also in-depth knowledge of the guided region—its history, geography, politics, art, and economy—as well as basic first-aid training. The dimension of skills encompasses the ability to communicate effectively, the power of interpretation, organizational and coordination capabilities, and the capacity to cope with problems and engage in professional self-renewal. Supporting this, Sulaiman Al Jahwari et al. (2016) stated that guides should have developed sophisticated verbal skills, including grammar and word choice, alongside nuanced non-verbal skills such as friendliness while maintaining a professional distance. Finally, qualities and physical appearance relate to the guide's leadership role, extroversion, hospitality, and professional dress. Furthermore, Sharma (2018) points out that an essential part of guiding involves emotional regulation, which is the ability to hide negative emotions like anger and consciously exhibit positive behaviors such as smiling and making eye contact.

Jonasson & Scherle (2012) state that the competencies required in a tourist guide include the ability to translate, narrate and interpret, verbal as well as non-verbal communication, a general willingness and openness to interact with cultural diversity, no barriers to travel, group involvement and creativity. Kapa et al. (2022) stated that the most important competencies that tourist guides should have are time management skills, ethical skills, enthusiasm, guest service skills, health and safety skills and communication skills. For leadership, which is one of the competencies that a tourist guide should have, Zhang et al. (2025) stated that a good leader should be good at managing four issues. These four issues are

attention, meaning, trust and self-knowledge. Managing attention means attracting the attention of the group he/she is addressing and gathering them around him/her. Managing meaning means aligning individuals with themselves and establishing good communication, while managing confidence emphasizes the importance of stability and focus. Managing oneself means knowing what one is good at and what one lacks. In a group with a good leader, everyone feels valued and belongs to the group, so they leave the tour satisfied. Unsatisfied guests express their dissatisfaction by complaining to various platforms (Sahin et al., 2017). Rogers et al. (1992) define consumer complaint behavior as the action or actions that occur after customer dissatisfaction and state that guests follow 5 different paths in this case;

- Doing nothing
- Changing future behavior (not buying the product or service complained about again),
- Complaint to close circle,
- Direct complaint (complaint to the company or its representatives)
- Complaints to third parties

All of these paths followed after a complaint are paths that can harm the agency and the destination. Even if the guests with a complaint follow the path of doing nothing, this is damaging. Because complaints are actually road maps to find out where it is wrong and make amends. Indeed, Patwary & Omar (2020) emphasized that it is important to take complaints seriously in providing good and quality service, which is the most basic feature of the service sector. He stated that complaints made by tourists provide the destination or business with the opportunity to compensate for service failures and allow the destination or business to win back tourists.

Based on the importance of tourist guides and the concept of complaint for the tourism sector, the study reveals the common causes of complaints against professional tourist guides and offers a roadmap for ensuring destination loyalty by offering solutions. The following table has been created by reviewing the literature on complaints against tourist guides and the leading studies conducted to date. The tags and results of these studies are given in the Table 1.

Table 1. articles dealing with complaints against tourist guides (Source: Authors' own elaboration)

Article Title	Conclusion
Chang (2006). Customer satisfaction with tour leaders' performance: A study of Taiwan's package tours.	In this study, data were collected by 3 methods. First, a semi-structured face-to-face interview with a random sample of Taiwanese travel agency owners; Second: Participant observation on a guided package tour; Third, international telephone calls with tour group participants. It was concluded that the service attitude of the tour leader was sufficient to satisfy the tour participants, but interpretation skills would increase the satisfaction level of the customers. It was also observed that tipping improves the performance of guides.
Akköz (2015). Evaluation of the Expected qualifications of professional tourist guides and their performance by domestic tourists. (Unpublished master's thesis).	According to the performance of professional tourist guides in terms of knowledge and equipment, communication has the highest average, while general culture has the lowest average. In terms of skills, the antecedents with the highest average are speaking ability, leadership ability, interpretation ability and body language ability. Taking responsibility, empathizing and coping with problems are the antecedents with the lowest performance in this area. Regarding character traits, the antecedents with the highest average are being respectful and polite and being hospitable. Being a listener and being disciplined are the antecedents with the lowest performance in this area. In conclusion, it can be said that increasing the performance of guides in terms of knowledge-equipment, skills and character traits will increase the satisfaction level of domestic tourists.
Avcı & Doğan (2017). What Do E-Complaints Say About Tourist Guides?	Of the 225 complaints received against tourist guides; Leadership and social skills, For professional competence, Failure to fulfill their responsibilities to the group, Complaints about unethical behavior and It was found that complaints about legal obligations were grouped under 5 themes.
Temizkan & Ar (2017). Analysis of E-complaints Against Tourist Guides.	Your 1337 complaints against the guides; 41.36% in the behavior dimension, 24.53% in the knowledge transfer dimension, 12.78% professional experience, 12.04% other dimension (not following the program and not knowing a foreign language) and 9.19% was found to be in the sales dimension.
Zorlu & Erkuş (2018). Tourist Complaints and Complaint Behaviors in Cultural Tours.	Main complaint issues in cultural tours; Sourced from tour content, Guide sourced, Break welded and It is due to the attitude of the bus staff
Cansu (2018). Professional tourist guides' professional adequacy of the foreign language education they receive during their education and training periods (Unpublished master's thesis).	Approximately 35% of the participants received additional foreign language training through the course in order to obtain a cock card or to add an additional language. The majority of these courses were in English. Approximately 40% of the participants think that the hours of foreign language training provided at their universities are sufficient. However, about 36% of the participants think that it is insufficient. It was observed that most of the foreign language training provided as practical training was inadequate, but theoretical training was found to be more adequate than practical training.
Kanlı (2019). Investigation of E-Complaints Against Tourist Guides with Content Analysis.	As a result of the examination of 397 e-complaint texts against tourist guides, 45% on the behavior of tourist guides, 41% on professional competence, 9% complaints about the sales made by the guides and 5% complaints about the information provided by the guides.
Çakmak & Kurnaz (2020). A research on complaints of tourist guides of acco-mmodation businesses: Safranbolu Case	It was observed that overly demanding and rude behavior of the tourist guides of the accommodation establishments, misinformation about the accommodation establishment and acting contrary to the tour program were the reasons for complaints.
Luşak (2023). Complaints about the Performance ofTourist Guides: A Review on Package Tour Consumers (Unpublished Master's Thesis).	The top five complaints of domestic package tour consumers about the performance of the tour guide were found to be that the tour guide was not polite, the tour guide was not respectful, the tour guide did not provide information about reliable shopping stores, the tour guide did not fulfill what was promised in the tour program, and the tour guide was not punctual.

When the complaints against tourist guides (Table 1) are analyzed, it is seen that the subject is still a new field of study in the literature. The majority of the studies were conducted with the survey method. When we look at the studies on the analysis of e- complaints against tourist guides in the national literature, we see Kanlı (2019), Avcı & Doğan (2018) and Temizkan & Ar (2017). It is thought that this study is important due to the fact that time has passed since the studies and everything is changing rapidly today. In addition, it is envisaged that the comparison with these studies will be useful in terms of seeing the change in complaints from past to present.

METHOD

This study was conducted within the framework of a qualitative research design to examine online complaints against professional tourist guides. In the study, netnography method was used to analyze online customer feedback (Bartl et al., 2016). Netnography is a qualitative research method used to understand consumers' behaviors and interactions in the digital environment and is increasingly adopted in tourism research (Kozinets, 2015). However, one of the strengths of the study is that the netnography method allows for the natural contextualization of consumer experiences.

Within the scope of the research, "www.sikayetvar.com", one of the leading online platforms where consumers in Turkey share their complaints, was used as a data source. On January 10, 2024, 1213 complaints were identified as a result of a search with the keyword "tour guide". However, 320 of these complaints were excluded from the analysis as they were not directly related to professional tour guides and a total of 893 complaints were included in the study.

Content analysis method was used to analyze the data. Content analysis is a qualitative research technique that allows large amounts of data to be systematically categorized and organized into meaningful themes (Krippendorff, 2018). Complaint data were coded and thematic analysis was applied through the MAXQDA 2022 program. In order to increase the reliability of the data during the analysis process, two different researchers independently coded the data and the agreement between the codes was measured by Cohen's Kappa coefficient (Fleiss et al., 1969). The agreement coefficient was above 0.80 and it was determined that the coding process was reliable. In line with the findings obtained from the literature and preliminary analyses, the data were divided into three main categories: personal attitudes and behaviors, professional incompetence and wage policies. These categories were further elaborated by dividing them into sub-themes:

Personal Attitudes and Behaviors: Indifference and neglect, discrimination, inappropriate and rude behavior.

Professional Inadequacy: Lack of foreign language, lack of knowledge, schedule changes and disruptions, lack of communication and organization, lack ofexperience. Fee Policies: Extra remuneration, wage transparency issues.

FINDINGS AND DISCUSSION

In the 1431 coding made for professional tourist guides, it was concluded that the most common complaint was related to personal attitude and behavior with 747 (Table 2). The second most common complaint is professional incompetence with 557. Although numerically small, it was also found that there were serious complaints about wages.

Table 2. Distribution of E-Complaints About Tour Guides by Category and Sub-Issue (n = 1,431) (Source: Authors' own elaboration)

Category	Sub-Issue	No. of Complaints	% of Total Issues
Personal Attitudes & Behavior	Inappropriate/Rude Behavior	400	27.9%
	Indifference/Neglect	323	22.6%
	Discrimination	24	1.7%
Professional Incompetence	Program Changes	245	17.1%
	Lack of Knowledge	226	15.8%
	Communication/Organizational Gaps	145	10.1%
Wage Policies	Overcharging	80	5.6%
	Extra Tour Pressure	54	3.8%
Total		**1,431**	**100%**

Complaints about Personal Attitudes andBehavior

Of the 747 complaints about personal attitudes and behaviors, 400 were inappropriate and rude behavior, 323 were indifference and negligence, and 24 were in thecategory of discrimination (Figure 1).

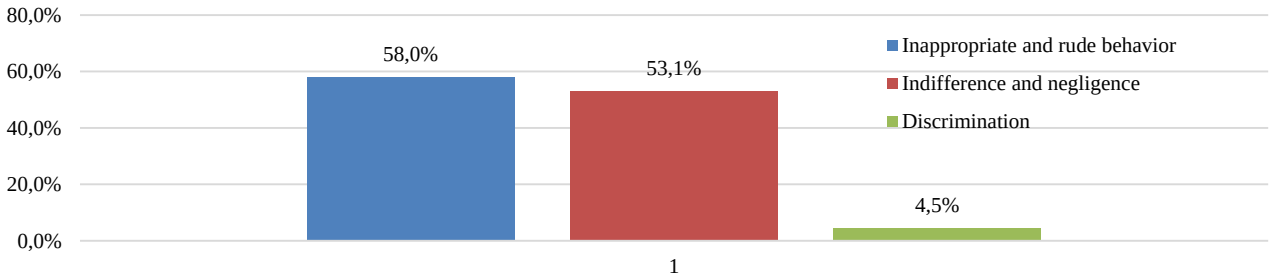


Figure 1. Graphic of sub-headings of the Personal Attitudes and Behaviors category (Source: Authors' own elaboration)

In the category of personal attitudes and behaviors, the most common complaint was inappropriate and rude behavior of the professional tourist guide with 58%. Under this heading, the professional tourist guide's behaviors that are

incompatible with professional ethics, immoral, verbally and physically violent are discussed. "He put a microphone in the mouths of people who were sleeping and snoring on the bus ride and made 40 people listen to their snoring and laughed and made everyone laugh at how they snored.", "He treated us not as customers but as his subordinates. He fought with everyone on the bus. He walked on people." As can be seen in the complaints, it is understood that there are professional tourist guides who exhibit rude behaviors that are not suitable for professional tourist guides. Again, under the heading of indifference and negligence, complaints such as "The professional tour guide said that they were free for 3 hours and did not even look at us.", "The tour guide was very indifferent. He did not accompany us to the places we visited".

The complaints that the guide did not let the group free and did not explain, did not take care of the guests, and did not help in any matter are intensely common. Under the heading of discrimination, there are complaints of discrimination based on nationality, such as "While he gave a humorous speech to foreigners for half an hour, he talked about Turkish citizens for two or three minutes." There are also complaints of discrimination based on nationality, such as "During the tour, he established a close relationship with some friends, chatted with them and forgot about us." There are also complaints that he established personal relationships within the group and treated others differently. At the same time, ". While he helped those who bought a tour from him with passport issues, he told those who did not buy a tour from him to go and take care of it yourself." There were also complaints that he discriminated against those who did not buy extra tours.

Complaints about Professional Incompetence

When the complaints in the category of professional inadequacy were examined, program changes and disruptions were the most common subcategory, followed by lack of knowledge, communication/organizational problems, lack of experience, and foreign language deficiency (Figure 2). As a matter of fact, Chen et al. (2022) stated in their study that the services provided by the enterprises at the specified time and in the specified manner meet the expectations of the tourists and accordingly increase customer satisfaction. Second most common complaint was lack of information with 40.6%, the third most common complaint was lack of communication and organization with 26%, the fourth most common complaint was lack of experience with 9% and the last most common complaint was lack of foreign language skills with 2.7%.

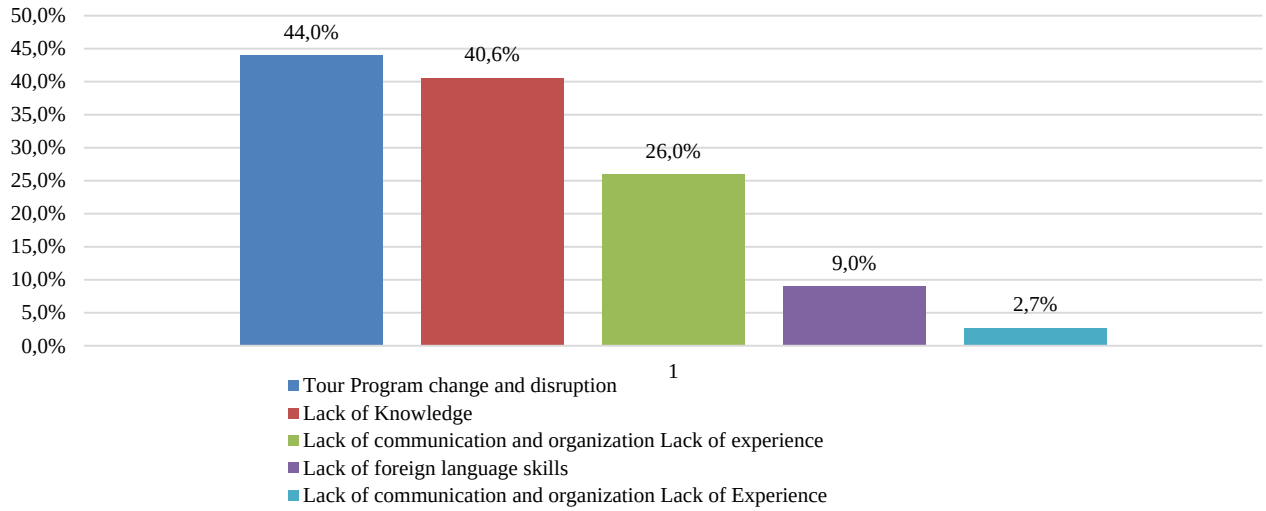


Figure 2. Graph of sub-headings of the category of occupational inadequacy (Source: Authors' own elaboration)

Regarding the program change and disruption "Although Batumi was in our agreement and the fee was charged, psychological pressure was applied by the guide and it was canceled and no refund was made."

"The places we wanted to visit, which were on the list of places to visit, were passed by saying that they were no different from the places you see here."

Examples of complaints about lack of information; "He knew nothing about the Balkans."

"He had no knowledge of the area. He would read us something on Google and then let us go."

Lack of communication and organization;

"I experienced all the unplannedness thanks to your guide. Not being able to schedule breaks, not being able to control the group, managing crises with stress and more."

Lack of experience;

"Tour guide is unprofessional and amateur"

"It was his first time as a long-distance guide. They shouldn't have left an inexperienced person alone."

Lack of foreign language skills; "France tour guide who doesn't speak French"

"The guide for the tour of Italy did not speak Italian. He was trying to speak English by putting a few words together with English in mind."

Complaints Regarding the Fee Category

In the fee category, overcharging guests was the most common complaint with 62.7%. The second most common complaint was about extra tours with 42.7% (Figure 3).

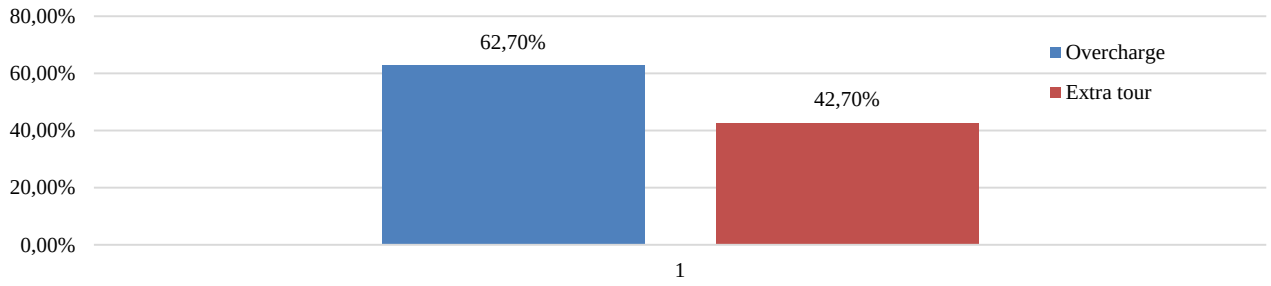


Figure 3. Graph of subcategories of the wage category (Source: Authors' own elaboration)

Regarding overcharging, "He charged 100 TL for the passage to Akdamar Island even though it was 50 TL.", "We paid 100 dollars for the Luxor tour, but it is already sold for 35 dollars." *There are similar complaints. Regarding the extra tours,* "I purchased all tour packages in the tour program. In the tour program that 11 people would participate in, they canceled my tour due to the cancellation of others and said that they would not refund the fee. I absolutely do not accept this.", "They leave those who do not buy the extra excursion packages during the tour at the gas station for the purpose of punishing those who do not buy the extra excursion packages during the tour and oblige you to buy the extra tours." *There* are similar complaints.

Overall, 893 valid complaints were analyzed, resulting in 1,431 distinct coded issues. Among them, 52.2% (747 complaints) were related to personal attitudes and behaviors of tour guides, followed by 38.9% (557 complaints) concerning professional incompetence, and 8.9% (127 complaints) regarding wage policies.

The most frequently cited issue was inappropriate and rude behavior (400 cases, 27.9% of total codes), followed by lack of destination knowledge (226 cases, 15.8%) and program disruptions (245 cases, 17.1%). Additionally, overpricing and aggressive promotion of extra tours were reported in 80 and 54 cases, respectively, indicating significant issues in ethical and transparent pricing. These figures emphasize that the core source of dissatisfaction stems from interpersonal misconduct and operational disorganization rather than technical knowledge alone.

By analyzing online complaints against professional tourist guides, this study reveals the main themes of tourists' negative experiences with guide services. The findings show that especially personal attitudes and behaviors and professional incompetence are the determining factors in terms of tourist dissatisfaction. These results are in line with other studies in the literature. For example, studies by Temizkan & Ar (2017) and Kanlı (2019) revealed that complaints against tourist guides are largely related to the personal attitudes and professional competencies of guides. In this context, the findings of our study offer important theoretical contributions when evaluated within the scope of Service Failure and Recovery Theory, which deals with service failure and recovery processes.

The findings suggest that failures in the services provided by tourist guides can negatively affect customer loyalty and trigger negative eWOM behaviors. This supports the importance of the service recovery process proposed by Morrisson & Huppertz (2010) and Naeem et al. (2024), and aligns with recent findings by Albayrak et al. (2025), who demonstrated that service failures significantly reduce customer engagement and intensify negative behavioral responses in online platforms. In particular, considering customers' reactions to service failure and the effects of recovery strategies, it becomes clear that training and supervision mechanisms should be strengthened to improve the service quality of tourist guides.

While studies such as Wahyuningsih et al. (2025) have focused on identifying the antecedents of tourist satisfaction in sustainable tourism contexts, the present findings draw attention to the inverse relationship—how specific dimensions of service failure, particularly behavioral and ethical issues in tour guiding, contribute to dissatisfaction and weaken destination image. This contrast underscores the need for integrated frameworks that address both the drivers of satisfaction and the deterrents caused by service misconduct in the tourism experience.

In terms of personal attitudes and behaviors, the most common complaints against tourist guides were inappropriate and rude behavior, indifference and discrimination. These results support the view emphasized by Hwang & Lee (2019) and Ap & Wong (2001) that tourist guides' communication skills and empathy abilities play a critical role in customer satisfaction. Developing effective communication strategies and paying more attention to professional ethics of tourist guides is seen as an important factor in reducing service failures. Recent research by Liu et al. (2025) emphasizes that perceptions of unfair treatment in customer reviews are shaped by a sense of relative deprivation. This notion helps explain why certain tour guide behaviors—such as favoritism, discrimination, or verbal misconduct—generate disproportionately negative reactions among tourists. In this context, the complaints analyzed in the present study can be seen not only as expressions of service dissatisfaction but also as responses to perceived injustice and inequality, which intensify emotional responses and contribute to stronger negative eWOM behaviors. Recent findings in Tourism Management suggest that leadership behaviors such as humor can mitigate employee stress in service failure contexts (Xu et al., 2025).

Although the focus here is on internal stakeholders, the underlying principle of interpersonal conduct impacting post-failure outcomes aligns closely with our analysis of tour guide behavior and customer dissatisfaction. These insights reinforce the importance of communication-based interventions and emotional competence training for tourism personnel.

In the category of professional inadequacy, program changes and disruptions, lack of information and organizational inadequacies were identified as the most frequently encountered problems. In particular, it is seen that tourists are dissatisfied with the changes in tour programs. This finding confirms the negative effects of not meeting customer expectations on tourists' overall satisfaction, as stated in the study by Park & Park (2016). In this context, the importance of making tour programs more transparent and flexible and the importance of crisis management skills of guides emerges.

Another important finding of the study is the significant level of complaints about tour guides' pricing policies. Issues such as extra tour fees, non-transparent pricing policies and overcharging can negatively affect destination loyalty by damaging tourists' perception of trust. Studies by Beerli & Martin (2004) and Sparks & Browning (2011) emphasize the effects of price transparency on tourist trust and destination image. Therefore, tour operators and guide associations should develop regulatory mechanisms to make their pricing policies more transparent and increase customer trust.

CONCLUSIONS AND IMPLICATIONS

This study aimed to examine e-complaints about professional tour guides, particularly in terms of their personal attitudes, professional competence and ethical behavior. Grounded in the framework of service failure and recovery theory, the research sought to understand the factors underlying dissatisfaction with the service delivery of tour guides and explore potential implications for improving service quality in tourism.

The findings confirm that the most common complaints are related to personal attitudes and behaviors rather than technical shortcomings. This suggests that the main problem is not only a lack of professional knowledge but also a poor understanding of service ethics and interpersonal skills. Such complaints suggest that many tourists perceive tour guides not only as information providers but as key figures shaping their overall travel experience. As a result, inappropriate behaviors such as rudeness, negligence and favoritism have far-reaching effects beyond individual dissatisfaction, affecting destination image and tourist loyalty. Moreover, the persistence of these complaints over time raises concerns about the effectiveness of existing regulatory and educational mechanisms in addressing the problem. Despite the existence of professional standards and codes of ethics, the recurrence of similar complaints over the years indicates that existing practice and training structures are inadequate. This suggests that stricter oversight, competency-based training models and systematic performance evaluations are needed to ensure sustainable service quality. The study also draws attention to the gap between technical competence and professional competence. While tour guides may meet the formal requirements for certification, issues such as program inconsistencies, inadequate destination knowledge and poor crisis management suggest that formal training may not adequately equip guides with the skills necessary for dynamic and unpredictable service interactions. The results reveal the reality that professional competence goes beyond knowledge to include qualities such as adaptability, leadership and emotional intelligence, which are critical to enhance the tourist experience

The results underline the need for tighter regulatory oversight and professional development initiatives in the tour guiding sector. Professional tour guides serve as key representatives of both tour operators and destinations, making it imperative for them to demonstrate ethical behavior, professionalism and competence. Regulatory bodies such as the Association of Tour Guides and the Association of Turkish Travel Agencies should implement stricter monitoring and disciplinary measures to ensure compliance with ethical standards. From a management perspective, tour operators should implement greater transparency in pricing and tour policies to reduce complaints about fees. Setting clear rules for extra charges and ensuring that tour programs are implemented as advertised will contribute to increased tourist confidence and satisfaction.

From a theoretical perspective, this study contributes to the service failure discourse in tourism by showing how intangible factors such as attitudes and behaviors can significantly influence service perceptions. While much of the literature on tourism service quality emphasizes logistical and operational factors, this study highlights the need for human centered approaches in tour guiding. Addressing these issues requires a holistic intervention that combines regulatory oversight, ethical training and behavioral assessment within a tourism service excellence framework. The findings of the study offer important implications from both theoretical and applied perspectives. Theoretically, analyzing e-complaints against tourist guides in the context of service failure and recovery theory contributes to understanding the nature of customer dissatisfaction in tourism services. In this sense, it makes a unique contribution to the theory by expanding scientific knowledge. In terms of practice, in order to improve the service quality of tourist guides, it is recommended to strengthen vocational training, establish effective supervision mechanisms for guides and strictly enforce ethical rules.

Future research could extend this investigation by conducting cross-cultural analyses of tour guide complaints to identify global best practices and structural differences in guiding regulations. Furthermore, empirical studies examining the impact of different training models on guide performance can provide practical insights for industry stakeholders.

By integrating these perspectives, the tourism sector can develop more comprehensive strategies to improve service quality, reduce negative experiences, and strengthen the role of professional tour guides as cultural brokers and facilitators of meaningful travel experiences.

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A SOCIO-PROFESSIONAL IDENTITY FRAMEWORK OF WORK-LIFE BALANCE AND JOB SATISFACTION AMONG HOTEL FOOD AND BEVERAGE EMPLOYEES USING SEM

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Abstract: This study focuses on the interplay between work-life balance (WLB), job satisfaction, and personal characteristics of employees of hotel Food and Beverage (F&B) service department. This study explores the socio-demographic predictors of job satisfaction (JS) and work-life balance (WLB) among hotel food and beverage (F&B) employees, embodying frameworks like the Conservation of Resources Theory and Work-Family Conflict Theory. A cross-sectional survey was carried among 354 hotel Food & Beverage employees using Spector's (1985) Job Satisfaction Survey (JSS) and capitalized work-life balance measures. Data analysis included descriptive statistics, logistic regression using SEM (AMOS), and comparative analysis with previous studies. The findings revealed moderate overall job satisfaction (M = 3.5) with the highest satisfaction for "Nature of Work" (M = 4.2) and the lowest for "Fringe Benefits" (M = 2.6). Logistic regression evident marital status significantly influence work-life balance (OR = 0.29, $p < 0.001$), with married employees reporting significantly lower WLB. Education positively predicted WLB, while gender and age had no significant effects. Comparative analysis with Spector (1985) and Karatepe & Uludag (2007) showed similar trends but also revealed sector-specific differences. This study introduces a socio-professional identity lens to contextualize why F&B workers, despite similar job demands, experience WLB disparities tied to marital and educational divides. Practical implications urge hotels to adopt demographically targeted interventions, such as family-support policies and skill-development programs to mitigate burnout and turnover. By spotlighting the understudied F&B sector, this research fills a gap in the literature and redefines WLB strategies for high-pressure service environments.

Keywords: work-life balance, job satisfaction, hotel employees, age, gender, education

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INTRODUCTION

The global hospitality industry is a key element of economic growth, and relies heavily on its frontline workforce, particularly in food and beverage (F&B) departments where employees face relentless customer interactions, irregular shifts, and high stress (Kim et al., 2017). Despite the sector's critical role, hotel F&B workers remain understudied in academic research, especially regarding how socio-demographic elements like age, gender, education, and marital status shape their work-life balance (WLB) and job satisfaction (JS). Existing literature predominantly examines general hospitality staff, overlooking F&B-specific stressors such as split shifts, physical exhaustion, and emotional labor (Gupta & Srivastava, 2022). The hotel industry is a critical component of the global economy, playing a vital role in tourism and hospitality. Job satisfaction has been associated with various positive outcomes, such as improved productivity, reduced turnover, and enhanced customer satisfaction (Umasuthan & Park, 2018; Hakuduwal, 2021; Khdour, 2021). Having praised the valley of Kashmir in India, the hotel industry plays a prominent role in the region's economy, contributing significantly to its growth and development. However, the industry's success is partially dependent on the satisfaction and well-being of its employees, who are the backbone of the customer service experience (Bañuls et al., 2018). Understanding the dimensions influencing job satisfaction among hotel employees is crucial, as it not only impacts their personal and professional lives but also the overall performance and competitiveness of the industry.

This study aims to examine the relationship between socio-demographic variables, work-life balance, and job satisfaction among hotel employees of Kashmir Valley, and further a comparison of results with the previous studies to find contradictions and alignment. While prior studies link WLB and JS to employee retention and productivity (Karatepe & Uludag, 2016), few explore how socio-demographic variables moderate this relationship in F&B roles.

Some theories like The conservation of Resources (COR) theory (Hobfoll, 1989) focus on the central issue of the study I.e. hotel food and beverage employees work in an extremely pressured environment where personal resources like time, energy, and emotional equilibrium are constantly challenged due to irregular and long working shifts, work-family conflict (WFC) theory explain the cause of stress and imbalance is due to conjugation of work and personal responsibilities (Greenhaus & Beutell, 1985). Role theory further discusses how employees struggle with multiple roles such as employee,

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spouse, parent, etc., which often disputes, especially in the case of highly demanding job roles in the F and B service sector (Katz & Kahn, 1978). Evaluation of these theories justifies the need for the study. For instance, marital status is a known predictor of WLB in broader hospitality has never been analyzed in F and B contexts, despite married employees juggling familial responsibilities with demanding service schedules (Karatepe & Sokmen, 2018). This study addresses the above-mentioned gaps by investigating the complex dynamics between socio-demographic variables, WLB, and JS among 354 hotel F&B service department employees, offering novel insights for targeted HR strategies.

BACKGROUND OF THE STUDY

Work-life balance and job satisfaction are significant components in understanding employee well-being and organisational performance. The food and Beverage (F&B) sector has gained popularity due to its demanding work environment, aimed at challenging well-being and job satisfaction. A study indicates that gender plays a significant role in managing work-life balance perceptions among hotel employees. Emotional labour, which often changes by gender, negatively impacts work-life balance (Hofmann & Stokburger-Sauer, 2017). Additionally, organizational support and flexibility in working hours prove an aid in achieving work-life balance; in terms of gender, it may be perceived differently, affecting their overall balance (Wong & Ko, 2009). Work-family conflict theory (WFC) supports explaining why food and beverage employees with family responsibilities may experience low work-life balance (Greenhaus & Beutell, 1985). This literature review synthesizes current findings on the disparities in WLB and job satisfaction across these demographic variables with a special focus on the F&B sector of Kashmir, India. It becomes evident to describe the above-mentioned theories to get a thorough understanding of the study variables.

Role theory: Role Theory (Katz & Kahn, 1978) postulates that individuals carry multiple roles (e.g., employee, parent, spouse), each with different expectations and responsibilities. Conflict arises when demands from one role interfere with another, a condition particularly pronounced in job roles with high job demands and irregular schedules, such as hotel food and beverage (F&B) services. In this study, Role Theory provides a foundational understanding of how socio-demographic factors, especially marital status and gender, influence perceived work-life balance (WLB). Married employees in the F&B context, for instance, are likely to experience role conflict due to simultaneous obligations to both work and non work domains, especially when work schedules infringe upon personal time. This theoretical context explains why balancing work and non-work domains becomes more challenging for individuals handling multiple demanding roles, and frames WLB as a function of role compatibility or conflict.

Work-family conflict theory: The Work-Family Conflict (WFC) Theory (Greenhaus & Beutell, 1985) focuses on the tension between work and family domains, suggesting that needs from work and home are together incompatible. This theory grouped conflict into work interfering with family (WIF) and family interfering with work (FIW). In the context of F&B service roles, characterized by long shifts, weekend shifts, and emotional labor, WIF is particularly salient. Married employees or those with care-giving responsibilities may experience higher levels of WFC, leading to diminished WLB and, likely, reduced job satisfaction (JS). The theory also underscores the importance of organizational factors such as inflexible schedules and lack of family-oriented policies, which can exacerbate the WFC. Therefore, WFC theory is instrumental in contextualizing the observed impact of marital status on WLB within this study.

Conservation of resources theory: Conservation of Resources (COR) Theory, coined by Hobfoll (1989), highlights that individuals strive to obtain, retain, and protect valued resources such as energy, time, autonomy, and emotional well-being. COR theory is used in this study to explain why employees with fewer coping resources, such as those with lower education levels, are more prone to burnout and experience lower WLB and JS. Conversely, employees with higher education are likely to possess more personal and professional resources (e.g., autonomy, and other operational skills) that help buffer against stress, thereby fostering better WLB. The theory also offers a framework for understanding the aggregate toll of resource depletion on employee job satisfaction, making it an essential perspective in evaluating socio-demographic disparities in food and beverage (F&B) roles.

Gender Disparities in Work-Life Balance and Job Satisfaction: Gender significantly influences work-life balance (WLB), with women often facing greater challenges due to traditional caregiving roles (Hochschild & Machung, 2012). This can lead to increased work-life conflict and lower job satisfaction compared to men (Kossek et al., 2019). Organizational policies also play a crucial role; while flexible policies can mitigate disparities (Allen et al., 2013), women may be less likely to utilise them due to career concerns. Perceptions of organizational support and flexible hours can also differ by gender (Wong & Ko, 2008). In the hotel industry, gender impacts job satisfaction. Studies indicate women may experience lower satisfaction aimed emotional labor demands (Hofmann & Stokburger, 2017). Furthermore, the impact of corporate social responsibility (CSR) on job satisfaction can vary by gender, with women potentially valuing CSR initiatives more (Kim et al., 2017). These findings underscore the need for gender-sensitive organizational practices to improve WLB and job satisfaction.

Educational Influences on Work-Life Balance and Job Satisfaction: Educational levels are a key factor in job satisfaction and work-life balance. Higher education often correlates with greater job satisfaction due to more autonomous and better-conditioned supervisory roles (Schmidt et al., 2020). Conversely, lower educational qualifications can lead to tougher work environments and increased work-life conflict (Srivastava & Gupta, 2022). In the hotel industry, education significantly influences job satisfaction, shaping employees' expectations and perceptions. Higher-educated employees may prioritize Quality of Work Life (QWL) strategies like empowerment and effective training (Santhanam et al., 2021). Tailored training based on education can improve job satisfaction by aligning roles with expectations (Shaffer et al., 2001). Furthermore, education intersects with gender. Highly educated women may face unique challenges balancing career ambitions with caregiving expectations, potentially increasing stress and reducing job satisfaction (Kalleberg, 2018).

Age-Based Disparities in Work-Life Balance and Job Satisfaction: Age is another critical factor that controls work-life balance and job satisfaction. Older employees often report higher job satisfaction, attributed to their gained experience and clear career goals (Ng & Feldman, 2010). However, they may also face different challenges related to work-life balance, particularly in managing caregiving responsibilities alongside their work-related responsibilities (Zhang et al., 2018). Conversely, younger employees tend to prioritize work-life balance more heavily, as evidenced by their demand for flexible working arrangements (Twenge, 2019). Younger employees may focus on career advancement and thus experience more work-life conflict, while experienced and older employees may seek stability and better balance (Wong & Ko, 2008). Younger employees might experience lower job satisfaction and high stress, likely due to unmet career expectations and less experience, while older employees may have higher satisfaction due to time management skills and experience (Goswami & Dsilva, 2019). Age-based disparities in job satisfaction are also influenced by the perceived importance of job facets, which may change over time (Shaffer et al., 2001).

Marital Status-Based Disparities in Work-Life Balance and Job Satisfaction:The hospitality industry, particularly food and beverage (F&B) service, is characterized by demanding work dynamics, long hours, and high customer interaction, often challenging workers' work-life balance (WLB) and job satisfaction (JS) (Karatepe & Uludag, 2008). Existing research finds a complex linkage between marital status, WLB, and JS. While some studies have examined the relationship between marital status and WLB across professions (Greenhaus & Beutell, 2005), the specific dynamics within hotel F&B remain relatively untouched. Studies have shown that marital status interferes with perceived WLB and JS. Married employees with family responsibilities may face greater difficulty managing work and personal life, potentially lowering WLB and JS (Michel et al., 2011). Conversely, marriage can provide social support and emotional well-being, positively impacting JS, even amidst challenges (Judge et al., 2001). Results highlight the need for deeper investigation. The impact of marital status on JS may be mediated by WLB. Employees perceiving a better balance between work and family are more likely to experience higher JS (Sirgy et al., 2007). Socio-demographic characteristics like gender, education, age, and marital status influence WLB and JS. Understanding these disparities can help design tailored training and development practices to improve satisfaction and retention in hospitality.

LITERATURE SUPPORT

Vigorous review of literature results in: no specific study conducted so far to study the mitigating role of education and marital status on the work-life balance of hotel F&B service employees, hence it novels the need of further study, particularly in the field of the hotel F&B sector. Contribution matrix in Table 1.

Table 1. Comprehensive literature Gap and Contribution matrix

Variable	Key Findings (Literature Insights)	Gaps in Hotel F&B Context	References
Age	Younger employees (18–25) adapt better to irregular shifts but report higher burnout (Kim et al., 2017).	No F&B-specific studies on age-WLB dynamics; existing research focuses on general hotel staff.	Kim et al. (2017), Journal of Hospitality & Tourism Research: Lim, H., Kim, S.H. BMC Nurs 24, 385 Springer nature (2025)
Gender	Mixed results: Both gender differences and younger employees are reported.	Contradictory findings: Recent studies suggest gender-neutral WLB in Food and Beverage	Vattan Singh & Anil Gupta; Journal of Hospitality and Tourism Horizons, emerald(2025); Karatepe & Uludag (2016), International Journal of Hospitality Management; Gupta & Srivastava (2022), Current Issues in Tourism
Education	Higher education (Bachelor's) correlates with better WLB in managerial roles but not in F&B frontline roles.	No F&B-specific studies; education's role in JS/WLB for non-managerial F&B roles is unexplored.	Eyoun, K et al., Journal of Human Resources in Hospitality & Tourism, 24(2), 208–229 (2024); Deery & Jago (2015), International Journal of Contemporary Hospitality Management
Marital Status	Married hotel employees report lower JS due to work-family conflict.	No prior research on marital status WLB/JS links in F&B; a critical gap is found in F&B's irregular hours.	Karatepe & Sokmen (2018) Tourism Management
WLB-JS Link	Strong correlation between WLB and JS in hospitality, but F and B-specific mechanisms are under study.	Existing studies focus on hotels broadly; F&B's unique stressors (e.g., long /late hours, customer abuse) are ignored.	Kang, Lee S. E, C. K & Lee et al., (2021). Sustainability
Novelty	Few studies explicitly analyze how demographic variables, like age or marital status, influence WLB/JS in F&B. Education's role in general WLB is studied but sublimated in the Food and beverage context.	The present study aims to explore demographic predictors in F&B, specifically under-tested conditions.	Karatepe & Sokmen (2018); Present study 2025
Contra-dictions	Gender-based contradictions in WLB/JS persist.	While older studies highlight disparities, recent work suggests parity in experiences.	Karatepe & Uludag (2016); Gupta & Srivastava (2022)
Education's Limited Role	Studies showed a link between Education and WLB in managerial roles only.	Education's role in work-life balance is never tested in front-line roles like f and B services employees.	Deery & Jago (2015); Present study 2025

Original Contribu-tion	This study first to analyze socio-demographic predictors of WLB/JS exclusively in hotel Food and Beverage job roles.	Prior research indicates that marital status can influence both perceived WLB and JS. Such as, married employees may experience greater difficulties in managing work and personal life, potentially leading to lower WLB and JS (Michel et al., 2011). The specific dynamics within the hotel F&B sector remain relatively underexplored.	Michel et al. (2011)
Practical Relevance	Provides actionable insights for HR policies targeting married, less-educated, and mid-career F&B employees	Age-neutral burnout could be managed by adopting Fatigue Risk Management Systems (FRMS), which is proven to reduce burnout by 30% in airline crews (Dawson et al., 2021); the same could be adapted for F&B's irregular hours.	Dawson et al. (2021)
Theoretical Advan-cement	Opens the door for more future research into this unexplored yet most stressful work domain of hotel employees. Introduces F&B's unique socio-professional identity as a mediator of WLB/JS outcomes.	Extends Conservation of Resources Theory: Marital roles compete with F&B's resource-intensive demands (Hobfoll, 1989).	Hobfoll (1989); Greenhaus & Beutell (1985); McGlynn, J., Bell, T. R., & Milford, M. (2025). (T&F) Sport in Society, (1)

OBJECTIVES

Grounded in the general aim of this study, a comprehensive review of relevant literature helped in the identification of objectives, multi-layered aspect of objective identification ensures a structured progression of inquiry, where the fulfillment of primary objectives lays the foundation for addressing the secondary objectives. This dual-layered objective formation makes this study both conceptually and methodologically precise. The identification and classification of these objectives display a logical sequencing aligned with empirical priorities and theoretical relevance. Therefore, it intensifies the need for literature contribution and knowledge addition in the sector of F&B.

1. Primary Objective: To examine the relationship between socio-demographic variables (age, gender, education, marital status) and work-life balance (WLB) among hotel F and B service employees.

2. Secondary Objectives:

1) To examine the influence of socio-demographic variables on job satisfaction in hotel and F&B job roles.

2) To compare work-life balance and job satisfaction patterns in hotel F&B employees with findings in hospitality literature.

3) To suggest actionable organizational strategies to address WLB and JS partiality-rooted socio-demographic divides.

CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESIS

The model below (Figure 1) represents the aim and objectives of the study.

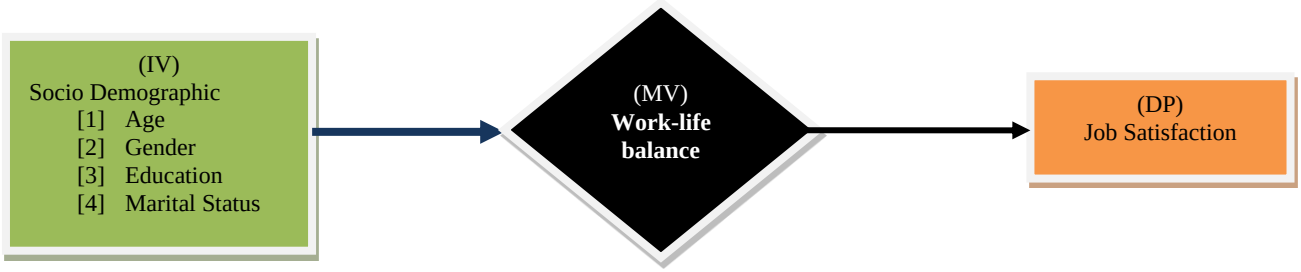


Figure 1. Conceptual Model

Hypothesis

H_1: Marital status significantly affects work-life balance, with Married food and beverage employees experiencing lower work-life balance.

H_2: A higher educational level is positively associated with better WLB among F&B employees.

H_3: Gender may influence how socio-demographic variables affect WLB and JS.

H_4: There is no significant effect of Age on work-life balance and job satisfaction of food and beverage employees.

H_5: The relationship between education and job satisfaction is mediated by work-life balance.

RESEARCH METHODOLOGY

1. Design

This study adopted a quantitative, cross-sectional research design to examine the relationships between socio-demographic variables (age, gender, education, and marital status), work-life balance (WLB), and job satisfaction (JS) among hotel (F&B) service employees. The choice of variables was theoretically grounded in Role Theory and Conservation of Resources Theory, which highlight how role conflict and resource loss relate to demographic characteristics. These frameworks support the use of socio-demographics as proxies for work and non-work role

expectations. Structural Equation Modeling (SEM) was employed to simultaneously assess direct and mediated relationships, including the hypothesized pathway: education → job autonomy → WLB. SEM was appropriate for exploring mediation and complex variable interactions within a single model.

2. Sampling

A total of 354 full-time F&B service employees from 3-, 4-, and 5-star hotels in Kashmir (India) participated. Hotels were selected based on the Jammu and Kashmir Department of Tourism's 2022 classification: Category A (5*), B (4*), and C (3*). The sample size was calculated for SEM using an effect size of 0.3, $\alpha = 0.05$, and power = 0.95. Stratified random sampling ensured proportional representation across hotel categories and sub-departments (Restaurants, In-Room Dining, Banquets).

3. Instrument

WLB was measured using Hayman's (2005) 5-item scale ($\alpha = 0.87$), e.g., "I can balance my work and personal life." JS was assessed using Spector's (1985) 9-item Job Satisfaction Survey (JSS) ($\alpha = 0.89$), e.g., "I am satisfied with my current job." Responses used a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Socio-demographic variables included age (18–25, 26–35, 36–45), gender (male/female), education (high school, bachelor's, master's), and marital status (single, married, divorced/widowed).

4. Data Collection Method

Stratified random sampling was used to collect responses from F&B employees across designated hotel categories and sub-departments. Data cleaning was carried out by removing responses with >20% missing values and outliers beyond ±3.0 z-scores to ensure quality and accuracy for SEM analysis.

DATA ANALYSIS AND STATISTICAL TOOLS

Descriptive statistics describe the sample population in terms of frequency and percentage. To examine the relation between variables, dimensions, and how variables interact with each other, Descriptive statistics were applied using SPSS and AMOS for SEM. Chi-square Statistic (χ^2) 52.5; Degrees of Freedom (df) 4; p-value < 0.001

Table 2. Distribution of work-life balance levels of employees and the relationship between Work-Life Balance and Job Satisfaction (N = 354)

Work-Life Balance	Job Satisfaction Level	Observed Frequency (O)	Expected Frequency (E)	Percentage (%)	Chi-square $(O-E)^2/E$
Low WLB	Low JS	78	52.3	22.0%	12.7
	Moderate JS	32	41.2	9.0%	2.1
	High JS	10	26.5	2.8%	10.3
Moderate WLB	Low JS	45	55.6	12.7%	2.0
	Moderate JS	98	80.1	27.7%	4.0
	High JS	55	62.3	15.5%	0.9
High WLB	Low JS	12	27.1	3.4%	8.3
	Moderate JS	25	39.7	7.1%	5.4
	High JS	47	32.2	13.3%	6.8

Table 2 presents the distribution of employees across different levels of work-life balance (WLB) and job satisfaction (JS), with observed frequencies and chi-square values. The findings indicate a significant association between WLB and JS among hotel F&B employees, confirmed by the chi-square test ($\chi^2 = 52.5$, df = 4, $p < 0.001$). This suggests a significant dependency between variations in WLB and JS. Notably, employees with low WLB are more likely to report low JS than expected (Observed = 78, Expected = 52.3), contributing the highest individual chi-square value (12.7). This supports existing literature that poor work-life balance often leads to reduced job satisfaction due to stress and diminished self-fulfillment. Likewise, employees with high WLB are overrepresented in the high JS category (Observed = 47, Expected = 32.2), contributing a chi-square value of 6.8, further affirming the positive link between WLB and JS. Overall, results indicate that better WLB increases job satisfaction, supporting theories like COR and WFC, and reinforcing Hypothesis 5, which posits that WLB mediates the relationship between education and job satisfaction.

Descriptive Analysis of Job Satisfaction Dimensions among Hotel F&B Employees

To find out the level of happiness in employees' job satisfaction was studied as a dependent variable in this study. Items used by Spector 1985 were used to measure the level of job satisfaction and to find out the measure of the variable, which consists of 36 items related to nine different subsets based on the nature of work.

Table 3 shows job satisfaction across 9 dimensions (Spector's JSS, 1997). Overall satisfaction was moderate (M=3.5, SD=0.7, α=0.89). Coworkers (M=4.7, SD=0.8, α=0.88) and nature of work (M=4.2, SD=1.0, α=0.82) had high satisfaction, supporting autonomy and variety theories (Hackman & Oldham, 1976). Supervision was also highly rated (M=4.5, SD=0.9, α=0.85), crucial for stress buffering (Kraimer et al., 2001). Low satisfaction was found in fringe benefits (M=2.6, SD=1.3, α=0.68) and pay (M=2.8, SD=1.2, α=0.76), aligning with compensation and turnover concerns (Lam et al., 2001). Promotion opportunities (M=3.1, SD=1.1, α=0.72) and operating procedures (M=3.0, SD=1.2, α=0.71) also showed dissatisfaction. Contingent rewards were moderate (M=3.3, SD=1.0, α=0.79).

Intrinsic/relational aspects had high satisfaction, while extrinsic/structural components were lower, suggesting that targeted strategies in compensation and growth could improve job satisfaction and retention.

Table 3. Distribution of Job Satisfaction Scores Using Spector's JSS (N = 354)

Job Satisfaction Subscale	Mean	SD	Cronbach's Alpha (α)	Interpretation
Pay	2.8	1.2	0.76	Low Satisfaction
Promotion	3.1	1.1	0.72	Moderate dissatisfaction
Supervision	4.5	0.9	0.85	High satisfaction
Fringe benefits	2.6	1.3	0.68	Low satisfaction
Contingent Rewards	3.3	1.0	0.79	Moderate satisfaction
Operating Procedures	3.0	1.2	0.71	Moderate dissatisfaction
Co-workers	4.7	0.8	0.88	Very high satisfaction
Nature of Work	4.2	1.0	0.82	High satisfaction
Communication	3.4	1.1	0.74	Moderate satisfaction
Total Job Satisfaction	3.5	0.7	0.89	Moderate overall satisfaction

Relationship between Employees' Socio-Demographics and Work-Life Balance

As per the cross tabulation analysis given in Table 4 it portrays all employees in the age group from 18 to 45 and > are reporting mixed work life balance, hence can be interpreted as having no significant association between age and work life balance ($p > 0.05$). Younger employees (18–25) reported slightly better WLB, aligning with Kim et al. (2017), who found younger hospitality workers adapt better to irregular hours. As per the cross tabulation analysis given in the table above, it is demonstrated there is no significant gender based contrast in work life balance with p value $0.021 > 0.05$, hence it contradicts with the previous research done by Karatepe & Uludag (2007), who reported higher WLB conflict for women in care giving roles, but aligns with recent studies showing gender-neutral policies improving equity.

As per the above cross-tabulation Table 6, it was depicted a significant relation between level of education and work-life balance with ($p < 0.05$), these results are aligned with the previous studies, Employees with bachelor's degrees report better work-life balance than others, it is likely due to access to supervisory roles and flexible shift timing (Deery & Jago, 2015).

The cross-tabulation results in Table 7, demonstrate a significant association between marital status and work-life balance with a p-value ($p < 0.05$). Married employees reported lower work-life balance; it is likely due to dual responsibilities in work and family domains aligned with Karatepe & Sokmen (2006).

Table 4. Cross-tabulation of WLB and Age Group of F&B service employees (Chi-square = 8.21, df = 4, p-value = 0.084)

Age Group	Low WLB	Moderate WLB	High WLB	Total WLB
18-25	45	60	30	135
26-35	55	70	25	150
36-45	25	30	14	69
Total	125	160	69	354

Table 5. Cross-tabulation of WLB and Gender (Chi-square = 3.12, p-value = 0.210, df = 2)

Gender	Low WLB	Moderate WLB	High WLB	Total
Male	70	85	30	185
Female	55	75	39	169
Total	125	160	69	354

Table 6. Cross-tabulation of WLB and Level of Qualification (Chi-square = 15.73, p-value = 0.003, df = 4)

Qualification	Low WLB	Moderate WLB	High WLB	Total
High School	80	90	25	125
Bachelor's	35	60	40	135
Master's	10	10	04	24
Total	125	160	69	354

Table 7. Cross-tabulation of WLB and Marital Status (Chi-square = 12.95, p-value = 0.011, df = 4)

Marital Status	Low WLB	Moderate WLB	High WLB	Total
Single	40	70	35	145
Married	75	80	25	180
Divorced/Widowed	10	10	9	29
Total	125	160	69	354

RELIABILITY ANALYSIS

Reliability analysis helps in assessing the internal consistency of the measuring scale. It is widely used for determining the consistency and reliability of the responses across (Nunnally & Bernstein, 1994). It was demonstrated in the measurement of the above subscales having very strong internal consistency, resulting in acceptable reliability ($\alpha \geq 0.68$) with co-workers ($\alpha = 0.88$) and Total Job Satisfaction ($\alpha = 0.89$). While the previous study of Spector 1985 reported little higher values, such as $\alpha = 0.91$ for co-workers, it is likely due to a broader sample diversity (Table 8).

Table 8. Reliability analysis of measurement scale

Variable	Cronbach Alpha	No of Items	Interpretation
Work-Life Balance	0.87	05	Excellent
Job Satisfaction	0.89	09	Excellent

The table displays the results of the reliability analysis using Cronbach's Alpha coefficients for the key variables of the study: Work-Life Balance and Job Satisfaction. All the variables demonstrate satisfactory internal consistency and reliability. **Work-Life Balance** achieved a Cronbach's Alpha of **0.87** across **5 items**, indicating **excellent reliability** according to conventional thresholds ($\alpha > 0.80$).

Job Satisfaction produced an even higher Cronbach's Alpha of **0.89** based on **9 items**, also categorized as excellent reliability, reflecting a high internal consistency among the items used to measure this construct. These results collectively confirm that the instruments employed for measuring the key variables are statistically reliable and suitable for further advanced analysis, like regression and structural equation modeling (SEM).

Logistic Regression Results Predicting Work-Life Balance among Hotel F&B Employees

After getting the results of descriptive statistics, the Researcher proceeded with advanced statistics such as Logistic Regression and Structural equation modeling (SEM) to explore and examine the influence of various socio-demographic factors on the feeling of reporting work-life balance among hotel F and B service employees. The results are presented below:

Table 9. Logistic regression

Variable	B (SE)	Odds Ratio (OR)	95% CI	p-value
Married (vs. Single)	-1.24(0.31)	0.29	0.16, 0.53	<0.001
Bachelor's (vs. HS)	1.56 (0.28)	4.75	2.75, 8.21	<0.001
Female (vs. Male)	0.18 (0.22)	1.20	0.78, 1.85	0.407
Age(36–45 vs. 18–25)	-0.45 (0.30)	0.64	0.35, 1.15	0.132

H1: (Supported)

Logistic regression in the above Table 9 suggests a significant negative correlation between marital status and work-life balance. Being married (vs. single) results in B=-1.24, p <0.001, indicating that married employees are less likely to report a high work-life balance. The odds ratio (OR) of 0.29 (95% CI: 0.16, 0.53) suggests that married employees are 71% less likely to report better work-life balance compared to their single counterparts; other variables show consistency. These results align with work-family conflict theory.

H2: (Supported)

Education level shows a positive association with work-life balance. Employees holding bachelor's degrees (vs. high school) had significantly higher chances of experiencing better work-life balance, with B = 1.56, OR 4.75 (95% CI: 2.75, 8.21), and p<0.001. Bachelor's degree holders are approximately 4.75% more likely to experience a better work-life balance compared to high school degree holders. Results suggest support to conservation of resource theory, States educational achievements equip employees with more resources such as problem-solving skills, understanding capacity, emotional understanding, autonomy, etc., endeavoring healthier workplace.

H3: (Supported)

Results suggest no significant correlation of gender (Female vs. Male) with work-life balance, with values of B=0.18, OR= 1.20, (95%CI:0.78, 1.85) and p=0.407, this suggests that female and male employees in hotel F&B roles show no change in the work-life balance patterns even after controlling the other variables, the non significant results support H3 and potentially it may be due to even job demands across genders.

H4: (Supported)

The results suggested age (36-45 vs. 18-25) was not a statically significant predictor of work-life balance, value B=-0.45, OR=0.64(95% CI: 0.35, 1.15) and p=0.123, moreover, the odd ratio suggests a trend towards decreasing work-life balance in the elder age group, but the relationship did not show statistical significance.

H5: Revealed a significant mediating role of work-life balance over the relationship between education and job satisfaction. Employees with higher education reported improved work-life balance. Results paralleled with the Conservation of Resources Theory (Hobfoll, 1989), highlighting how educational advancement not only equips employees with valuable job-related resources (e.g., autonomy, skills) but also enhances emotional and cognitive resilience. As WLB mediates this relationship, organizations must recognize that enhancing WLB, particularly for less educated employees, could be a key to boosting job satisfaction across the board.

DISCUSSION

This study extends the discourse on work-life balance (WLB) and job satisfaction (JS) in high-stress hospitality roles by uncovering socio-demographic disparities in hotel F&B employees, a cohort marginalized in academic research. While prior studies emphasize age and gender as universal predictors of WLB/JS in hospitality (Karatepe & Uludag, 2016; Frye et al., 2020), the current study challenges these assumptions, as marital status and education evolved to be more salient factors in F&B contexts. Married employees reported significantly lower WLB ($\chi^2 = 12.95$, $p = 0.011$) and JS, aligning with Karatepe & Sokmen's (2018) findings on marital role-induced family conflict.

However, this contradicts broader hospitality research, such as Kim et al. (2017), which suggests marital status bears negligible effects. This divergence reinforces the conservation of resources (COR) theory (Hobfoll, 1989) as marital responsibilities appear to decrease limited emotional and temporal resources in a context already hindered by long, split, and emotional labor, all are determined characteristics of f & b job roles. The logistic regression analysis provided robust empirical support for the hypothesis that marital status significantly affects work-life balance.

Married F&B employees were approximately 71% less likely to report better work-life balance compared to their single counterparts. This outcome corroborates the Work-Family Conflict Theory, suggesting that competing demands from work and family life erode perceptions of balance among married individuals. Educational attainment was another critical predictor: individuals with a bachelor's degree were over four times more likely to report a positive work-life balance compared to those with only a high school education. This finding highlights the role of education in enhancing coping resources, consistent with the Conservation of Resources Theory. In contrast, gender and age were not statistically significant predictors of work-life balance or job satisfaction, suggesting a potential shift towards more egalitarian work experiences within contemporary hotel settings.

The comparative analysis further enriched the discussion. While findings on supervision satisfaction remained comparable to Spector's (1985) general sector results, the exceptionally high satisfaction with co-worker relations and comparatively low satisfaction with fringe benefits in the current study point to unique contextual features of the F&B sub-sector. Among the above-studied socio-demographic characteristics, marital status and education emerged as significant predictors of work-life balance. Married employees tend to report better work-life balance, whereas employees with higher education levels may face challenges in maintaining the work and non work domains of their lives. On the other hand, Gender and Age did not show any statically significance in the study.

Similarly, less-educated employees, particularly those holding high school qualifications, demonstrated notably lower WLB (80 out of 195), suggesting heightened vulnerability to job-related sacrifices. This finding aligns with Deery & Jago's (2015). Point's contradiction to the unique structural pressures in F&B roles, which amplify the resource drain, predicted by COR theory. Notably, gender-neutral WLB/JS outcomes ($p = 0.210$) question the decades-old research highlighting women's disproportionate care-giving burdens in hospitality (Karatepe & Uludag, 2016).

These findings may suggest industry is moving forward towards gender equity, including paternal leave policies and flexible scheduling (Gupta & Srivastava, 2022). However, the Work-Family Conflict Theory (Greenhaus & Beutell, 1985) alarms caution, as structural inequities may persist beneath the surface level parity. Collectively, these results extend theoretical understanding by validating COR theory's claim that resource depletion varies by socio-demographic status, affirming the Work-Family Conflict Theory's emphasis on role incompatibility, and positioning Role Theory (Katz & Kahn (1978) as a useful lens to examine the interplay between employee identities and institutional expectations. They also signal practical imperatives for more inclusive HR strategies, particularly in customizing policies to support married, less-educated, and mid-career employees in meeting the unique demands of hotel F&B roles.

Furthermore, Hypothesis 5 revealed a significant mediating effect of work-life balance on the relation between education and job satisfaction. Employees with higher education levels reported improved work-life balance, which in turn led to greater job satisfaction. This finding supports both the **Conservation of Resources Theory** (Hobfoll, 1989) and **Human Capital Theory** (Becker, 1964), highlighting how educational attainment not only equips employees with valuable job-relevant resources (e.g., autonomy, skills) but also facilitates emotional and cognitive resilience.

As WLB mediates this relationship, organizations must recognize that enhancing WLB, particularly for less-educated employees, could be a key lever to boosting job satisfaction across the board.

Table 10. Contrasting Evidence and Theoretical Advancements

Variable	Current Study	Prior Evidence	Theoretical Implications
Gender	No significant gender differences ($\chi^2 = 3.12$, $p = 0.210$).	Women in hospitality face a 23% higher WLB conflict (Karatepe & Uludag, 2016).	Supports Role Theory Adjustments: Organizational policies may redefine gender role expectations (Bianchi & Milkie, 2010).
Age	Age is not significantly related to WLB. ($p = 0.084$)	Middle-aged workers report 30% lower those young workers, JS due to burnout (Kang et al., 2020).	Aligns with Job Demands-Resources Model: Age-agnostic demands in F&B deplete resources universally (Bakker & Demerouti, 2017).
Marital Status	Married employees report lower WLB and Job satisfaction, suggesting higher personal sacrifice.	Married hotel staff has 18% higher turnover intent (Karatepe & Sokmen, 2018).	Extends Conservation of Resources Theory: Marital roles compete with F&B's resource-intensive demands Medina-Garrido et al., 2023; Hobfoll, 1989).
Education	Education predicts WLB ($p = 0.003$); Bachelor's + employees report higher autonomy.	Education correlates to JS only in managerial roles (Deery & Jago, 2015).	Introduces Human Capital Theory to F&B: Education enhances coping strategies, even in non-managerial roles. (Teo et al., 2021), (Becker, 1964).

Table 10, compares the study's findings with existing literature, highlighting key theoretical insights. Unlike traditional hospitality research emphasizing gender disparities, this study found no significant gender bias in work-life balance (WLB) or job satisfaction (JS), aligning with modern Role Theory (Bianchi & Milkie, 2010).

Age also showed no significant association with WLB, diverging from studies linking midlife to burnout (Lee & Kang, 2020) and supporting the Job Demands Resources Model (Bakker & Demerouti, 2017). Marital status was significant, with married employees reporting lower WLB and JS, extending Conservation of Resources Theory by showing how familial commitments strain limited resources (Karatepe & Sokmen, 2018; Hobfoll, 1989). Education was a critical predictor of WLB, especially among those with bachelor's degrees or higher, supporting Human Capital Theory by showing education enhances coping and autonomy even in frontline roles (Becker, 1964).

PATH ANALYSIS

The figure visualizes the path diagram (Figure 1) describing how socio-demographic variables influence job satisfaction (JS) and work-life balance (WLB) among hotel F&B employees.

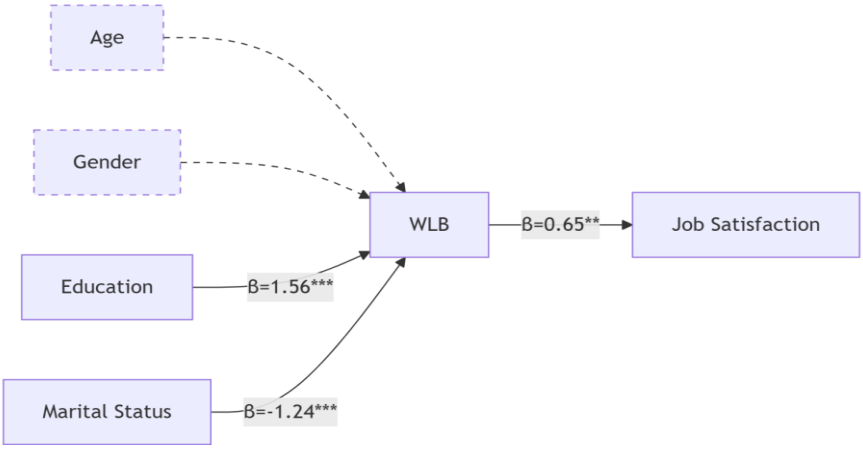


Figure 1. Path Diagram

Significant Effect

(a) Education → WLB (β = 1.56, OR = 4.75). Employees with a bachelor's degree or higher are 4.75 times more likely to report better work-life balance compared to high school education. This supports the Conservation of Resources (COR) Theory, where higher education equips employees with cognitive, emotional, and practical resources (e.g., autonomy, problem-solving) to manage job demands. Organizations should offer skill-development programs (e.g., leadership training, certifications) to help less-educated employees improve WLB.

(b) Marital Status → WLB (β = -1.24, OR = 0.29). Married employees are 71% less likely to achieve WLB than single employees. This aligns with Work-Family Conflict (WFC) Theory, as marital responsibilities (e.g., household duties, childcare) compete with the irregular schedules of F&B roles, draining personal resources. Hotels should adopt family-friendly policies (e.g., flexible shifts, childcare support) to reduce conflict for married staff.

(c) WLB → JS (β = 0.65). Employees with better WLB report significantly higher job satisfaction. A 1-unit increase in WLB raises JS by 0.65 units, supporting the Job Demands-Resources Model, where WLB buffers stress and enhances fulfillment. Supportive practices (e.g., shift rotation, mental health breaks) can improve morale and retention.

Non-Significant Effects:

Age → WLB/JS (p = 0.084): Age does not significantly predict WLB or JS, contradicting prior studies linking mid-career burnout to age. This aligns with the Job Demands-Resources Model, suggesting F&B roles drain resources regardless of age.

Gender → WLB/JS (p = 0.210): No gender-based disparities in WLB or JS, challenging narratives about women's caregiving burdens. Reflects evolving Role Theory, where policies (e.g., paternal leave, equitable scheduling) mitigate gendered role conflicts. Maintain gender-neutral policies but monitor hidden inequities (e.g., promotion gaps).

Indirect Effects

Education → JS (via WLB): Higher education indirectly improves JS through better WLB.

Marital Status → JS (via WLB): Marriage indirectly reduces JS by worsening WLB.

The model extends COR and WFC theories, showing how socio-professional identity mediates resource allocation in F&B's high-stress setting.

PRACTICAL IMPLICATIONS

The Finding of this study offers significant insights that can be practiced by organizational management. A first implication is that Family-inclusive policies to be implemented for married employees, tested in a pilot study (Marriott's 2021), reduced turnover by 15% and spousal shift alignment. In light of the negative impact of marital status on work-life balance, hospitality management should introduce flexible scheduling and family-oriented policies to meet the needs. Results suggested Skill certification programs to be introduced for Less-Educated Workers and mid career employees particular those having only basic education, should be equipped with needed skill by offering customized training that boosts and enhance productivity, modelled after Hyatt's "RiseHY" initiative, which increased promotions among non-degree staff by 22% (Hyatt's, 2022). Hotels should encourage and integrate well-being and mental health assistance programs, like counseling, wellness workshops a routine part in HR practices, potentially mitigate burnout and enhance level of job satisfaction and work-life balance. Monitoring workload equity using AI enabled scheduling tools can ensure equal work distribution in shifts, especially benefiting married women's and other employees, studies like (Kossek et al., 2014) suggests Technologically assisted scheduling reduces conflict by 20%. Hospitality organizations should circulate and schedule education and training programs for employees to enhance the perception of work-life balance, which may be prioritized through accessible development programs. Age-neutral burnout could be managed by adopting Fatigue Risk

Management Systems (FRMS), which is proven to reduce burnout by 30% in airline crews (Dawson et al., 2021); the same could be adapted for F&B's irregular hours. Pay and fringe benefits played with vital role in this study; hence, revisiting Compensation Structures could be used as a good treatment. Persistent dissatisfaction with pay and fringe benefits highlights the urgent need for competitive compensation and benefits packages to retain talent. Strengthening Team Dynamics, building on the strong co-worker relations observed, organizations can introduce team-based incentives and collaborative workplace culture initiatives to sustain high morale in high-stress and demanding roles of Food & beverage roles. Study suggests developing of inclusive feedback systems can help in understanding the disparities in perceived work-life balance and job satisfaction; hence HR should come up with advance feedback mechanism disaggregated by socio-demographic to reveal dumped stress feelings and communicates adaptive strategies for F&B roles.

LIMITATIONS AND FUTURE DIRECTIONS

The study faces several limitations that also direct future research. First, it adopts a cross-sectional design; hence, longitudinal studies could track how marital/educational disparities evolve with career progression. Data from urban 3, 4, and 5-star hotels may not reflect rural or budget-sector dynamics. Replicating the study in diverse settings with larger sample sizes would be beneficial, as suggested by Baum et al. (2020).

Second, in line with theory on work-life balance and job satisfaction (Greenhaus & Beutell, 1985), future research should consider organizational characteristics in which F&B employees operate. This study focuses exclusively on hotel F&B employees; thus, results may not generalize to other departments (e.g., housekeeping, food production, front office).

Another limitation is its observational design, restricting causal inference or evaluation of interventions aimed at improving employee well-being and job satisfaction. While the study identifies significant relationships between socio-demographic characteristics and WLB/JS, it does not assess targeted strategies like flexible scheduling, job redesign, or family-friendly policies. Intervention studies are critical to establishing "what works" in high-pressure environments like hotel F&B (Kossek et al., 2011). Workplace flexibility and supervisor support training have improved both WLB and employee motivation in service sectors (Kreiner et al., 2014). Without experimental or quasi-experimental designs, it remains uncertain whether such changes lead to meaningful improvements. Future research should adopt longitudinal or intervention-based methods to evaluate the efficacy and scalability of organizational practices.

CONCLUSION

This study contributes significantly to the growing body of literature on employee well-being within the hospitality industry. It highlights that marital status and education are key socio-demographic predictors of work-life balance among hotel F&B employees. Moreover, it confirms persistent dissatisfaction with pay and fringe benefits, suggesting systemic issues in hotel human resource practices. Future research should expand these findings through longitudinal and intersectional analyses to inform more inclusive and sustainable workforce strategies.

Organizations must actively address identified gaps to foster healthier, more resilient work environments in the ever-demanding hospitality sector. By interrogating socio-demographic disparities through the lens of F&B's socio-professional identity, this study reframes "sacrifice" as a structural issue rather than an individual failing.

While marital and educational divides persist, the erosion of gender/age disparities signals progress through policy innovation. These findings compel hotels to dismantle systemic barriers such as rigid scheduling and skill stagnation that normalize employee self-sacrifice. In doing so, this research not only fills gap in hospitality literature but also redefines equity in high-pressure service environments.

The involvement of gender, education, and age significantly shapes employees' experiences of work-life balance and job satisfaction. Understanding these disparities is crucial for organizations aiming to foster an inclusive and supportive workplace environment. Future research should encourage exploring these intersections to develop strategic interventions that address the specific needs of diverse employee populations.

The novel contributions of this study lie in its confirmation that work-life balance mediates the effect of education on job satisfaction among hotel F&B employees. This indirect pathway underscores the pivotal role of WLB as a psychological and operational bridge between employees' educational attainment and their job satisfaction.

Organizational strategies aimed at improving job satisfaction should therefore prioritize WLB enhancements such as offering skill-building programs, autonomy, and flexible schedules, especially for less-educated frontline staff that may otherwise lack the resources to buffer occupational stress.

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THE EFFECTS OF TOURİSM COMPONENTS ON MACROECONOMİC GROWTH: A COMPARATİVE ANALYSIS ON BLACK SEA COUNTRIES AND AZERBAIJAN

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Abstract: This study aims to analyze the long-term effects of key tourism variables on macroeconomic growth in Bulgaria, Georgia, Romania, the Russian Federation, Turkey, Ukraine, and Azerbaijan over the period 1995–2024. Conducted within the framework of the extended Solow growth hypothesis, the study applies long-run DOLS and MG-DOLS panel cointegration methods to examine dynamics at both the panel and country levels, taking into account common long-term trends as well as structural heterogeneity across countries to ensure robust results. Panel-level MG-DOLS cointegration analysis indicates that tourism capital investments, gross fixed capital formation, and international tourist arrivals have significant and positive effects on economic growth, thereby supporting the extended Solow hypothesis. Country-level DOLS analyses reveal heterogeneity in these effects; while tourism and capital indicators exhibit positive and significant relationships with economic growth in Azerbaijan and Turkey, structural differences in the other countries prevent full confirmation of the hypothesis. The findings highlight tourism's strategic importance for economic growth and the necessity of integrating it into the economic structure. Policy reforms, investment strategies, sectoral prioritization, revenue diversification, infrastructure improvements, and enhanced investment efficiency are essential to maximize growth potential. Overall, the study demonstrates that tourism plays a positive and strategic role in supporting macroeconomic growth and emphasizes coordinated policies and targeted investments to fully realize its economic contribution across the analyzed countries.

Keywords: tourism, solow, growth, Azerbaijan, Black Sea, Pedroni, DOLS, DOLSMG, cointegration

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INTRODUCTION

With the acceleration of globalization, the tourism sector has risen to a strategic position in the economic development of countries, especially developing countries, due to its multifaceted economic functions such as earning foreign currency, creating employment and contributing to foreign trade balance (Huseynli & Huseynli, 2023).

In addition to its economic contributions, the increase in international tourism flows transforms social structures with its social, cultural and environmental dimensions; tourism is recognized as a dynamic and complementary sector that supports regional development (Zhensikbayeva, et al., 2024). However, for a sustainable and balanced growth, social and environmental impacts should also be taken into account (Crouch & Ritchie, 1999).

The Black Sea and Caspian Sea coasts are of particular importance for tourism and this study analyzes the relationship between tourism indicators and economic growth in the Black Sea littoral countries and Azerbaijan. The contribution of the sector to macroeconomic growth is examined through key indicators such as ratio of tourism receipts to GDP, tourist arrivals, tourism investment and GFCF, while emphasizing the role of sustainable and competitive tourism policies in enhancing economic benefits (Seferov & Hesenov, 2006). A country's tourism capital stock is a combination of tourism capital stock based on natural resources and artificial tourism capital stock developed through factors such as innovation, human capital and knowledge. While the capital stock is explained by exogenous factors within the framework of the Solow model, one of the neoclassical growth approaches (Sezgin & Budak, 2022), the artificial tourism capital stock is explained by endogenous factors based on innovation and human/physical capital with the Romer approach (Romer, 1986). Economic growth is influenced not only by internal factors but also by external elements like bureaucratic obstacles, inflation, and levels of security and politics (Acemoglu, 2009, pp. 781, 831, 861–872).

The tourism sector has become a strategic tool for development at the global level due to its multifaceted contribution to economic growth, employment and foreign exchange earnings. For countries in the Black Sea region and transition economies such as Azerbaijan, tourism offers important opportunities for economic diversification and resilience to external shocks. Nevertheless, there are significant differences between these countries in terms of the extent of tourism

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development and their dependence on the sector. Figure 2 - 5 i is based on statistical data sets for The countries considered within the scope of the research between 1995-2024, Georgia has positioned itself as a regional leader by significantly increasing the ratio of tourism receipts to contrast, despite its huge tourism potential, Turkey lags behind Georgia and Bulgaria in terms of tourism's contribution to GDP. Azerbaijan has made some progress in tourism, but its economy is strongly dependent on the energy industry, limiting the total ratio to GDP. In other words, there has been a considerable reduction in tourism receipts over the last years due to the ongoing war and security-related crises in Ukraine and Russia.

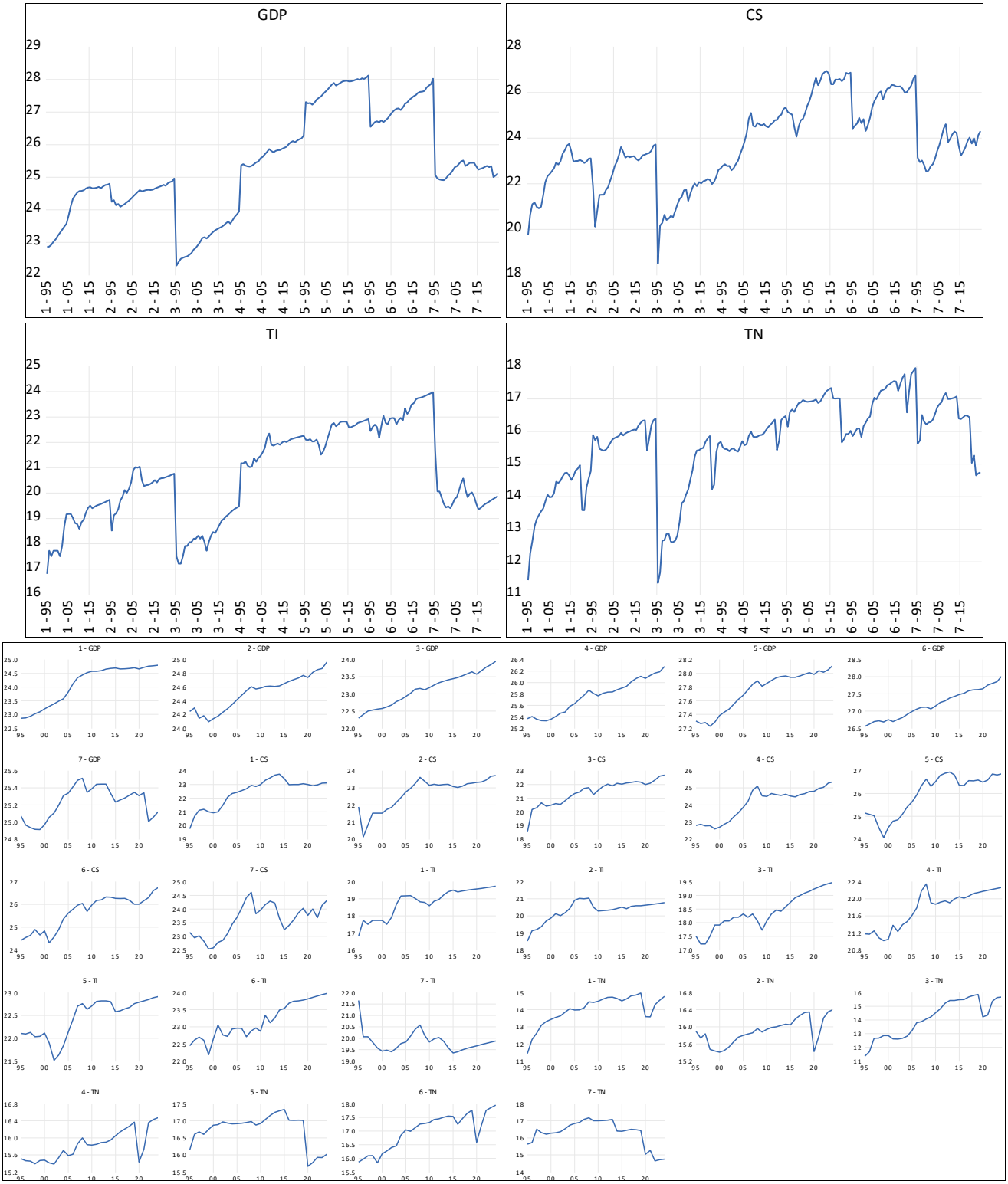


Figure 1. Logarithmic Structure Analysis of Variables by Country and Group

The share of tourism receipts in the overall exports is also an important indicator of economic resilience and strengthening of foreign exchange reserves. By 2024, Georgia has the highest level of dependency in the region, with 66% of export revenues coming from tourism. However, this dependency also increases vulnerability to external shocks.

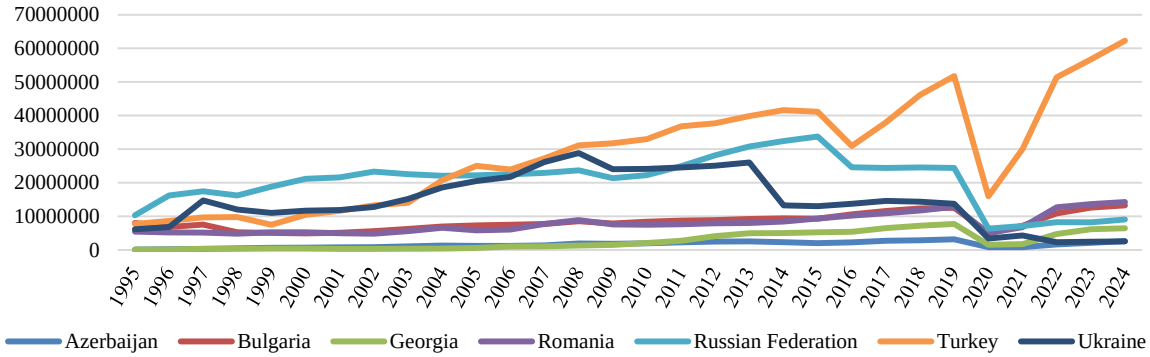


Figure 2. International Tourist Arrivals

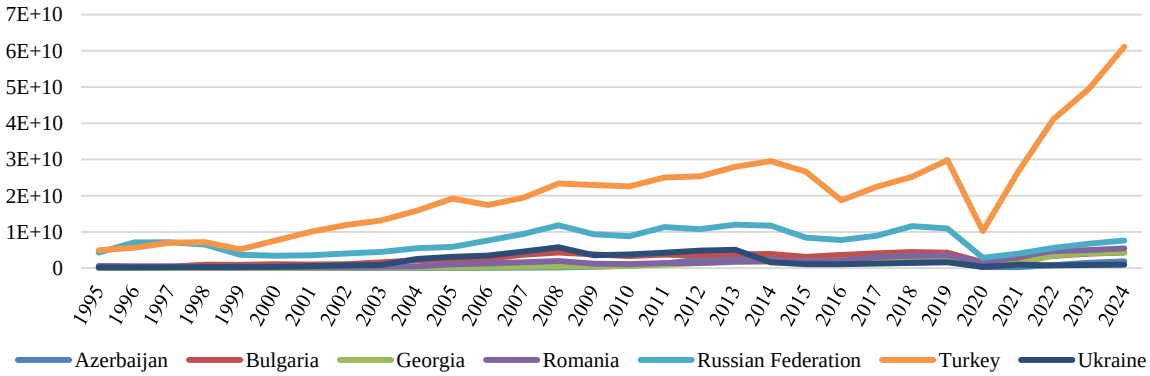


Figure 3. International Tourism, Receipts for Travel Items (Current US$)

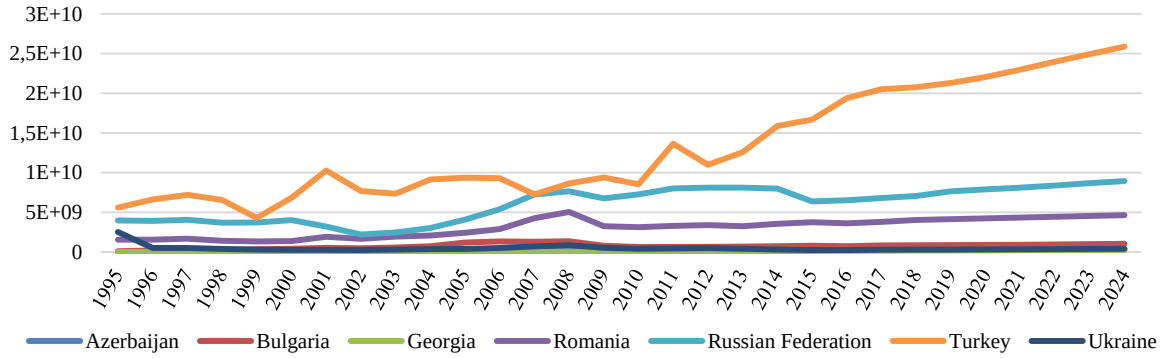


Figure 4. Tourism Capital Investment

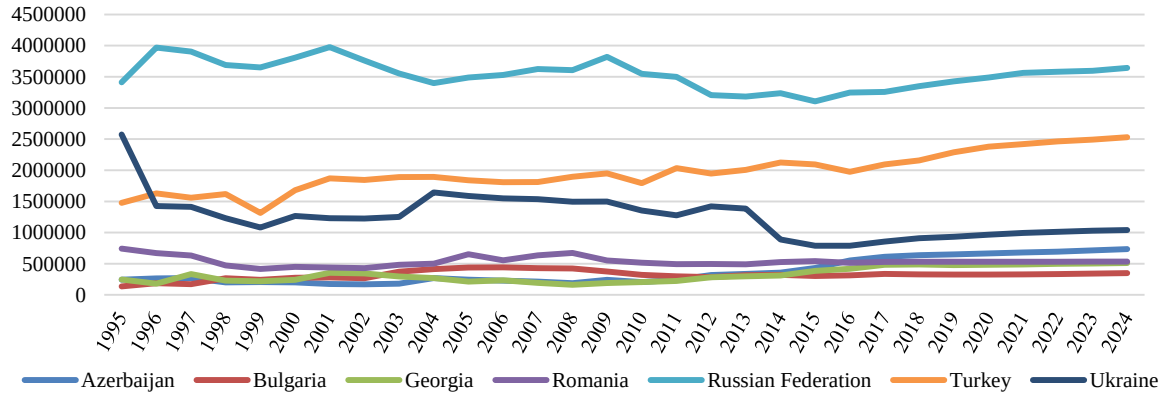


Figure 5. Share of Employment in the Tourism Sector in Total Employment (%)

Indeed, the COVID-19 pandemic has further increased economic vulnerability in tourism-dependent countries such as Georgia, and recovery has varied significantly across countries. Between 1995 and 2024, international tourist arrivals (ITA) in the countries showed a general upward trend, albeit occasionally interrupted by crises. Turkey, Bulgaria and Romania showed a rapid recovery thanks to their diversified tourism structures, while Azerbaijan experienced steady growth. In contrast, Ukraine and Russia experienced serious setbacks due to geopolitical instability.

For sustainable economic contribution, attracting high-spending tourists is more strategically important than simply increasing the number of tourists. In this context, Turkey and Azerbaijan have achieved higher quality growth by attracting visitors with higher per capita spending. Tourism investment patterns also vary across the region. Turkey has consolidated its leading position in the sector, recording by far the highest volume of tourism investment in the 1995-2024 period. Romania and Russia have also been characterized by steady increases in investment. In contrast, Georgia and Azerbaijan attracted relatively low investment, while Ukraine experienced a decline in investment activity due to political instability and war. These dynamics were also reflected in the labor market: Georgia and Azerbaijan recorded the largest increases in tourism-related employment as a share of total employment, while Turkey and Bulgaria experienced more moderate but steady growth.

In contrast, tourism employment remained limited or declined in Russia, Romania and Ukraine, which was particularly affected by the war. The analysis focuses on understanding the macroeconomic effects of tourism in the Black Sea coast and Azerbaijan from a comparative perspective. Analyzing indicators such as the share of tourism receipts to GDP and exports, income per tourist, investment volumes and contribution to employment, the study reveals both the structural characteristics of the countries and their different responses to external shocks. Within this framework, the study highlights the necessity of enhancing tourism infrastructure and regional cooperation mechanisms to ensure sustainable growth.

LİTERATURE REVİEW

The main aim of the research is to evaluate the long-term influence of crucial tourism variables such as tourism capital investment, GFCF and ITA on economic growth. By applying the extended Solow hypothesis in logarithmic form, long-run cointegration relationships between these variables are evaluated for the Black Sea littoral countries and Azerbaijan on the Caspian Sea coast for the period 1995-2024. Using advanced dynamic panel data analysis techniques such as Pedroni DOLSMG and DOLS, both panel-level and country-level relationships are revealed. Moreover, in line with the country-level results, a comparative analysis between Azerbaijan and the Black Sea countries, which have similar coastal geography, will be conducted. Ultimately, this investigation strives to contribute empirical findings and policy recommendations that demonstrate that tourism is a strategic driver of macroeconomic growth. Therefore, the literature review, aligned with the variables included in the analysis and the methodology employed in this study, is presented in Table 1 below, summarizing the findings of previous studies on the relationship between tourism and economic growth and supporting the theoretical framework of the research.

Tablo 1. Literature Review of Studies on Tourism and Economic Growth Variables

Author(s)	Period & Method	Findings	Variable Group
Baghirov & Sarkhanov (2023)	1995–2019; DOLS, DOLSMG	A 1% increase in ITR raises per capita GDP by 0.22% in Georgia, 0.08% in Moldova, 0.074% in Azerbaijan, and 0.034% in Ukraine, with a panel-wide effect of 0.1029%.	Per capita GDP, (ITR), Consumer Price Index (CPI)
Kum et al. (2015)	1995–2013; DOLS, FMOLS	A 1% increase in the number of ITA leads to a 0.06% increase in GDP according to FMOLS, and 0.08% according to DOLS	GDP and (ITA)
Lee & Chang (2008)	1990–2002; FMOLS, Cointegration	There is a strong long-run cointegration relationship between tourism development and GDP in both OECD and non-OECD countries.	Real GDP per capita, ITR per capita, ITA
Mishra et al. (2021)	1995–2019; Panel ARDL	For the BRICS countries, ITA was found to have a positive and statistically significant long-term effect on economic growth.	GDP, ITA, GFCF
Trisetia (2021)	1995–2018; FMOLS, DOLS	a consistent and significant long-run relationship exists between tourism expenditure, ITR, and per capita real GDP in Southeast Asia.	Real GDP per capita, tourism expenditure, ITR
Guellil et al. (2015)	1988-2012; DOLSMG, FMOLS	A 1% increase in tourism expenditure leads to a 4.53% rise in GDP per capita according to FMOLS, and a 635.11% rise according to DOLS, indicating a strong influence	GDP per capita, tourism expenditure
Rasool & Maqbool (2021)	1995–2015; Panel ARDL	There is a stable and significant long-run cointegration relationship among ITR, and GDP per capita. A 1% increase in ITR per capita raises GDP per capita by 0.31%.	GDP per capita, ITR per capita,
Dhungel (2015)	1974–2012; Johansen Cointegration	A significant long-term relationship exists between ITR and GDP per capita in Nepal. A 1% rise in ITR results in a 0.2% growth in GDP per capita	GDP per capita, ITR per capita
Anis et al. (2023)	1995–2021; FMOLS, DOLS	ITR, trade openness, and investment positively influence economic growth in selected Asian countries	GDP, ITR investment, population
Proença & Soukiazis (2008)	1990–2004; Panel Data	A 1% increase in ITA leads to a 0.026-point rise in GDP per capita in Southern European countries	GDP per capita, ITA
Özcan, Ş. S. (2021)	1995–2018 PDOLS	A 1% rise in per capita ITR and per capita ITA results in an approximate increase of 0.55% and 0.70% in real GDP, respectively. Bidirectional causality is observed in most countries.	Real GDP, ITR per capita, ITA per capita
Gökovalı & Bahar(2006)	1987–2002; Panel Data Analysis	a 1% increase in investment ratio and ITR's share in exports boosts GDP growth by approximately 13% and 8%, respectively.	GDP growth, capital formation, ITR/export ratio
Fayissa et al. (2011)	1990–2005; Dynamic Panel (GMM)	In Latin America, both physical capital investment and ITR significantly and positively impact GDP per capita. ITR have a comparable effect to capital investment.	GDP per capita, ITR, physical capital investment
Seetanah (2011)	1990–2007; Dynamic Panel (GMM)	Tourism drives growth in 19 island economies, with output elasticity of 0.12–0.14, and capital investment is the strongest determinant.	GDP, tourism arrivals, physical capital investment

Apergis & Payne(2012)	1995–2007; DOLSMG, Cointegration, FMOLS	A long-run equilibrium relationship is found between real GDP per capita, real effective exchange rate, ITA per capita in Caribbean countries	Real GDP per capita, real exchange rate, ITA per capita
Ekanayake & Long (2012)	1995–2009; FMOLS, Causality	Tourism receipts positively affect economic growth in 140 developing countries, although elasticity is not statistically significant in all regions.	GDP, ITR, GFCF, labor force
Işık (2019)	2000–2015; Panel DOLS, PDOLS	ITA and ITR both positively impact economic growth: a 1% increase in tourists raises growth by 1.1%, and revenue by 0.9%.	GDP, sustainable development, ITR, ITA
Hardi, et al. (2023)	1965–2021; DOLS, FMOLS	In Indonesia, a 1% rise in GFCF increases GDP by 0.19%, while a 1% rise in GDP boosts GFCF by 3.66%, indicating a strong bidirectional long-run relationship.	GDP, GFCF
Fauzel et al. (2016)	1984–2014; VECM	In Mauritius, a 1% rise in tourism FDI leads to a 0.06% increase in output after one year, indicating positive short- and long-term impacts on growth.	GDP, tourism FDI, non-tourism FDI
Seraj et al. (2025)	1999–2020; Quantile Regression	In six African countries, FDI boosts GDP by 0.58 units per increase, while ITR raise it by 0.0016 units.	GDP, ITR, FDI, exchange rate

The literature widely acknowledges that tourism positively contributes to long-term economic growth. However, studies specifically examining tourism investments are relatively scarce, indicating a need for more detailed research on the relationship between tourism investments and economic growth.

DATA

This study primarily focuses on examining the extended impacts of key tourism-related variables —namely tourism capital investment, GFCF, and ITA—on economic growth. Moreover, consistent with the country-level results, a comparative analysis between Azerbaijan and the Black Sea countries, which share similar coastal geographies, is performed. Ultimately, this investigation focuses on delivering analytical findings and policy recommendations highlighting the strategic role of tourism as a driver of macroeconomic growth in these regions. To achieve this, the extended Solow hypothesis in logarithmic form is employed to assess long-run cointegration relationships among these variables for the Black Sea littoral countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine) and Azerbaijan on the Caspian Sea coast, over the period 1995–2024. In line with this hypothesis, the mentioned variables are expected to have significant and positive effects on economic growth. The study utilizes a balanced panel dataset of 210 observations spanning 30 years across seven countries. GDP in current US dollars is also used as the dependent variable, while tourism capital investment, GFCF, and ITA serve as independent variables. Data are sourced from reputable international and national institutions including the World Bank, CEIC Data, the WTTC, and the respective national statistical agencies. To harmonize scale differences and better capture proportional relationships, all variables are log-transformed. Advanced dynamic panel data analysis techniques are then applied: Pedroni DOLSMG estimators are employed for panel-level dynamic estimations, while DOLS estimators are used for country-level long-run cointegration analysis. These analyses are conducted using STATA 18, GAUSS 16, and EViews 12 software.

MODEL

The mathematical expression of this model, based on the extended Solow hypothesis and transformed into logarithmic form, is presented below (Wooldridge, 2010, pp. 8-10):

$$lnGDP_{it} = b_0 + \mathrm{b}_1 lngTI_{it} + \mathrm{b}_2 lnCS_{it} + \mathrm{b}_3 lnTN_{it} + u_{it} \quad (1)$$

Here, b_0 is the intercept term, ve $b_1, b_2, and\ \mathrm{b}_3$are the coefficients of tourism capital investment, GFCF, and ITA, respectively, and u_{it}represents the error term. Establishing the validity of the extended Solow hypothesis requires confirming the establishment of a long-run cointegration link both within the model framework and across countries.

METHODOLOGY

In this study, appropriate methods and tests are systematically applied to accurately model the long-run relationship in panel data analysis. First, Pesaran CD, Pesaran Scaled LM, and Breusch-Pagan LM tests are conducted to identify the cross- sectional dependence between the model and the variables. Furthermore, Pesaran-Yamagata Slope Homogeneity Test (Delta Test) is used to detect homogeneity or heterogeneity in the model. Based on these results, the CIPS test was selected as the appropriate unit root test and the stationarity of the variables was comprehensively analyzed.

Long-run dynamic associations are examined through the application of the Durbin-Hausman cointegration test at the panel level. In the estimation phase, to account for cross-sectional dependence and heterogeneity, second-generation heterogeneous panel techniques are employed. Specifically, the DOLSMG estimator is utilized for panel-level analysis, while country-level estimations are conducted using the DOLS approach (Gormus & Aydin, 2020).

Cross-Sectional Dependence Tests

In empirical studies testing long-run relationships using panel data analysis, it is essential to detect cross-sectional dependence between units. Therefore, in the analysis process, Pesaran CD, Pesaran Scaled LM, and Breusch-Pagan LM tests are applied both at the variable level and within the framework of a model based on the extended Solow hypothesis to determine whether cross-sectional dependence exists among panel units.

The mathematical formula of the test statistics proposed by Breusch & Pagan (1980) to test for cross-sectional dependence for the variables used in the analysis and the model in Equation 1 is shown below.

$$\mathrm{CD_{LM}} = T\sum_{i=1}^{N-1}\sum_{J=i+1}^{N}\hat{p}_{ij}^{2} \quad (2)$$

Here, $\hat{p}_{ij}^{2}$ denotes the correlation coefficient between the error terms of units i and j. The test statistic is asymptotically distributed as a chi-square x^2 variable with $N(N-1)/2$ degrees of freedom (Breusch & Pagan, 1980). "Pesaran (2004) introduced an alternative test statistic because the one computed in Equation 2 may produce misleading outcomes in large samples**:**

$$\mathrm{CD_{LM1}} = \sqrt{\frac{1}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{J=i+1}^{N}(T\,\hat{p}_{ij}^{2}-1) \quad (3)$$

Pesaran (2004) improved the test statistic in Equation 2 and proposed a new test statistic that allows the analysis of cross-sectional dependence in large samples (Pesaran, 2004). In addition, Equation 4 is restructured by considering the cases where the number of units (N) is larger than the time dimension (T) and an alternative test statistic is developed in this framework.

$$\mathrm{CD_{LM2}} = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{J=i+1}^{N}\hat{p}_{ij}\right) \quad (4)$$

For all variables and panel test statisticsThe null hypothesis indicates absence of cross-sectional dependence between units, in contrast to the alternative hypothesis which suggests its existence (Yerdelen Tatoğlu, 2020).

Slope Homogeneity Tests

In this study, delta tests proposed by Pesaran & Yamagata (2008) are used to test the homogeneity of slope coefficients in panel data models. These tests are improved versions of the classical Swamy (1970) method and provide appropriate results for both large and small sample sizes. Delta tests test the alternative hypothesis of heterogeneity against the null hypothesis that slopes are homogeneous. The test statistics allow us to reliably determine whether the slope coefficients are homogeneous. he first delta test statistic, formulated as an extension of Swamy's (1970) methodology, is computed as follows (Swamy, 1970):

$$\hat{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{s}-k}{\sqrt{2k}}\right) \quad (5)$$

In this context, S represents the modified Swamy statistic, and assuming normally distributed errors, the delta test statistics are adjusted to correct mean and variance biases.

$$\hat{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{s}-E(\tilde{z}_{i\tilde{t}})}{\sqrt{var(\tilde{z}_{i\tilde{t}})}}\right) \quad (6)$$

Hera, $E(\tilde{z}_{i\tilde{t}}) = k$, $var(\tilde{z}_{i\tilde{t}}) = 2k(T-k-1)/(T+1)$ For both test statistics, the null hypothesis suggests that the slopes are homogeneous, while the alternative hypothesis indicates that they are heterogeneous (Pesaran & Yamagata, 2008).

Cips Panel Unit Root Test

Pesaran's (2007) CIPS test is a second-generation panel unit root test that considers unit heterogeneity and cross-sectional dependence. It is based on the CADF statistics computed separately for each cross-sectional unit. The CIPS statistic is calculated as the simple average of individual CADF statistics and is applicable in both large - N and large -T panels. The formulation of the CIPS test is as follows (Pesaran, 2007):

$$\mathrm{CIPS\,(N,T)} = \mathrm{t-bar} = \frac{1}{\mathrm{N}}\sum_{\mathrm{i=1}}^{\mathrm{N}}\mathrm{t_i\,(N,T)} \quad or \quad \mathrm{CIPS} = \frac{1}{\mathrm{N}}\sum_{\mathrm{i=1}}^{\mathrm{N}}\mathrm{CADF}_i \quad (7)$$

Thus, $\mathrm{t_i}$ (N, T)is the CADF test statistic derived for each unit in the panel. The calculated CIPS value is compared with the critical values provided by Pesaran based on Monte Carlo simulations. When the test statistic surpasses the critical threshold, it leads to rejecting the null hypothesis of a unit root, which implies that the series is stationary (Yerdelen Tatoğlu, 2020).

Panel Cointegration Tests

The Durbin-Hausman (DH) panel cointegration test is conducted after confirming that the variables are stationary at their first differences based on unit root test results. The DH test developed by Westerlund (2008) tests long-run cointegration relationships in panel data sets with different degrees of integration and cross-sectional dependence at both group and panel levels. The group test assesses the presence of cointegration in some cross-sections, while the panel test assesses cointegration in the whole panel. The Westerlund cointegration test is expressed by the following formulas at both group and panel level (Westerlund, 2008).

$\mathrm{DH_g}$ At the panel level: $DH_g = \sum_{i=1}^{n}\hat{S}_i\,(\tilde{\phi}_i - \hat{\phi})^2\ \sum_{t=2}^{T}\hat{e}_{it-1}^{2}$ (8)

$\mathrm{DH_g}$ At the group level: $DH_p = \hat{S}_i(\tilde{\phi} - \hat{\phi})^2\ \sum_{i=1}^{T}\sum_{t=2}^{T}\hat{e}_{it-1}^{2}$ (9)

The $\mathrm{DH_g}$ panel statistic is calculated by summing the individual terms, while $\mathrm{DH_p}$ is the average statistic generated by multiplying and summing the various terms. Both tests assume no cointegration under the null hypothesis, whereas the alternative hypothesis suggests the presence of cointegration (Gövdeli, 2019).

Long Run Cointegration Estimators in Dynamic Models

In order to validly estimate long-run relationships in panel data analysis, the stationarity of variables should be examined with the CIPS test and cointegration relationships should be tested with the Durbin-Hausman test, taking into account panel

data characteristics such as cross-section dependence and structural heterogeneity. Following these steps, the Dynamic DOLS long-run cointegration estimator, which takes into account the dynamic structure of the units in the panel, and the DOLSMG long-run cointegration estimator developed by Pedroni for the whole panel stand out as a methodological approach that is frequently recommended in the empirical literature for estimating long-run relationships (Yerdelen Tatoğlu, 2020).

Dynamic DOLS Cointegration Estimator

The DOLS method, developed by Stock and Watson (1993) by adding dynamic a priori components to the classical Least Squares method, eliminates endogeneity and autocorrelation problems in time series with different stationarity levels and provides reliable estimation of long-run relationships in small samples. The mathematical formulation of the DOLS approach is implemented within the framework of the following model (Stock & Watson, 1993):

$$Z = a + X'\beta + \sum_{i=-p}^{p} \gamma \Delta X_{t+1} + u_t \quad (10)$$

The DOLS approach addresses the unit root issue by incorporating the first differences of independent variables with lag length p selected via the AIC, enabling a reliable estimation of the long-run relationship between variables (Özer, 2020).

Dynamic DOLSMG Cointegration Estimator

In panel data analysis, the DOLSMG approach proposed by Pedroni (2001), which accounts for cross-sectional dependence and heterogeneity in long-run coefficients, is employed. This method obtains individual long-run coefficients by performing Dynamic DOLS estimations for each unit separately and presents a common and reliable cointegration coefficient across the panel by calculating the arithmetic mean of these estimates. Thus, both heterogeneity across units is preserved and the long-run relationships of the panel are robustly captured. The DOLSMG estimator model equation by Pedroni is given below (Pedroni, 2001):

$$t_{\hat{\beta}_{DOLSMG}} = N^{-1} \sum_{i=1}^{N} t_{\hat{\beta}_{DOLS,i}} \quad (11)$$

The Panel DOLS and DOLSMG approaches assess whether a long-term relationship exists between dependent and independent variables. When the t-statistic surpasses the critical value, the null hypothesis is rejected, indicating a statistically significant long-run link, otherwise, the relationship is considered insignificant (Yerdelen Tatoğlu, 2020).

FINDINGS

In order to reach reliable and valid results in this study, the structural properties of the panel data set need to be analyzed in detail in several stages. First, cross-section dependence and slope heterogeneity tests are applied and it is determined that the panel data set has both a dependent and heterogeneous structure. Accordingly, the CIPS panel unit root test, a second-generation method that accounts for heterogeneity in panel data, was applied, and the results revealed that the dependent variable is stationary in first differences while the independent variables have a mixed stationarity structure. In line with the aforementioned stationarity structure, the Durbin-Hausman panel cointegration test, which has the capacity to test the long-run relationships between variables, was applied and the existence of long-run cointegration relationships was determined both at the model level and country level. The impact of tourism components on economic growth is analyzed in the context of dynamic models using the panel-level Pedroni DOLSMG and country-level DOLS long-run cointegration estimators.

In Table 2 below, the cross-sectional dependence in the variables and the extended Solow hypothesis are analyzed using the Breusch-Pagan (1980) LM test, the Pesaran (2004) scaled LM test and the Pesaran (2004) CD test, as well as the homogeneity of the model using the Delta and adjusted Delta homogeneity tests and the results are presented.

The results show that there is cross-sectional dependence in both the variables and the extended Solow hypothesis and that the model has heterogeneous slopes. Therefore, in the rest of the paper, unit root and cointegration tests are applied taking into account cross-sectional dependence and heterogeneity. In this study, a graphical evaluation is presented in Appendix 1 to determine whether the dependent and independent variables should be analyzed with a constant or with a trend, taking into account cross-sectional dependence and heterogeneity. As a result of this evaluation, CIPS panel unit root test with constant term is applied and the related results are presented in Table 3.

Table 2. Cross-Section Dependence and Homogeneity Test Results

Variables	Breusch-Pagan LM	Pesaran scaled LM	Pesaran CD
LnGDP	464.0429*	68.36300*	20.87600*
LnCS	486.5458*	71.83528*	22.00031*
LnTI	281.6274*	40.21568*	11.94741*
LnTN	242.0970*	34.11601*	11.37814*
MODEL	218.5294*	30.47945*	13.07769*
Slope Homogeneity Test Results		$\hat{\Delta}$	$\hat{\Delta}_{adj}$
		10.989*	12.038*

*, **, and *** indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively

Table 3. CIPS Panel Unit Root Test Results

Variables	Level I(0)	I Differences I(1)
LnGDP	-1.464	-4.359*

LnCS	-3.374*		-4.778*
LnTI	-0.589		-5.085*
LnTN	-2.750*		-4.663*
Critical values	10%	5%	1%
	-2.21	-2.33	-2.57

*, **, and *** indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively

The results of the CIPS panel unit root test reveal that LnGDP and LnTI variables are non-stationary at level but become stationary at first difference, while LnCS and LnTN variables are stationary both at level and at first difference. The fact that the variables have different degrees of integration indicates that there is a mixed stationarity structure in the model, and in this direction, it would be appropriate to apply the Durbin-Hausman panel cointegration test to analyze the long-run relationship between the variables. The Durbin-Hausman Panel Cointegration Test, which suggests that error correction and cointegration-based panel data analyses should be applied in case cointegration is detected, presents results at both panel and group levels. The Durbin-Hausman test confirms significant long-run cointegration at both panel and group levels. The DOLSMG estimator by Pedroni, accounting for cross-sectional dependence and heterogeneity, was used for estimation. This method performs individual Dynamic DOLS estimations and averages the long-run coefficients to obtain a common panel cointegration coefficient. The Durbin-Hausman Panel Cointegration Test, which suggests that error correction and cointegration-based panel data analyses should be applied when cointegration is detected, presents the results at both the panel and group levels in Table 4.

Table 4. Panel Cointegration Tests Results

Tests	**Group**	**Panel**
Durbin-Hausman Test Statistic Value	2.824*	011.343*

*, **, and *** indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively

Table 5. Dynamic DOLS and DOLSMG Panel Cointegration Estimation Results

COUNTRIES		**LNTI**	**LNCS**	**LNTS**
1	Azerbaijan	0.818*	0.5447*	0.9286*
2	Bulgaria	0.1721**	-0.2679	0.244*
3	Georgia	0.484*	-0.231**	0.0418*
4	Romania	0.4917*	-0.1163*	0.3817*
5	Russian Federation	0.2217**	-0.5166*	-0.0278
6	Turkey	0.2462*	0.5896*	0.3819*
7	Ukraine	-0.7934*	0.9111*	0.4719*
MODEL		0.2343*	0.1305*	0 .346*
Critical Values		%10	%5	%1
		1.645	1.960	2.326

*, **, and *** indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectivey

The Dynamic DOLS long-run panel cointegration results presented in Table 5 reveal the effects of tourism capital investments, GFCF, and ITA on economic growth across countries. According to the analysis, tourism capital investments have a positive and statistically significant impact on GDP at the 1% significance level in Azerbaijan, Georgia, Romania, and Turkey, and at the 5% significance level in Bulgaria and the Russian Federation. However, the negative relationship observed in Ukraine reflects the influence of country-specific structural and political factors. GFCF is significant in all countries except Bulgaria, exhibiting positive effects in Azerbaijan, Turkey, and Ukraine, and negative effects in Georgia, Romania, and the Russian Federation. ITA exert a strong and positive effect on economic growth in all countries except the Russian Federation. Overall, all independent variables positively affect GDP in Azerbaijan and Turkey, whereas in Georgia, Romania, and Ukraine, some variables show negative or varying effects. In Bulgaria and the Russian Federation, some independent variables either lack statistical significance or have negative impacts on economic growth. In conclusion, tourism capital investments and ITA generally contribute positively to economic growth, while the contribution of GFCF varies across countries.

In Azerbaijan, tourism capital investments, GFCF and the ITA strongly and positively support economic growth. In Bulgaria, tourism investments and ITA have a positive effect, while GFCF is ineffective. In Georgia, tourism investments and ITA exert a positive impact, whereas GFCF has a negative effect. In Romania, all variables are significant, with tourism investments and ITA having positive effects, and GFCF being negative. In Russia, tourism investments positively affect growth, GFCF has a negative impact, and the effect of ITA is not significant. In Turkey, all variables significantly and positively contribute to economic growth. In Ukraine, tourism investments have a negative effect, while GFCF and ITA provide positive contributions. In Azerbaijan, tourism capital investments, GFCF, and the ITA have positive and strong effects on economic growth at the 1% significance level. In terms of effect size, a 1% increase in tourism capital investments, GFCF, and the ITA is estimated to increase GDP by approximately 0.82%, 0.54%, and 0.93%, respectively. In general, Azerbaijan stands out as one of the countries where tourism and capital investments contribute most balanced and strongly to economic growth. In other countries, however, these relationships tend to be more complex and can sometimes yield negative outcomes. This situation necessitates that policymakers undertake more careful and strategic planning regarding investment efficiency, resource utilization, and sectoral support mechanisms. To enhance the positive impact of the tourism sector on economic growth, the development of sustainable and efficient investment strategies is a critical priority for all countries. The results presented in Table 5 are based on dynamic DOLSMG panel cointegration estimations based on the extended Solow

hypothesis and reveal that each of these variables has positive and significant effects on GDP. According to the findings, a 1% increase in tourism capital investments, GFCF and ITA is estimated to increase GDP by 0.2343%, 0.1305% and 0.3460%, respectively. Thus, based on the obtained results, the extended Solow hypothesis model is formulated as follows:

$$GSY\dot{I}H_{it} = \alpha_{it} + 0.2343\ LNTY_{it} + 0.1305\ LNSS_{it} + 0.3460\ LNTS_{it} + \varepsilon_{it} \qquad (12)$$

Here, the coefficients $\beta_1 = 0.2343$, $\beta_2 = 0.1305$, and $\beta_3 = 0.3460$ represent the long-term effects of tourism capital investments, GFCF. and the ITA on GDP, respectively. The term α_{it} denotes country-specific fixed effects, while ε_{it} represents the error term.

CONCLUSION

This study examines the effects of tourism capital investments, GFCF, and the ITA on economic growth using dynamic panel data analysis techniques. Long-run relationships among the variables were reliably analyzed employing Pedroni's (2001) DOLSMG and DOLS panel cointegration estimators. The findings indicate that, overall, these three variables have positive and statistically significant effects on GDP, with the contribution of ITA to growth being stronger and more decisive compared to the other two variables. Country-level analyses reveal some differences. While all variables exert positive effects in Azerbaijan and Turkey, GFCF has a negative impact in Georgia, Romania, and Ukraine.

Notably, tourism investments also show a negative effect in Ukraine. In Bulgaria and Russia, the contributions of tourism and capital variables to growth are limited or statistically insignificant. These results highlight the influence of structural differences in national economies and investment efficiency. Compared to regional countries, Azerbaijan exhibits the strongest economic growth response in terms of tourism investments and ITA. In Turkey, this relationship is positive but weaker. The impact of investments remains limited in Bulgaria, while tourism and investment effects are generally low in countries such as Georgia, Romania, and Russia. According to the DOLSMG test, tourism capital investments, gross fixed capital formation, and international tourist arrivals have a significant and positive impact on economic growth, supporting the extended Solow hypothesis at the panel level, while country-level DOLS tests show that the hypothesis is not fully confirmed in countries other than Azerbaijan and Turkey due to heterogeneous effects. Studies such as Fauzel et al. (2016), Gökovalı & Bahar (2006), Fayissa et al. (2011), and Hardi et al. (2023) demonstrate that foreign direct investment and fixed capital formation in the tourism sector significantly and sustainably support economic growth in the long term. Additionally, Seraj et al. (2025) emphasize that tourism contributes positively to sustainable growth and GDP increases in African countries. The positive impact of GFCF on economic growth, which varies across countries and is strong in Azerbaijan, Turkey, and Ukraine but insignificant in Bulgaria, aligns with the findings of Seraj et al. (2025) and Fauzel et al. (2016), who emphasize the beneficial role of capital accumulation in economic development. The stronger positive impact of ITA on GDP compared to other variables, supported by analyses conducted in Azerbaijan, Georgia, Turkey, Romania, Bulgaria, Ukraine, and the Russian Federation, aligns with the findings of Baghirov & Sarkhanov (2023), Kum et al. (2015), Rasool & Maqbool (2021), Özcan (2021), Seetanah (2011), and Işık (2019), which emphasize the positive effects of tourism on economic growth.

This study confirms that tourism and capital investments have a significant and lasting impact on long-term economic growth, with international tourist arrivals (ITA) emerging as the strongest contributor. It recommends enhancing tourism capital through incentives, infrastructure development, and promotional efforts to attract more ITA. Due to structural and economic differences among countries, tailored policies should be implemented to increase investment efficiency. Improving investment quality and management is also essential for sustainable growth. The study offers valuable insights for policymakers and provides a solid foundation for future research on the economic role of tourism and investment.

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DEVELOPING CREATIVE TOURISM ROUTES TO PROMOTE AGRICULTURAL TOURISM IN SAKHU SUBDISTRICT, THALANG DISTRICT, PHUKET PROVINCE, THAILAND

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Abstract: The rapid expansion of the tourism industry underscores the growing significance of community-based tourism as a mechanism for sustainable local development in Thailand. Agrotourism, which integrates agricultural activities with tourism experiences, presents a promising strategy to support rural economies and promote cultural exchange. This study aimed to explore the potential of agrotourism resources in Sakhu Subdistrict, examine tourists' needs and preferences, and develop innovative tourism routes to enhance the appeal and sustainability of agrotourism in the area. A mixed-methods approach was employed, combining quantitative surveys with qualitative interviews. Data were collected from 400 tourists and 30 key informants, including local stakeholders and tourism experts. Research instruments comprised questionnaires, interview guides, and assessment forms designed to evaluate the potential and suitability of agrotourism resources. Both statistical and content analyses were applied. Findings indicated that Sakhu Subdistrict possesses diverse tourism resources, such as beaches, fruit orchards, and cultural attractions based on local wisdom. However, the overall agrotourism potential scored only 59.76%, which is below the national standard. Tourists expressed high levels of demand for accommodations ($\bar{x}$ = 4.48), activities ($\bar{x}$ = 4.42), and attractions ($\bar{x}$ = 4.41), with particular interest in fruit picking and local cooking experiences. Based on the findings, two creative tourism routes were developed: one focusing on agricultural lifestyles and the other on fishing community practices. Trial implementations and evaluations showed high suitability ($\bar{x}$ = 4.12), with accommodation receiving the highest score ($\bar{x}$ = 4.28).

Keywords: Tourism routes, Agricultural tourism, Tourism potential, Tourist demand, Phuket

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INTRODUCTION

The tourism industry is a rapidly expanding sector that plays a vital role in Thailand's economy and society. The National Tourism Development Plan (2012–2016) emphasized the importance of tourism, particularly community-based tourism, which promotes community and local government participation in the development of tourist attractions. This approach aims to create value and added benefits while taking into account environmental sustainability, local identity, and traditional lifestyles (Ministry of Tourism and Sports, 2011). Subsequently, the second National Tourism Development Plan (2017–2021) encouraged public participation in tourism management and emphasized the importance of enabling people to benefit from tourism. It promoted tourism education, awareness, and encouraged communities to engage in the development of tourism products and services based on local heritage and culture (Ministry of Tourism and Sports, 2017). In this context, agricultural tourism (agrotourism) is considered a key activity in the development process, serving as a bridge between agriculture and tourism. It contributes to the equitable distribution of economic and social benefits, representing a strategic approach for fostering both community and national development.

Thailand is considered an agricultural country with a wide variety of farming occupations and rich agricultural wisdom. The nation is well-known for its expertise in crop cultivation, horticulture, fisheries, and livestock production, all of which hold significant potential as tourist attractions. These agricultural assets can create memorable experiences for visitors by providing opportunities to participate in farming activities, engage with farmers, and experience the natural environment and rural agricultural lifestyles. Such interactions foster learning and the exchange of knowledge about sustainable livelihoods (Department of Agricultural Extension, 2007). Agrotourism, in this context, not only generates income for local communities, particularly for farmers who own agricultural tourism sites but also allows other community members to benefit from tourism (Tachom et al., 2021). Agrotourism offers tourists the chance to

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experience nature, rural lifestyles, local customs, traditions, and diverse agricultural practices, and gain new knowledge and experiences in an enjoyable and environmentally responsible manner. Additionally, it enhances the value of agricultural resources for farmers and related stakeholders, contributing to stronger families, communities, and societies in terms of economic, social, environmental, and cultural development (Madhyamapurush, 2010).

In the Sakhu Subdistrict, a variety of agricultural activities are practiced, including fruit orchards, fisheries, agricultural product processing, and seafood production. The community's distinctive way of life holds great potential for development as a tourist destination. However, the community still lacks the knowledge and capacity to manage agrotourism and has not yet integrated its attractions and tourism activities coherently. The residents are eager to preserve their agricultural resources and local heritage through the development of creative agrotourism routes in the area. Such development is expected to increase awareness, knowledge, and appreciation of natural and cultural resources among local people. Therefore, this study aims to explore and analyze the potential of agrotourism resources, investigate tourists' demand for agrotourism, and develop creative tourism routes to promote agrotourism in the Sakhu Subdistrict, Thalang District, Phuket Province. The goal is to enhance the visibility and capacity of community-based agrotourism, contributing to sustainable job creation, livelihood development, and income generation for the local community.

LITERATURE REVIEW

Concept of Tourism Resources

Tourism resources refer to tourist attractions, activities, and cultural traditions that reflect the distinctive characteristics of local civilization and are capable of attracting visitors. These resources are diverse and can be classified into various types according to their nature and role. Generally, tourism resources can be categorized into three main types (Isichaikun, 2003). 1) Natural Tourism Resources: These refer to attractions that originate from natural settings, which may be slightly modified by humans to enhance their suitability for tourism. Natural tourism resources can be subdivided into three groups: (1) Undisturbed natural resources: Areas that remain in their original, pristine condition and are suitable for study or nature appreciation, such as national parks, mountains, or wildlife sanctuaries. (2) Accessible natural resources with basic infrastructure: Areas such as grasslands, hot springs, or beaches that are more easily reachable and may have some basic facilities. (3) Developed and adapted natural resources: Natural settings that have been enhanced or developed, such as resorts or recreational areas integrated with natural landscapes. 2) Historical, Archaeological, and Religious Tourism Resources: These include man-made sites that possess historical, archaeological, or religious significance. They can be divided into: (1) Historical and archaeological sites: Locations such as ancient cities, monuments, or inscriptions that serve as evidence of past civilizations. (2) Religious sites: Structures like temples, churches, or ritual spaces that represent human beliefs and religious faith, which are integral to cultural identity. 3) Cultural and Traditional Tourism Resources: This category encompasses ways of life, customs, and practices passed down through generations, including language, clothing, traditional games, music, and local ceremonies. It also includes cultural values and belief systems such as local wisdom, tribal identities, and social norms. These elements attract tourists interested in learning about and understanding the culture of a particular area (Isichaikun, 2003).

The Concept of 5As in Tourism Components

Effective tourism resources should comprise essential components that can attract tourists, stimulate their interest in visiting, and leave them with a memorable experience. These components have been studied and proposed by various institutions and scholars. One widely recognized framework is the 3As model proposed by Sukhothai Thammathirat Open University (2005), which includes: Attraction – the appeal of the destination, Accessibility – ease of access to the site, and Amenity – the quality of services and facilities provided. In a more comprehensive approach, Dickman (1996) expanded this model into the 5As framework, which includes the following elements: Attraction – This refers to tourist attractions that are either natural or man-made, including cultural traditions and heritage, which serve as the primary draw for tourists.

Activities – These are the experiences and engagements available to tourists at the destination, such as hiking, diving, shopping, and other leisure or cultural activities. These add value to the destination and enhance its appeal. Accessibility – This involves transportation systems and infrastructure that enable tourists to travel to the destination, including distance, road conditions, and travel convenience from major hubs. Amenities – This includes basic infrastructure and services essential for tourism, such as restaurants, public utilities, safety measures, and healthcare services, which contribute to a comfortable and secure experience. Accommodation – Adequate, diverse, and suitable lodging options that cater to different tourist needs.

Accommodations should ideally be located near tourist attractions to ensure convenience and safety. According to Glyptou (2022), effective tourism planning that enhances visitor satisfaction and competitiveness must incorporate the five core components of the 5As framework: accommodation, activities, attractions, accessibility, and amenities. In this regard, Sujkird (2024) employed the 5As tourism component framework as a strategic tool for the development of agrotourism routes in Uthai Thani Province. Similarly, Chomphoothong et al. (2023) adopted the 5As model to evaluate the tourism potential of agrotourism sites in Prachuap Khiri Khan Province. The findings from both studies underscore the widespread applicability of the 5As framework in tourism planning and destination management in Thailand, as it provides a holistic lens through which to examine the critical elements necessary for delivering a high-quality and sustainable visitor experience.

Concept of Agricultural Tourism

Agricultural tourism, or agrotourism, is a concept that meaningfully integrates the agricultural and tourism sectors. Its primary aim is to enable visitors to learn about, understand, and experience the lifestyle of farmers through hands-on activities conducted in agricultural settings. This form of tourism emphasizes experiential learning rather than mere

entertainment or leisure. Tourists are offered opportunities to participate in various farming-related activities such as vegetable planting, fruit harvesting, animal feeding, product processing, or even engaging in local agricultural festivals and traditions. This concept not only raises awareness among tourists regarding the significance of the agricultural sector but also contributes to the generation of additional income for rural communities and promotes the sustainable conservation of natural resources. Furthermore, it optimizes the use of local resources and creates opportunities for farmers to enhance their knowledge and develop quality learning sites for visitors (Department of Tourism, 2009). The Department of Agricultural Extension (2005) describes agricultural tourism as encompassing visits to various types of agricultural sites, such as fruit orchards, herbal gardens, agroforestry plantations, livestock farms, and aquaculture operations. It also includes visits to educational institutions or research centers focusing on agricultural technology. These destinations offer tourists the opportunity to engage in creative, hands-on activities that allow them to appreciate the beauty of agricultural environments, learn about farming success stories, and gain an understanding and awareness of environmental and cultural conservation.

Songkhla (2022) proposed a categorization of agricultural tourism activities based on the nature of content and tourists' interests, dividing them into four main groups: Demonstration Activities – Focus on showcasing production processes, such as mushroom cultivation, beekeeping, or food processing. These activities are ideal for tourists who seek practical knowledge that can be applied to their livelihoods. Educational Activities – Emphasize academic knowledge, such as organic farming programs that include training sessions, expert consultations, and lectures. These are popular among farmers and individuals deeply interested in agriculture. Product Sales Activities – Involve selling agricultural products to tourists, such as processed foods or souvenirs. Many sites, particularly women's groups, also demonstrate the making of traditional snacks or local dishes. Agribusiness Guidance Activities – Suitable for individuals interested in agricultural entrepreneurship. These activities provide in-depth information on production and marketing models, often in the form of business farm tours, inspiring tourists to pursue agricultural enterprises. Moreover, Kaewsuriya (2001) classified agricultural resources that can serve as the foundation for agritourism activities into seven categories: rice farming, ornamental flower cultivation, fruit orchards, vegetable gardens, herbal plantations, livestock farming, and agricultural festivals.

In addition, Dhungana & Khanal (2023) highlight the role of agrotourism in the United States, noting that its primary objective is to attract visitors to farms through various activities such as farm tours, pick-your-own fruit and vegetable experiences, farm animal interactions, and agricultural festivals or events. In contrast, in Thailand, Sangnak et al. (2025) observed the emergence of new formats of agrotourism, which emphasize immersive learning experiences that actively engage visitors, along with the integration of advanced technologies such as hydroponic farming to cater to the preferences of modern tourists. Furthermore, Thakur & Arora (2025) stated that agrotourism contributes to increased income and employment opportunities for agricultural communities in India and Kenya, while also promoting environmental sustainability and preserving the traditional lifestyles of local communities.

MATERIALS AND METHODS

The objectives of this study were to investigate the capacity of agrotourism in Sakhu Subdistrict, assess tourists' expectations and interests, and design creative tourism routes to improve the attractiveness and long-term viability of agrotourism in Sakhu Subdistrict. This study employed a mixed-methods research design, incorporating both qualitative and quantitative approaches. The methodology is outlined as follows:

Population and Sample

The population and sample for this study comprised three groups:

1) Local Wisdom Practitioners, Community Members, Community Enterprise Groups, and Agrotourism Site Owners in Sakhu Subdistrict, Thalang District, Phuket Province. A total of 15 participants were selected using purposive sampling based on the following criteria:

• Local wisdom practitioners: Individuals possessing knowledge, experience, and expertise in traditional agricultural practices, local fisheries, and indigenous culinary arts.

• Community members, community enterprise groups, and agrotourism site owners: Individuals or groups actively involved in supporting tourism activities, operating community-based enterprises, or managing agrotourism initiatives within the Sakhu Subdistrict.

• Willingness to participate: Participants were required to voluntarily agree to provide information and actively engage in the research process aimed at developing an agrotourism route in the Sakhu Subdistrict.

2) Tourism Experts, Travel Agency Representatives, Tourist Representatives, and Representatives from Tourism-Related Agencies in Phuket Province. A total of 15 individuals were purposively selected based on the following qualifications:

• Tourism experts (n = 5): Individuals with academic or professional expertise in tourism management or tourism route development.

• Travel agency representatives (n = 3): Professionals with experience in delivering travel services to both domestic and international tourists.

• Tourist representatives (n = 3): Individuals with prior experience in participating in agrotourism, either within Thailand or abroad.

• Representatives from tourism-related agencies (n = 4): Personnel affiliated with government bodies or official tourism organizations in Phuket Province.

3) Thai Tourists Visiting the Sakhu Subdistrict Community in Thalang District, Phuket Province. The sample size was determined using Cochran's formula (1977) for an unknown population, yielding an estimated sample size of 369 respondents. To enhance the reliability and completeness of the data, the number of respondents was increased to 400, selected through convenience sampling.

Research Instruments

Four types of research instruments were utilized in this study. All instruments underwent content validity verification by three experts using the Item-Objective Congruence (IOC) method. The IOC values for each instrument were as follows:

1. The Tourism Resource Potential Assessment Form achieved an IOC value of 0.987.
2. The Semi-Structured Interview Guide had an IOC value of 0.953.
3. The Tourist Needs Questionnaire yielded an IOC value of 0.979. It was pilot-tested with a sample of 50 individuals who shared similar characteristics with the target population. The reliability of the instrument was confirmed with a Cronbach's alpha coefficient of 0.97.
4. The Evaluation Form for the Suitability of Agrotourism Routes recorded an IOC value of 0.979.

Data Analysis

Qualitative Data, the researcher conducted qualitative data verification using data triangulation by comparing information from different sources. Subsequently, the interview data were analyzed using content analysis methods. Quantitative data were analyzed using statistical software. Descriptive statistics, including percentages, means, and standard deviations, were applied to analyze the levels of demand for agrotourism activities and the suitability of the developed agrotourism routes based on the research findings. A summary of the research procedures is presented in Figure 1.

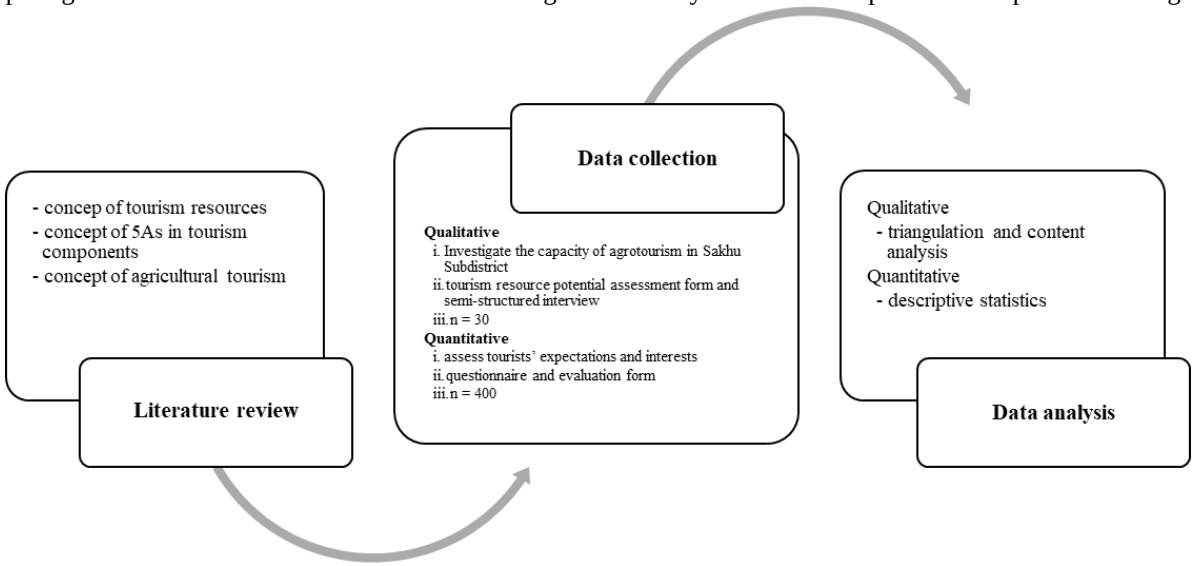


Figure 1. Research Methodology Steps (Source: Researchers (2024)

RESULTS

Agricultural Tourism Potential in Sakhu Subdistrict, Thalang District, Phuket, Thailand

The tourism resources identified in the area include: Natural tourism resources: There are three sites, namely Nai Yang Beach, Nai Thon Beach, and Pling Island (Figure 2). Cultural tourism resources: There are seven sites, including Lung Bat's New Theory Agriculture Garden, the Sakhu Subdistrict Administrative Organization Agricultural Learning Center, Ban Sakhu Durian Garden, Ching Pla Market, traditional grilling wisdom, local food, and basket weaving (Figure 3.)



a. Nai Yang Beach (20.11.2024) b. Nai Thon Beach (17.11.2024) c. Ping Island (23.02.2023)

Figure 2. Natural tourism resources Source: Photographed by Kanokwan Kaewuthai (2024)



a. Ban Sakhu CBT (19.06.2024) b. Durian with grilled sticky rice (08.07.2024) c. Ban Sakhu Fritters (21.05.2024)



d. Fish Weaving with coconut leaf (10.08.2024) e. Eco Print (10.08.2024)

Figure 3. Cultural tourism resources (Source: Photographed by Kanokwan Kaewuthai, 2024)

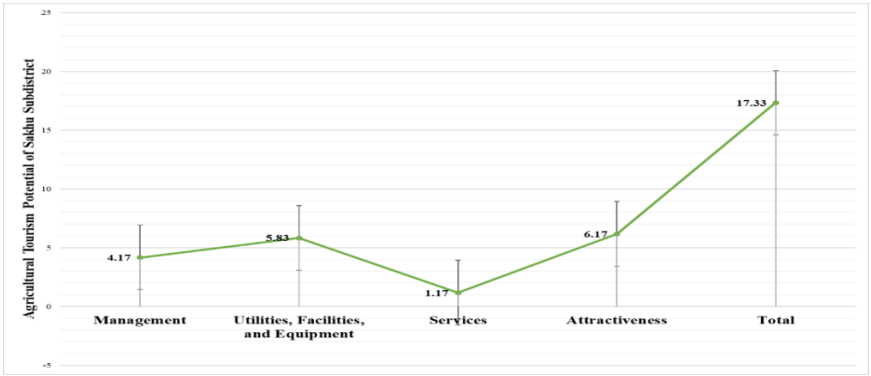


Figure 4. Agricultural tourism potential of the Sakhu subdistrict (Source: Researchers, 2024)

The assessment of potential based on the Agricultural Tourism Quality Standards (Department of Tourism, 2023) found that the Sakhu Subdistrict community's potential is below the agricultural tourism quality standard, with an overall score of 59.76%. The only component that met the standard was the attraction potential of the agricultural tourism sites, which received a good rating of 68.56%, as shown in Figure 4.

Tourists' Preferences for Agricultural Tourism in Sakhu Subdistrict, Thalang District, Phuket, Thailand

The majority of the sample group was female, accounting for 70.1%. Most respondents were aged between 41 and 50 years old (38.2%) and resided in Phuket Province (51.5%). The largest occupational group was government officers or public sector employees, making up 30.8%. Most had a monthly income of less than 25,000 baht, representing 43.8%. The majority traveled with friends (33.0%), and the travel group size ranged from 1 to 5 people (65.5%). Regarding sources of information about agricultural tourism sites, 66.3% received information from friends. Additionally, 85.2% had prior experience visiting agricultural tourism sites operated by communities in other areas. The most common activity previously undertaken was visiting mixed agricultural gardens, accounting for 72.9%. Concerning the activities that the sample group desired to experience in the

agricultural tourism sites in the Sakhu community, the top three were: visiting fruit orchards such as durian and mangosteen (62.5%), picking and eating fruits in the garden (56.2%), and participating in local cooking activities (49.4%), respectively.

Tourists' Demand for Agricultural Tourism

The sample group expressed a high overall demand, with a mean demand score of 4.39 (S.D. = 0.54). When considering demand by tourism components, tourists showed the highest demand for accommodation, with a mean score of 4.48 (S.D. = 0.63), followed by activities and attractions, with mean scores of 4.42 (S.D. = 0.60) and 4.41 (S.D. = 0.58), respectively. Regarding accommodation, the sample group most desired safe lodging, with a mean score of 4.55 (S.D. = 0.67). This was followed by friendly hospitality and service, and the availability of clean and private bathrooms, both with the same mean score of 4.52 (S.D. = 0.65 and 0.71, respectively) as shown in Figure 5.

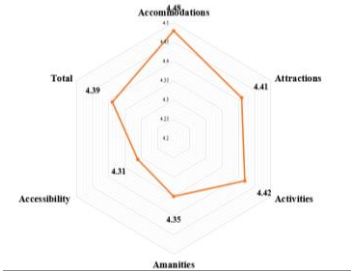


Figure 5. Tourist demand for agricultural tourism in Sakhu subdistrict (Source: Researchers (2024)



a. Map of Tourism Routes b.Tour Programs Flyer in Sakhu subdistrict

Figure 6. Tourism routes and agricultural programs tour in the Sakhu subdistrict (Source: Designed by researcher Benjaporn Kaewuthai, 2024)



a. A warm welcome to guests (21.05.2024) b. Farm tour by local guide (21.05.2024) c. Local dessert workshop (21.05.2024)

Figure 7. Suitability assessment of the agricultural tourism routes (Source: Photographed by Kanokwan Kaewuthai (2024)

Tourism Routes to Promote Agricultural Tourism in Sakhu Subdistrict, Thalang District, Phuket, Thailand

The research team conducted focus group discussions with the community enterprise group to develop agricultural tourism routes in Sakhu Subdistrict. The information from Objective 1, which involved surveying and analyzing the potential of agricultural tourism resources in Sakhu Subdistrict, and Objective 2, which studied tourists' demands for agricultural tourism in the area, served as the foundational data for designing and creating tourism activities. These activities emphasize learning, direct observation, and hands-on experience. As a result, two tourism routes were developed: the Agricultural Lifestyle Learning Route of Ban Sakhu Community and the Fishing Lifestyle Learning Route of Ban Sakhu Community (Figure 6).

After designing the activities and tourism routes, the research team provided knowledge transfer to members of the Sakhu Ruamjai Community Enterprise regarding tourist services, hospitality, communication, and storytelling. This was to prepare the community for delivering quality services to visitors. A trial run of the agricultural tourism routes was then conducted to assess the readiness and suitability of the developed tourism routes, as shown in Figure 7. The evaluation of the suitability of the agricultural tourism routes in Sakhu subdistrict revealed that, overall, the routes received a high suitability score with a mean of 4.12 (S.D. = 0.60). The highest suitability rating was for accommodation, with a mean score of 4.28 (S.D. = 0.95), followed by tourism attractions with a mean of 4.18 (S.D. = 0.58), activities with a mean of 4.17 (S.D. = 0.65), facilities with a mean of 4.00 (S.D. = 0.69), and accessibility to tourist sites with a mean of 3.96 (S.D. = 0.78), as shown in Figure 8.

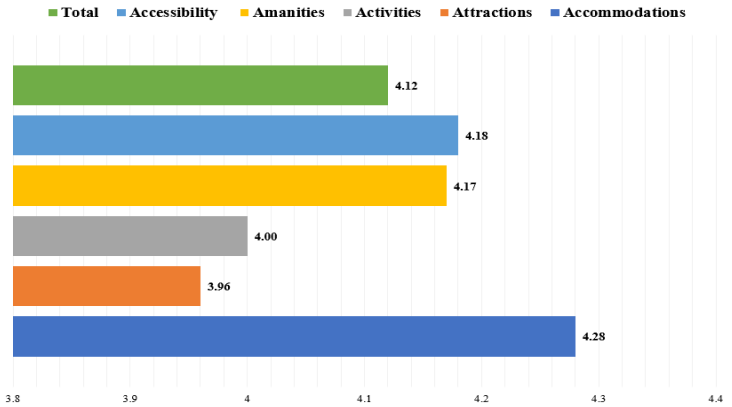


Figure 8. Suitability assessment of agrotourism routes in Sakhu subdistrict (Source: Researchers (2024)

DISCUSSION

The analysis of tourism resources revealed that the Sakhu subdistrict possesses diverse tourism assets, including natural resources such as Nai Yang Beach, Nai Thon Beach, and Pling Island, as well as cultural resources comprising agricultural gardens, local markets, traditional food, and indigenous wisdom. However, the overall tourism potential remains below standard levels, particularly in terms of facilities and accessibility. This is consistent with the study by Ruengdet et al., (2023), who stated that the tourism management model of the Bang Bai Mai Floating Market remains inconsistent with tourist needs and behaviors. Furthermore, the community's local environment is limited, and most activities emphasize training rather than promoting learning and experience-sharing for tourists, which is considered a weakness in the development potential of agricultural tourism in Thailand. Turtureanu et al. (2025) emphasized that infrastructure readiness is crucial to the success of agricultural tourism in rural areas, especially transportation systems, accessibility, and basic services such as accommodation and sanitation facilities. Meanwhile, the UNWTO (2021) highlighted that agricultural tourism should balance the use of local resources and involve the community systematically in management. Regarding tourist demand, visitors showed a high level of interest in agricultural tourism, especially in activities involving learning and hands-on experiences, such as fruit orchard visits, fruit picking, and local cooking. These activities reflect the experiential tourism model proposed by Pine & Gilmore (2020), which focuses on providing opportunities for tourists to engage in direct experiential learning rather than superficial observation. Additionally, tourists expressed the greatest demand for accommodation, with particular importance placed on safety, cleanliness, and friendly service. Therefore, the community should prioritize providing lodging that meets these expectations to ensure tourist satisfaction, which aligns with the findings of Kunchu et al. (2025), who reported that tourist satisfaction is strongly associated with the quality of accommodation and services in agricultural tourism sites and serves as a key indicator for the long-term sustainability of tourism. For the development of agricultural tourism routes in the Sakhu Subdistrict, two routes were designed to emphasize tourist participation in various activities such as learning production processes, hands-on involvement, and cultural exchange. This approach aligns with the concept of creative tourism as described by Richards & Raymond (2000) which emphasizes creating value through opportunities for tourists to interact and share experiences with local hosts. The trial implementation of these tourism routes showed overall good suitability, particularly concerning accommodation and tourist attractions. He et al. (2021) stated that community capacity building is a vital factor in promoting sustainable tourism. Therefore, government agencies, educational institutions, and the private sector should collaborate to enhance essential knowledge and develop service skills among local communities and entrepreneurs to effectively and sustainably support tourism development and elevate community potential in the future.

RECOMMENDATIONS

1. Local administrative organizations, tourism offices, and the Department of Agricultural Extension can utilize the findings of this research to support strategic planning for tourism development at the local level. This includes prioritizing investments in infrastructure such as roads, accommodations, and tourist service centers, as well as promoting community participation in tourism management.
2. Educational institutions in the area should focus on developing skills and providing training in agricultural tourism management, hospitality, and the design of tourism experiences for local communities. This would foster collaborative networks between academic sectors and local communities to sustainably drive the grassroots economy.

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EXPLORING SCIENTIFIC PRODUCTION ON HERITAGE TOURISM IN IBERO-AMERICA: A BIBLIOMETRIC PERSPECTIVE (1995–2023)

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Abstract: This study evaluates the state of heritage tourism research in Ibero-American countries from 1995 to 2023. It aims to identify publication trends, leading authors and institutions, citation structures, thematic evolution, and the most influential journals in terms of productivity and impact. A bibliometric analysis was conducted on a dataset of 519 peer-reviewed articles retrieved from the Scopus database, authored by researchers affiliated with institutions in 16 Ibero-American countries. Performance analysis and science mapping techniques were employed to assess productivity, scholarly impact, collaboration patterns, and intellectual structures. Findings reveal a marked acceleration in research output after 2020, with 50% of publications produced in the last four years. English dominates as the language of publication (76%), while the articles span 21 subject areas, primarily Social Sciences, Business and Management, and Environmental Science. Research is highly concentrated, with Spain (59%) and Portugal (13%) as the leading contributors. Authorship patterns indicate that 86.4% of contributors published only one article, reflecting a field largely sustained by occasional authors. Nearly 92.7% of publications received fewer than 50 citations, underscoring limited impact. A key imbalance emerges between productivity and impact at both journal and author levels. Pedro M. García-Villaverde is the most prolific author (18 publications, 436 citations), yet the most cited work is by Richards and Wilson, (1 publication, 666 citations) similarly, Sustainability (59 articles, 1,005 citations) is the most productive journal, while Tourism Management is the most influential, with 1,795 citations from only 12 articles. Keyword analysis highlights the dominance of classical terms such as "cultural tourism," "heritage," and "World Heritage Cities," alongside growing interest in sustainability, geotourism, and urban tourism. However, the wide dispersion of keywords reflects thematic fragmentation. Overall, heritage tourism research in Ibero-America has expanded rapidly but remains geographically concentrated, reliant on occasional contributors, and limited in international impact, with few highly cited articles.

Keywords: Urban tourism, heritage tourism, Ibero-America Tourism, world's cultural heritage

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INTRODUCTION

Tourism and heritage are closely related, heritage tourism is among the oldest forms of tourism, with origins that can be traced back to the travels of ancient Egyptians, Romans, and European nobility (Bitušíková et al., 2021). It is an experiential activity in which tourists engage with heritage resources by experiencing local customs, traditions, and cultural practices, gaining a unique and immersive way to learn about a destination (Liu et al., 2022; Brooks et al., 2023; Darasa et al., 2024). As a consequence of the importance of this type of tourism, scientific literature in this field has increased in recent years (Menor et al., 2020; González & López, 2017). Adopted in 1972, the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention sought to preserve humanity's cultural and natural legacy for future generations. The convention defines which sites are eligible for inscription on the World Heritage List, which includes cultural, natural, and mixed sites of outstanding universal value (Falk & Hagsten, 2024). Being part of these lists alludes to the recognition of a universally worthy existence, marking the site as a must-visit destination for tourists (Menor et al., 2020).

World Heritage classification significantly contributes to establishing an urban and heritage brand for a city, this distinction confirms global validation, has a positive impact on the city's tourist image (Pinheiro & Paulino, 2022; Dwyer & Kim, 2003; Gao & Su, 2019) and increases awareness among tourists (Dieck & Jung, 2018). Cultural committees of the UNESCO publishes annual updates to the World Heritage List. Currently, the UNESCO World Heritage Convention recognizes 1, 248 sites, categorized as 78% cultural, 19% natural, and 3% mixed (UNESCO, 2025). According to Article 1 of the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (revised in 2025), cultural heritage eligible for inclusion on the World Heritage List falls under three main categories: monuments, groups of buildings, and sites. Each of these categories is recognized for its universal value across historical, artistic, scientific, aesthetic, ethnological, and anthropological dimensions (UNESCO, 2025). Inscription on the List enhances protection,

* Corresponding author

visibility, and international support, enabling cities and regions to position themselves as attractive tourist destinations (Bertacchini et al., 2024). By conducting an examination of the regional distribution of cultural heritage sites, it is found that the Ibero-American region accounts the 16% of the global total cultural sites (data as of 15 July 2025). The Ibero-American space consists of the Iberian Peninsula (Spain and Portugal) together with 19 Latin American countries, which exhibit diverse physical, social, and economic characteristics. Despite this diversity, they are unified by a shared history of colonial subjugation under Spain and Portugal, which has led to use Spanish and Portuguese as the dominant means of communication (Rodríguez & Zamorano, 2018). The principal objective of this study is to evaluate the state of heritage tourism research across Ibero-American countries from 1995 to 2023 by performing a bibliometric analysis of the scientific literature produced by authors affiliated with institutions in the region. This research aims to systematically map the field's evolution, quantify the productivity and impact of its contributors, delineate its intellectual structure, and synthesize its central research themes.

LITEARTURE REVIEW

Fundamentally, heritage constitutes the assemblage of tangible and intangible assets that a society elects to preserve and bequeath to future generations (Tahiri et al., 2025). Heritage sites transcend the notion of being static relics of the past; rather, they are dynamic cultural landscapes that continuously evolve and exert a profound influence on contemporary societies (Knapp, 2024; Ghosh et al., 2025). At the apex of these sites are those designated as World Heritage Sites by UNESCO, those rare and irreplaceable cultural and natural treasures recognized for their outstanding universal value to humankind (Nian et al., 2023). These sites function as vital cultural resources, encapsulating historical depth, architectural ingenuity, and enduring socio-cultural traditions (Ghosh et al., 2025). Consequently, tourism associated with cultural heritage is predominantly oriented toward the exploration and appreciation of such sites, offering visitors immersive opportunities to engage with the histories, traditions, and ways of life that define local and global identities (Kadyrbekova et al., 2024). In this capacity, cultural heritage has emerged as a strategic driver of tourism competitiveness, providing destinations with a unique means to distinguish themselves through their historical narratives, living traditions, and distinctive artistic expressions (Mammadova & Abdullayev, 2025). Tourism, which relies on its cultural and heritage dimensions as core attractions for destinations, has become an essential force in advancing economic development while simultaneously facilitating the global circulation of cultural values (Ghosh et al., 2025). Historical significance occupies a central position within this form of tourism, functioning as a bridge that links past and present while sustaining long-term interest among diverse groups of travelers motivated by cultural experiences (Kadyrbekova et al., 2024).

The value of heritage is inherently complex, as the combination of historical, aesthetic, and socio-cultural attributes contributes to enhancing both a site's significance and its attractiveness to visitors (Ghosh et al., 2025; Zhu et al., 2023). Within this framework, heritage tourism emerges as a distinct typology of cultural tourism, in which individuals are motivated by the search for and engagement in profound cultural experiences (Orts-Cardador et al., 2024; Rasoolimanesh et al., 2021). As a tourism segment, heritage tourism has demonstrated steady growth, driven by travelers' increasing demand for authentic and meaningful encounters (Mammadova & Abdullayev, 2025). In this context, tourism experiences grounded in cultural authenticity act as positive emotional regulators, shaping favorable perceptions and reinforcing visitors' attitudes toward destinations (Phat et al., 2025).Recent bibliometric studies collectively demonstrate the rapid consolidation of heritage tourism as a distinct scientific domain, particularly following 2015 (Zhang et al., 2023; Darasa et al., 2024; Geçikli et al., 2024; Orts-Cardador et al., 2024). An examination of trends within the relevant literature reveals that while earlier research often emphasized concepts such as diversity, tourist preferences, and economic impact, a notable shift has occurred in the 2020s towards themes like staged authenticity, World Heritage Sites, and place attachment. These emerging trends suggest a growing scholarly inclination to highlight the intrinsic value of heritage itself (Geçikli et al., 2024). This evolution is further evidenced by the relationship between tourism and World Heritage Sites gaining significant academic relevance since 2016, a period during which scientific production on the topic has tripled (Orts-Cardador et al., 2024).

MATERIALS AND METHODS

1. Research Design and Data Source

The objective is operationalized through five specific and interrelated goals: (1) To examine the evolution of scholarly. (2) To profile the most productive authors in the field. (3) To identify the most highly cited research publications produced in Ibero-American. (4) To analyze the knowledge structure based on authors' keywords. (5) To determine the most productive journals and those with the highest citation impact.

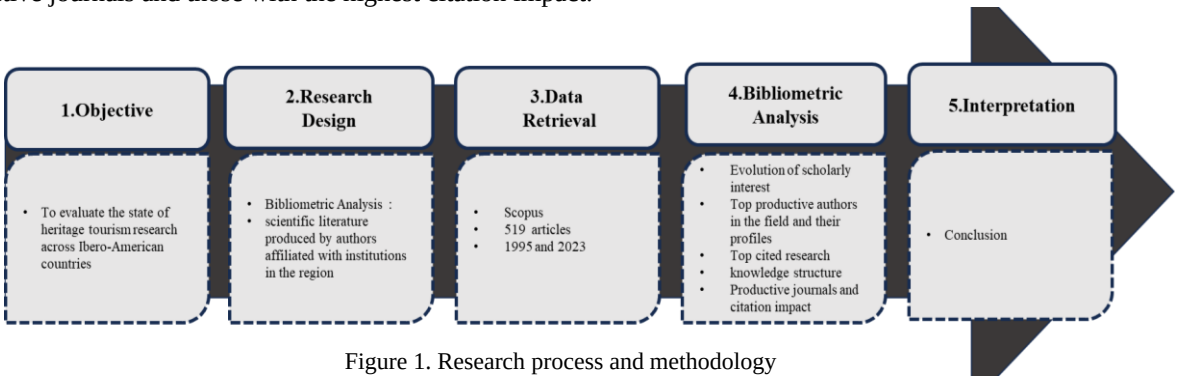


Figure 1. Research process and methodology

To achieve the objective, a bibliometric analysis was conducted, a method for evaluating scientific outputs, to understand the progression of the discipline (Öztürk et al., 2024). The primary rationale for selecting this analytical approach lies in its ability to provide insights, identify research gaps, and map the collaborative network within the field. The research process and methodology are illustrated in Figure 1.

2. Data Retrieval Strategy and Query

The study examines the available research in the Scopus database. The data retrieval process was designed to be both comprehensive and precise. To obtain an initial overview, the first query conducted was: (TITLE-ABS-KEY ("heritage city") OR TITLE-ABS-KEY ("heritage tourism") OR TITLE-ABS-KEY ("heritage cities"), this query string initially resulted in 5,043 documents of various types (article, book chapter, conference paper, review, book, conference review, editorial, note, erratum, retracted, short survey, letter), To align with the focus of this study, the search was limited to published articles: TITLE-ABS-KEY ("heritage city") OR TITLE-ABS-KEY ("heritage tourism") OR TITLE-ABS-KEY ("heritage cities") AND (LIMIT-TO (DOCTYPE , "ar")). The initial extraction of articles from Scopus yielded 3,954 publications from 130 countries worldwide, dating from 1989 to 2024.

The results indicate that only 16 of the 22 countries within the Ibero-American region are represented in this academic output: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru, Portugal, and Spain. Consequently, the following six countries were excluded from the final analysis: Andorra, the Dominican Republic, Honduras, Paraguay, Uruguay, and Venezuela.

3. Data Cleaning and Refinement

The search was limited to these 16 Ibero-American countries with scientific production and to full calendar years. The final advanced query was: TITLE-ABS-KEY ("heritage city") OR TITLE-ABS-KEY ("heritage tourism") OR TITLE-ABS-KEY ("heritage cities") AND PUBYEAR > 1994 AND PUBYEAR < 2024 AND (LIMIT-TO (AFFILCOUNTRY , "Bolivia") OR LIMIT-TO (AFFILCOUNTRY , "Brazil") OR LIMIT-TO (AFFILCOUNTRY , "Chile") OR LIMIT-TO (AFFILCOUNTRY , "Colombia") OR LIMIT-TO (AFFILCOUNTRY , "Costa Rica") OR LIMIT-TO (AFFILCOUNTRY , "Cuba") OR LIMIT-TO (AFFILCOUNTRY , "Ecuador") OR LIMIT-TO (AFFILCOUNTRY , "Mexico") OR LIMIT-TO (AFFILCOUNTRY , "Nicaragua") OR LIMIT-TO (AFFILCOUNTRY , "Peru") OR LIMIT-TO (AFFILCOUNTRY , "Panama") OR LIMIT-TO (AFFILCOUNTRY , "Spain") OR LIMIT-TO (AFFILCOUNTRY , "El Salvador") OR LIMIT-TO (AFFILCOUNTRY , "Guatemala") OR LIMIT-TO (AFFILCOUNTRY , "Portugal") OR LIMIT-TO (AFFILCOUNTRY , "Argentina")) AND (LIMIT-TO (DOCTYPE , "ar"))

A total of 519 articles were retrieved. All articles were subsequently analyzed to ensure no duplicates were present.

RESULTS AND DISCUSSION

Between 1995 and 2023, Scopus indexed a total of 3,954 publications on heritage tourism, contributed by researchers from 130 countries. Of this global output, 13.1% (519 articles) originated from authors affiliated with Ibero-American institutions. Analysis of this subset reveals that only 16 out of the 22 countries in the region contributed to this research field. Table 1 presents the distribution of publications by country over the period.

Table 1. Heritage Tourism Publications from Ibero-America (Source: Own elaboration based on retrieved data)

Country	HT	Country	HT
Spain	59%	Cuba	1.2%
Portugal	13%	Argentina	0.8%
Brazil	6%	Bolivia	0.5%
Mexico	5%	Costa Rica	0.3%
Ecuador	5%	Guatemala	0.3%
Chile	4%	El Salvador	0.2%
Colombia	2%	Nicaragua	0.2%
Peru	2%	Panama	0.2%

Notes: HT= percentage of published articles on heritage tourism (N = 519 articles)

Collectively, these 519 publications have received 8,666 citations and involve 1,212 unique researchers. They were published across 200 academic journals in 7 different languages, and span 21 subject areas, highlighting the field's multidisciplinary character. Over the 28-year period, authors employed 1,811 distinct keywords, revealing a broad and diverse thematic landscape. The key characteristics of the dataset are summarized in Table 2.

Table 2. Data set summary (Source: Own elaboration based on retrieved data)
Notes: HTA= published articles on heritage tourism in Ibero-American countries (N = 519 articles)

HTA	Total number	HTA	Total number
Ibero-American countries (based on author institutional affiliation within the geographic region)	16	Languages	7
Articles	519	Journals	200
Citations	8,666	Author Keywords	1,811
Authors	1,212	Study subject area	21

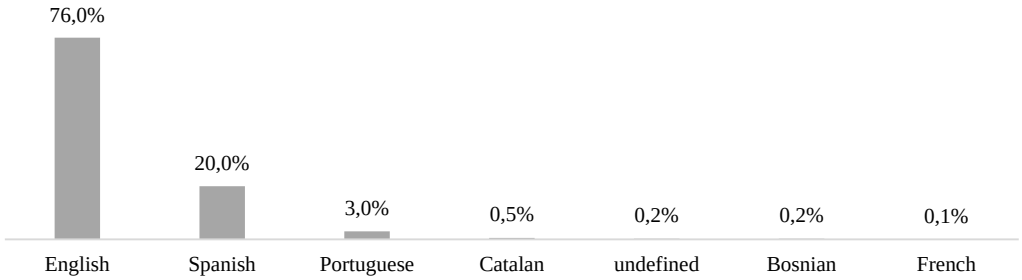


Figure 2. Publication languages (Source: Own elaboration based on retrieved data)

As shown in Figure 2, the analysis of publication languages reveals that English dominates the academic discourse on heritage tourism in Ibero-American countries, accounting for 76% of the total output. Spanish, the primary language of the region, constitutes 20% of the publications, while Portuguese accounts for only 3%. The remaining 1% of articles were published in Catalan, Slovenian, French, and Bosnian.

Based on the Scopus database, the disciplinary focus of heritage tourism research in Ibero-American countries is the Social Sciences, representing the core disciplinary foundation of heritage tourism research, accounting for the majority of academic output (34%) beyond the social sciences, substantial contributions come from Business, Management and Accounting (16%) and Environmental Science (13%). Figure 3 illustrates the disciplinary focus distribution.

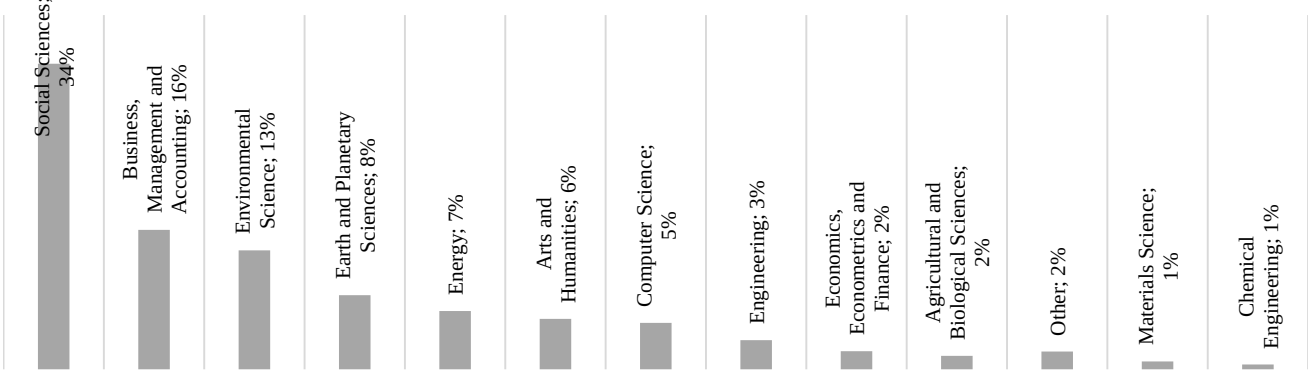


Figure 3. Disciplinary focus (Source: Own elaboration based on retrieved data)

1. Evolution of scholarly interest

Productivity behavior over time is a crucial indicator of research growth. Figure 4 illustrates the evolution of the field based on annual publication trends. The temporal distribution reveals that the first article was published in 1995, followed by a five-year gap without any publications until 2000. Between 2000 and 2019, approximately 50% of the scientific output was produced, indicating that it took 19 years to reach half of the total scholarly production. In contrast, the period from 2020 to 2023 alone accounts for the remaining 50% of publications. This remarkable acceleration over just four years underscores a substantial surge in academic interest and research activity on heritage tourism within Ibero-American institutions. In particular, 2023 stands out as the most productive year, with 70 published articles, followed closely by 2021 (67 articles), 2020 (59 articles), and 2019 (54 articles).

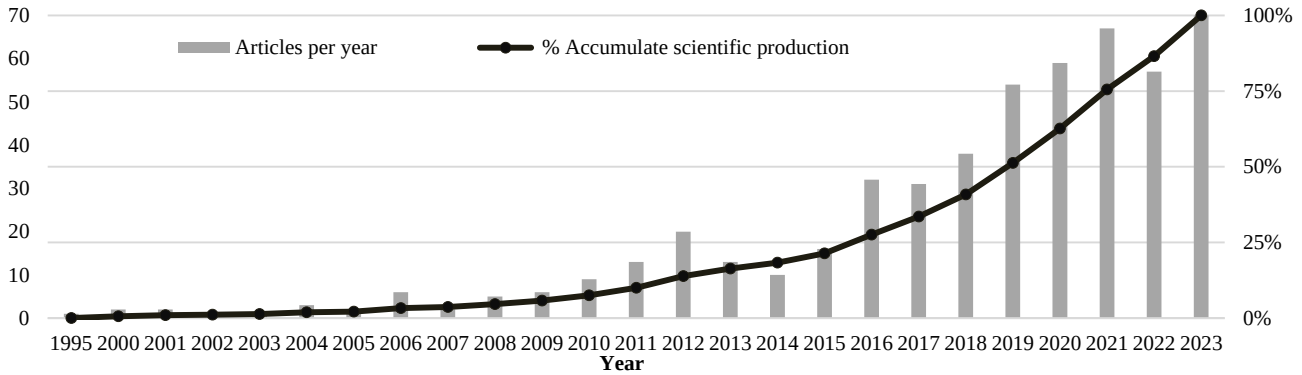


Figure 4. Annual publication growth (Source: Own elaboration based on retrieved data)

2. Top productive authors in the field and their profiles

The analysis of author productivity reveals a strong concentration of scholarly output among a limited number of researchers. When examining co-authorship patterns (measured by the number of papers in which authors participated)

it becomes evident that, of the 1,212 unique authors, the overwhelming majority (86.4%) were involved in only a single publication. This pattern indicates that the field is predominantly sustained by occasional contributors (complete results are presented in Table 3). Table 4 presents the profiles of the most prolific scholars contributing to heritage tourism research in Ibero-American countries. The selection criterion for inclusion was authorship of a minimum of ten heritage tourism articles (HTA). To create a profile of each author, the table includes different indicators of broader academic performance: institutional affiliation, total Scopus-indexed publications across all topics (TD), total citations across all documents (TC), and the h-index (H). The evaluation of these metrics reveals the following profile of top authors: García-Villaverde, Pedro M. (Universidad de Castilla-La Mancha) leads the ranking with 18 articles on the subject, positioning him as the most productive author in the dataset on this specific topic. His overall Scopus record includes 60 publications, supported by a robust citation count of 1,509 and an h-index of 23. In the second tier, Martínez-Pérez, Ángela; Hernández-Rojas, Ricardo David; and López-Guzmán, Tomás each contributed 12 heritage tourism articles. Within this group, López-Guzmán stands out with a particularly robust academic profile, including 103 total Scopus publications, 1,755 citations, and an h-index of 21. This record reflects significant scholarly visibility that extends beyond the boundaries of heritage tourism. Mid-level contributors include Elche, Dioni (11 HTA, 27 TD, 732 citations, h-index 15) and Pérez Gálvez, Jesús Claudio (10 HTA, 46 TD, 594 citations, h-index 14), both of whom demonstrate balanced profiles.

Table 3. Co-authorship patterns (Source: Own elaboration based on retrieved data)

Articles co-authored	Number of authors	%TSA	Articles co-authored	Number of authors	%TSA
1	1047	86.4%	7	1	0.1%
2	113	9.3%	8	2	0.2%
3	23	1.9%	10	1	0.1%
4	14	1.2%	11	1	0.1%
5	4	0.3%	12	3	0.2%
6	2	0.2%	18	1	0.1%

Notes: %TSA = Authors as a percentage of the total unique authors (N = 1,212)

Table 4. Most prolific scholars (Source: Own elaboration based on retrieved data)

Author name	HTA	Affiliation Institutions	TD	TC	H
García-Villaverde, Pedro M.	18	Universidad de Castilla-La Mancha, Ciudad Real, Spain	60	1509	23
Martínez-Pérez, Ángela	12	Universidad de Castilla-La Mancha, Ciudad Real, Spain	14	381	8
Hernández-Rojas, Ricardo David	12	Universidad de Córdoba, Cordoba, Spain	29	250	10
López-Guzmán, Tomás	12	Universidad de Córdoba, Cordoba, Spain	103	1755	21
Elche, Dioni	11	Universidad de Castilla-La Mancha, Ciudad Real, Spain	27	732	15
Pérez Gálvez, Jesús Claudio	10	Universidad de Córdoba, Cordoba, Spain	46	594	14

Notes: HTA, published articles on heritage tourism in Ibero-American countries; AF, affiliation Institutions; TD, total of documents produced on Scopus (despite the study area); TC, total citations of all their published documents (despite the study area); H, h – index

An examination of the most prolific author, García-Villaverde, Pedro M., shows that between 2015 and 2023 he authored 18 publications on heritage tourism, which together have accumulated 436 citations. His research output, disseminated through 12 different journals, reflects both thematic diversity and a high degree of academic visibility.

3. Top cited research publications

The examination of citation patterns for the 519 heritage tourism publications produced by authors affiliated with Ibero-American institutions shows a total of 8,666 citations. As illustrated in Figure 5, 17.9% of these articles have never been cited, while an additional 74.8% have received fewer than 50 citations. Collectively, these two groups represent 92.7% of the total output, suggesting that the majority of research from the region has achieved limited scholarly visibility. By contrast, only 4.8% of the articles fall within the 50 to 100 citation range, and just 2.5% have exceeded the 100-citation threshold, highlighting the presence of a small number of influential studies.

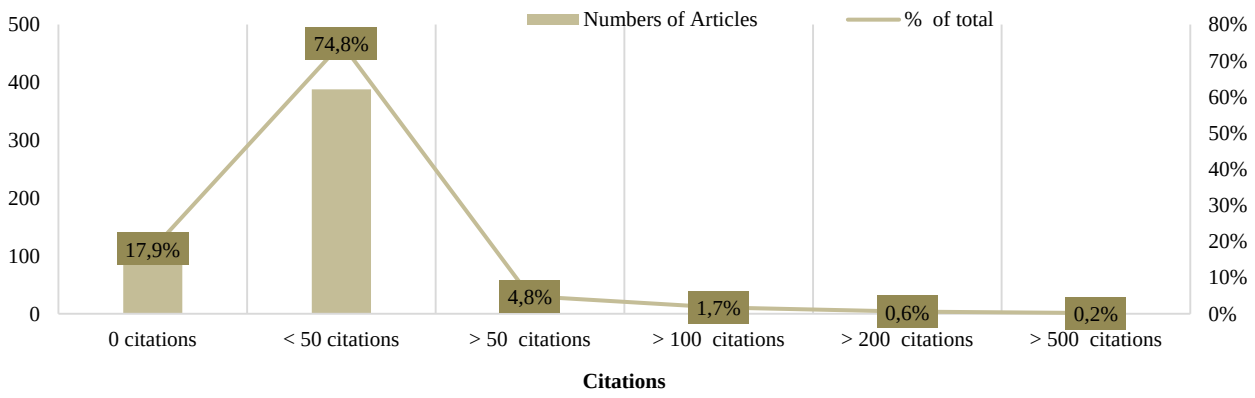


Figure 5. Citation Structure (Source: Own elaboration based on retrieved data)

An analysis of citation metrics highlights the three most influential heritage tourism publications authored by researchers affiliated with Ibero-American institutions. As is evident from Table 5, which lists only articles with more than 100 citations, the most cited article is "Developing Creativity in Tourist Experiences: A Solution to the Serial Reproduction of Culture?" (Richards & Wilson, 2006), which has garnered 660 citations over the study period. Ranked second is "Visitors' Experience, Mood, and Satisfaction in a Heritage Context: Evidence from an Interpretation Center" (Rojas & Camarero, 2008), which has received 414 citations (246 fewer than the leading study). In third place is "Geotourism and Geoparks as Novel Strategies for Socio-Economic Development in Rural Areas" (Farsani et al., 2011), with 256 citations (404 fewer than the top-cited publication). This citation gap illustrates a disproportionate distribution of scholarly impact, whereby a single publication has achieved significantly higher visibility and influence compared to others.

The evidence from Table 5 highlights that scholars are characterized by notable thematic diversity, addressing creativity, visitor experience, geotourism, mining heritage, cultural events, and urban dynamics. A recurring feature among these highly cited works is their reliance on emblematic case studies, such as the Guggenheim Museum Bilbao, the European Capital of Culture in Salamanca, and the World Heritage City of Porto.

Table 5. Articles surpassed the 100-citation mark (Source: Own elaboration based on retrieved data)

Article	Citations	Journal
Developing creativity in tourist experiences: A solution to the serial reproduction of culture?	660	Tourism Management
Visitors' experience, mood and satisfaction in a heritage context: Evidence from an interpretation center	414	Tourism Management
Geotourism and geoparks as novel strategies for socio-economic development in rural areas	256	International Journal of Tourism Research
The development of cross-cultural (mis)understanding through volunteer tourism	242	Journal of Sustainable Tourism
Evaluating the influence of a large cultural artifact in the attraction of tourism: The Guggenheim Museum Bilbao case	165	Urban Affairs Review
Identity and community - Reflections on the development of mining heritage tourism in Southern Spain	149	Tourism Management
Gentrification, transnational gentrification and touristification in Seville, Spain	136	Urban Studies
Intangible heritage tourism and identity	127	Tourism Management
The economic impact of cultural events: A case-study of Salamanca 2002, European Capital of Culture	121	European Urban and Regional Studies
Motivation-based cluster analysis of international tourists visiting a World Heritage City: The case of Porto, Portugal	121	Journal of Destination Marketing and Management
The mediating role of experience quality on authenticity and satisfaction in the context of cultural-heritage tourism	117	Current Issues in Tourism
Spatial-temporal study on the effects of urban street configurations on human thermal comfort in the world heritage city of Camagüey-Cuba	115	Building and Environment
A closer look at Santiago de Compostela's pilgrims through the lens of motivations	105	Tourism Management

4. Knowledge structure based on authors' keywords

Keyword analysis in bibliometric research is commonly used to uncover the intellectual structure and thematic orientation of a research domain (Chen & Xiao, 2016). To identify the most frequent terms associated with heritage tourism research in Ibero-American countries, this study examined authors' keywords, resulting in a dataset of 1,811 unique terms. These keywords were categorized into four frequency groups: (a) those appearing only once (1,524 keywords), (b) those appearing 2 to 10 times (275 keywords), (c) those appearing 11 to 19 times (7 keywords), and (d) those appearing more than 20 times (5 keywords). Figure 6 presents a word cloud visualization representing groups (c) and (d), which include the 12 most frequently used keywords. The relative size of each word in the figure reflects its frequency, offering a visual representation of the most prominent themes in the field.



Figure 6. Most frequently used keywords word cloud visualization (Source: own construction)

Table 6 presents a comprehensive summary of the frequency metrics for groups "c" and "d," ranking the results based on the frequency of keywords and the percentage of total published articles. The combined analysis of Table 6 and the word cloud visualization (figure 6) highlights both the central themes and the fragmentation characterizing heritage tourism research in Ibero-American countries. The dominant keywords: "Tourism" (12.1%), "Cultural tourism"

(11.9%), and "Heritage tourism" (7.3%), confirm that the field is primarily rooted in cultural and heritage frameworks. These core terms are closely followed by related concepts such as "Heritage," "Cultural heritage," and "World heritage cities," further reinforcing the sector's orientation toward cultural identity, preservation, and place-based tourism narratives. Beyond the cultural dimension, the appearance of keywords such as "Sustainability" (3.7%), "Geotourism" (3.3%), and "Urban tourism" (2.7%) suggests an increasing diversification of research interests toward environmental concerns, alternative tourism modalities, and urban dynamics.

Table 6. More frequent authors' keywords (Source: own construction)

Authors' keyword	F	R3	%HTA	Authors' keyword	F	R3	%HTA
Tourism	63	1	12.1%	Geotourism	17	7	3.3%
Cultural tourism	62	2	11.9%	World heritage cities	15	8	2.9%
Heritage tourism	38	3	7.3%	Sustainable tourism	15	8	2.9%
Heritage	28	4	5.4%	Urban tourism	14	9	2.7%
Cultural heritage	23	5	4.4%	Heritage	12	10	2.3%
Sustainability	19	6	3.7%	Spain	12	10	2.3%

Notes: F, frequency appearance, R3, Ranking position according total frequency appearance, %HTA, Percentage of total published articles on heritage tourism in Ibero-American countries

Thematic classification of author keywords, as shown in Table 7, provides a crucial complement to the keyword frequency analysis by offering a higher-level synthesis of research content. While keyword analysis identifies the most commonly used terms, thematic grouping reveals the conceptual organization and knowledge structure underlying the field, in this examination author keywords were systematically categorized into 27 thematic groups. The results are presented in Table 7, which details each theme along with its corresponding percentage of total keyword occurrences (%TW).

Insight into the conceptual architecture of heritage tourism research in Ibero-American countries reveal a strong focus on empirical, place-based approaches, with "Case study" (15.1%) emerging as the most dominant theme. This underscores a research preference for examining heritage tourism through localized analyses of cities, regions, and countries. Closely following is "Tourism studies" (13.4%), a broad category encompassing research on visitor behavior, satisfaction, destination image, and tourism impacts. The high percentage of keywords categorized as "Other" highlights a fragmented thematic landscape, where many studies employ niche or context-specific terms without alignment to established thematic clusters.

Table 7 Conceptual architecture (Source: own construction)

Theme	%Total key Word	Theme	%Total key Word	Theme	%Total key Word	Theme	%Total key Word
Case of study	15.1%	Sustainability	4.4%	Urban	1.8%	Web	0.7%
Tourism studies	13.4%	Marketing	4.0%	Digital	1.5%	Spatial	0.6%
Other	13.0%	Economics	3.5%	Territory	0.9%	Education	0.5%
Methodology	7.5%	Cultural	3.3%	Development	0.8%	Organization	0.5%
Heritage	6.6%	Historical	3.2%	Knowledge	0.8%	Covid	0.3%
Topic	5.8%	Type of tourism	3.1%	3D and virtual	0.7%	Innovation	0.3%
Social	4.9%	Geo	2.1%	Planning	0.7%	Urban	1.8%

5. Productive journals and citation impact

Identifying the most productive journals (by publication count, as shown in Table 8) and the most influential (by citation count, as shown in Table 9) is crucial for understanding the channels through which Ibero-American scholarship gains visibility in the global academic landscape. The analysis of journal metrics reveals a generally low level of productivity in heritage tourism research across journals publishing work by Ibero-American scholars.

Findings indicate that the total output (N = 519) was disseminated across 200 journals over the 28-year study period. As shown in Figure 7, two notable outliers emerge. First, Sustainability (Switzerland) published 59 articles, making it the most prolific outlet and accounting for 11.4% of all publications. Second, 128 journals (64% of the total) published only a single article each, which collectively represent 24.7% of the total output.

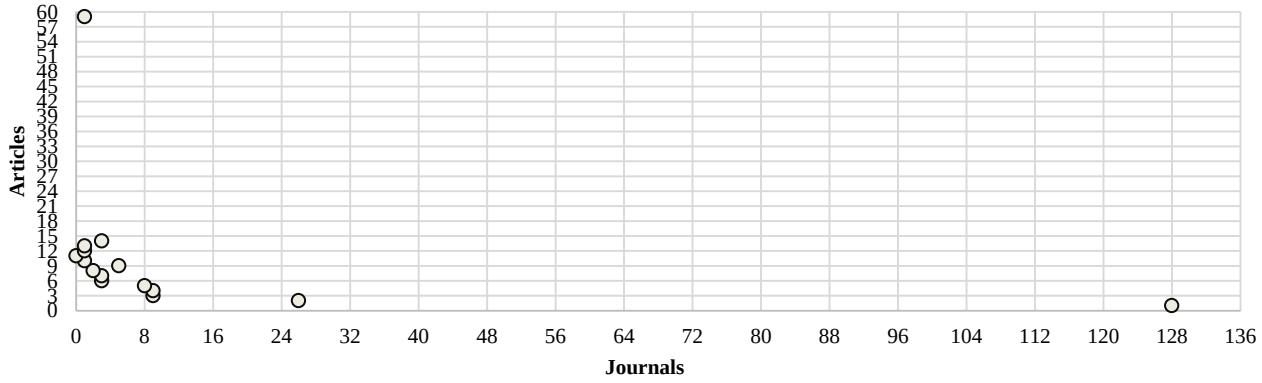


Figure 7. Number of articles published (N=519) per number of Journals (N = 200) (Source: Own elaboration based on retrieved data)

By ranking the most productive journals with a threshold of 10 articles as the criterion for inclusion, the findings demonstrate that only 7 out of 200 journals meet this requirement. The results are shown in Table 8.

Table 8. Most productive journals (Source: Own elaboration based on retrieved data)

R1	Journal	publication count	%HTA	TCHTA
1	Sustainability (Switzerland)	59	11.4%	1,005
2	Journal of Heritage Tourism	14	2.7%	161
3	Cuadernos Geograficos	14	2.7%	43
4	International Journal of Tourism Research	14	2.7%	643
5	Geoheritage	13	2.5%	334
6	Tourism Management	12	2.3%	1,795
7	Documents d'Analisi Geografica	10	1.9%	53

Notes: R1 = productivity ranking position based on a minimum threshold of 10 articles; %HTA = percentage of published articles relative to the total output (N = 519); TCHTA = total number of citations of journal articles

By the examination of the citation count data reveled that the 200 journals accomplish a total of 8,666 citations over the analyze period, 18% of total journals receive cero cites, Tourism Management journal leads with 1,795 citations, despite accounting for only 12 articles that represent 2.3% of the total publications. Second place is Sustainability (Switzerland) with 1005 cites but with 47 articles more (Figure 8).

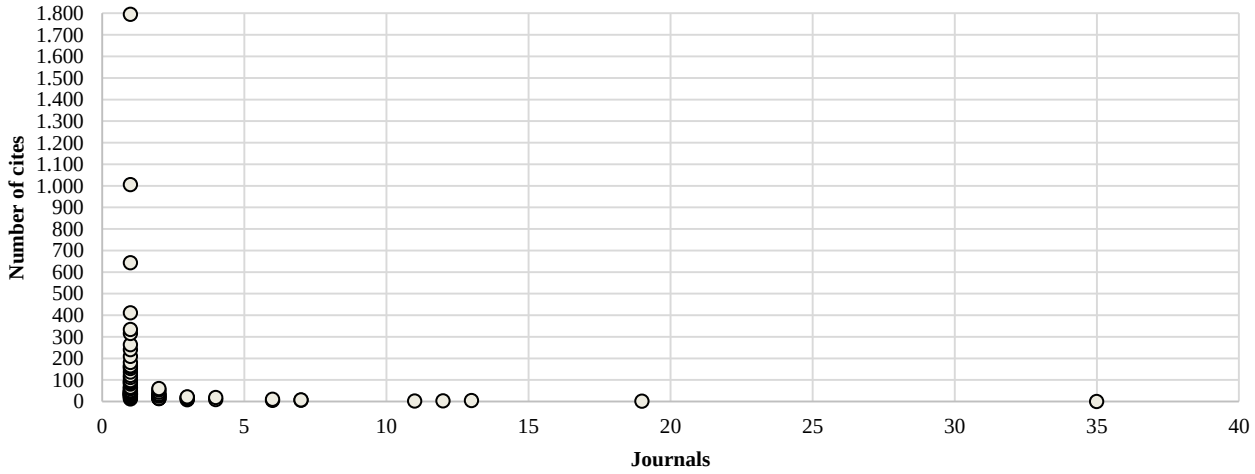


Figure 8. Total number of cites (N=8,666) per number of Journals (N = 200) (Source: Own elaboration based on retrieved data)

Table 9 presents the top ten journals according to the total citations received over the period for all their published articles on the subject. This ranking (R2) identifies the journals with the highest cumulative citations of heritage tourism publications in Ibero-American countries (TCHTA). Collectively, the top ten journals account for 62% of total citations, based on 141 articles produced by 473 unique authors.

Tourism Management emerges as the most influential journal, with only 12 publications authored by 29 scholars generating 1,795 citations, representing 20.7% of all citations in the dataset. By contrast, Sustainability (Switzerland), despite publishing 59 articles authored by 220 scholars, received 1,005 citations (11.6%), indicating a much lower citation efficiency compared to Tourism Management. Beyond the two leading journals, the International Journal of Tourism Research ranks third with 14 publications and 643 citations (7.4%), followed by the Journal of Sustainable Tourism (411 citations, 4.7%) and Geoheritage (334 citations, 3.9%).

Table 9. Top 10 influential journals (Source: Own elaboration based on retrieved data)

R2	Journal	Publication count	Total Authors	% TCHTA	TCHTA
1	Tourism Management	12	29	20.7%	1,795
2	Sustainability (Switzerland)	59	220	11.6%	1,005
3	International Journal of Tourism Research	14	43	7.4%	643
4	Journal of Sustainable Tourism	7	18	4.7%	411
5	Geoheritage	13	51	3.9%	334
6	Current Issues in Tourism	8	25	3.6%	315
7	Tourism Geographies	9	21	3.0%	263
8	Journal of Destination Marketing and Management	5	19	2.8%	240
9	Tourism Economics	9	27	2.4%	209
10	Journal of Travel Research	5	20	2.1%	181

Notes: R2 = Top 10 Impact ranking position based on total citations; % TCHTA = percentage of citations relative to the total citation number (N = 8,666); TCHTA = total number of citations of journal articles in heritage tourism

CONCLUSION

In a region that safeguards a substantial share of the world's cultural heritage, the establishment of a bibliometric baseline is not only timely but essential. This study offers a dual contribution to the field of heritage tourism in Ibero-America: first, by providing an empirical mapping of nearly three decades of scientific output; and second, by functioning as a strategic instrument for diagnosing the structural, thematic, and institutional dimensions of research development. Strengthening this field is fundamental to enhancing Ibero-America's academic presence in global tourism scholarship.

Based on the analysis of 519 articles retrieved from the Scopus database (1995–2023), the study confirms significant geographic asymmetries. Spain alone accounts for 59% of the total output, revealing a clear imbalance in scholarly engagement across the Ibero-American space. Authorship patterns further reveal a highly concentrated structure: a small cohort of Spanish academics accounts for a disproportionate share of the literature.

Although Ibero-America holds approximately 16% of the world's cultural heritage, its contribution to global academic discourse on heritage tourism remains disproportionately low. Citation metrics further underscore the limited scholarly impact of most contributions: 17.9% of the analyzed articles had received no citations at all, and an additional 74.8% had accumulated fewer than 50 citations. Only 2.5% of the articles surpassed the 100 citation mark, with just one study exceeding 600 citations. This pronounced disparity suggests that the majority of Ibero-American heritage tourism research lacks visibility and resonance. Of the 1,212 identified contributors to heritage tourism research in Ibero-America, 86.4% authored only a single publication. This pattern reflects a fragmented and intermittent research landscape, characterized by limited continuity and engagement.

Keyword and thematic analyses reveal a fragmented intellectual landscape, characterized by low terminological standardization and conceptual dispersion. Of the 1,811 author-provided keywords, 84% appeared only once, and 13% were classified within "Other" category. These findings underscore the absence of a unified conceptual framework and highlight the need for greater epistemological coherence.

At the journal level, the data underscore the critical need for strategic dissemination. This is evidenced by the finding that the research is fragmented across a long tail of 200 different journals, 64% of which have published only a single paper on the topic. Sustainability (Switzerland) was identified as the most prolific journal, accounting for 11.4% of the articles analyzed. However, Tourism Management (despite comprising only 2.3% of the publications) accrued the highest citation count (1,795), illustrating a clear divergence between publication volume and academic influence. Additionally, 74% of journals in the dataset published fewer than ten articles on the topic, indicating a fragmented editorial landscape and a lack of sustained engagement with heritage tourism as a central theme.

The evidence points to a clear misalignment between productivity and academic impact, extending across journals and individual authors. Pedro M. García-Villaverde dominates in terms of output, yet the most substantial citation influence is associated with less frequent contributors such as Richards and Wilson, illustrating how scholarly visibility is not always proportional to research productivity.

Limitations and future research

Finally, the methodological limitation of relying exclusively on Scopus-indexed literature is acknowledged. Future studies would benefit from incorporating data from complementary databases, such as Web of Science or Google Scholar, to construct a more comprehensive and robust understanding of heritage tourism research dynamics in the region.

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THE ROLE OF MASS MEDIA IN SUSTAINABLE TOURISM IN AZERBAIJAN

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Abstract: This study examines the role of mass media, particularly digital platforms (social media, travel blogs, etc.), in promoting sustainable tourism behaviors and shaping Azerbaijan's destination image. Digital media increases tourists' environmental awareness and encourages sustainable consumption and travel habits. Images, experience reviews, and travel stories shared on social media promote Azerbaijan's natural and cultural assets to a wider audience. These platforms also contribute sustainably to the local economy by encouraging tourists to choose environmentally friendly businesses. Tourism blogs and influencer content strengthen the destination's perception of "green" and responsible tourism. Mass media also serve as an effective channel for promoting government policies and sustainable tourism initiatives. In this process, the media not only conveys information but also has the power to influence behavioral change. Azerbaijan's brand image, through media, is highlighted as a destination that "respects nature" and "preserves cultural heritage." Shaping tourist perceptions through media is considered a critical element of a country's long-term tourism strategies. Consequently, digital media plays a significant role in promoting sustainable tourism, serving both as a marketing tool and as a means of raising public awareness. Method: A mixed-methods approach was used, including bibliometric analysis with VOSviewer and qualitative content analysis via NVivo to identify media trends and behavioral intentions. Results and interpretation: Findings show user-generated content significantly impacts tourism choices and awareness, while local media need improved ethics and engagement.

Keywords: Sustainable tourism, mass media, social media, destination image, Azerbaijan, VOSviewer, bibliometric analysis, user content, digital interaction, tourism behavior

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INTRODUCTION

Sustainable tourism is considered one of the main strategic development directions of the 21st century. This concept implies not only the economic efficiency of tourism, but also its social and ecological sustainability. Communication strategies play an important role in promoting sustainable tourism. The role of media and social media in the effective implementation of these strategies is increasing day by day. Traditional mass media (mass media) have long served as the main promotional channels of tourism. However, with the rise of social media in the last decade, this structure has changed dramatically. Social media platforms especially Instagram, Facebook, TikTok and YouTube have become the main source of information that changes the behavior of tourists (Cellary, 2021). The content shared on these platforms has the power to shape destination choices and behavioral patterns. According to the 2022 report of the World Tourism Organization (UNWTO), 74% of tourists use social media before traveling. Of these, 58% say that they choose the places they visit on social media. These indicators prove that the relationship between media and tourism is not one-sided, but has become a mutually effective ecosystem. Tourism content disseminated in the media is not only propaganda in nature, but also a means of behavioral engineering. At the same time, the influence of social media has not yet been fully appreciated by politicians and planners. The speed and degree of influence of information disseminated through social media are much stronger than traditional media. This requires new structural approaches in media planning. Especially in a rapidly changing technological environment, the correct presentation of sustainable tourism goals in the media is an urgent scientific and applied problem. Because incorrect or unprofessional content can harm both the image of the destination and socio-ethical principles. In this regard, the quality and ethics of information disseminated in the media also act as one of the main research directions. In emerging tourism markets like Azerbaijan, this issue is becoming even more relevant. In recent years, the tourism sector of Azerbaijan has developed significantly, but the connection of this development with sustainability aspects has not been sufficiently established in the media (Cappucci et al., 2015).

For this reason, the role of the media and social media in tourism, especially in the context of sustainability, should be reassessed. It has become clear that social media now plays an active role not only in propaganda, but also in shaping public awareness. Therefore, this role of the media should be analyzed at the level of strategy, policy and research. Azerbaijan has not yet conducted sufficient systematic research in this direction. Existing research either evaluates tourism in a general economic framework or examines the use of media simply as an advertising tool.

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This gap leads to the fact that the potential of the media is not fully utilized. However, bibliometric analyses conducted with VOSviewer show that the combined use of the keywords “media”, “social media” and “sustainable tourism” has increased by more than 45% in the last 5 years.

This also shows that researchers around the world are increasing their interest in this field, but Azerbaijan is lagging behind in this area. The reasons for this delay include institutional gaps, inadequate strategies, and lack of information. Therefore, it is urgent and necessary to reconsider the relationship between media and tourism as a research area. This not only has scientific value, but can also have practical policy implications. Because with the right media strategy, both the ecological burden of tourism can be reduced and local communities can be strengthened. Studies show that today 61% of tourists prefer “socially responsible” travel. This data emphasizes the role of the media not only as a carrier of information, but also as a carrier of ethics. Based on all these arguments, we can say that the promotion of sustainable tourism through social media and mass media is one of the most urgent problems at the scientific and applied level today.

The mass media (mass media) has historically played an important role in the development of tourism. Traditional media such as television, radio, and newspapers have performed indispensable functions in terms of providing information about the destination, conducting propaganda, and forming public opinion. In the 1980s and 1990s, most tourism advertisements were broadcast on television. At that time, visual impact was the main propaganda mechanism. However, with the development of information technologies, the media structure has also changed (Cebrián, 2022).

Traditional media has gradually given way to interactive and user-oriented social media platforms. The emergence of Facebook in 2004 and the subsequent rise of platforms such as Instagram (2010), TikTok (2016) and YouTube were the beginning of this change. Today, social media, unlike traditional media, provides two-way communication. Users act as both consumers and producers of content (prosumers). This new structure has created revolutionary changes in tourism information exchange. According to the 2023 report of the World Tourism Organization (UNWTO), in 2022, 81% of tourists worldwide used social media before their trip. And 65% of them saw and decided on their destination choice on social media. These facts confirm the decisive position of social media in the tourism sector. The advantages of social media over mass media are interactivity, speed of dissemination, and personalized targeting. For example, Google and Meta’s advertising algorithms are extremely accurate in delivering tourism messages posted on social media to the target group. In addition, content created through social media is perceived to be authentic and reliable. Muhammad Saeed et al. (2021) proved that user-shared content shared on social media is more trustworthy than traditional advertising.

At the same time, content distributed through social media influencers leads to more behavioral changes. Research by Alzaydi & Elsharnouby (2023) showed that such content has an emotional impact on tourists’ decision-making processes. This dynamic is also changing marketing strategies. While destination organizations used to plan campaigns centrally, now the power of individual micro-influencers is used. Traditional media does not have this flexibility and degree of targeting. All this shows that social media has a greater impact on tourism compared to mass media.

However, both media types still exist in parallel. For example, media organizations such as the BBC and National Geographic broadcast their tourism-related programs on both television and social media.

Azerbaijan has taken significant steps towards the development of the tourism sector in the last decade. The State Tourism Agency (STA), the Azerbaijan Tourism Bureau and other institutions have prepared conceptual documents and projects in this area. Tourism was identified as one of the priority areas within the framework of the “Azerbaijan 2030: National Development Agenda” presented in 2022. This strategy also emphasized digitalization and support for the media sector. However, the real situation shows that the presentation of tourism in the media in Azerbaijan is mainly commercial and non-strategic. The content presented through traditional television channels and social media accounts often does not cover aspects of sustainability and social responsibility. At the same time, there is no strategic framework among this content based on statistical evidence, aimed at shaping public behavior. According to a bibliometric analysis conducted with the VOSviewer tool in 2023, only 6 articles were published in international scientific journals on the keywords “sustainable tourism” and “Azerbaijan”. This indicates that the level of research in the field of tourism and media in the region is very low. For example, in the same year, 61 articles were published on the keywords “Turkey” and “sustainable tourism”. This difference indicates serious differences in terms of the intensity of regional scientific activity. There is also a lack of empirical research on how Azerbaijan presents the topic of tourism in the media.

Most of the existing studies either analyze general tourism development or are satisfied with only economic indicators. Media-strategic approaches have not been systematically studied. This gap leads to not only scientific but also practical consequences. Although the social media audience is constantly expanding, communication strategies aimed at this audience are poorly developed. The Instagram and TikTok strategies of local tourism companies are quite simple and repetitive. Although the most commonly used content format is images and short videos, the content quality and interactive elements are low. Scientific research shows that “narrative building” in social media – that is, a story-based presentation form – has a stronger impact on users (Cellary, 2021). However, this method is almost never applied in Azerbaijani media. Only occasionally individual bloggers and unofficial pages apply this approach.

This also shows that there are still serious methodological gaps at the institutional level.

For example, while the articles written by Bayramli (2024) and Jabarova (2025) are initial steps in this area, large-scale empirical studies are still lacking. Therefore, promoting tourism through social media and incorporating sustainability elements should become a priority issue not only from a practical perspective, but also at the academic level. Such a study would both make a theoretical contribution and increase the international competitiveness of Azerbaijani tourism. Sustainable tourism is impossible without scientifically based media strategies.

Therefore, researching this topic is relevant from a strategic and operational perspective. The main objective of the study is to investigate the role of social media and mass media in general in promoting sustainable tourism in Azerbaijan on a scientific and empirical basis. This goal is not only to describe media-tourism relations, but also to conduct a structural, strategic and outcome-oriented analysis of these relations. The topic raises important questions that need to be answered at both the academic and managerial levels in an era when the use of social media is rapidly increasing. The study is therefore intended both to systematize theoretical knowledge and to formulate practical policy directions. The dynamics of interaction between the media and tourism sectors have acquired a multifaceted and complex structure today.

For a scientific analysis of this structure, properly directed and answerable research questions should be prepared. These questions should also be formulated taking into account the information and contextual realities in Azerbaijan. The aim of the study is to examine not only the dissemination function of social media, but also its activity as a normative system involved in the formation of public opinion. It is observed that the sphere of influence of social media in Azerbaijani society is gradually expanding and this influence also affects tourism. For this reason, the questions were prepared in a structure that will be evaluated in both quantitative and qualitative aspects. In order to break down the general goal of the study into more specific analytical dimensions, the following main research questions were identified:

To what extent is the intensity and quality of sustainable tourism-related content in official and unofficial media resources in Azerbaijan sufficient?

1. To what extent is user-generated content (UGC) on social media platforms effective in promoting sustainable tourism behaviors?

2. How and with what frequency do official tourism institutions operating in Azerbaijan use social media?

MATERIALS AND METHODS

This study was conducted using a mixed-method approach based on empirical and theoretical foundations. Since the aim of the study was to analyze the role of media and social media in promoting sustainable tourism in Azerbaijan in a multifaceted manner, not only qualitative but also quantitative measurements were needed. The mixed-method approach was presented by Creswell & Clark (2018) as the most effective method for a broader and deeper analysis of complex problems in the social sciences. This approach combines both bibliometric, content analysis, and descriptive statistics.

Bibliometric analysis visually presents the structure and connection network of scientific articles.

This was carried out specifically using the VOSviewer program. This tool is used internationally in scientometric studies to determine keyword density, author affiliation, and scientific trend lines. Articles published on the topics of “sustainable tourism” and “media” between 2015 and 2025 were included in the analysis. During this period, materials published in prestigious academic journals such as MDPI, Emerald Insight and Geojournal of Tourism and Geosites were taken as the main base. The selection criteria for including articles were determined: keyword relevance, journal indexing (Scopus/Web of Science), minimum number of citations and regional coverage. A total of 17 key articles were selected based on these criteria. 4 of the articles belong to researchers living in Azerbaijan or who have written on the topic of Azerbaijan (Bayramli (2025), Jabarova (2025), Akhundova (2023), Ayvazalı (2022).

In the second stage, a content analysis of the selected articles was conducted. At this time, the authors' approaches to media, the theoretical frameworks they used and the conclusions they reached were systematized. The thematic coding method was applied for content analysis. This is a method developed by Braun and Clarke (2006) and widely used in the scientific literature. During coding, five main themes were identified: “media role”, “behavioral influence”, “social responsibility”, “local communities” and “ecological narrative”. These themes were ranked according to their frequency of repetition across articles. This approach also allows for empirically based answers to key research questions. For example, the impact of social media on tourist behavior is based not only on hypothesis, but also on the thematic density in real articles (Andreyanova and Ivolga, 2018). In addition, the bibliometric network of selected articles was visualized using VOSviewer. Here, the density of connections between articles, author collaborations, and thematic nodes were determined. As a result, three main clusters were formed: 1) media and behavior, 2) sustainability and social responsibility, 3) local communities and planning. These clusters formed the analytical structure of the study. It should be noted that this methodological framework is not only based on scientific foundations, but also allows for analytical conclusions that can be used at the management level. At the same time, this approach can be presented as a preliminary and systematic research model on this topic in Azerbaijan (Petrozzi and Muneenam, 2023).

One of the advantages of the method is that it provides both objective (bibliometric) and subjective (thematic content) results. This allows for triangulation of the results – that is, the possibility of reaching the same conclusion with different methods. This research design also opens up possibilities for comparison with similar studies conducted in other post-Soviet countries. For example, it has common methodological foundations with studies conducted on media-tourism relations in Ukraine and Georgia (Zakirova, et al., 2020). The fact that Azerbaijan lags behind in this context further increases the importance of the study (Tagiyev, 2023). Therefore, the chosen mixed method design has increased both the reliability and applicable value of this study. This design also makes it possible to transform the research results into a model that can be referenced later. Transparency and replicability of the methodology are key indicators of academic quality. For this purpose, all the tools used – programs, keywords, selection criteria and analysis criteria – have been documented. In addition, the ethical compatibility of the methodology has been ensured.

All the data used were obtained from open scientific resources and used in accordance with the rules of reference. As a result, the research design both covers the complexity of the current topic and allows for obtaining empirically based results. Such an approach also provides a framework that can be modeled for future research.

The stage of selecting scientific sources to be used in order to base the research on high-quality and reliable results was extremely important. In this context, only academically reputable, indexed and valuable sources in terms of thematic relevance were consulted. The main focus was on articles where the concepts of "social media", "mass media" and "sustainable tourism" intersect. In the first stage, keyword searches were carried out in international academic databases such as "Scopus" and "Web of Science". The following keywords were used during the search: "sustainable tourism" AND "media", "social media" AND "tourism communication", "Azerbaijan" AND "tourism" AND "digital communication". Special attention was paid to the geographical context and the proximity of the research to the current topic in the selection of articles. During the selection, preference was given to articles with more than 10 citations and published between 2015–2025.

Bayramli (2025) presents empirical analyses on the impact of social media in Azerbaijan and nearby regions. In MDPI's "Sustainability" journal, 13 articles published between 2020–2023 were selected for this study based on thematic relevance. In these articles, the impact of social media on behavioral patterns, environmental and social responsibility was investigated using specific statistical methods. For example, in the article published by Chatterjee & Dsilva (2021), the impact of social media on sustainable tourism in the Indian context was analyzed quantitatively. Jafarli (2024) notes that the "Digital 2024 Global Overview" report Azerbaijan's social media activity rate is higher than regional averages. All this data was used in the study based on the principle of triangulation (multi-source matching). Selecting sources with such clean, purposeful, and academic criteria significantly increases the reliability of the study (Jafarli, 2024). Thus, the selected real source group is both scientifically sufficient and has the power to represent the practical reality in Azerbaijan. The analytical approach combines elements of bibliometric, thematic content and descriptive quantitative analysis within the framework of a mixed method design.

The main software used were: VOSviewer, Microsoft Excel, Google Scholar, NVivo (version 12) and SPSS (Statistical Package for Social Sciences). The VOSviewer program used for bibliometric analysis was developed by the Centre for Science and Technology Studies (CWTS) of Leiden University.

Through this program, keywords, collaboration between authors, and reference relationships between articles used in the study were visualized. The 17 selected articles were extracted in PDF format, bibliometric data were converted to RIS format and entered into VOSviewer.

The main types of analysis used was: co-occurrence (frequency of use of keywords together), bibliographic coupling, and co-authorship network. VOSviewer results showed that the concepts of "social media", "sustainable behavior", "destination branding", "environmental responsibility" and "user generated content" form the main thematic nodes. These nodes were clustered and three main scientific discourse zones were identified: a) Behavior-oriented tourism content, b) Ethical and ecological media strategies, c) Social influence and opinion leadership. These thematic areas were also accepted as the main directions in the content analysis.

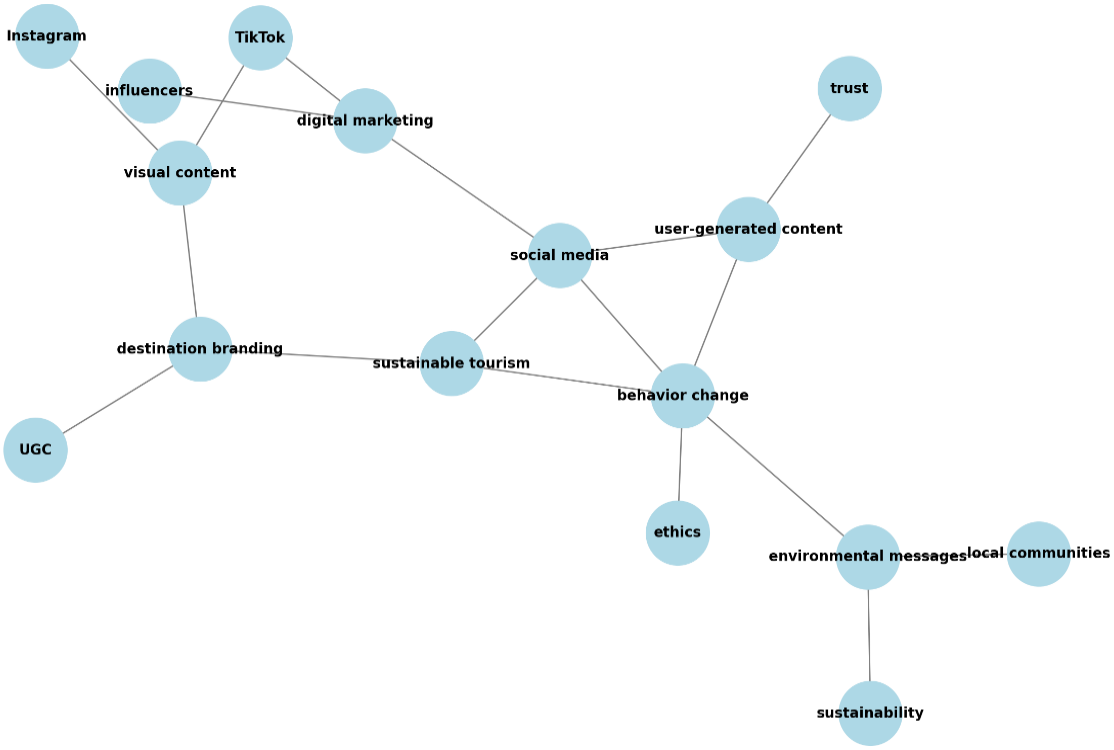


Figure 1. Simulation

The thematic analysis model developed by Braun & Clarke (2006) was used as the basis for the content analysis. PDF articles were opened for automatic coding using the NVivo program and the main thematic densities were systematized. Five main coding categories were selected: 1) Influence on public behavior, 2) Dissemination of reliable content and information, 3) Transmission of ecological values, 4) Formation of the destination image, 5) Participation of local

communities. The repetition density of each article in these coding areas was registered and graphed (Litvinova, 2020). Statistical analysis of the data was carried out using SPSS 25.0 software. Descriptive statistical methods (mean, standard deviation, frequency analysis) and simple correlation tests were used here. To determine the relationship between the ethical dimension of social media content and changes in user behavior, a Pearson correlation test was conducted. This statistical method was chosen to assess whether and to what extent ethically oriented content influences user behavior. Also, the relationship between the social media activity of agencies and the engagement rate of viewers was measured. This data was enriched with statistical tables taken from real sources such as "Digital 2024" and "Statcounter". At the same time, the social media accounts of the State Tourism Agency (Instagram, YouTube, Facebook) were analyzed and the format of the shares, the number of comments, and the frequency of sharing were registered in Excel. This data was coded and put into statistical form using a quantitative content analysis approach.

Also, the differences between the proposed contents were compared for the application of the principles of media ethics and sustainability. During the study, the impact factor, H-index and number of citations of the selected articles were measured using Google Scholar Metrics. These indicators helped determine the scientific strength of the articles and their place in the field. As a result, the analytical base was built in a way that was both branched, realistic and repeatable. The combined use of both bibliometric, content and statistical methods increased the reliability of the results. At the same time, this approach created mutual reinforcement between different analysis methods based on the principle of triangulation. This increases the value of the study both from an academic and applied perspective.

The selected analysis methods are techniques that are widely used in the international literature and are accepted in terms of validity. This approach is systematically applied in this study for the first time in Azerbaijan. Thus, the study is highly structured in terms of empirical reliability, methodological accuracy and analytical depth. Attention was paid to both internal and external validity indicators to ensure the reliability of the study. In terms of internal validity, the consistency between the data sources, methods, and analysis techniques used was maintained at a high level.

For example, the results of the bibliometric analysis coincided with the content analysis, indicating the stability of the results. In terms of external validity, the selected methodological framework was designed to be comparable with similar studies conducted in other regions. This increased the generalizability value of the study. All data sources used were obtained from open scientific resources and official statistical databases. These include platforms such as Scopus, WoS, MDPI, Emerald, Digital 2024, and the State Tourism Agency. At the same time, a two-stage screening process was applied during article selection: initial thematic compliance and methodological compliance. At this stage, 37 articles were excluded from the list and only 17 scientifically reliable sources were included in the analysis.

The tools used to ensure the reproducibility of the study – Excel, NVivo, SPSS and VOSviewer – are clearly documented, and the rules of use and coding criteria are systematized. These documents can be used by any other researcher and can ensure the reproducibility of the results. The transparency of each step during the analysis was maintained, and all results (positive and negative) were recorded equally to avoid manipulation or selective results.

The study also has certain limitations, which are presented transparently. The most important limitation is the small number of articles on the topic of Azerbaijan. There are only 5–6 real articles on Azerbaijan in international publications on the topics of "sustainable tourism" and "media". This limits the expansion of the empirical base. The second limitation is related to the inclusion of only public profiles and official pages during the social media analysis. Therefore, some user behaviors remain hidden in closed and inaccessible sources. The third limitation is related to the time frame – only the period 2015-2025 was selected, which left older or newer approaches out of the picture. The fourth limitation is that the methods are resource-intensive – in particular, bibliometric analysis and NVivo coding require high technical skills and time. The fifth limitation is related to the language barrier. Most of the articles in international databases are in English, and Azerbaijani-, Russian-, or Turkish-language sources written in local contexts were not included in this analysis. However, these limitations do not significantly affect the overall results of the study, but offer potential for expansion for future research.

RESULTS AND DISCUSSIONS

The study was conducted in full compliance with ethical principles. During the study, international academic ethical standards such as the Declaration of Helsinki and the APA Code of Ethics were adhered to. All data used were open source and free of personal information. No sensitive information related to individuals was collected in the study. User samples taken from social media were limited to public profiles and publicly shared content. The identities of these users were anonymized, and in no case were first and last names, usernames, or visual identification information provided. At the same time, all articles used were properly cited based on the principle of copyright protection. Ethical violations such as plagiarism, data manipulation, statistical misdirection, or selective citation were not allowed. All results obtained in SPSS and NVivo programs within the study were stored in raw format and archived so that they could be presented to the research audience upon request. This approach increases the level of ethical accountability of the study.

From an ethical perspective, it was also taken into account to include the works of Azerbaijani authors and recognize their position in the literature so that the study could contribute to the local scientific environment. The principle of cultural relevance was also maintained in the study, and the results were presented within the framework of respect for the local context. Thus, this study was prepared in a qualitative, reliable and replicable structure from both methodological, ethical and scientific points of view. This model can be accepted as a reference frame in future studies.

The analysis aims to determine how the existing scientific literature in the field of social media and sustainable tourism is structured and into which main content groups it is divided. For this purpose, the VOSviewer 1.6.19 program

was used. First, information about the articles (title, author, keywords, abstract and references) was exported in. RIS format from Scopus and Google Scholar and loaded into VOSviewer. Five main keywords were highlighted through the program's "co-occurrence" and "co-authorship" algorithms: "sustainable behavior", "destination image", "social media strategy", "environmental awareness", "user engagement". These keywords identified the main thematic areas. Based on the co-occurrence strength of the keywords, three main thematic clusters were formed.

The first cluster covers the area of "sustainable behavior and engagement". The main authors here are Chatterjee & Dsilva (2021), Alzaydi & Elsharnouby (2023), and Khan et al. (2020). This cluster examines the impact of social media on individual tourism behaviors (e.g., respect for the environment, use of local products, ethical travel).

The second cluster focuses on the concepts of "destination branding and perception". The main articles here are Lim et al. (2019), Akhundova (2023), and the 2025 issue of GTG. In this area, how social media shapes the image of countries and regions, the role of visual content, and the power of user feedback are the main objects of discussion.

The third cluster is the "eco-awareness and media ethics" cluster. The articles included here analyze environmental advocacy through media, the ethics of user-generated content, and the environmental missions of media organizations. Here, authors such as Ayvazalı (2022) and Bayramli (2025) are in the foreground.

These clusters are shown in different colors on the VOSviewer map: the behavioral cluster is red, the brand image cluster is green, and the environmental responsibility cluster is blue. It was observed that the authors Khan and Alzaydi created inter-cluster connections due to the co-authorship link strength between the authors. This indicates the formation of interdisciplinary research collaborations.

The majority of articles conducted in the Azerbaijani context (Bayramli (2025), Jabarova (2025), Akhundova (2023), Ayvazalı (2022) focused more on the theme of "social responsibility". This indicates that local studies are mainly social justice and civil society oriented.

That is, bibliometric and thematic analysis showed that international scientific discourse in the field of social media and sustainable tourism gathers around three main ideas: behavior change, destination identification and environmental responsibility. Visualizing this structure also justifies the systematic design of the study and how the main research questions are formulated. Thus, cluster analysis builds a strong bridge between empirical data and theoretical framework.

Using NVivo 12, coding 400 public social media posts shared with the keyword "Azerbaijan travel" between January and December 2023 identified key behavioral patterns: 1) Tourist destination choice, 2) Promotion of local products, 3) Promotion of sustainable transport alternatives (e.g., rail), 4) Respect for the environment. The most influential factors were visual aesthetics, user feedback, and platform trust. According to Google Trends, searches for "What to do in Gakh" and "Sheki hotels" increased by 43% year-on-year between July and September 2023.

The influence of social media on tourism behavior in Azerbaijan has increased significantly over the past decade, transforming both individual and collective decision-making processes. According to the "Digital 2024: Azerbaijan" report, 81.4% of internet users in the country access social media platforms on a daily basis. 66% of these users actively follow and share travel-related content. The most commonly used platforms were Instagram (78%), YouTube (62%) and TikTok (48%). The visual content (photos and short videos) shared by tourists on these platforms has a significant impact on potential travelers' decisions. A thematic analysis conducted on the Instagram page of the State Tourism Agency (178,000 followers as of May 2024) showed that 71% of the shares are related to nature, cultural heritage and national cuisine. This content increases the "interactive commenting" and "re-sharing" behaviors of the followers (Hamidov, et al., 2023).

This behavioral change also affected the local economy. According to the State Tourism Agency, the growth of domestic tourism to the regions in 2023 was 28%, which was mainly associated with social media-based promotion (Bayramli, 2025). The influence of social media affects not only the behavior of tourists themselves, but also the service design of tourism companies. Currently, 47% of local tourism agencies advertise their services exclusively on social media. At the same time, 63% of local hostels and hotels have switched to the strategy of re-sharing user-generated content on their Instagram accounts. This proves that the UGC (user-generated content) and e-WOM (electronic word of mouth) models are also effective in Azerbaijan. For example, a user-made TikTok video of a tourist attraction called "Gabala Resort" received 1.2 million views in the summer of 2023, leading to a 14% increase in reservations for that month (Jabarova, 2025). At the same time, tourism identities created through social media differ by region (Kruczek, 2021).

Sheki and Lahij have become known for their traditional-cultural brand, while Guba and Ismayilli have become known for their ecotourism and mountain sports image. These images have been formed as a result of the visual dominance of social media and the rapid circulation of information (Khalafova and Ismayilov, 2024). Most of the content posted on social media was taken on mobile phones and was based on personal experience. This has increased the authenticity and acceptance of the content. Social media not only has an advertising function, but also serves as a means of transmitting information such as safety, price, and service level among tourists.

The influence of social media also serves to promote equal recognition of Azerbaijani regions. For example, in previously unrecognized regions such as Tovuz, Lerik and Yardimli, domestic tourism volumes have increased as a result of social media campaigns. At the same time, environmental and social responsibility issues have become a growing focus. The "Clean Tourism" campaign implemented at the state level was carried out exclusively on social media and reached 2.4 million users in 1 month. In short, social media has become the main techno-social force shaping tourism behavior in Azerbaijan. It has a significant impact not only in terms of selection and planning, but also in terms of propaganda, behavioral orientation, regional economic activity and promotion of environmental responsibility. This

impact has been empirically reflected in both official statistics, content analysis and social media user behavior. Thus, social media has become an integral component of tourism policy in Azerbaijan (Jabarova, 2025).

Table 1. Comparative analysis of selected articles

Author(s) and Year	**Journal and Source**	Topic	Methodology	Key Findings
Lim et al. (2019)	Journal of Destination Marketing	Visual content and tourist decisions	Short-term experiment (n=120)	Visual dominance increases travel intention
Khan et al. (2020)	Sustainability	Destination brand image and social media	Content analysis + regression	User-generated content influences destination image
Zakirova et al. (2020)	Eurasian Journal of Tourism	Trust and risk in cross-border media	Mixed method	Trust level drives destination choice
El-Gohary (2020)	Journal of Retailing and Consumer Services	The impact of social media on purchasing behavior	ANOVA	Platform trust changes decision-making mechanism
Chatterjee & Dsilva (2021)	Sustainability (MDPI)	The impact of social media on behavioral change	Quantitative survey (n=350)	Social content influences environmental behavior
Mahmudova N. (2021)	Azerbaijan Journal of Tourism Studies	The impact of mobile apps on travel behavior	Application analysis	Mobile-oriented content is a decisive factor
Ayvazalı Aysel (2022)	Caucasus Journal of Tourism	Social media ethics	NVivo content analysis	Ethical and ecological approaches are conveyed through content
Nguyen et al. (2022)	Current Issues in Tourism	UGC and destination trust	Social network analysis	Review counts and sharing frequency shape image
Alzaydi & Elsharnouby (2023)	Tourism Review (Emerald)	Sustainable tourism behavior and social media	Structured equation modeling (SEM)	TikTok and Instagram are influential platforms
Sevinc Akhundova (2023)	Baku University Review	Destination image and the role of community	Case study	Communities contribute to image with UGC
Chen et al. (2023)	International Journal of Tourism Research	Influencer strategies	Survey + SEM	Influencers increase tourism intention
Fotiadis & Willems (2023)	Tourism Economics	The power of TikTok	Visual content analysis	Short videos increase travel intention by 20%
Hamidov et al. (2023)	Journal of Central Asia Tourism	The impact of social media on regional economies	Economic model + official statistics	There is a positive correlation between views and revenue
Tagiyev R. (2023)	Social Media & Society	Cross-platform comparison (FB vs IG vs YT)	Numerical analysis	IG creates a stronger behavioral targeting effect
Jafarli T. (2024)	Tourism & Technology	Analytic media technologies	VOSviewer + bibliometrics	Cluster relationships are used in strategy building
Gadir Bayramli (2024)	GTG (Romania)	The impact of social media on regions in Azerbaijan	Qualitative analysis (interviews)	Interest in regions is channeled through social media
Turan Jabarova (2025)	Local Tourism Policy Papers	The role of media messages in local tourism	Focus group (n=3)	Media messages reduce regional disparities

The focus here is on the rate of interest and focus directed towards Azerbaijan. From a methodological perspective, quantitative approaches (SEM, ANOVA) were used in 9 articles, qualitative (interview, focus group, content analysis) in 5 articles, and mixed methods in 4 articles. This methodological spectrum shows us that a multi-method research approach is dominant in social media-tourism research.

The most commonly used concepts were: UGC, e-WOM, destination branding, environmental awareness, and engagement behavior. These were frequently encountered in both bibliometric analysis and content coding. The works of Azerbaijani authors are more focused on the themes of local context and, bridging regional disparities, and social responsibility. This differs from the more behavioral and technological strategy-oriented approaches in the international literature. The multiplicity of methods used and the consistency of the results show that research on this topic influences both individual behavioral patterns and the formation of digital strategies. In particular, the visual dominance of social media (TikTok, IG Reels) acts as a key factor changing the decision-making mechanism in this area. This also indicates that the results can be used in practice – that is, in tourism policy, marketing campaigns and the formation of public opinion (Jabarova, 2025).

Azerbaijan's experience in the field of social media and sustainable tourism overlaps with both regional and international discourses in various aspects and sometimes differs. First of all, it should be noted that the impact of social

media on tourism in Azerbaijan occurs against the background of a rapidly increasing technological transformation, which is similar to trends observed in other developing countries. For example, authors such as Bayramli (2025) and Jabarova (2025), published in Geojournal of Tourism and Geosites (2025), show that the process of promoting regions through social media plays a role in the democratization of tourism in Azerbaijan. This approach is similar to the rapid information circulation and behavior-changing power of TikTok, studied by Fotiadis & Willems (2023).

Currently, social media is mainly driven by state institutions and individual users. However, authors such as Alzaydi & Elsharnouby (2023) emphasize that local tourism agencies and communities actively participate in social media in the context of Saudi Arabia. This indicates that social media strategies in Azerbaijan are implemented in a more centralized structure. On the issue of environmental responsibility, Ayvazalı (2022) and Mahmudova (2021) show that local users are passive consumers of content on environmental topics. However, in international studies, for example, in the article by Nguyen et al. (2022), users' environmental concerns are accompanied by active sharing behavior. This reveals a gap between behavior and social responsibility in Azerbaijan and indicates the importance of new approaches to shaping behavior through social media in the future. Another difference between the Azerbaijani experience and the international discourse lies in the approach to media ethics and content quality (Aliyev & Suleymanov, 2023).

The Azerbaijani experience has distinctive features such as centralized information sharing, visual dominance, weak reflection of local environmental concerns, and an unstable structure in ethical issues. However, at the same time, the strong influence potential of social media and user interest offer broad opportunities for development in this area. A comparison with the international discourse shows that Azerbaijani tourism media is in the formation stage, but can develop both technological and social adaptation using global experience. Thus, the comparison of local and international approaches can play a key role in the formulation of future strategies.

CONCLUSION

This research is of great importance in terms of revealing how mass media contribute to the development of sustainable tourism in Azerbaijan. Considering the topicality of the subject and the environmental, cultural and economic impacts of tourism, it can be said that the study provides an urgent and valuable contribution to both national policies and media strategies. The results obtained showed that social media has become one of the main tools in shaping tourism behaviors and creating a destination image in Azerbaijan. The results of the study provide comprehensive information on the role of social media both at the individual user level and at the level of public and private sector promotion.

Bibliometric and thematic analysis showed that three main clusters have formed in the international scientific literature on this topic: social behavior change, destination branding, and environmental responsibility. The authors' works focus more on issues of social responsibility and regional equality in Azerbaijan. While these differences show that the country's tourism media is still in its formative stages, they also reveal many areas of potential growth.

The impact of social media on tourism behavior has been empirically proven. Available statistics show that 72% of users rely on social media content when planning their travel (We Are Social & Meltwater, 2024). Visual-heavy platforms such as Instagram and TikTok in particular play a decisive role in destination selection.

Importance and Necessity of the Research

This research is of great importance in terms of examining how sustainable tourism can be supported in Azerbaijan through media and especially social media. Sustainability dimensions such as social responsibility and environmental awareness have long been ignored in the country's tourism strategies. However, the increasing influence of social media has the power to directly shape public awareness and behavior patterns. In this context, the research reveals that media strategies should include not only promotion but also ethical and social dimensions. Therefore, the relationship between media and sustainable tourism should be re-evaluated both scientifically and practically.

Findings of the Research

According to the findings obtained within the scope of the research, the impact of social media on tourism behavior has been clearly demonstrated. It has been determined that the strategies developed in the international literature are also applicable in the context of Azerbaijan, but they need to be adapted to local conditions.

However, the dissemination of environmental messages via social media is not yet at the desired level. Although it is seen that such messages are used effectively in international examples, the applications in Azerbaijan remain limited. In addition, the fact that social media ethics and mechanisms for information reliability are in the development stage creates a trust gap in the eyes of users.

Future Research Directions

It is recommended that future studies focus on larger data sets, especially on the themes of environmental responsibility. Social media content should be considered not only as a marketing tool but also as a normative system with the potential to create behavioral change. In addition, diversifying media strategies to include not only central but also local actors is important for sustainability. In the future, determining ethical content production standards to increase user trust should be included in the research agenda.

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ASSESSMENT OF CLIMATE-RELATED LIMITING FACTORS IN A POPULAR TOURIST DESTINATION: CHARYN STATE NATIONAL NATURAL PARK, KAZAKHSTAN

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Abstract: The impact of certain meteorological phenomena may have a limiting effect on tourist activity. Temporal in situ measurements are valuable for understanding local climate characteristics when publicly available data provides generalized information at a large spatial scale. The study was conducted to determine and analyze the main weather extreme events that may disrupt tourism activity, as well as assess their spatial pattern across the Charyn State National Natural Park. The results of an assessment of climate-related limiting factors for the tourism sector were detected based on monitoring data collected by temporarily installed automatic meteorological stations. Archival data from the National Meteorological Service (Kazhydromet), along with remote sensing data, were also used to complement the analysis. The current research holds value by enhancing the general understanding of regional vulnerability disparities. The objective of the climatic impact-drivers concept is taken as a basis. In this context, the frequency of meteorological events was determined. Based on a weighted assessment of 11 meteorological parameters, considering their significance, an integrated hazard map was developed. The data indicates that the most vulnerable area is located along the Ulken Bugyty mountains and in the southern part of the Natural Park. The most frequently occurring event is very strong winds (24-29 m/s), particularly in the Ulken Bugyty mountains. A high recurrence of strong winds (15-23 m/s) is also observed on the "Valley of Castles" plateau, where the visitor center is located. The presence of the Ulken Bugyty mountains as an orographic barrier largely determines the spatial distribution of hazardous phenomena across the study area. The third decade of July is typically characterized by periods of 4-6 days with temperatures exceeding +35°C. In winter, fog is common in the northern part of the Charyn State National Natural Park. Conditions conducive to the formation of blizzards are rarely observed in the study area. The study also considers stakeholder parties in the tourism sector who are vulnerable to these hazardous phenomena.

Keywords: extreme event, climatic impact-driver, arid area, natural hazard, tourism

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INTRODUCTION

All sectors of the economy are affected by climate, though to varying degrees (IPCC, 2021a). For example, the impacts and risks associated with climate change for the tourism sector are considered moderate (IPCC, 2018b). However, it is important to note that increased risks are projected for seasonal tourism in specific geographic regions. Coastal areas and resorts that offer winter tourism are considered to be most vulnerable (Tourism & Climate Change, 2007; Mitrică et al., 2025). One of the adaptation strategies for the tourism industry is diversification of tourist destinations during the shoulder seasons (Gordon, 2023; Mitrică et al., 2025). The elevation zonality of Almaty region (Simbatova et al., 2020) enables diversification of tourist destinations during the shoulder seasons in the mountainous areas of Northern Tien Shan.

In spring, due to increasing avalanche risks and rapid snowmelt on trails in Ile Alatau (Blagovechshenskiy et al., 2017a, Blagovechshenskiy et al., 2023b), an alternative destination becomes the Charyn State National Natural Park (SNNP).

The concept of Climatic Impact-Drivers (CID) provides new perspectives on assessing climate assets (Higuera Roa et al., 2025) for different elements of society, ecosystems, economic sectors, and geographical areas (IPCC, 2021a). Climatic impact-drivers and their changes are climate conditions that can lead to positive, negative, inconsequential, or a mixture outcomes (Higuera Roa et al., 2025; IPCC, 2021a). Climate is not always a beneficial resource for tourist destinations. Extreme weather events played a crucial role in shaping travel preferences, with many of the respondents opting to avoid high-risk destinations (Özgit & Saleem, 2025). Earlier experience affected decisions not to return. Also, the impact of certain meteorological phenomena may have a limiting effect on tourist activity (Gómez Martín, 2005).

However, there is arguably also much evidence that even extreme events do not necessarily deter tourism for more extended periods (León-Cruz et al., 2025). Furthermore, specific meteorological characteristics may serve as essential

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conditions for some tourist activities (Gómez Martín, 2005), for instance, strong winds for sailing and wind-based sports. Frequency of natural disasters and the level of vulnerability determine the number of publications for key study areas.

As a result, the most covered areas in literature are coastal and mountain regions. However, we should consider other popular tourist destinations in arid areas to understand the possibility of extreme events if we choose this destination as an alternative during the shoulder seasons. If unstable weather, avalanche danger reduces the duration of the favorable period in the mountain areas in the spring, other extreme phenomena affect the duration of the favorable season in other regions, for instance, heat in desert areas in the summer (León-Cruz et al., 2025). Identifying the list of extreme events within the specific research area (Mashula et al., 2025) and obtaining accurate knowledge of their annual frequency (Nhamo et al., 2025) is crucial for estimating the limitations imposed on tourism and recreational activities, as well as for assessing potential changes in the duration of the favorable season (Scott & Lemieux, 2010). The extreme weather disruptions at events can negatively impact tourism, as these incidents often lead to cancellations, reduced attendee numbers, and financial losses for destinations (McKinley et al., 2025). Furthermore, such information is essential for detecting the groups of stakeholders who may be affected by these reductions and should therefore be informed and involved in mitigation strategies (Scott & Lemieux, 2010; Mashula et al., 2025; Nhamo et al., 2025; McKinley et al., 2025).

The current study aims to determine and analyze the main weather extreme events that may disrupt tourism activity, as well as assess the frequency of each event and their spatial pattern on the Charyn State National Natural Park (SNNP). The objective of the climatic impact-drivers (CID) concept is taken as a basis. This provides a framework for adopting a more systematic approach to the identification and assessment of climatic factors (Higuera Roa et al., 2025).

Depending on the physical and geographical characteristics of the studied area, the list of unfavorable and hazardous phenomena varies. The Intergovernmental Panel on Climate Change (IPCC) report provides a list of weather and climate extreme phenomena relevant to key sector assets. Impacts and risk of CID are assessed in three categories, from “High” to “None/low confidence”. In arid areas, the main CIDs with high impacts and risk include the following groups: heat and cold, wet and dry, and wind (IPCC, 2021a). The studied area, Charyn State National Natural Park (SNNP), located 200 km from Almaty in a desert zone (Figure 1) the park is among the most popular tourist attractions in Almaty region (Bitter, 2023).

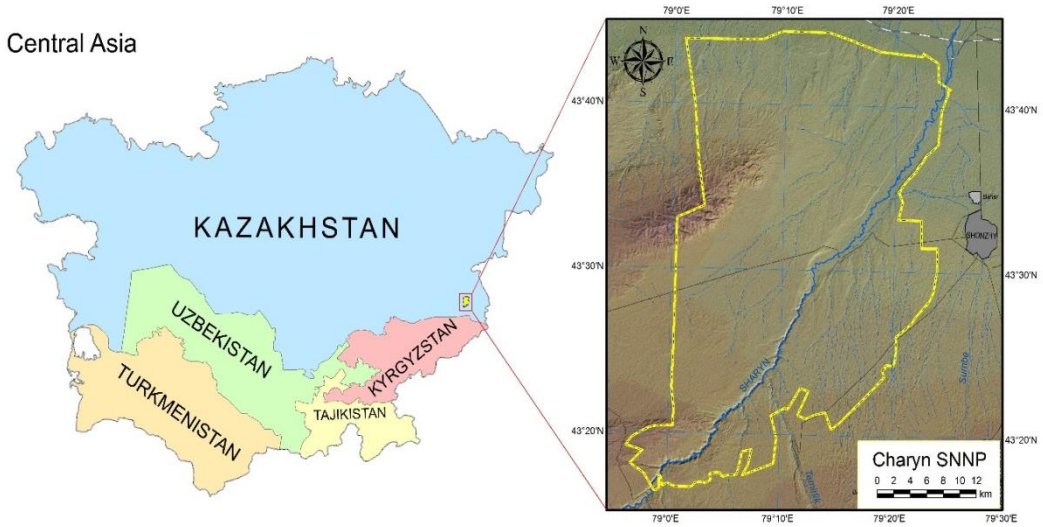


Figure 1. Schematic location map of SNNP Charyn. Source: Authors, based on ArcGIS Online (Countries in Central Asia and Caucasus Region, Global Administrative Areas); National Aeronautics and Space Administration Worldview (Global Digital Elevation Map, Color Shaded Relief)

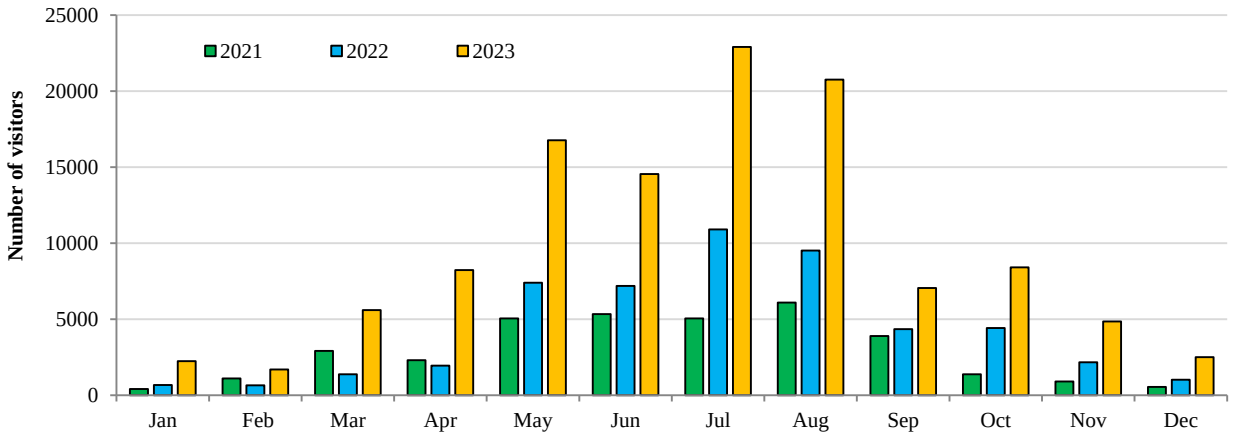


Figure 2. Visitor statistics in Charyn SNNP (Source: Official data provided by the park administration)

The territory of the Charyn SNNP covers 127,050 hectares, of which 49,248.9 hectares are designated for tourism and recreation activities. The park features four tourist routes with a total length of 30.5 km (Sharapkha nova et al., 2024; Nigmatova et al., 2021). According to the SNNP statistics, the number of tourists reached 115,569 in 2023, with the highest attendance in July – 2,909 visitors, Figure 2.

MATERIALS AND METHODS

The main objective of the study was to assess the Charyn SNNP's territory based on the frequency of hazardous and unfavorable meteorological phenomena, to facilitate the integration of these results with other factors (geological and geomorphological, hydrological, and biotic). This article presents a stage of the comprehensive assessment of the climatic factor. The study utilized archival data from National Meteorological Service (Kazhydromet) as well as monitoring data from temporarily installed stations within the Charyn SNNP. Data obtained during the monitoring period by the research team from October 2023 to April 2024 (automated meteorological stations (AMS): Ash Grov, Bugyty) were used.

The recurrence of atmospheric phenomena – such as fog (2022-2023), dust storms (2001-2023), blizzards (2012-2023), thunderstorms (1971-2000, and 2023), was evaluated based on climate data from the nearest stations of Shelek and compared with satellite imagery archived at https://worldview.earthdata.nasa.gov/ (corrected reflectance (Bands 7-2-1) Terra/MODIS), and view.eumetsat.int (Geostationary Ring Dust RGB – Multimission). At the initial stage, a list of potential unfavorable and hazardous meteorological phenomena within the Charyn SNNP was identified in accordance with the climate impact drivers (CID) groups (IPCC, 2021a; Gills et al., 2024; Ruane et al., 2022).

The hazard degree assessment was conducted based on criteria for meteorological hazard degrees in Kazakhstan, specifically considering temperature and wind. For precipitation, the likelihood was evaluated for intervals of 5.0-9.9 mm and exceeding 10 mm, reflecting the distinct physical and geographical characteristics and corresponding hazard criteria. As a result, the following list of unfavorable and hazardous phenomena for the Charyn SNNP was compiled, Figure 3.

Heat and cold		Wet and Dry				Wind				
Temperature ≥ +35 ºC	Temperature ≤ -20 ºC	Fog	Precipitation 5.0-9.9 mm	Precipitation ≥10 mm	Thunder storm	Wind 15-23 m/s	Wind 24-29 m/s	Wind ≥30 m/s	Blizzard	Dust storm

Figure 3. Adopted list of Climatic Impact-Drivers for Charyn SNNP (Source: IPCC, 2021a)

According to Formula 1 (Brier & Panofsky, 1958) and based on statistical analysis, the probability of occurrence for hazardous and unfavorable phenomena was determined.

$$P(E) = \left(\frac{f}{N}\right) \times 100\% \qquad (1)$$

Formula 1, where P(E) – the probability of event E, %; f – the number of cases when event E occurred; N – total number of observations (sampling size). The likelihood of each event was scored according to the criteria outlined in Table 1.

Table 1. Characteristics of probability estimates (Source: Tammepuu, 2008)

Characteristic	Probability, %	Score
Very Likely	≥50	5
Likely	≥5	4
Unlikely	≥0.5	3
Very unlikely	≥0.05	2
Extremely unlikely	≥0.005	1

Each phenomenon was assigned a significance level to prioritize the impact severity (Table 2, Formula 2). The significance was determined through expert judgment.

$$I_{CID} = \frac{\sum_{i=1}^{n} (C_i \times K_i)}{\sum_{i=1}^{n} K_i} \qquad (2)$$

Formula 2 (Clark-Carter, 2010) is a weighted mean, where I_{CID} – integrated index of meteorological hazard for point, *Ci* – probability score, *Ki* – significance score.

Table 2. Assessment of meteorological hazards (Source: Authors)

Parameter	Probability, score			Significance, score
	Charyn	Bugyty	Ash Grove	
Temperature ≥ +35 ºC	4	3	3	4
Temperature ≤ -20 ºC	3	3	3	4

Precipitation 5.0-9.9 mm	3	0	4	4
Precipitation ≥10 mm	2	4	3	5
Wind 15-23 m/s	3	2	0	4
Wind 24-29 m/s	3	3	0	5
Wind ≥30 m/s	0	3	0	5
Fog	4	4	4	3
Blizzard	2	2	2	4
Dust storm	2	2	2	4
Thunder storm	3	3	3	5

RESULTS

Precipitation of ≥10 mm, thunderstorms, and wind (24–29 m/s, ≥30 m/s) hold the greatest significance, scoring 5 points, for the area under study. Excessive precipitation can act as a trigger for hydrological and geomorphological processes, while wind significance is assigned based on the severity of the phenomena's hazard to Kazakhstan and their likely consequences, according to the Beaufort scale. Based on a scoring system of 11 meteorological parameters, taking their significance into account, a hazard map for meteorological phenomena has been developed for the Charyn SNNP, Figure 4. The data indicate that the most vulnerable area is along the Ulken Bugyty mountains and the southern part of the Charyn SNNP.

According to the assessment of hazardous and unfavorable phenomena within the Charyn SNNP, it can be noted that the most frequently occurring event (Figure 4) is very strong winds (24-29 m/s) – particularly in the Ulken Bugyty mountains. A high recurrence of strong winds (15-23 m/s) is also observed in the area of the Charyn AMS on the "Valley of Castles" plateau, where the visitor center is located.

During winter, the northern part of the SNNP is characterized by fog. Squalls and hurricane-force winds are typical for the Ulken Bugyty mountains, along with precipitation exceeding 10 mm. The recurrence of extreme temperatures is observed throughout the area, ranging from about 4 days in the cold season (temperatures below -20°C) to approximately 11.5 days for temperatures above +35°C. The probability of dust storms and blizzards is low. Conditions necessary for blizzards formation are rarely met within the Charyn SNNP. Given the high frequency of very strong winds at the Bugyty AMS, snow whirlwinds may occur on the windward western slopes of the Ulken Bugyty mountains under such conditions. The presence of orographic barrier largely determines the spatial distribution of hazardous phenomena across the study area.

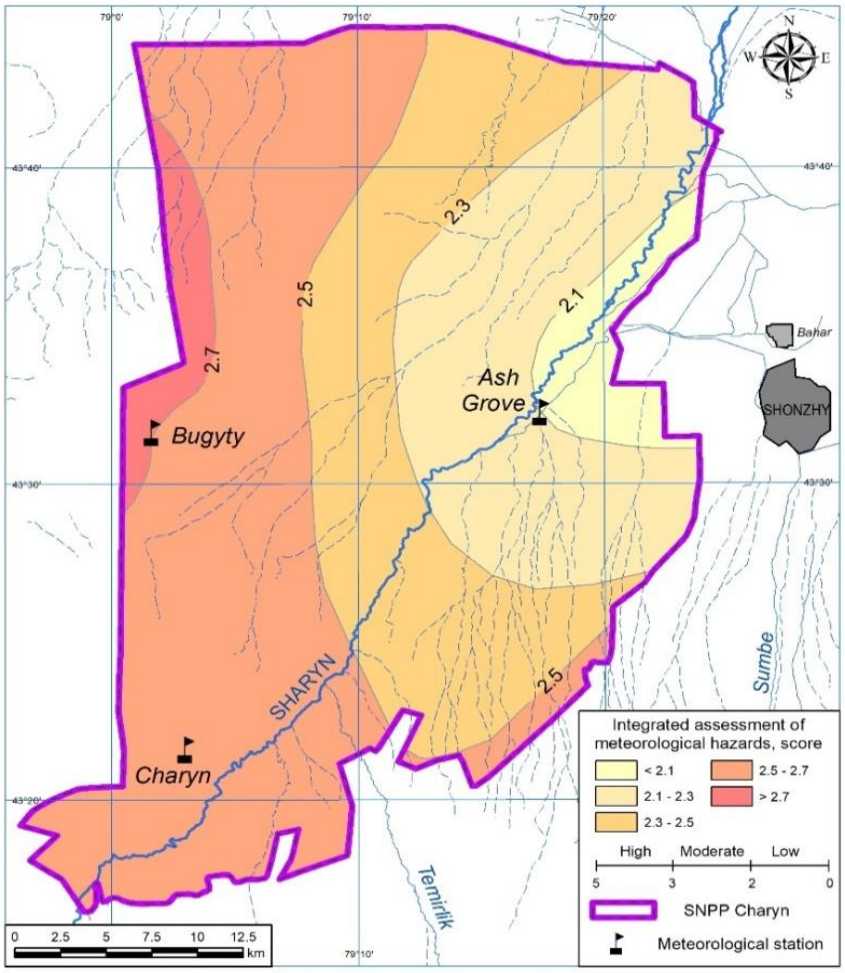


Figure 4. Integrated map of spatial distribution of meteorological hazard (Source: Authors)

DISCUSSION

We can divide two groups of stakeholders who could be impacted by unfavorable events and hazards: Government and Tourism industry, Figure 5. All stakeholders could be divided into these two types: those who are more involved into ecosystem services and others who have any type of infrastructure objects. Tour operators would be a category, which depends on those two groups of stakeholders. Regarding tourists, guides and transport, they directly depend on weather conditions but are more adaptive and flexible to season changes and can change the destination at the stage of planning, unlike holders of tourist infrastructure. Extreme weather events can damage or destroy infrastructure, leading to delays, cancellations, and increased maintenance costs (Gössling & Scott, 2025).

In this case we divided tourism industry into two types of stakeholders: geographically fixed and mobile groups. Tourism industry represents part of the economic system, developed for promoting social and mental well-being based on natural resources, influenced by changes in climate conditions. Government is one of the stakeholders interested in sustainable development of region and economic grow. Development of tourist industry, on one side, depends on policy documents and programs issued by government which could be the reason for choosing location for resort planning.

Also, decisions in emission reduction responsibilities, land use planning, disaster risk management could be managed by the government (Figure 5). For this reason, the Government in framework should be presented by policy as actor of decision making. Specially Protected Natural Areas are presented as stakeholders directly linked to government. Physical climate risks encompass extreme weather, biodiversity loss, and health risks. Socio-economic impacts involve social disruptions and changes in economic opportunities and employment (Gössling & Scott, 2025).

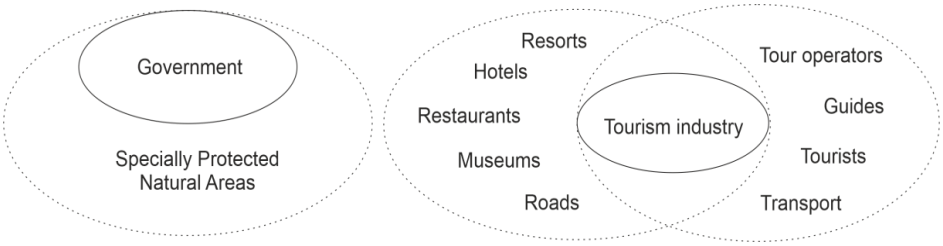


Figure 5. Groups of stakeholders (Source: Authors)

We can talk about cancellation ratio in context of tour or hotel bookings (Falk & Hagsten, 2017). In this case, cancelation ratio is more frequently the result of extreme events and less of changes in seasonality. On high favorable season if guides work every weekend, the loss of income could be about 10-20% in case of the 1-2 days tour cancellation.

Natural hazards may impact directly on local level in short-term perspective on infrastructure by destroying it. Charyn SNNP is more frequently affected by a road washout due to mudflow (Sharapkhanova et al., 2024). At the same time impact could be on ecosystem components and recovery of it would be prolonged to long-term. At the local level, natural hazards influence the spatial distribution of tourists and population density (Keiler et al., 2005). In short-term perspective, natural disasters could be the main migration force, but can also interact with other factors (Khatib, 2023).

CONCLUSION

For the assessment of each hazardous and unfavorable meteorological phenomenon or process, threshold values are established. For the Charyn SNNP, certain parameters, such as precipitation, have been taken into account due to their infrequent manifestation. The assessment results indicate that the highest recurrence is observed for very strong winds (24–29 m/s) and strong winds (15–23 m/s) across the study area. Although fog is frequent, the overall risk is reduced during the winter months when park visitation decreases (Figures 2, 6).

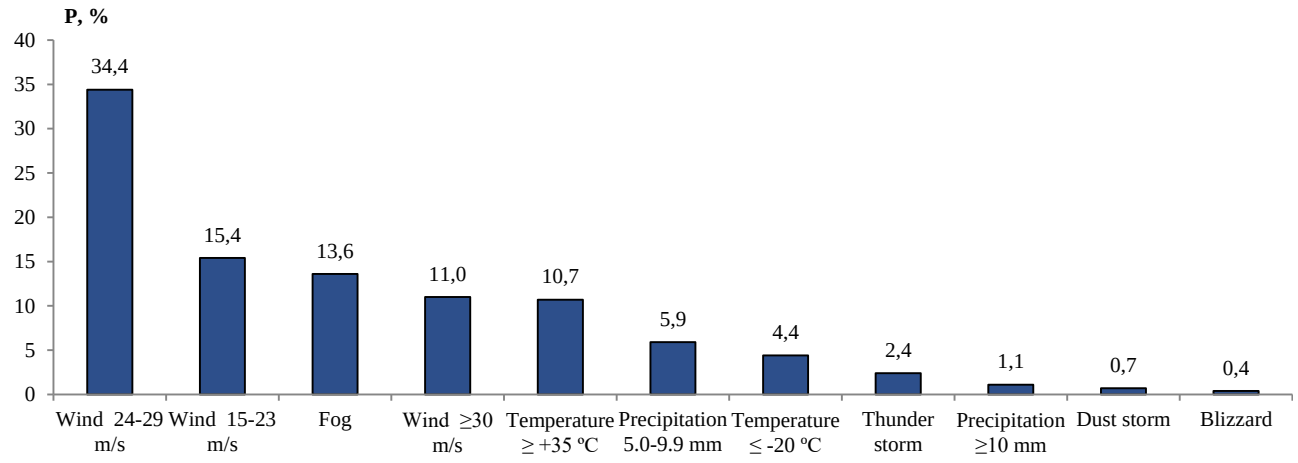


Figure 6. Maximum frequency of meteorological events for the Charyn SNNP (the total number of all events is taken as 100%) (Source: Authors)

During spring and summer, particular attention should be paid to weather forecasts for precipitation, as secondary hydrological and geomorphological processes tend to become more active during this period. Squalls and hurricane-force winds are characteristic of the Ulken Bugyty mountains, along with precipitation exceeding 10 mm. In the third decade of July, periods of 4 and 6 days with temperatures exceeding +35°C were observed in 2022 and 2023.

This can be explained by the dominance of a summer thermal depression over Central Asia and south of Kazakhstan, which most often reaches its peak development around this time. In 2022 and 2023, July ranked first, and August is second in visitation, as shown in Figure 1, indicating that increases in temperature are not significantly taken into account by visitors. The results of the study allowed for a more precise understanding of the spatial distribution of extreme meteorological phenomena within the Charyn SNNP and their recurrence in relation to other weather events.

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EXPLORING CRISIS MANAGEMENT THEORIES TO STRENGTHEN TOURISM RESILIENCE WITHIN WILDLIFE RESERVES IN MPUMALANGA, SOUTH AFRICA

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Abstract: Wildlife tourism is the cornerstone of the economy of the province of Mpumalanga, South Africa, serving as a crucial economic and conservation pillar that supports biodiversity protection and rural livelihoods. However, wildlife tourism has been affected by natural and manmade crises that have tested the resilience of the tourism sector in the Mpumalanga region. The focus of this study is on crisis management for the Mpumalanga Tourism and Parks Agency (MTPA) managed wildlife tourism sites. The study aims to explore the application of robust crisis management theories, including preventive measures and response plans, to safeguard both tourists and the tourism sector as a whole, analyse how these theories have been applied in practice across various wildlife contexts, and synthesise best practices and gaps in the existing literature to inform future crisis resilience strategies in the wildlife tourism sector. The theories considered in the study are resilience, crisis communication, community-based natural resource management, and stakeholder theories. This study employs a desktop research methodology to explore and synthesise existing theories and documented practices used in wildlife tourism crisis management. Drawing on secondary data and global case contextual analysis of 20 publications, which assisted in generating insights through the systematic review and analysis of secondary data sources to build a theoretical understanding. Using the research onion framework by Saunders, a qualitative, interpretive research approach was employed to investigate how theories can be applied to crisis management in wildlife tourism sites. The results of the study highlight the lack of a formalised, site-specific crisis management plan; a lack of adaptive scenario planning and dedicated risk assessment practices, which already exist but are reactive rather than proactive; limited local community involvement; and stakeholder coordination that is often dependent on personal networks rather than institutional frameworks. The interpretation of these results points to a gap between theoretical best practices and operational reality, further highlighting that theories are understood conceptually but not integrated into an overarching crisis management system. The MTPA-managed wildlife tourism sites would benefit from formalised multistakeholder crisis platforms to ensure cohesive, timely responses from stakeholders.

Keywords: tourism resilience, crisis management, crisis management theories, wildlife tourism, wildlife tourism crisis management

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INTRODUCTION

Wildlife tourism is positioned to support and act as an intermediary between conservation and socioeconomic goals (Tichaawa & Lekgau, 2024, p. 1782). This sector is among the largest forms of tourism in Sub-Saharan Africa, with various reports indicating that wildlife tourism is a dominant factor in international arrivals to the region (Jones et al., 2023; Lekgau & Tichaawa, 2022). Wildlife tourism is a cornerstone of South African tourism, thanks to its unique and diverse landscapes, flora, and fauna (Kelso & Giddy, 2023:1910). Mpumalanga is a region that hosts some of the world-renowned and the country's most iconic wildlife tourism destinations, including portions of the famous Kruger National Park (KNP), the Blyde River Canyon, and several smaller provincial reserves managed by the Mpumalanga Tourism and Parks Agency (MTPA) (Mpumalanga Tourism Growth Strategy, 2025). The development of tourism has a significant impact on the environment and local communities (Kupi, 2025:1758). Kelso & Giddy (2023:1910) assert that wildlife tourism is a large contributor to Mpumalanga's socio-economic and environmental landscape.

It is both a vital economic driver and a cultural symbol in Mpumalanga, drawing thousands of domestic and international visitors to iconic parks and reserves. Moreover, wildlife tourism is a crucial economic and conservation pillar for Mpumalanga, supporting biodiversity protection and rural livelihoods (KNP Annual Report, 2023). The overall tourism contribution to Mpumalanga is estimated at over R30 billion annually, accounting for nearly 6% of the province's Growth Domestic Product (GDP) (KNP Annual Report, 2023).

Despite its ecological and economic importance, the MTPA faces several strategic challenges, such as wildlife poaching, particularly rhino poaching, underfunding, and aging infrastructure, which hinder effective park management and pleasant visitor experiences, community tensions over land claims and benefit-sharing, climate change and

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environmental degradation, as well as global crises such as pandemics (Cloete et al., 2018:21; MTPA, 2023:167). Moreover, conservation initiatives are further hampered by the human dynamics within the ecosystems, exacerbated by limited participation and, consequently, limited benefits derived from protected areas (Tichaawa & Lekgau, 2024:1782).

There is limited research on the theories that can be applied in trying to address these crises. Moreover, from a socio-economic perspective, the surrounding rural communities are highly dependent on natural resources and tourism-linked livelihoods, providing vital income through guiding, hospitality, and craft industries (Snyman et al., 2021:48).

Persistent poverty and high youth unemployment rates in these rural municipalities limit the broader community benefits from tourism and conservation, which is exacerbated by limited access to skills development (van der Merwe & Saayman, 2025:2). As such, ongoing land reform and restitution claims for sites such as Manyeleti and Songimvelo require the establishment of responsive and inclusive governance structures to address community expectations for co-management and equitable benefit-sharing (MTPA, 2023:167).

The focus of this study is on crisis management for MTPA-managed wildlife tourism sites, aiming to explore the application of robust crisis management theories, including preventive measures and response plans, to safeguard both tourists and the tourism sector as a whole. Moreover, the study focuses on enabling the development of tailored crisis management strategies that address the complex social, economic, and environmental effects, thereby enhancing resilience and sustainability in the South African wildlife tourism sector (Snyman et al., 2021:48).

The primary research question for this study is: How can crisis management theories be effectively applied to manage and mitigate the diverse crises in MTPA-managed wildlife tourism sites? The objectives of this study are to identify and examine key theories of crisis management relevant to wildlife tourism, analyse how these theories have been applied in practice across various wildlife tourism contexts, and synthesise best practices and gaps in the existing literature to inform future crisis resilience strategies in Mpumalanga wildlife tourism. There are currently studies that have investigated wildlife tourism crisis management, as discussed in the following literature review section.

LITERATURE REVIEW

Global Lessons on Wildlife Tourism Crises

The global literature on crisis management in tourism has evolved significantly over the past two decades, offering a wealth of case studies and theoretical frameworks applicable to protected areas (Newsome, 2021:295) such as those under the management of the MTPA. Globally, there has been discussion about the degradation of tourism sites and protected areas caused by increasing congestion and inappropriate use (Paapa & Kambonal, 2025:352), over-tourism (Tourism Review, 2020:5139; Capocchi Vallone et al., 2019:3303), and the combined impacts of uncontrolled tourism access and development (Schulze et al., 2018:435). For example, comparative studies from East Africa, Australia, and the Amazon Basin state that crises disrupt wildlife tourism and that varying response frameworks yield different outcomes (Newsome, 2021:295). The tourism industry's exposure to crises has generated substantial academic interest worldwide. Pennington-Gray (2018: 136) pioneered structured approaches to crisis and disaster management in tourism, advocating for destination-specific risk assessments and adaptive planning mechanisms.

Case studies from Australia and Southeast Asia illustrate how natural disasters, such as tsunamis and bushfires, have devastated ecotourism economies but have also revealed opportunities to build resilience through community-based tourism and diversified visitor markets. In the Amazon Basin, reports indicate that illegal logging networks can exploit wildlife tourism opportunities when governance is compromised (Newsome, 2021:295).

Global lockdowns from 2020 to 2021 due to the Coronavirus (COVID-19) pandemic led to a near-total collapse in international travel. Protected areas and eco-tourism operations suffered significant economic losses during this period and in the subsequent years. As such, the key impact that stood out from this was that up to 90% revenue was lost in some privately-run reserves, staff had to be laid off, anti-poaching patrols were reduced, illegal hunting increased, and community livelihoods were severely affected for those dependent on tourism (Spenceley et al., 2021; United Nations Environmental Programme UNEP, 2020; African Leadership University-Wildlife Tourism Crisis Report, 2020).

Lessons that can be applied to the MTPA are that the lockdown highlighted the fragility of tourism-reliant conservation, thus emphasising the need for economic diversification, such as carbon credits, local crafts, and virtual experiences (Spenceley et al., 2021). This experience has also encouraged the establishment of emergency response funds and scalable park budgets (Spenceley et al., 2021).

African Perspectives on Wildlife Tourism Crises

African wildlife tourism is particularly vulnerable to systemic crises, such as pandemics and viral outbreaks (Maphanga, 2019:2). Studies on the outbreak of contagious diseases harm a destination, as everyday life is disrupted and commerce is disturbed. Tourists may shun destinations that have infectious disease outbreaks (Sifolo & Sifolo, 2015:11).

For instance, the 2014-2016 Ebola outbreak severely impacted West African ecotourism by triggering global travel restrictions and stigma, despite limited geographic spread (Sifolo & Sifolo, 2015:11). Meanwhile, in East Africa, the Masai Mara and Serengeti experienced a decline in visitors during the COVID-19 pandemic, leading to increased poaching due to a lack of ranger presence and community unemployment (Waithaka et al., 2021). African case studies highlight the significance of community partnerships and diverse funding sources (BirdLife International, 2018; Rosenberg et al., 2019:120; Trisos & Pigot, 2020). Lessons from the Kruger National Park and Kenya's Maasai Mara emphasise proactive stakeholder engagement and ecological monitoring as best practices. However, much of the literature on wildlife tourism remains fragmented across environmental, sociological, and tourism disciplines (Newsome, 2021:295).

The lessons from the Southern African Development Community (SADC) region include examples from SANParks and Namibias community conservancies (entities that manage national parks). The Kruger National Park, for instance, responded to poaching and pandemic-related disruptions by digitising some operations, forming anti-poaching task forces, and leveraging private sector funding (SANParks, 2022). Likewise, these cases underscore the importance of flexible, multilevel governance in addressing protected area crises (Biggs et al., 2015:20). In Namibia, 86 community conservancies successfully managed wildlife and tourism activities on communal lands during the COVID-19 pandemic and drought crisis (World Bank, 2024). Their key strengths included the legal recognition of community land and wildlife rights.

Response to crises is facilitated through conservancies that draw on reserve funds, which are used to maintain ranger salaries, and there is strong external support from Non-Governmental Organisations NGOs (World Bank, 2024). Furthermore, the lessons from Namibia are that community-based governance and financial autonomy are essential for building resilience. There must be flexibility in co-management contracts to enable quicker local-level decision-making (World Bank, 2024). This is particularly relevant to Manyeleti and Songimvelo, in Mpumalanga, where there are community claims and partnerships (SANParks, 2022). The examples demonstrate how crisis resilience can be built through community empowerment, revenue-sharing models, and adaptive conservation funding.

South African Lessons from the Rhino Poaching Crisis Management in the Kruger National Park, South Africa

Since 2008, South Africa has faced a rhino poaching epidemic, with the Kruger National Park at the epicentre. Over 10,000 rhinos were poached between 2008 and 2021 (SANParks, 2024). There has been an increased militarisation of anti-poaching units and border controls within the park (SANParks, 2024; Endangered Wildlife Trust, 2021). The Kruger National Park's response strategy has utilised anti-poaching task forces comprising rangers, police, and the military, as well as employing technology such as drones, Global Positioning System (GPS) collars, and predictive analytics, alongside ensuring community partnerships in buffer zones (SANParks, 2024). Inter-agency collaboration in crisis response requires the development of community intelligence-gathering systems, alternative income options, and ensuring that surveillance technology is beneficial when complemented with community trust-building efforts (EWT, 2021; SANParks, 2024).

Background and Overview of the MTPA

The MTPA is a statutory entity established under the Mpumalanga Tourism and Parks Agency Act (Act No. 5 of 2005). It is mandated to manage, conserve, and promote the natural and cultural resources of the Mpumalanga province, while fostering sustainable tourism development. Operating under the Department of Economic Development and Tourism (DEDT), the MTPA serves as the primary steward of Mpumalangas Provincial Nature Reserves and tourism assets (Foxcroft et al., 2017:158; Mashabane et al., 2023:520). According to the MTGS (2025:3), the agency also facilitates the effective management and conservation of biodiversity and ecosystems within the Mpumalanga province, thereby promoting socio-economic growth and transformation in the tourism and conservation industries (MTGS, 2025:3; MTPA, 2023:167; Mashabane et al., 2023:520). Moreover, the MTPA is mandated to develop and ensure effective management of protected areas, thus fostering, promoting, developing, and marketing tourism sustainably (Foxcroft et al., 2017:158; Mashabane et al., 2023:520).

Protected Areas Under the MTPA Management

The MTPA manages approximately 219,015 hectares of formally protected areas comprising 26 nature reserves, which is equivalent to 3% of the Mpumalanga Province. Only 13 of the 26 nature reserves are physically managed by MTPA across three districts in Mpumalanga (MTPA, 2023:167; Cloete et al., 2018:21; Polaris Market Research and Consulting LLP, 2023). The 13 nature reserves are 100% claimed, and some have title deeds to landowners (MTPA Annual Report, 2023/2024). The MTPA manages reserves not only to protect biodiversity but also serves as a vital node for nature-based tourism, which is integral to the province's economic development (MTPA, 2023:167).

Table 1. The MTPA-managed reserves in Mpumalanga Province (Source: MTPA Annual Report, 2023/2024)

District Municipality	Reserve(s)
Ehlanzeni District Municipality	Andover Nature Reserve, Barberton Nature Reserve, Blyde River Canyon Nature Reserve, Mahushe Shongwe Nature Reserve, Manyeleti Nature Reserve, and Mthethomusha
Gert Sibande District Municipality	Nooitgedacht Dam Nature Reserve and Songimvelo Nature Reserve
Nkangala District Municipality	Loskop Dam Nature Reserve, Mabusa Nature Reserve, Mkhombo Nature Reserve, Ohrigstad Dam Nature Reserve, SS Skosana Nature Reserve, and Verloren Valei Nature Reserve

The MTPAs wildlife tourism portfolio includes game-viewing and photographic safaris in Big Five and scenic reserves, as well as eco-lodges and camping facilities, often co-managed or leased to private operators. It also features community-based tourism projects that link cultural heritage with wildlife experiences and adventure tourism activities, such as hiking, boating, and birdwatching (Cloete et al., 2018:21; MTPA, 2023:167).

METHODOLOGY

This study employs a desktop research methodology to explore and synthesise existing theories and documented practices adopted during crisis management within wildlife tourism. Drawing on secondary data and global case contextual

analysis of 20 publications, the desktop study approach is suitable for generating insights through the systematic review and analysis of secondary data sources to build a theoretical understanding. Using the research onion framework (Saunders et al., 2019), a qualitative interpretive research approach was employed to investigate how theories can be used in crisis management for wildlife tourism sites. The interpretive paradigm is deemed appropriate for the study, given the focus on understanding the application of theories to institutional dynamics and lived experiences.

The research onion, as described by Saunders et al. (2019), comprises six layers: Philosophy, Approach, Strategy, Choice, Time, and Technique. This study has adopted each layer as illustrated in the table below:

Table 2. Summary of the research onion application (Source: Author's own creation)

Layer	Research onion	Description	Application to the study
Layer 1	Research philosophy	The foundation of a study is the set of beliefs upon which the research is built (Saunders et al., 2019).	Interpretivism was applied, as the study employs an approach grounded in subjective ontological assumptions.
Layer 2	Research approach	This is the broader method a researcher uses for research, which can be either inductive or deductive (Saunders et al., 2019).	A deductive approach was used to test the existing theory.
Layer 3	Research strategy	This layer outlines how, in line with the study's aims, research can be conducted (Saunders et al., 2019).	A case study was used to develop a theory, which was systematically collected and analysed.
Layer 4	Methodology choice	It involves deciding how many data types (qualitative or quantitative) to collect, whether mono, mixed, or multi-method (Saunders et al., 2019).	The mono method has been utilised to analyse unstructured data and subjective conclusions.
Layer 5	Time zone	Defines the time frame for the research: Cross-sectional (short-term)- collecting data at a specific point in time. Longitudinal – the process of collecting data repeatedly over a long period of time to compare data (Saunders et al., 2019).	A cross-sectional time period was employed to collect data at a single point in time, enabling the study of the phenomenon.
Layer 6	Technique	Data collection style and analysis (Saunders et al., 2019).	Desktop secondary data and global case contextual analysis from 20 publications.

The research onion by Saunders et al. (2019) has guided this study, as explained in the layers outlined in Table 2. The following section will discuss the conceptual/theoretical framework that is important to the study.

Conceptual/ Theoretical Framework

This study identifies and examines key theories of crisis management relevant to wildlife tourism, including resilience theory, stakeholder theory, crisis communication theory, and community-based natural resource management theory.

Resilience Theory

According to Filimonau & De Coteau (2020: 202), the word resilience originated from the Latin word “resilere”, translated as “to spring back”, and therefore implies a certain degree of flexibility. Resilience is the capacity of a system to absorb disturbance, undergo change, and retain essentially the same function, structure, identity, and feedback (Copley, 2025:23). Resilience can be understood as the ability of the system to reduce the likelihood of a shock, to absorb a shock if it occurs (an abrupt reduction in performance), and to recover quickly after a shock (re-establishing normal performance) (Copley, 2025:23). Studies on tourism resilience theories are primarily centred on natural disasters, making them unsuitable for the epidemic crisis due to its suddenness, rapid transmission, and comprehensiveness (Ling et al., 2021:684).

Therefore, one can argue that the resilience theory is particularly relevant to the context of complex socio-ecological systems that are frequently disrupted by factors such as poaching, droughts, and pandemics. The application of resilience theory can help better understand the state and change of tourism destinations in the face of an epidemic (Ling et al., 2021:685). Challenges to applying resilience theory in a setting like the MTPA-managed reserves may arise if the reserve operates within a rigid, top-down, and exclusionary system that lacks adaptive governance, stakeholder feedback, institutional learning, fixed policies, and integrated socio-ecological thinking—essential components of resilience. It is vital to explore other theories applicable to wildlife tourism, such as crisis communication theory.

Crisis Communication Theory

Crisis communication theory is a multidisciplinary field that encompasses a range of practices by which organisations communicate before, during, and after crises to restore normal operations (Spradley, 2017:1; Ulmer et al., 2015). Effective crisis communication is recognised as essential for maintaining trust, mitigating reputational damage, and ensuring organisational continuity in the face of adverse events (Coombs, 2019:370).

Crisis communication theory uses attributions of the organisation's responsibility for a crisis to prescribe crisis response strategies that should maximise the protection of the organisation's reputation (Coombs, 2019:370). The crisis communication theory is well-suited to the context of wildlife tourism sites managed by the MTPA, as it promotes effective communication, which is essential in crises such as pandemics, poaching, and natural disasters, to maintain tourist confidence, coordinate staff, and disseminate information to local communities. The MTPA typically utilises radio, social media, and park signage to manage public messaging during crises, aligning with best practices from the

theory (MTPA, 2023:167). The crisis communication theory supports proactive planning, which helps reduce reputational damage and operational disruption during tourism-related crises (Coombs, 2019:371).

The application of the crisis communication theory would be hindered by the lack of transparency in communication structures if the MTPA lacks well-established or proactive communication channels to inform stakeholders during a crisis. Limited public engagement or media presence may hinder the operationalisation of the crisis communication theory, especially if the MTPA has limited public visibility and media relations capacity at the individual nature reserve level. Therefore, past failures to address community concerns or environmental issues can erode the credibility necessary for the theory to be practical, due to a lack of trust in the theory (MTPA, 2023:167).

Community-Based Natural Resource Management Theory

Child (2019:152) and Muzirambi et al. (2019:143) state that community-based natural resource management theory is a people-centered approach that integrates the conservation of the natural resource base. Muzirambi et al. (2019:143) state that community-based natural resource management theory for wildlife tourism crisis management emphasises the role of local communities in managing and protecting natural resources, especially during crises affecting wildlife tourism. This approach is rooted in the idea that communities living near wildlife areas have the most direct stake in the health of the environment and are therefore best positioned to manage these resources sustainably (Seoraj-Pillai & Pillay, 2016:34; Muzirambi et al., 2019:143). The community-based natural resource management theory could be applied in several MTPA-managed nature reserves. For example, the MTPA can allow communities to benefit from the resources while ensuring the protection and conservation of ecosystems. The Community-based natural resource theory applies to wildlife tourism sites, as many are located adjacent to or embedded within rural communities with strong cultural and economic ties to the land. The theory aligns with the MTPA's goals of involving local people in wildlife management and in deriving tourism benefits, thereby helping reduce conflict and improve conservation outcomes (MTPA, 2023:167). The application of community-based natural resource management theory would be challenged by a top-down governance model, in which policies and decisions are made by government officials rather than by communities, which contradicts the bottom-up participatory approach required by the theory.

Limited community involvement can challenge the application of the theory, which, by nature, seeks the full participation of communities in planning, decision-making, and benefit sharing (Seoraj-Pillai & Pillay, 2016:34).

Stakeholder Theory

According to Khan (2023:34), tourism stakeholders are individuals or organisations with a vested interest in the tourism sector. They may be directly involved, such as tourism businesses and government agencies, or indirectly involved, such as local communities and environmental organisations (Freeman, 2023:80). Pennington-Gray and Basurto-Cedeno (2023:325) point out that the stakeholder theory in tourism crisis management emphasises the importance of involving all relevant parties in the planning, response, and recovery processes of a crisis. Pennington-Gray and Basurto-Cedeno (2023:325) also argue that stakeholder theory underscores the need to recognise and address stakeholders' diverse interests, concerns, and roles in effective crisis management. Stakeholders relevant to the study include MTPA management and staff, local communities, tourists, conservation organisations, government agencies, the media, and tourism operators. The United Nations UN, (2023:78) states that communication and transparency are key in the application of stakeholder theory, whereby clear, consistent, and transparent communication is essential to keep all stakeholders informed and aligned regarding the crisis event. This helps prevent misinformation, manage expectations, and build trust among stakeholders during a crisis (Pennington-Gray & Basurto-Cedeno, 2023:325; Wondirad et al., 2020:7810).

The United Nations World Tourism Organisation (UNWTO, 2020:40) and the UN (2023:78) argue that integrating stakeholder theory into wildlife tourism crisis management makes the approach more comprehensive, inclusive, and likely to yield sustainable outcomes that protect both wildlife and the interests of all parties involved.

The stakeholder theory applies to the MTPA, as it operates in a multi-stakeholder environment involving government departments, private tourism operators, NGOs, researchers, traditional leaders, and residents. The stakeholder theory may be compromised by factors such as power imbalances, a lack of transparency, and the dominance of top-down decision-making (Pennington-Gray & Basurto-Cedeno, 2023:325). In a politically sensitive context, such as land claims or benefit-sharing disputes, the stakeholder theory may be further compromised.

Below is a summary of the theory's application to crises that have previously affected the MTPA, providing a practical approach to studying their impact on MTPA-managed wildlife tourism sites.

Table 3. Summary of theoretical application on crises that have previously affected the MTPA-managed wildlife tourism sites

Crisis	Period	Impact on the MTPA-managed reserves	Theory linked
COVID-19 pandemic	2020-2023	Travel bans led to drastic declines in visitors, resulting in revenue shortfalls and a risk to local livelihoods.	Crisis communication theory: Importance of clear messaging to stakeholders (Coombs, 2019:370). Community-based theory: Emphasises community livelihood diversification and resilience (Muzirambi et al., 2019:143).
Poaching and illegal wildlife trade	2008-present	Sharp increase in rhino deaths; heightened security and patrol costs; tourist concerns	Resilience theory: The necessity to build an anti-poaching system with resilience and adaptive capacity (Copley, 2025:23). Stakeholder theory: Need for inclusive collaboration with communities and law enforcement (UNWTO, 2020:40).

Human-wildlife conflict	Ongoing since 2010	Crop damage, livestock loss, and community resentment are impacting conservation support.	Community-based theory: Necessity of community involvement in mitigation and benefit-sharing (Muzirambi et al., 2019:143) Stakeholder theory: Managing conflicting interests through participatory governance (UNWTO, 2020:40).
Historical land and socio-political crises	Post 1994 and ongoing	Land claims complicate park boundaries and management, as well as community mistrust.	Stakeholder theory: Complex power dynamics and the need for inclusive conflict resolution (Freeman, 2023:80). Community-based theory: Recognising indigenous rights and traditional knowledge (Muzirambi et al., 2019:143).
Natural disasters and severe drought events	2015-2017	Water scarcity stressed wildlife and communities.	Resilience theory focuses on the adaptive capacity of ecosystems and social systems (Ling et al., 2021:685). Stakeholder theory: Coordinated responses are necessary among the government, communities, and NGOs (Pennington-Gray & Basurto-Cedeno, 2023:325).
MTPA employees and local communities protest	Ongoing	Disruption of reserves operation; economic and reputational damage, and conservation and wildlife management risks	Stakeholder theory: Getting all affected stakeholders involved (UNWTO, 2020:40).
Infrastructure degradation	2010-present	Reduced park accessibility and service quality, along with operational inefficiencies.	Resilience theory: Importance of maintaining system functions under stress. Collaboration: the need for multi-sectoral partnerships to mobilise resources (Ling et al., 2021:685).

Each theory offers distinct yet complementary contributions. For instance, the resilience theory provides a systems-level adaptive approach, the crisis communication theory enhances transparency and trust, the community-based natural resource management theory grounds resilience in local agency and knowledge, and the stakeholder theory ensures broad-based participation and strategic alignment (Freeman, 2023:80). Theory-practice gaps may persist due to the implementation of theory being weakened by top-down governance, funding limitations, and a lack of effective monitoring frameworks, as further discussed in the following sub-section.

Gaps Between Theory and Practice in the Context of MTPA

Despite the relevance and potential of crisis management theories, a significant gap remains between theoretical frameworks and actual practice within the MTPA. These gaps hinder effective crisis preparedness, response, and long-term sustainability. Below is an analysis of the most critical disconnects.

Table 4. Summary of a theory-practice gap (Source: Author's creation)

Theory	MTPA Practice	Identified Gap	Assumed best Practice
Resilience theory (Ling et al., 2021:684)	Reactive crisis handling; lack of adaptive planning	Planning bias: not all stakeholders are involved	Long-term planning for ecological/social shocks
Stakeholder theory (Pennington-Gray & Basurto-Cedeno, 2023:325)	Centralised decisions with limited community voice	Stakeholders are not consulted/ involved in the early stages	Inclusive, participatory governance in planning
Crisis communication theory (Coombs, 2019:370)	Delayed and inconsistent messaging to local communities	Poor communication protocols and information dissemination	Timely, audience-specific information sharing
Community-based natural resource management theory (Seoraj-Pillai & Pillay, 2016:34)	Communities are sidelined from real decision-making.	Lack of capacity-building and trust in local community capabilities	Empowered local roles in tourism/crisis response

To close the existing gaps, it is suggested that for an organisation such as the MTPA to do the following;

- Translate theory into action by developing operational guidelines grounded in key theories, supported by training and funding (Ling et al., 2021:684).
- Conduct institutional audits to assess current gaps in stakeholder engagement, communication capacity, and crisis readiness (UNWTO, 2020:40; Ballantyne et al., 2023:197).
- Pilot community-based tourism crisis initiatives in selected sites, focusing on co-creation and local leadership (Seoraj-Pillai & Pillay, 2016:34).
- Develop integrated communication platforms for crisis alerts, updates, and feedback collection, tailored to diverse linguistic and digital access levels (Coombs, 2019:370).
- Institutionalise learning from past crises through after-action reviews and the development of a crisis knowledge management system (Ballantyne et al., 2023:197).

CONCLUSION

This paper concludes that no single theory is sufficient to address the layered crises facing the MTPA wildlife tourism sites. A hybrid framework that draws on resilience, crisis communication, community-based natural resources, and stakeholder theories offers the most promise. Future research should include empirical case studies and interviews

with MTPA officials and community stakeholders to validate these conceptual insights. Strengthening crisis readiness will not only protect biodiversity but also support the long-term sustainability of tourism in Mpumalanga. To maximise collaborations, the MTPA should establish a provincial crisis collaboration platform that brings together NGOs, local government, local communities, traditional leaders, private operators, and emergency services.

The MTPA must further formalise community resilience programs as part of its conservation and tourism mandate, with dedicated budgets and local coordinators. It is recommended that the MTPA establish an inter-agency emergency protocol with clear roles, timelines, and mechanisms for resource sharing to support effective crisis management.

Train staff in collaborative leadership, community engagement, and crisis diplomacy, recognising the human element in crisis governance. Stakeholder interviews and participatory research should be conducted through in-depth interviews and focus groups with diverse stakeholders, including MTPA officials, local community leaders, tourism operators, conservation NGOs, and law enforcement personnel. Investigate community perspectives on benefit-sharing, trust in the MTPA, and willingness to engage in crisis preparedness and response.

The increasing frequency and complexity of crises impacting wildlife tourism in Mpumalanga underscore the urgent need for a transformative approach to crisis readiness and sustainability within the MTPA-managed sites.

This paper highlights that resilience is not merely the capacity to recover from shocks but also the ability to adapt and innovate proactively in the face of uncertainty. Furthermore, strategic investments in robust communication systems, early warning mechanisms, and diversified economic models can buffer against shocks while maintaining stakeholder trust and engagement. Enhancing crisis readiness in the MTPA context requires a holistic mindset, one that recognises the interdependence of ecological health, community wellbeing, and economic viability.

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APPLICATION OF THE REPRESENTATIVE STATISTICAL SURVEYS FOR THE PURPOSES OF STUDYING THE ATTITUDES TOWARDS THE DOMESTIC TOURISM IN BULGARIA - ON THE EXAMPLE OF THE PLOVDIV DISTRICT

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Abstract: The main goal of the article is to determine the attitudes of the population of the second largest district in Bulgaria - Plovdiv towards the domestic is to determine the attitudes tourism in the country and the main factors that influence them. The analysis in this article is based on the microdata from a nationally representative survey, using two-staged clustered sample of respondents, stratified by Bulgarian districts and residence place type and the application of statistical methods such as frequency distributions and measures of central tendency (summary statistics). The results show that the residents of Plovdiv district prefer summer vacation tourism much more than winter one, although the practicing of it is relatively rare - 1-2 times a year. The main reasons that hinder more frequent travel in the country are primarily of a financial nature. Decisions on booking accommodation are predominantly based on advice from people already experienced in the field, especially relatives and friends. The availability of public transport in the Plovdiv district is not a strong incentive for use among residents, who prefer traveling domestically by private vehicle. The residents of the district show a much stronger preference for summer vacations at the Bulgarian seaside compared to leisure domestic tourism at mountain winter resorts. Despite the relatively high ratings given by the respondents, the main problems faced by the domestic tourists are: the unreasonably high prices, the poor service, the overbuilding, and the orientation of tourism services primarily towards the foreign market. The conclusion outlines the main measures that need to be taken to overcome negative attitudes, related to improving the quality of service in winter and summer resorts, improving transport infrastructure, strengthening the image of Bulgarian tourism through the main communication channels, etc.

Keywords: population attitudes, domestic tourism, Plovdiv district, representative survey, statistical analysis

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INTRODUCTION

Domestic tourism is of particular importance for the development of Bulgaria as a year-round destination. National Statistical Institute (NSI, 2025) data show that over 60% of the population's tourism travel expenses are for travel within the country. The remaining 40% are distributed as follows: during the summer months, most of them are directed to the economies of Türkiye and Greece, and during the winter months - to Austria, Italy and France. The present paper examines the attitudes of Bulgarians towards domestic tourism for leisure purposes, based on a study conducted in the Plovdiv region. The aim is to determine the reasons for the negative image of summer seaside resorts and winter ski destinations among a part of the population. Most tourism research is based on individual samples, which are not representative. They provide some information and most of them reflect attitudes relatively clearly, but they are not comprehensive and cannot be completely objective due to unclear or limited criteria for selecting respondents. For this reason, the main purpose of this article is to examine the application of nationally representative surveys in the study of attitudes, by presenting a specific study.

CASE STUDY AREA

Plovdiv District is the second most populous district in Bulgaria (633,586 people), with about 75% of its residents living in cities (472,213 people) according to NSI (2025) data as of December 31, 2023. The population of the district center Plovdiv is 325,485 people, which constitutes about 51% of the population in the district. Urbanization is a complex social, economic and demographic process, the essence of which is the concentration of population, production and service activities in cities (Penkova, 2008). The dependence has been established that with increasing technologization of the economy and society, the demand for recreational activities increases (Ivanova, 2018).

The geographical location of the Plovdiv region shows that the cities in the region are equally distant from the Bulgarian and Greek sea coasts. The distance from the center of the region, the city of Plovdiv, to the port of

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Alexandroupolis is about 220 km and takes just over 3 hours, and to Burgas it is about 250 km. and takes about 2.5 hours (Google maps, Direction). On the other hand, the two national ski resorts Pamporovo and Borovets are located in two neighboring districts of Plovdiv – Smolyan and Sofia region, and the popular international ski destination Bansko is only about 150 km away. Inside the district, the wealth of cultural and historical landmarks, the presence of favorable natural resources, the traditions and experience of the local population in offering tourism services provide an opportunity to practice various types of tourism. The territory of the district covers the southern slopes of the Stara Planina Mountains, the Pazardzhik-Plovdiv plain, parts of the Sredna Gora and Rhodope Mountains. According to the Strategy for Integrated and Sustainable Tourism of Plovdiv District 2019-2027, there are conditions to form five more compact spatial zones in which specific combinations of tourism products can be developed:

- Northern belt, which covers the municipalities of Karlovo, Sopot, Brezovo, Rakovski, Kaloyanovo, Hisarya and Maritsa. Main destinations are Karlovo, Sopot, Klisura, Kalofer, Rakovski, Zhitnitsa, Manole, Starosel and Hisarya, as well as parts of the Central Balkan National Park. The belt offers opportunities for mountain, sports, cultural, rural, wine, health and ecotourism.
- Central belt with the center of the municipality of Plovdiv and peripheral parts of the municipalities of Rhodopes and Maritsa. The belt offers opportunities for cultural and historical, festival, business, entertainment and ecotourism.
- Southern belt, formed around the municipalities of Asenovgrad, Kuklen and Lucky with opportunities for the development of religious, pilgrimage, mountain, wine, health and ecotourism.
- Western belt, which encompasses the municipalities of Perushtitsa, Krichim, Stamboliyski, Saedinenie and parts of the Rhodopes municipality. The belt offers opportunities for wine, cultural and ecotourism.
- Eastern belt – on the territory of the municipalities of Parvomay and Sadovo, offering opportunities for agrarian and rural tourism.

Plovdiv district offers also opportunities for slow tourism mostly in destinations as Hisarya, Starosel, Koprvshtitsa, Karlovo, Kalofer, Pavel banya, Velingrad, Tsigov chark, Chepelare, Momchilovtsi, and many small villages in Western Rhodopes. This kind of tourism becomes very popular because of the fast pace of life and the chronic stressors, mostly in the urban areas. The people in their active age try to find ways to cope with stress including the type of tourism they practice. The slow living philosophy is one of these strategies (Varadzhakova, 2017).

Plovdiv District is among the most significant and fastest-growing economic districts in Bulgaria. The latest published NSI (2025) data on the average salary of employees in 2022 of 1,494 leva show that it ranks sixth out of the 28 districts in the country by this indicator (NSI). The average monthly total income of one person is 866 BGN, slightly below the national average of 904 BGN. The district ranks 11th among the other districts. The average pension for the district is 762.52 BGN and is lower than the national average of 784.48 BGN, ranking it 10th among the other districts. These data show that overall, the well-being of the population is good and is around the national average.

On the other hand, Plovdiv district has an excellent transport geographical location. The transport corridor "Orient/East-Mediterranean", part of the Trans-European Transport Network (TEN-T), through the "Trakia" motorway passes through the region and connects it to the Black Sea. The total length of the road network is 1020 km, 97% of which is asphalted. The railway network in the region is 324 km long, 285 km of which is electrified. Main railway line No. 1 Kalotina - West - Svilengrad in Plovdiv district has 8 stations, Railway line No. 8 (Plovdiv-Burgas), which is part of transport corridor No. 8 has 6 stations there, and main railway line No. 3 (Sofia(Iliyantsi)-Varna) in the district has 7 stations.

The population of Plovdiv District has equal conditions for practicing both domestic and outbound tourism, which is why the analysis of their attitudes towards both types is important.

LITERATURE REVIEW

Domestic tourism encompasses travel by residents of a country within its borders. Interest in this type of tourism and tourists' attitudes has grown in recent years, especially in the context of global travel restrictions during the COVID-19 pandemic (Akhter Shareef et al., 2023). Understanding consumer attitudes towards domestic tourism is crucial for all stakeholders seeking to foster sustainable economic and tourism growth, increase satisfaction, and loyalty among domestic tourists and excursionists. They are important for understanding how individuals perceive the world around them and what their behavior is. In tourism, researching consumer attitudes is of key importance, as they directly influence tourist satisfaction (Huang & Hsu, 2009), the selection of a destination (Kim & Kwon, 2018) and indirectly even their future behavior when choosing a destination (Lee, 2009).

Their research is important for better targeting potential customers when developing marketing strategies and tourism policies, for ensuring a pleasant tourist experience, which is essential for the long-term success of destinations (Cetin & Bilgihan, 2015). Provoking an intention to visit a specific tourist destination in the future is a challenge for the tourism business (Ervina & Octaviany, 2022) and is based on the specific attitudes that the potential tourists have.

Attitudes are a construct of social psychology (Wolf et al., 2020) and represent individuals' evaluations, views or predisposition to ideas, people, objects, etc. (Plaza-Mejía et al., 2023). According to Fabrigar et al. (2005), attitudes have a two-node structure. One node is the object of the attitude, and the other is the overall evaluation of the object. The relationship between the two represents the strength of the attitude. The attitude strength shows how important it is for the person (Howe & Krosnick, 2017). According to the tripartite model of attitudes (Rosenberg & Hovland, 1960), also known as ABC model, they have 3 main components: affective, behavioral, and cognitive. The affective or emotional component reflects feelings and emotions towards a given object, product or phenomenon. The behavioral component shows the intentions or actual actions generated by the attitude. The cognitive expresses beliefs, knowledge

and evaluations regarding the object of the attitude (for example, a destination or a tourist product). Attitudes are the result of physically observable or verbal stimuli (Kim & Stepchenkova, 2015).

Tourist attitudes vary depending on various factors such as gender, generation, marital status, income, previous travel experience, knowledge of the destination, etc. (Varadzhakova & Naydenov, 2024). When researching attitudes towards a given tourist destination, it is necessary to examine all or at least some of these factors in order to lay the foundations for an adequate tourism policy towards target groups.

Although the topic on the population attitudes towards domestic tourism plays an important role for the building of adequate national tourism strategies and policies, there are a few scientific papers in that field that rely on the statistical analysis of data from representative surveys. Kabuitu et al. (2022) examine how the demographic and travel characteristics of the the domestic tourists influence their purchase decisions and travel choices. The study is based on a structured questionnaire distributed to a random sample of domestic tourists and the data is analyzed using descriptive statistics and Chi-square techniques. The key findings show that the duration of the visit is dependent on the annual income, the number of visits and travel arrangements at the Kenyan Coast are dependent on the age, and the mode of transport is dependent on both age and education. The identification of the preferred local destinations and attractions for the domestic tourist market, depending on demographic and travel characteristics, is crucial in order to increase travel propensity for the sustainability of the industry.

A case study by the OECD (2025) discusses the integration of traditional survey methods (National Visitor Survey) with new data sources like mobile positioning data to measure domestic tourism in Australia. While the article focuses on data sources and methodology, it highlights the importance of the representative surveys for reliable statistical analysis. The latter concerns mainly the benchmarking of the survey results with population data and the comparison of the traditional and the mobility data for validation. The key insights show that the representative surveys remain a cornerstone for measuring attitudes and behaviors in domestic tourism and that the new data sources can complement surveys to improve the granularity and the timeliness. Raykova & Naydenov (2024) in their paper use data from a representative survey with a two-stage random sample stratified by Bulgarian districts and residence type to analyze public attitudes towards domestic tourism on a national level. The methodology includes descriptive analysis, spatial analysis, frequency distributions, and statistical hypothesis testing. Key indicators are practices, frequency, stay duration, non-participation, and satisfaction with domestic tourism, with results highlighting significant regional and demographic differences.

The domestic tourists' perception and attitude towards circularity in Egypt is elaborated in Elsawy (2024). The article investigates the Egyptian domestic tourists' attitudes towards circular economy practices in tourism, using data from a structured online survey targeted at Egyptians with domestic tourism experience. The study examines the relationship between environmental consciousness, demographics, and attitudes towards the circularity, using statistical analysis to reveal the patterns and mediating/moderating effects. The study provides actionable insights for sustainable tourism strategies in developing countries. Other research paper (Parvez & Kashem, 2018) focuses on the young Bangladeshi tourists, utilizing a survey questionnaire adapted from standardized measures and completed by 571 randomly selected respondents from Dhaka. The analysis measures attitudes, travel patterns, and satisfaction levels, employing statistical methods to assess the contribution of young tourists to the domestic tourism sector and to identify the key influencing factors. A working paper of the UN Tourism emphasizes the importance of the household income and expenditure surveys as a rich source for the studying domestic tourism consumption and behavior (UNTourism, 2005). According to the paper these surveys provide representative data on the household travel activity and are considered the most efficient instrument for measuring domestic tourism across countries.

The study also discusses the use of tourism-specific modules within multipurpose household surveys to estimate domestic tourism activity. Gonda (2024) focuses on the study on the gender differences in tourism consumption attitudes in Hungary using a representative online survey of 1,085 respondents aged 15–74. The statistical analysis revealed significant differences in the attitudes and consumption patterns between the males and females, highlighting the value of representative survey data for the understanding of the demographic variations in the domestic tourism attitudes.

MATERIALS AND METHODS

The analysis in this article is based on the microdata from a nationally representative survey. The latter is executed using two-staged clustered sample stratified by Bulgarian districts and residence place type. The first-stage clusters are the electoral districts and the second-stage ones are the households. The survey unit is a person aged 18+, permanently residing in the territory of the Republic of Bulgaria.

The total sample size for the survey on a national scale is 1003 persons and the sample size of the strata for Plovdiv district equals 101 persons. The survey fieldwork is conducted by 71 interviewers during the spring of 2023 using online-based questionnaire by the means of tablet-assisted personal interviews. The questionnaire is of a structured-type one and includes 9,5 standard pages of survey questions grouped in 6 sections. For the purposes of the analysis in this article only a part of the questions is used, mainly concerning: the general practices for domestic tourism in Bulgaria, practices for winter leisure tourism in the Bulgarian ski resorts and the practices for summer vacation tourism in the Bulgarian seaside resorts.

The statistical analysis of the microdata from the survey comprises the methods of the descriptive statistics. The latter cover: frequency distributions and summary numeric characteristics (such as the average) using data measured on the nominal, ordinal and ratio scales (Field, 2024). The statistical analysis is applied using IBM SPSS ver. 30 and the charts are made by the usage of the Microsoft 365 software.

The methodology steps of the current study can be visualized by the following (Figure 1).

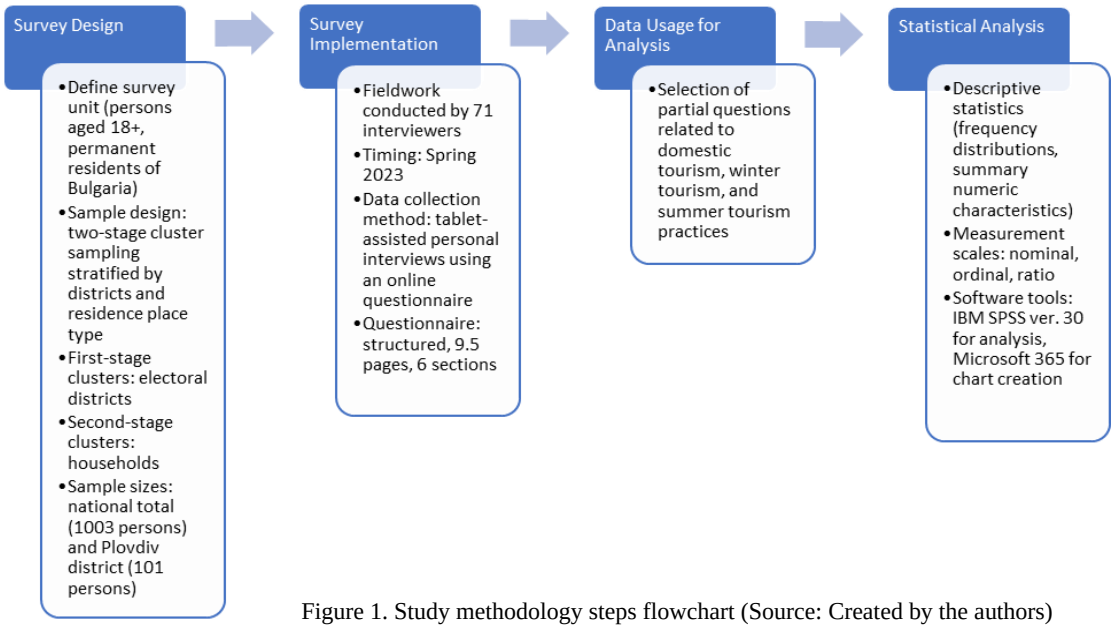


Figure 1. Study methodology steps flowchart (Source: Created by the authors)

RESULTS AND DISCUSSION

Of essential importance for the overall understanding of the results from the statistical analysis of the domestic tourism practices of the Plovdiv district residents is the discussion of the specific demographic characteristics of the studied population. The 'profile' of the Plovdiv district respondents, described by the frequency distribution of the studied units by gender, age and education is presented in Figure 2. The results presented in Figure 2 show that male and female respondents are equally represented, a large share (72%) of the residents studied has secondary education and as the age increases more respondents are interviewed. The general practices for the realization of the domestic tourism in Bulgaria by a representative sample of the Plovdiv residents are analysed starting with frequency of the travel for domestic tourism purposes presented by the pie-chart in Figure 3. It is clearly visible that a large share of the respondents (65%) travel in Bulgaria only once a year or even less, approx. ¼ of all respondents (26%) travel several times a year and 8% of the Plovdiv district residents do not travel in Bulgaria at all. The main reason for the inability to travel locally is the lack of financial resources. When the respondents decide to book a place for accommodation, they usually seek for the advice of people who already have some experience in that field (Figure 4).

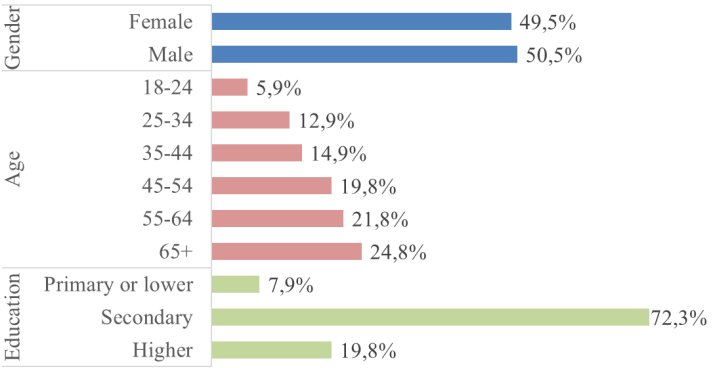


Figure 2. Demographic characteristics of the studied sample (Source: National representative survey data)

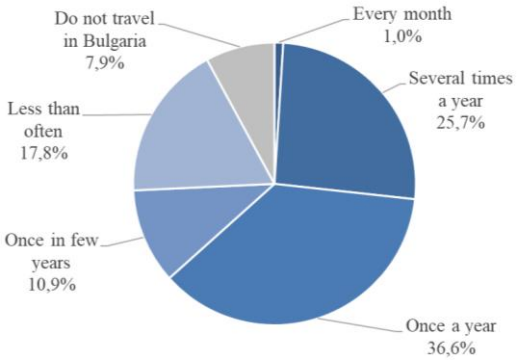


Figure 3. Frequency of travel for domestic tourism purposes (Source: National representative survey data)

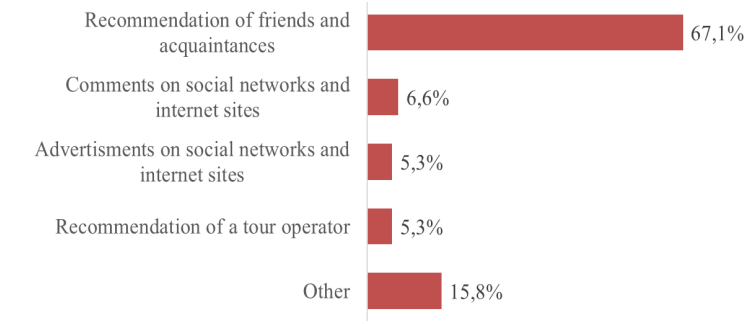


Figure 4. Approaches for choosing the accommodation place (Source: National representative survey data)

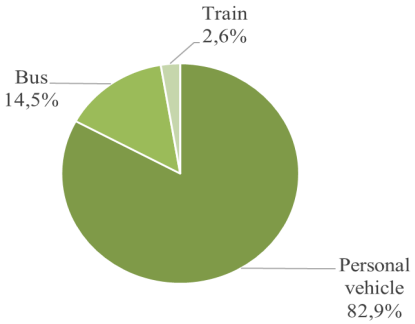


Figure 5. Means of transportation (Source: National representative survey data)

Figure 4 shows evidently that the main 'factor' (67%) in the process of choosing the accommodation place is the recommendations from friends and relatives. The 'modern' means such as social network and internet sites (less than 7%) and recommendations of the tour operators (approx. 5%) are far behind the 'old-fashioned' communications.

Although there are public means of transportation in Bulgaria – buses and railways, the Plovdiv district residents mostly prefer (83%) to visit the places for domestic tourism using their own car (Figure 5).

When respondents from the district of Plovdiv are asked to evaluate the degree of the influence of the main information sources on the domestic tourism practices using the scale: from 1 – To a small degree to 7 – To a great degree, the results 'speak' clearly (Figure 6). To the greatest degree the main 'influencer' on the preferences for the domestic tourism practices is the opinion of the relatives and friends (5,9) and the 'modern' communication channels are far behind it (3,1-3,4). The print media has almost no power (2,1) over the travelling decision process.

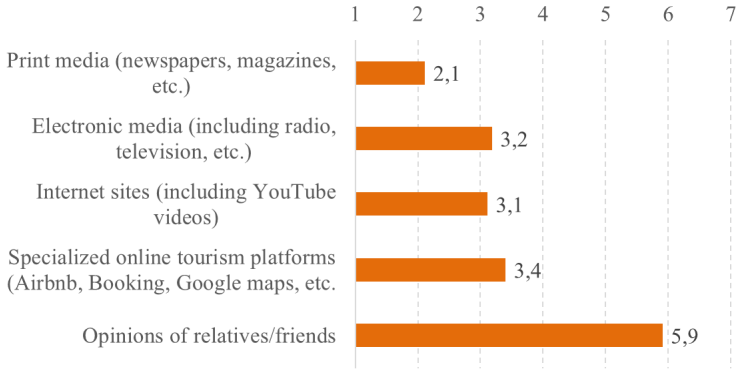


Figure 6. Influence of the main information sources on the domestic tourism practices (Source: National representative survey data)

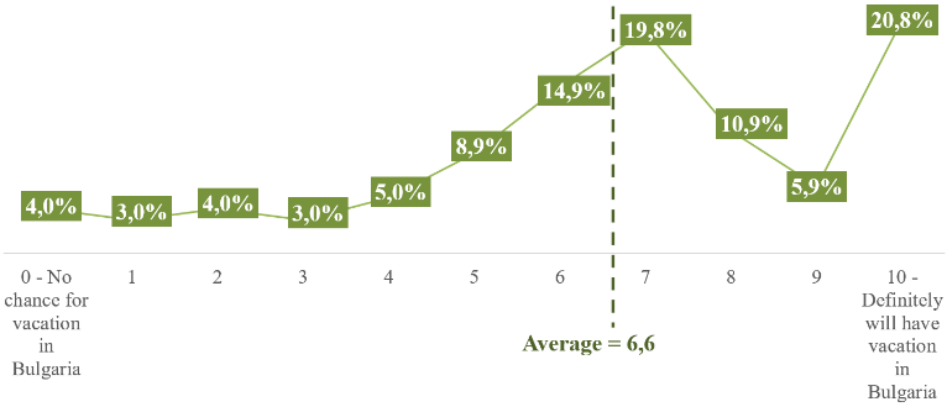


Figure 7. Probability for practicing domestic tourism in the near future (Source: National representative survey data)

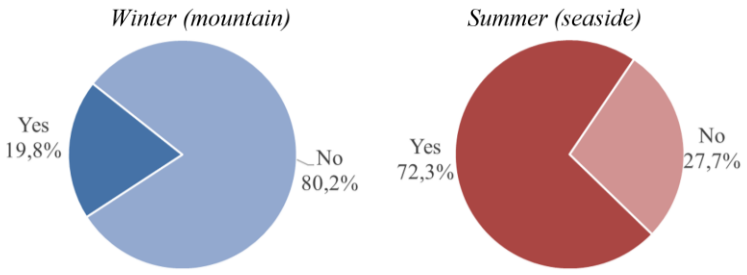
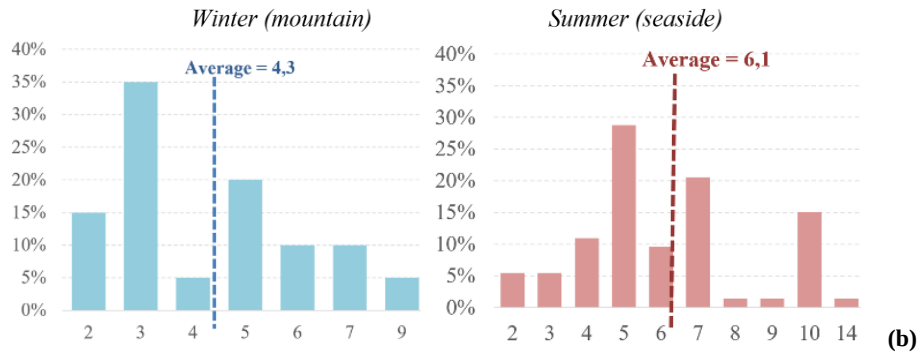


Figure 8. General practices for winter (a) and summer (b) domestic tourism (Source: National representative survey data)

Presumably the 'not-so-great' experience of the local tourists in Bulgaria leads to a tiny rise of probability for practicing domestic tourism in the near future over the middle point of the scale (6,6): from 0 – No chance for vacation in Bulgaria to 10 – Definitely will have a vacation in Bulgaria. The distribution of the Plovdiv respondents by the probability for practicing domestic tourism in the near future is shown in Figure 7.

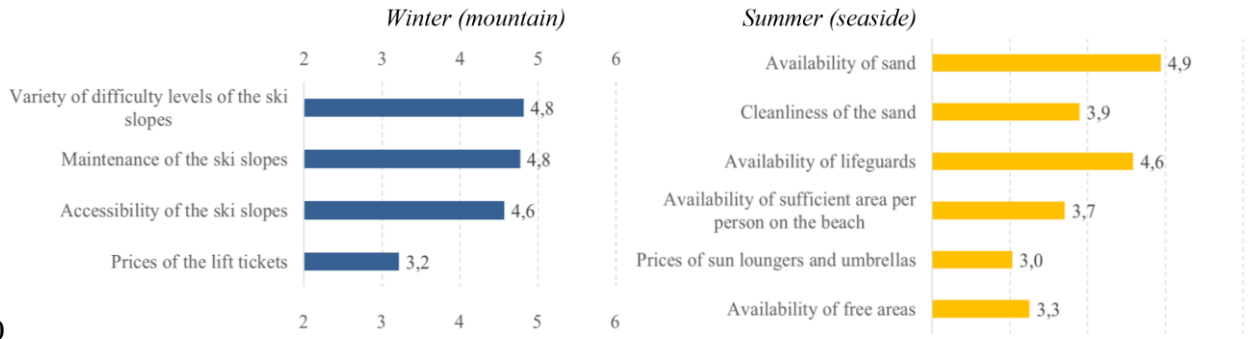
Discussing the practices of the Plovdiv district respondents for the winter leisure tourism in the Bulgarian ski resorts and the practices for summer vacation tourism in the Bulgarian seaside resorts leads to the following results (Figure 8).

The residents of the Plovdiv district prefer a summer vacation at the Bulgarian seaside (72%) much more in comparison to the leisure domestic tourism at the mountain winter resorts (20%). Not only the Bulgarian seaside is a favourite choice of the Plovdiv district respondents for their summer vacation (Figure 9) but they prefer stay approx. 40% longer at the seaside resorts in Bulgaria (6,1 nights) than the mountain ones (4,3 nights). The evaluation of the touristic resources when practicing the winter and summer domestic tourism by the respondents shows some typical 'features' of the local resorts (Figure 10).



(a) **(b)**

Figure 9. Average length of the stay (number of nights) in a Bulgarian winter (a) and summer (b) resorts (Source: National representative survey data)



(a) **(b)**

Figure 10. Evaluation of the touristic resources when practicing the winter (a) and summer (b) domestic tourism (Source: National representative survey data)

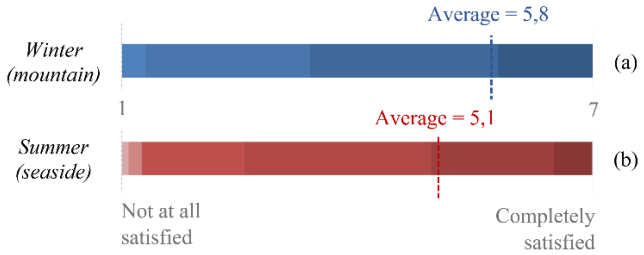


Figure 11. Overall level of satisfaction with the winter (a) and summer (b) domestic tourism (Source: National representative survey data)

Figure 10 shows that although the winter resorts offer good conditions for ski sports the prices are quite high. The beaches at the Black seaside are suitable for a summer vacation, but the lounger and umbrella prices and also the beach maintenance can spoil the full relaxation. When the respondents 'summarize' their overall experience at the Bulgarian winter and summer resorts, using the scale: from 1 – Not at all satisfied to 7 – Completely satisfied, the results are not very 'enthusiastic' (Figure 11). Although the obvious preference of the seaside vacation during the summer time, the overall level of satisfaction with domestic tourism at the mountains in the winter (5,8) is higher than the summer vacation at the Black Sea resorts (5,1). However, the overall satisfaction levels are far from the complete satisfaction which should set a starting point in a future discussion of the potential opportunities for making improvements, both in the state policy regarding domestic tourism and in the organization of the vacation process in the accommodation places.

CONCLUSION

The domestic tourism in Bulgaria plays an important role in the country's economy, contributing to the development of regions, increasing employment, generating budget revenues, developing infrastructure, and strengthening local culture and heritage. Most of the residents of the Plovdiv district travel for tourism purposes once a year or less, and the main reason for the inability to travel is the lack of financial resources. The tourists prefer sea summer tourism to all other types, and the average duration of a vacation at the sea is about 6 days.

The main influence on tourists when choosing a specific place to stay is the opinion of their relatives and friends. Other channels such as online tourist platforms and social networks have a significantly lower influence. The domestic tourists prefer their personal vehicles as the main means of transportation when conducting domestic tourism.

The Plovdiv district residents prefer Black Sea resorts because of the attractive natural resources (including the presence of sufficient sandy beaches) and the opportunities for combining sea with other types of tourism. The main "complaints" of domestic tourists are related to the high prices in accommodation and restaurants and entertainment establishments that do not correspond to the quality offered, as well as the pollution of coastal waters and overbuilding. Based on the moderately good impressions from the vacation on the seashore, the tourists are not particularly confident about whether they want to spend their next vacation on our Black Sea coast and whether they would recommend Bulgaria as a seaside destination.

Author Contributions: Conceptualization, D.V. and A.N..; methodology, A.N. and D.V.; validation, A.N. and D.V.; formal analysis, A.N. and D.V.; investigation, D.V.and A.N. and ; data curation, A.N. and D.V. ; writing - original draft preparation, A.N. and D.V.; writing - review and editing, A.N. and D.V.; visualization, A.N. and D.V.; supervision, A.N.and D.V. ; project administration, D.V. and A.N.. All authors have read and agreed to the published version of the manuscript.

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SUBSURFACE INVESTIGATION OF LO AND BANGI CAVES USING THE VERY LOW FREQUENCY (VLF) METHOD FOR GEOTOURISM DEVELOPMENT

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Abstract: The existence of Lo Cave and Bangi Cave area, which are close to each other in the karst area of Kedungsalam Village, Donomulyo District, Malang Regency, has excellent potential to be developed as a geotourism destination that supports nature conservation and economic empowerment of the local community. However, until now, there is no adequate scientific data regarding the structure and direction of the cave system in the area. This study aims to determine the pattern and direction of the cave system as a basis for developing geotourism in the Lo Cave and Bangi Cave area. Data acquisition was conducted using the Very Low Frequency (VLF) geophysical method on ten measurement lines with 10 m intervals, which were adjusted to the topographic conditions and karst features in the field. The transmitter used the NWC station located in North West Cape, Australia, with a frequency of 19.800 Hz. In data processing, Baker and Myers' corrections were used to reduce the influence of topography on the data. The Fraser filter is used to make the anomaly position more visible and easier to interpret, and the Karous-Hjelt filter visualises the rock conductivity pattern against depth. VLF data processing results showed consistent conductive anomalies on all lines, indicating the presence of cavities and underground water flow paths. 3D modelling revealed that the cavity system extends from Lo Cave to the northwest, then branches at Line 3. The first branch heads southeast across Lines 6, 2, 1, and 9, while the second branch heads north until it reaches Bangi Cave. These findings provide information about the subsurface patterns and structures around Lo Cave and Bangi Cave as a scientific basis that can be used for the development of safe and sustainable geotourism.

Keywords: Cave conservation, Geotourism, Karst area, Underground cave system, Very Low Frequency (VLF)

* * * * * *

INTRODUCTION

Karst landscapes are one of the geological heritage sites that possess extremely high scientific, ecological, and aesthetic value (Yilmaz, 2012; Khalaf, 2022; Wang et al., 2022). Dissolving carbonate rocks such as limestone, dolomite, and gypsum by acidic water creates unique and complex landforms, such as dolines, ponors, and underground cave systems. This morphological uniqueness appeals to researchers and academics and holds great potential for developing nature-based tourism, particularly geotourism (Zhang et al., 2023; Labib et al., 2024). The presence of karst systems indicates long-term geological processes, storing important information about underground hydrology and unique biodiversity (Andreo, 2012; Susilo et al., 2018; Sahrina et al., 2022). Therefore, karst areas have great potential to be developed as educational tourism destinations supporting nature conservation and local communities' economic empowerment (Hadian et al., 2021; Khalaf, 2022).

Caves are one of the karst features that are formed naturally through the process of rock dissolution over a long period (Sánchez-Botello et al., 2018; De Waele & Gutiérrez, 2022; Rauf et al., 2023). Karst cave systems usually have underground river networks, long passages, and large rooms (chambers), making them suitable research objects in geology, ecology, and climatology (Ford & Williams, 2007; Duc & Guinea, 2014).

If the management manages the cave appropriately, the cave has the potential to be developed as a geotourism site that functions as a place for recreation and education (Sahrina et al., 2022; Hadian et al., 2025; Kusuma et al., 2025). In

* Corresponding author

addition, cave geotourism development can provide economic and social impacts for local communities and strengthen awareness of environmental conservation (Carrillo-Hernández et al., 2024; Dousin & Aralas, 2024; Xia, 2024). One area with great potential for cave geotourism development is Kedungsalam Village, Donomulyo District, Malang Regency, Indonesia. There are two main caves in this area, Lo Cave and Bangi Cave, which, based on field observations and interviews with local communities, show indications of an active cave system developing vertically and horizontally and carrying groundwater. The existence of these two caves is visually appealing (Figure 1) and can potentially be developed as a geotourism destination. However, information regarding the internal structure of the cave, the direction of groundwater flow, and fracture patterns is still minimal. This problem is a challenge in developing geotourism, especially in designing tourist routes and reducing potential geotechnical hazards (Sunkar et al., 2022). Thus, subsurface studies are needed as a scientific basis for safe and sustainable geotourism management (Aydın & Yüceer, 2020; Zakaria et al., 2021).

Direct exploration methods, such as geological surveys and speleological exploration, do provide important information regarding the physical conditions of caves, but they still have limitations in reaching the entire subsurface structure (Suranyi et al., 2010; Gama et al., 2019), especially at depths and in areas that are difficult to access. Some structural indications can be observed on the surface. Still, this information is insufficient to determine the direction, depth, and distribution of cavities or fractures, which are critical in karst systems. To address this, geophysical approaches offer a practical solution, as they can reveal subsurface structures without damaging the environment or requiring drilling (Wang, 2017; Hussain et al., 2020). In complex and varied karst environments, the geophysical methods must have high resolution at shallow depths and efficiently cover large areas (Goldscheider, 2015). Therefore, integrating geophysical and local geological data is essential in supporting conservation efforts and the development of geotourism based on scientific data.

One promising geophysical method for studying karst areas is the Very Low Frequency (VLF) method. Based on the study by Telford et al. (1990). This method effectively detects conductive zones such as fractures, cavities, and underground rivers using electromagnetic waves from low-frequency transmitter stations. Santos et al. (2006) researched Santiago Island, Cape Verde, and successfully identified groundwater flow zones in volcanic-karst formations. De Giorgi & Leucci (2014) used the VLF method in Italy to find cavities that could cause land subsidence. A survey by Bahri et al. (2024) also successfully detected an underground river located at a depth of 30 m in the Donorojo District, Pacitan, Yogyakarta. The results of previous studies using the VLF method show that this approach is reasonably practical in identifying subsurface structures. Meanwhile, Faizal et al. (2017) mapped conductive anomalies related to dissolution zones and groundwater potential using the VLF method in Hargosari Village, Gunungkidul. The advantages of VLF lie in time and cost efficiency and its ability to identify subsurface anomalies with adequate resolution, especially in complex karst environments (Sharma et al., 2014; Eppelbaum, 2021). Based on this, this study was conducted to determine the patterns and subsurface structures of Lo Cave and Bangi Cave using the VLF method. The results of geophysical data interpretation can provide a strong scientific basis for designing safe, educational, attractive, and sustainable geotourism development, while promoting the wise and responsible utilization of karst potential.



(a) **(b)**

Figure 1. (a) Internal view of Bangi Cave with active stalactites; (b) Internal condition of Lo Cave showing horizontal passage (Source: Authors field survey, Kedungsalam Village, November 18-21, 2024)

MATERIALS AND METHODS

1. Study Area

The stratigraphy of South Malang Karst consists of sedimentary rocks from the Wonosari Formation, Campurdarat Formation, and Nampol Formation (Figure 2Figure). The Wonosari Formation consists of coral limestone, mudstone limestone, tuff limestone, sandstone limestone, napal, black peat mudstone, and calcirudite. The Campurdarat Formation consists of Hablur limestone and mudstone. The Nampol Formation consists of tuffaceous sandstone, claystone, sandy napal, sandy limestone, and black claystone. The age of the Wonosari Formation rock unit is concluded to be Late Miocene, and the Nampol Formation rock unit is Middle Miocene. In contrast, the Campurdarat Formation rock unit is Early Miocene. Based on the Geological Map (Figure 2), the research location is in the Wonosari Formation, which is dominated by limestone, sandy napal, and claystone intercalations (Boimau et al., 2018). The dissolution process

(karstification) that has been ongoing for thousands of years has formed various distinctive features, such as dolines, ponors, underground rivers, and natural caves. These conditions make Southern Malang one of the areas rich in geological potential and highly suitable for the development of geotourism based on karst landscapes.

Regarding structural geology, South Malang is influenced by regional tectonic activity, which forms faults and cracks, and affects the cave formation process (Labib et al., 2019; Syahputra et al., 2019). This geological structure is one of the primary considerations in implementing geophysical surveys to identify the distribution patterns of subsurface cavities and detect anomalies that are not visually visible. The study locations include Lo Cave and Bangi Cave, which are suspected of having subsurface linkages that may be explored with the VLF approach. This area has a strong ecotourism potential because of its biodiversity, unusual morphology, and geological educational value, which can be used in geotourism development.. Therefore, understanding the internal structure of the two caves is an essential initial step in designing conservation strategies and sustainable utilisation of the area. This study provides an initial overview of the characteristics of the karst cave system in South Malang, which has rarely been studied in depth using a geophysical approach.

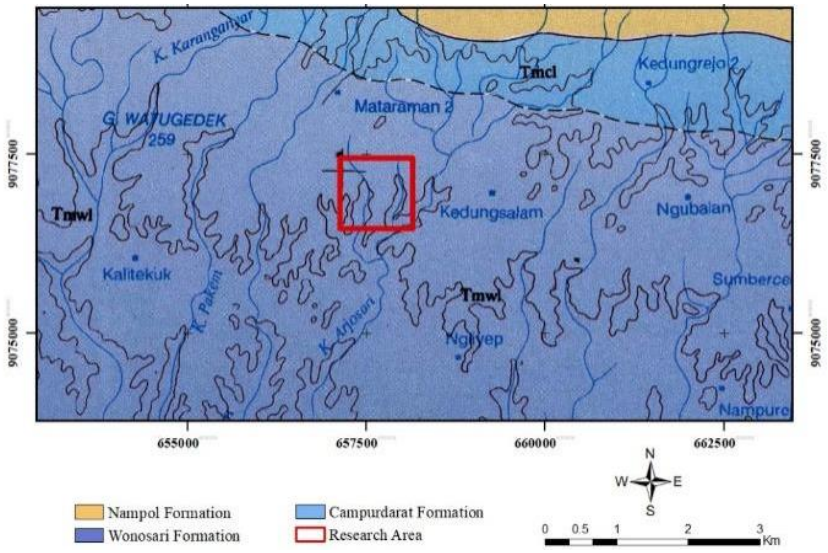


Figure 2. Geological map of the research location (Source: Developed by the authors, 2025)

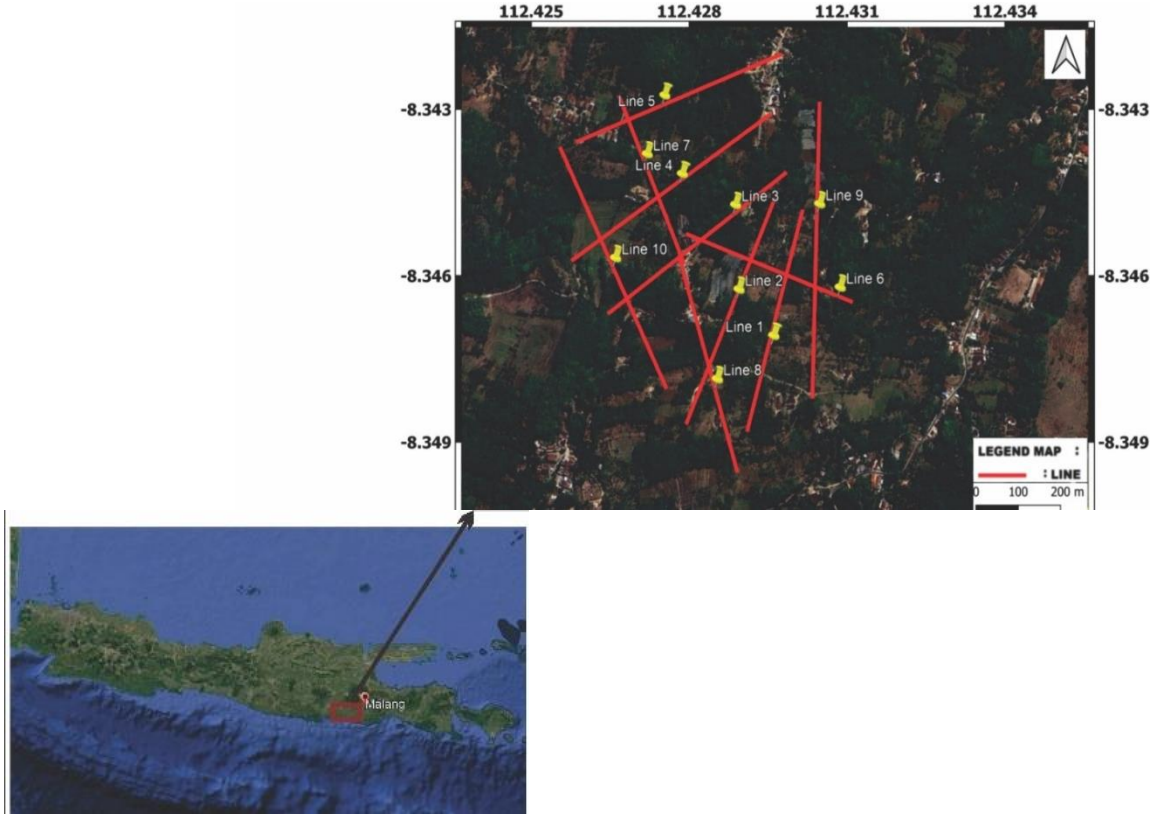


Figure 3. Research location map and VLF survey design (Source: Developed by the authors, 2024)

2. Research methodology

The VLF method is an electromagnetic (EM) method that utilizes electric and magnetic fields sourced from low-frequency radio transmitters in the frequency range of 5-30 kHz, which can provide differences in the conductivity values of subsurface rocks (Jeng et al., 2004; Sharma et al., 2014). The presence of cracks that are getting bigger and forming caves filled with water causes the conductivity value to be different from the value of the surrounding rocks. So it is easy to detect using the VLF method (Hussain et al., 2020; Iswahyudi et al., 2021; Purwanto et al., 2024; Zhang et al., 2024). VLF measurements consist of 10 lines with a distance between lines of 150-250 meters, adjusted to the topography in the field with an interval of 10 m per line (Figure 3).

The transmitter used is the NWC station located in North West Cape, Australia, with a frequency of 19,800 Hz. This station was chosen because the transmitted frequency is stronger and more stable than other VLF frequencies at the research location. Topographic correction uses the Baker and Myers method to reduce the influence of topography on the data based on the slope angle between two trajectory points, with positive correction values for ascending trajectories and negative values for descending trajectories (Baker & Myers, 1980). A moving average filter was used to separate low-frequency data from high-frequency data, ensuring that the measured signal better represented the presence of the cave. This moving average method is performed by averaging the anomaly values divided by the length of the smoothing interval used. Then, the Fraser filter is used to make the anomaly position more visible and easier to interpret (peak) (Djeddi et al., 1998; Alao et al., 2024). The Karous-Hjelt filter and Surfer software visualize the rock conductivity pattern against depth (Khalil & Santos, 2014; Sharma et al., 2014; Shirzaditabar & Karimi, 2020). Three-dimensional (3D) visualization is used to identify cave patterns, making it easier to detect the presence of cave paths or systems.

RESULTS AND DISCUSSION

The results of Very Low Frequency (VLF) data processing on ten profiles, aimed at identifying underground cave systems, are presented as conductivity pseudosections. Red colors represent high-conductivity anomalies (materials that are more conductive than their surroundings), which may indicate the presence of cavities, fractures, or underground water paths. The blue color indicates low conductivity (more resistive materials), which is typically associated with rocks with poor electrical conductivity (Sharma et al., 2014; Purwanto et al., 2024).

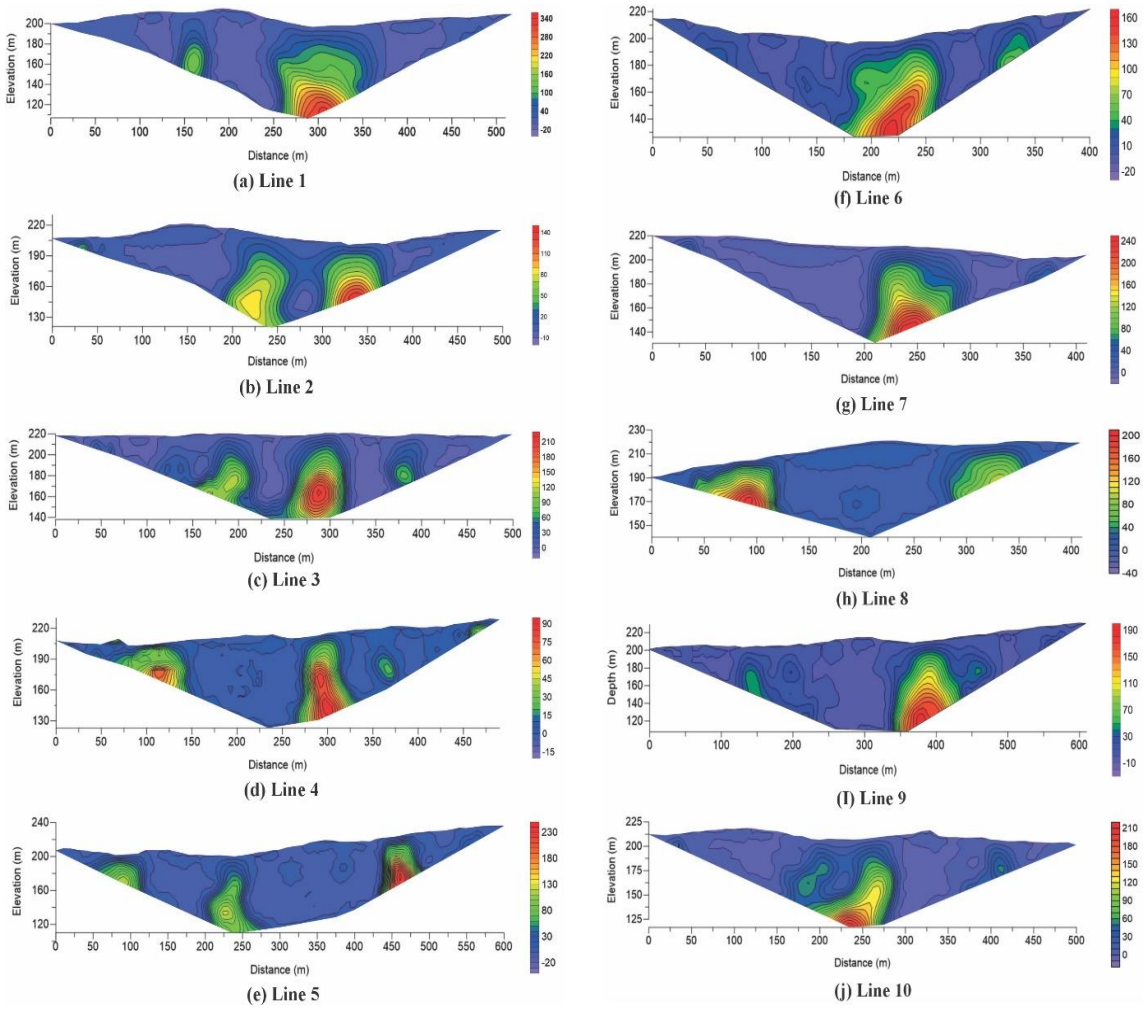


Figure 4. 2D VLF-EM subsurface conductivity image for ten measurement lines
in the karst area of Lo Cave and Bangi Cave, Kedungsalam Village (Source: Authors, 2025)

Figure 4a shows the results of Karous-Hjelt filter processing on Line 1, which shows a conductive anomaly at a distance of 150-165 meters at a depth of 15 meters, and a second anomaly at a distance of 320-360 meters at a depth of 45 meters.

The first anomaly is smaller than the second anomaly and is located very close to the mouth of Lo Cave, so it is considered a cavity connected to Lo Cave. Meanwhile, the second anomaly is thought to be influenced by the presence of a water-filled cave. On Line 2 (Figure 4b), two conductive anomalies are considered to be water-filled caves. The first anomaly is located at a distance of 260-275 meters at a depth of 20 meters, and the second anomaly is located at 340-380 meters at a depth of 24 meters. Both anomalies are linear, with the anomalies on Line 1, which are not far from the mouth of Lo Cave.

Line 3 (Figure 4c) shows the presence of two conductive anomalies. The first anomaly is located at a distance of 150-190 meters and has a depth of 25 meters, while the second is located at 260-310 meters and has a depth of 26 meters. The location and depth of these anomalies are linear with those on Lines 1 and 2, thereby reinforcing the interpretation that these anomalies are part of a cavity system connecting Lo Cave and Bangi Cave.

On Line 4 (Figure 4d), there is one conductive anomaly zone at a distance of 275-350 meters at a depth of 15 meters, which is suspected to be a cave parallel to the mouth of Bangi Cave. The anomaly zone at a distance of 75-160 meters is not believed to be part of the primary cavity connecting Lo Cave and Bangi Cave. In addition to being close to the surface and not linear with the cavity on the previous line, field data also indicates the presence of a ponor or fracture where water enters the underground system during the rainy season at this location, as shown in 5a.

Line 5 (Figure 4e) shows three conductive anomalies at distances of 60-100 meters, 210-260 meters, and 435-480 meters. Based on their positions and direct observations in the field, it is concluded that these three anomalies are not part of the Lo Cave and Bangi Cave systems. This phenomenon demonstrates that fractures or caves formed by the dissolution of carbonate rocks can create irregular patterns, indicating the complexity of the underground structure in karst areas (White, 1989; Mylroie, 2020; De Waele & Gutiérrez, 2022).

Figure 4f shows that Line 6, which intersects Lines 1, 2, 3, and 9, indicates the presence of conductive anomalies at a distance of 180-250 meters with a depth of 25 meters. It correlates with anomalies on Lines 1 and 2, which are suspected to be part of a cave system. Above the mouth of Bangi Cave, on Line 7 (Figure Figure 4g), a higher conductive anomaly is seen compared to other areas on the line. This can be seen at a distance of 220-290 meters and a depth of less than 20 meters.

A relatively high conductive value was also observed at the end of Line 8 (Figure 4h), at a distance of 60-110 meters at a depth of less than 20 meters, possibly due to the presence of a ponor, as seen in

Figure 5b, right at that point. A conductive anomaly was also observed at a distance of 310-340 meters. The existence of this anomaly is the same as the position of the anomaly on Line 3 (Figure 4c), so it is suspected to be the same cave.

Line 9 (Figure Figure 4i) shows a conductive anomaly at 370–430 meters. This anomaly corresponds to the position of the conductive anomaly on Line 6 (Figure 4f), which is considered the same cave.

Line 10 shows a conductive zone at a distance of about 215–265 meters with a depth of 30 meters. The location of this anomaly is the same as the first anomaly shown on Line 4 (Figure 4d), which Ponor causes. Interpretation of VLF data shows the presence of fractures and cavities in the soil around Lo Cave and Bangi Cave. The existence of this karst feature is marked by a conductive anomaly higher than the surrounding rocks on each measurement line.

Figure 6 shows that the anomaly is a network of interconnected cave systems between Lo Cave and Bangi Cave. The cave passage begins at Lo Cave, heads northwest, branches at Line 3, and turns southeast. Another branch extends north to Bangi Cave. Based on direct observations, water enters Bangi Cave when it rains. These water streams meet at Line 3 and flow southeastward across Lines 6, 2, 1, and 9, as shown in Figure 6.



(a) **(b)**

Figure 5. Ponors at the study site acting as entry points for surface water into the underground karst system:
(a) ponor observed on line 4, and (b) ponor observed on line 8 (Source: Authors field survey, Kedungsalam Village, 2024)

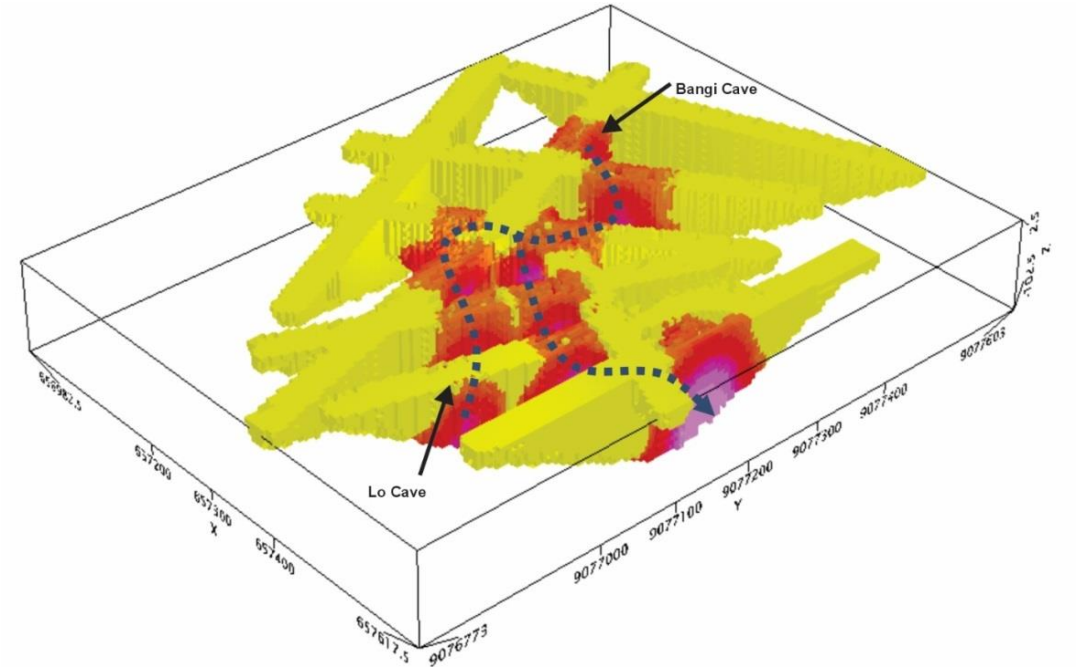


Figure 6. The Lo Cave and Bangi Cave patterns from VLF data show conductive anomalies in all lines (Source: Authors, 2025)

In addition to the presence of conductive anomalies suspected to be the Lo Cave and Bangi Cave systems, several anomalies were also identified that appeared without a clear pattern, interpreted as isolated cavities or fracture zones resulting from dissolution processes (Figure 4). These results are consistent with those reported by De Waele & Gutiérrez (2022), who stated that the emergence of cavities and fractures scattered and separated from the central cave system is caused by uneven rock dissolution processes. Several factors, such as pre-existing fractures and localized groundwater flow dynamics, influence the dissolution of carbonate rocks.

The results of VLF surveys around Lo Cave and Bangi Cave, which indicate the presence of interconnected underground cavities, provide the initial basis for developing cave geotourism in Kudungsalam Village.

To ensure that tourism in the karst area is educational and environmentally friendly, the following steps should include environmental assessment, infrastructure development based on geological stability, and community participation.

CONCLUSION

Based on the results of research in the karst areas of Lo and Bangi Caves using the Very Low Frequency (VLF) method, it is found that there are conductive anomalies that represent interconnected underground cavities, starting from Lo Cave to the northwest, then branching to the southeast and north towards Bangi Cave.

The presence of conductive anomalies forming a network of caves and ponors also indicates the potential vulnerability of the area to sinkhole hazards. Although the VLF method effectively detects conductivity laterally, it has limitations in providing a more detailed and accurate picture of the variation of the subsurface layer at the research site.

Thus, further research needs to be conducted by integrating other methods, such as Electrical Resistivity Tomography (ERT) or hydrogeological modelling, to obtain more detailed information on the karst system in Lo Cave and Bangi Cave.

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EXPLORING TOURISM ATTRACTIONS IN OUIDAH, BENIN: VISITOR EXPERIENCES AND RECOMMENDATIONS

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Abstract: The aim of the study is to explore visitor experiences and propose strategic improvements for tourism in Ouidah (Benin), a town renowned for its cultural and historical landmarks, including the Route of the Slaves and the Temple of Pythons. Using data collected from an online survey of 105 participants from Benin and abroad, the research highlights the strong appeal of Ouidah's heritage attractions while identifying critical areas for enhancement, such as infrastructure, accessibility, and promotional efforts. Findings show the Slaves' Route (24.8%), Python Temple (24.3%), and Gate of No Return (22%) are the most visited, while sites like the Indigo Color Home (3.1%) remain under-visited, indicating the need for better promotion.Word-of-mouth of 46% of respondents was the main information source, followed by miscellaneous sources (36%), while internet and travel agencies played minor roles. Infrastructure was rated mainly "Good" (58%), though issues included poor road conditions, limited public transport, lack of signage, and inadequate amenities such as restrooms and shaded areas. Safety, environmental management, and authenticity of Vodun heritage interpretation were also concerns. A rate of 70% of respondents would "definitely" recommend Ouidah, showing strong potential for repeat and referral tourism. Recommendations include infrastructure upgrades, accessibility improvements, interactive cultural experiences and diversified promotion. The findings emphasize the need for sustainable tourism practices, community engagement, and targeted marketing strategies to strengthen Ouidah's position as a cultural destination in West Africa. Actionable recommendations are provided to guide policymakers and tourism managers in elevating visitor satisfaction and preserving the town's unique legacy. Survey results also revealed seasonal peaks in visitation during February, April, July, and August, aligning with school holidays and favoring domestic tourism. The underrepresentation of some niche attractions points to opportunities for thematic circuits and experiential packages. Respondents stressed the need for better guide training, multilingual materials, and eco-friendly site management. Addressing these gaps can extend visitor stay, diversify the tourism offer, and ensure long-term destination resilience.

Keywords: Ouidah, Benin, cultural heritage tourism, visitor experience, sustainable destination development

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INTRODUCTION

Ouidah boasts a significant tourism potential rooted in its rich historical and cultural heritage, encompassing human, ethnographic, and artisanal traditions (Tosina, 2019). As part of Benin's development strategy under the PAG (2021-2026), the city benefits from projects aimed at advancing beach, memorial, cultural, and sustainable tourism.

Positioned between the Atlantic Ocean and the lagoon, Ouidah is a notable tourism hub, featuring iconic sites such as the Temple of Pythons, the Slave Route, and the Gate of No Return. The aim of this study is to highlight visitor satisfaction and experience by showing what aspects of Ouidah's tourism attractions visitors found most memorable; the challenges and improvement areas by spotlighting issues such as infrastructure, accessibility, and service quality; tourism promotion and cultural heritage by examining the awareness of Vodun beliefs, historical sites, and how the destination is perceived. Therefore it is meant to explore visitor experiences and propose strategic improvements for tourism in the historic town of Ouidah, Benin. Geographically, Ouidah spans over 364 km² within the Atlantic Department and hosts a population of 102,428 as of 2023. Its natural setting between the ocean and lagoon offers fertile ground for tourism development, while its administrative structure of ten districts and 60 villages reflects a rich cultural and historical heritage. It is bordered to the south by the Atlantic Ocean, to the east by the Commune of Abomey-Calavi, to the west by the Commune of Grand-Popo, and to the north by the Communes of Kpomassè and Tori-Bossito (Figure 1).

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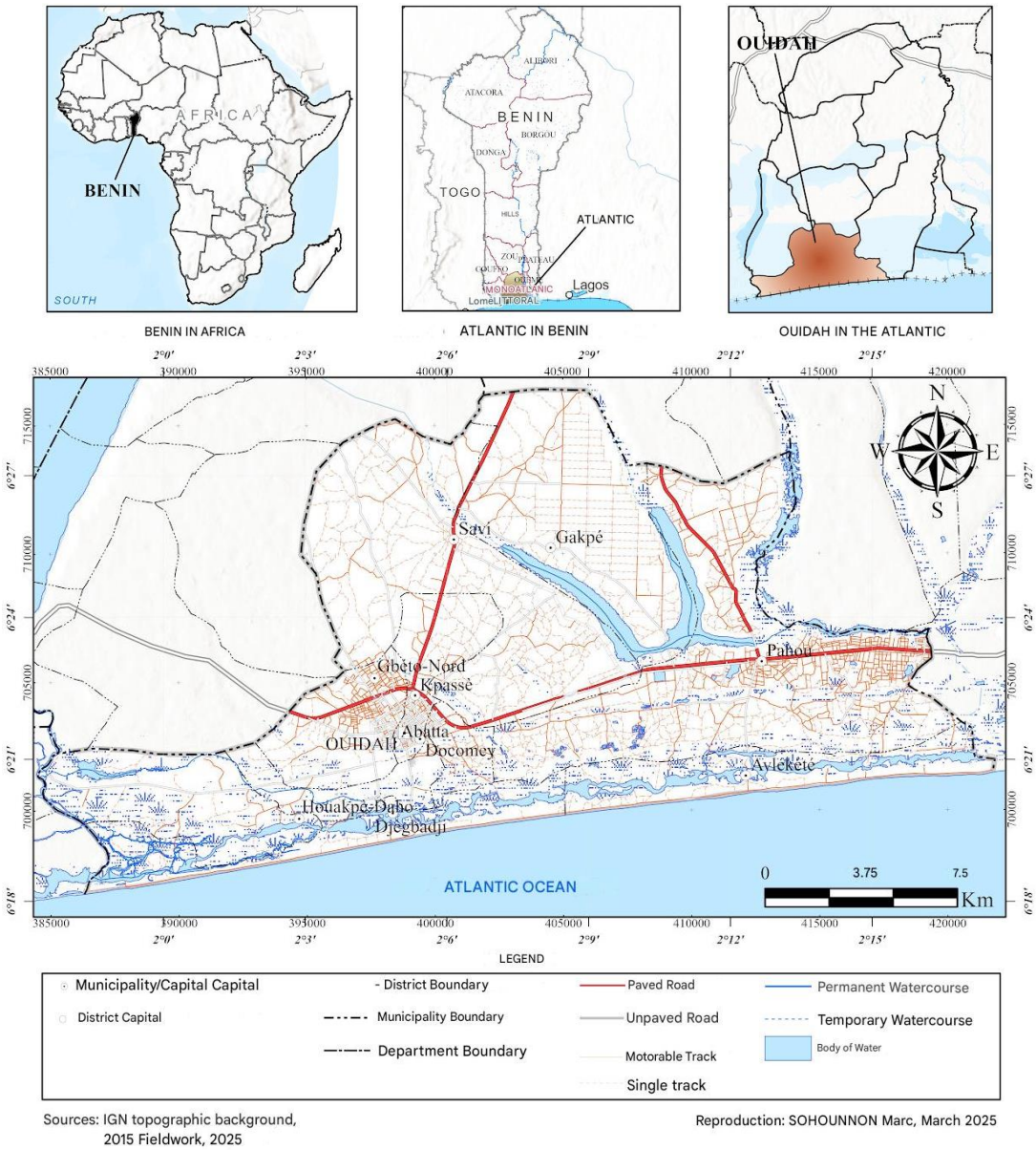


Figure 1. Ouidah location at continental, regional and local level (Source: Authors, 2025)

The city's physical environment features a humid climate with alternating rainy and dry seasons, a diverse ecosystem, and soil variations supporting sacred forests and plantations. Its strategic location and unique environmental characteristics make Ouidah a vital component of Benin's tourism landscape (Town hall of Ouidah, 2019).

Ouidah, founded in the 16th century by Djedji Kpassè, second king of the Xwéda, emerged as a settlement called "Gléwé," reflecting its agricultural origins. Over time, the name evolved into "Ouidah," derived from the French transcription of "Xwéda." The Xwéda people were the city's first inhabitants, laying the foundation for its historical and cultural significance. Situated 42 km west of Cotonou along the Atlantic coast, Ouidah holds a prominent place in Benin's history. The city gained international attention in recent decades due to large-scale cultural events, symbolizing its modern renaissance. Efforts to reconcile its legacy as a slave port with aspirations for cultural revival define this transformative era. Its strategic location and unique environmental characteristics make Ouidah a vital component of Benin's tourism landscape (Town hall of Ouidah, 2019).

LITERATURE REVIEW

Tourism has long been a priority for successive governments in the Republic of Benin (Hountondji et al., 2025; Ishioro & Uwanoghor, 2023; Amakpe, 2022; Gbedjihounde, 2019; Pan, 2019; Ononeme, 2010), with significant efforts directed toward its development over several decades. The adoption of the National Long-Term Perspective Studies (NLTPS) in 2000 set an ambitious goal for Benin to become by 2025 a nation renowned for good governance, unity, peace, economic prosperity, cultural prominence, and social well-being. Building on this vision, the 2013 national tourism policy aimed to position Benin as a leading West African destination, prioritizing the preservation of its cultural and natural heritage.

Since 2016, public authorities have significantly intensified their focus on tourism development. The Government Action Program (PAG 2016-2021) launched extensive investments in flagship projects to generate economic growth and

employment, with the tourism sector expected to create 175,000 direct jobs by 2021 and contribute 3,781 billion CFA francs in cumulative revenue during 2018 -2025. Reforms and large-scale projects have been implemented to transform tourism, culture, and arts into engines of economic progress, unemployment reduction, and cultural promotion.

These initiatives include the development of tourist sites, enhancement of institutional frameworks, improvement of tourism products, and substantial sector funding. The momentum continued with the PAG (2021-2026) further solidifying the government's commitment to tourism as a tool for economic and cultural elevation on the international stage.

Between 2016 and 2021, several projects focused on Ouidah underscored its importance as a religious, cultural, and historical tourism hub. These include the rehabilitation of the Pendjari Wildlife Park, the creation of the "Route des Tata" circuit, and the initiation of the International Museum of Slavery. Other efforts include restoring the Portuguese Fort, developing the Avlékété beach station, and modernizing existing sites like Ganvié and Abomey-Calavi. By 2030, Benin aspires to welcome over two million foreign visitors and double tourism revenues, with Ouidah, located just 40 kilometers from Cotonou, poised to play a central role in this vision. Renowned for the iconic Porte du Non-Retour, a monument to the memory of slavery (Vignondé, 2002), Ouidah exemplifies the convergence of religious, cultural, and historical tourism (PR, 2016).

Ouidah's appeal lies in its rich heritage as both a spiritual capital of Vodun and a historical port linked to the transatlantic slave trade. Scholars such as Rieucau (2019) highlight Ouidah's unique position as a site embodying the duality of Vodun culture and slavery memory, while Amadoudji (2021) underscores the coexistence of memory sites and Vodun places of worship. This blending of history and spirituality attracts visitors to key landmarks, including the Temple of Pythons, Kpassè Sacred Forest, and the Slave Route. Research by Boko et al. (2018) further confirms Ouidah's exceptional natural and anthropogenic tourism potential, bolstered by favorable bioclimatic conditions during certain months. Within West Africa, Ouidah's positioning as a Vodun spiritual center and slave trade heritage site parallels destinations like Gorée Island in Senegal and Elmina Castle in Ghana, where memory tourism blends education, cultural identity, and reconciliation. These sites demonstrate the role of heritage tourism in fostering cross-border cultural networks and attracting diasporic visitors (Araujo, 2010). The understanding of cultural diversity through intangible traditional practices (Tătar et al., 2024) as well as the unique natural settings can preserve this heritage and boost tourism in African countries (Tegegne et al., 2022). Recognizing these strengths, the Beninese government has restructured tourism activities in Ouidah to maximize their impact. Events such as the Vodun Days, an annual international celebration of Vodun art, culture, and spirituality, have significantly increased visitor numbers. The 2025 edition alone attracted 435,000 visitors, compared to 97,000 the previous year, underscoring the festival's success in elevating Ouidah's profile as a regional cultural destination.

This growth is supported by ongoing efforts to modernize and promote Ouidah's attractions while ensuring the preservation of their authenticity and cultural significance. Before the establishment of this festival, tourist arrivals in the city of Ouidah were low despite its natural and cultural assets. In the absence of complete and reliable statistics, data from visits to the Ouidah Museum between 2006 and 2020 were utilized (Boko et al., 2018).

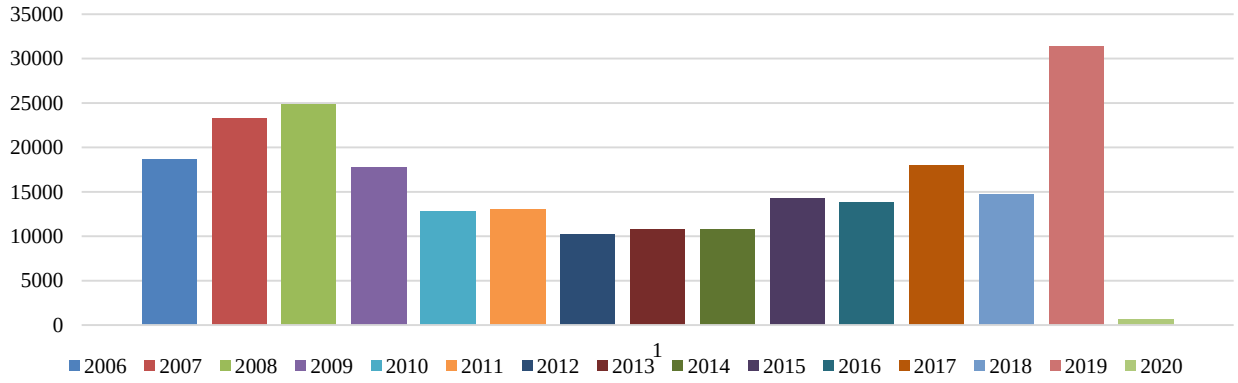


Figure 2. Evolution of the number of visits to the Ouidah Museum from 2006 to 2020 (Source: Town Hall of Ouidah, 2019)

Tourist arrivals in Ouidah have fluctuated over time, increasing from 18,690 in 2006 to 31,329 in 2019 (Figure 2). The low figures in 2020 were due to the onset of the COVID-19 pandemic as well as the closure of the museum for renovations. Based on these numbers, visits tend to concentrate during February, April, July, and August, months that coincide with school holidays, thus promoting domestic tourism among students. At the beginning of 2021, the Beninese government began renovation work on the Ouidah History Museum, which has remained closed to this day.

METHODOLOGY

Our research was conducted in collaboration with researchers from the Abomey-Calavi University and relied on the application of an online survey in French language which achieved a response rate of 105 respondents from 120 distributed quizzes, applied during February 16th and March 8th, 2025. The response rate strengthens the reliability of our findings and highlights the engagement of participants in exploring tourism in Ouidah. Links of the quiz were sent to Beninois as well as foreign tourists having visited the historic town of Ouidah, Benin.

The quiz link was distributed to travel guides who accompany tourists across Ouidah as well as to Beninois from Abomey-Calavi and Cotonou cities who visited Ouidah. The filtering questions related to age, gender and education revealed that Ouidah's tourism sector primarily attracts young people aged between 18-35 years (79%) (Figure 3),

educated (67% with a bachelor's degree) visitors (Figure 4), with a majority being female (59%), suggesting a target audience that values cultural and historical experiences, requiring tailored marketing, immersive storytelling, and interactive heritage-based tourism initiatives as also revealed by other studies (Dehoorne et al., 2023).

This study uses a digital questionnaire accomplished through Google Forms to collect and analyze both qualitative and quantitative data (Manggaberani, 2024) from tourists in Ouidah's tourism sector, highlighting inclusive participation and employing a deductive approach for insights. The survey included both closed and open-ended questions. The study limitations refer to the small sample of respondents who are mostly of young age and the lack of stakeholders' perspective.

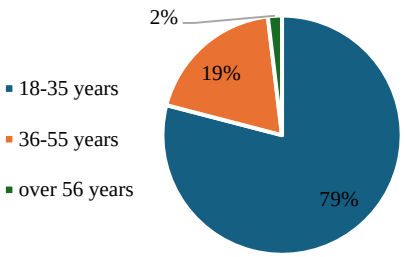


Figure 3. Participants' age to the survey

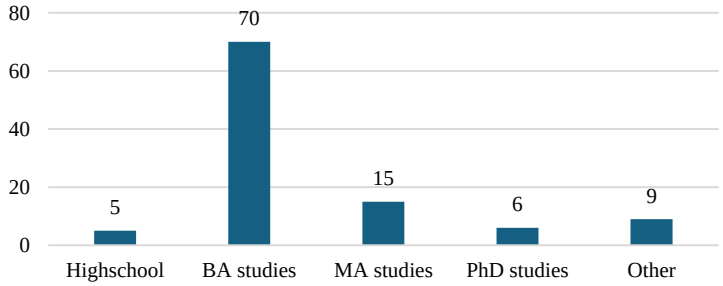


Figure 4. Respondents' education level

(Source: Online survey applied to Ouidah visitors during February-March 2025)

RESULTS

Ouidah, located on the Atlantic coast of Benin, is a city rich in history and culture, known for its central role in the slave trade and as the birthplace of the Vodun religion. Just 40 kilometres from Cotonou, this city offers a unique blend of historical, cultural and spiritual sites that attract visitors from around the world.

These various sites include natural wonders, historical and cultural heritage sites, and more. Most visitors first go to the Python temple, by thousands each month. This site is part of several other sites in the center of Ouidah, such as the Basilica of Ouidah, the French cemetery, and the Historical Museum of Ouidah (Figure 5).

However, it should be added that beyond these sites, there is also the slave route, not to mention the Kpassè forest.

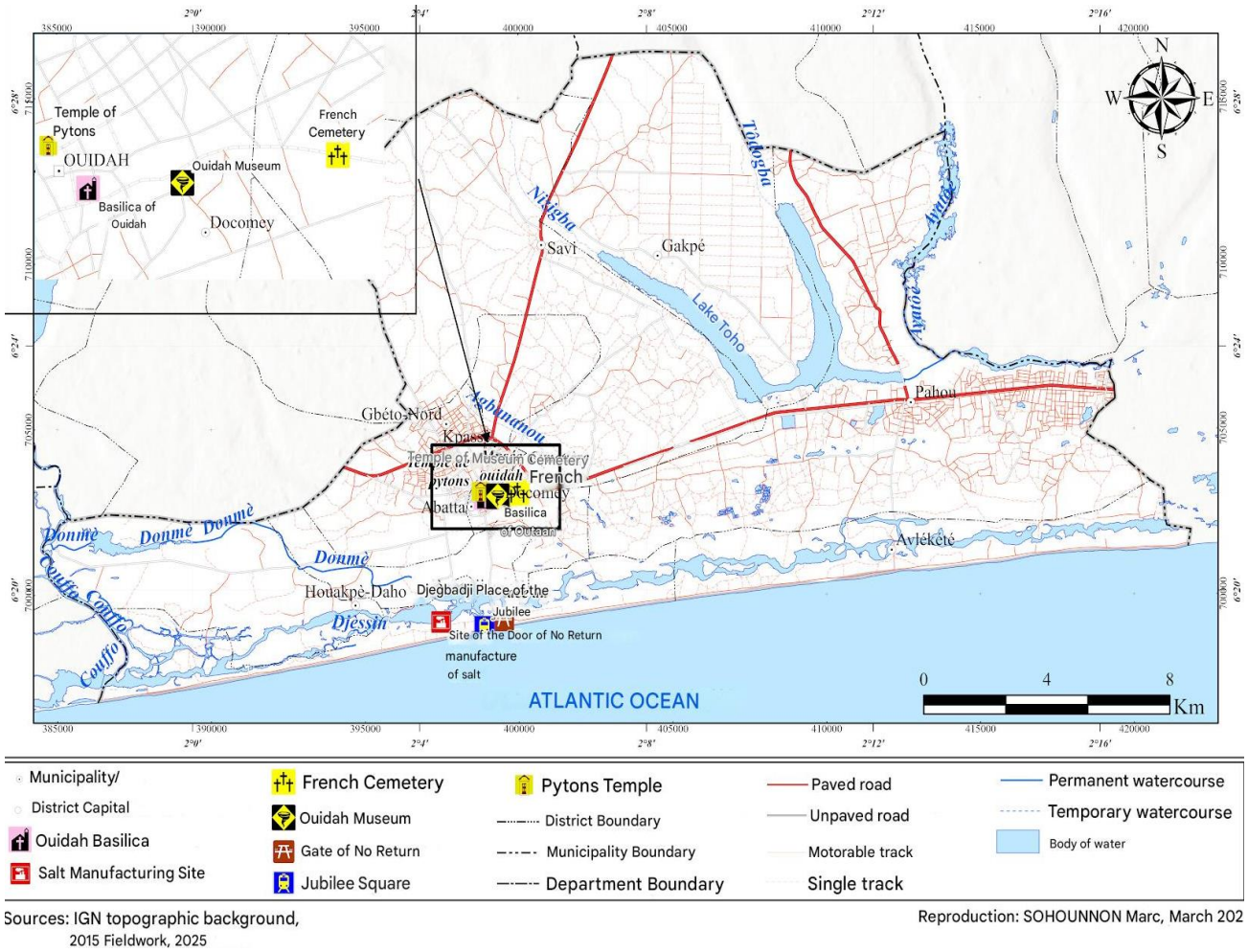


Figure 5. Iconic attractions of Ouidah Town (Source: Authors, 2025)

In relation to the visitor attraction sites, the distribution of visitor interest across various tourist attractions in Ouidah highlights significant disparities in popularity. The Slaves' Route leads with 24.8% of visitors, closely followed by the Python Temple at 24.3%, and the Gate of No Return at 22% (Figure 6), emphasizing their historical and cultural appeal. The History Museum of Ouidah attracts 16.4%, serving as an educational hub, while the Contemporary Art Museum of Zinsou and Sacred Kpasse Forest each draw 12.3%, showcasing niche interests in art and religion. Less frequented sites, like the Indigo Color Home (3.1%) and several others, each account for under 1% of visits, suggesting limited visibility or specialized appeal. These results suggest that historical memory and Vodun heritage drive tourism in Ouidah, while lesser-known sites could benefit from increased marketing efforts and diversification strategies (Weidenfeld, 2018).

The distribution of visitor interest across Ouidah's attractions reveals a clear concentration around historically and spiritually significant sites, with the Slaves' Route, Python Temple, and Gate of No Return collectively attracting over 70% of visitors. This dominance underscores the enduring appeal of memory tourism and Vodun heritage, yet it also exposes a lack of diversification in the tourism offer. Attractions like the Indigo Color Home and other lesser-known sites remain underutilized, suggesting either inadequate promotion or a mismatch between visitor expectations and site presentation. This imbalance risks overburdening popular sites while leaving others underfunded and underdeveloped.

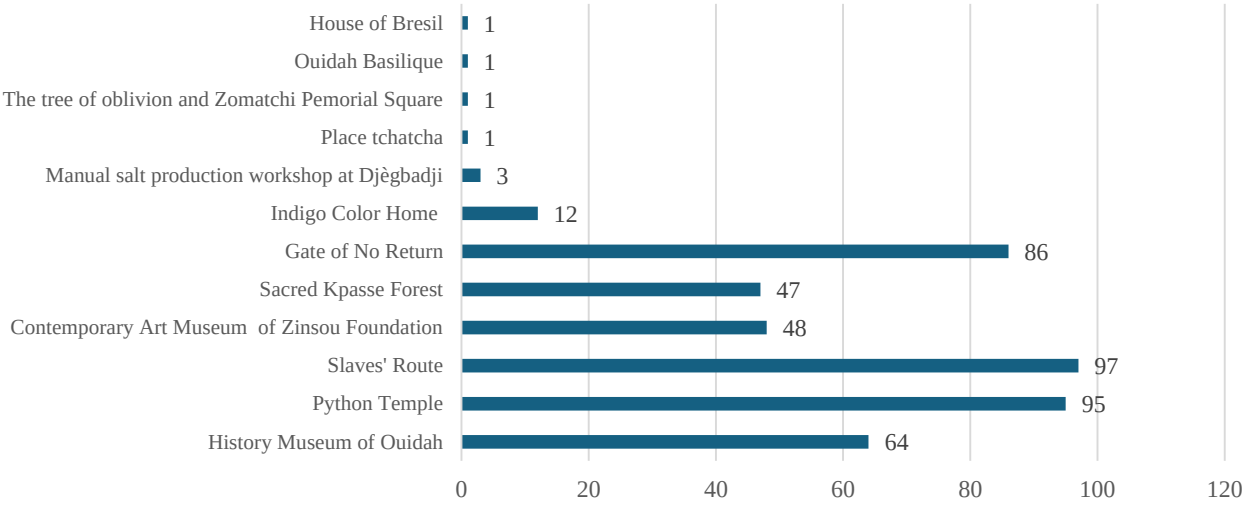


Figure 6. Respondents who visited Ouidah's attractions (Source: Online survey applied to Ouidah visitors during February-March 2025)

The overall assessment of tourist experience is an important research tool meant to improve hospitality services and find out the satisfaction level (Juliana Sihombing et al., 2024; Huete Alcocer & López Ruiz, 2019) therefore the current study results showed that the largest segment, accounting for 58% of responses, reflects tourists who rated their experience as "Good." This indicates that the majority had a generally positive impression of their visit.

Following that, 31% of tourists rated their experience as "Excellent," showcasing a significant portion of highly satisfied visitors who likely found the attractions, services, or cultural offerings outstanding. Meanwhile, 11% rated their experience as "Average," suggesting areas where expectations were met but not exceeded, pointing to potential opportunities for improvement. Importantly, 0% of tourists rated their experience as "Bad," signalling the absence of major dissatisfaction or issues (Figure 7).

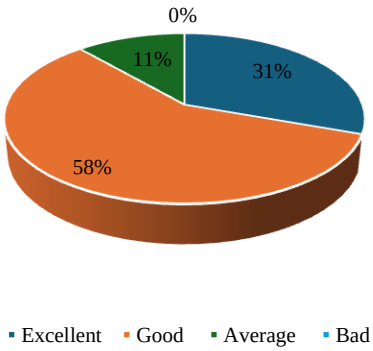


Figure 7. Participants' responses related to the overall experience assessment

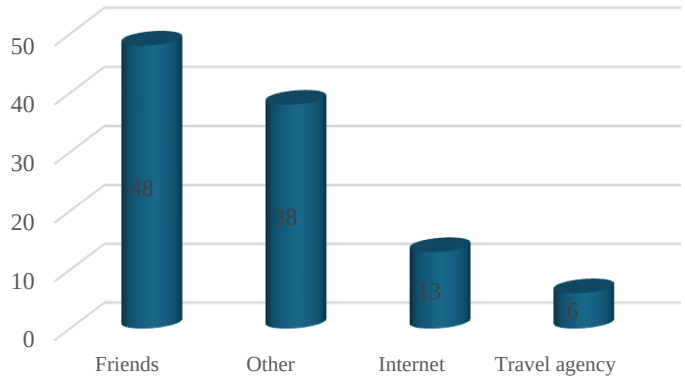


Figure 8. Participants' responses related to information sources

(Source: Online survey applied to Ouidah visitors during February-March 2025)

Surveying information sources helps understand tourist behavior (Gretzel, 2008), improve site visibility (Avram, 2015) destination image (Van-Dúnem et al., 2021) and tailor marketing. Related to the surveyed tourists' information

sources (Figure 8), the findings show that the primary sources of travel planning information, with 48 people (the majority) relying on recommendations from friends emphasise the trust placed in personal connections and highlight the importance of word-of-mouth recommendations. Thirty-eight people use diverse, unspecified channels ("other sources"), reflecting varied approaches to gathering information. The Internet, utilised by 13 individuals, indicates a smaller but growing reliance on digital resources. Meanwhile, travel agencies, consulted by only 6 people, show a minimal role in modern trip planning. This distribution underscores a shift towards personal and digital sources while traditional options like travel agencies face declining popularity. These insights suggest opportunities to optimise and expand online travel resources for broader use. Strengthening online promotion, social media campaigns, and partnerships with travel agencies could enhance visibility and attract more visitors (Kotler et al., 2017).

Surveying tourist infrastructure and services (Figure 9) ensures tourist needs are met, identifies gaps, and enhances destination appeal and satisfaction (Munir et al., 2025). The illustrated left-side chart reveals that 58% of tourist infrastructure is rated as "Good," followed by 24% as "Average" and 18% as "Excellent," with 0% rated as "Bad." This indicates an overall positive perception of the infrastructure, with most facilities meeting or exceeding expectations, though there remains room for improvement to elevate the "Average" ratings to higher levels and enhance the tourist experience. Investments in accessibility, maintenance, and visitor facilities could increase satisfaction and lead to higher "Excellent" ratings.

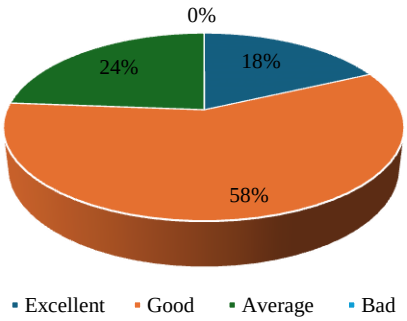


Figure 9. Participants' response related to tourist infrastructure assessment;

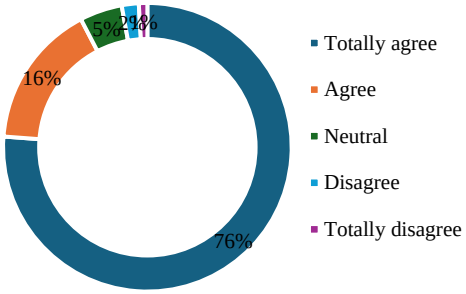


Figure 10. Participants' responses related to the attractions' impact on the local industry

(Source: Online survey applied to Ouidah visitors during February-March 2025)

Tourist attractions drive visitor interest, generate economic growth, and highlight cultural and natural heritage, boosting local tourism (Ursache, 2015). The illustrated right-side chart (Figure 10) demonstrates a strong belief in the positive impact of attractions on local industry, with 76% of respondents fully agreeing and another 16% agreeing. Neutral opinions are limited to 5%, while minimal disagreement is evident, with only 2% disagreeing and 1% totally disagreeing. Overall, the data reflects a predominantly favorable perception of the role attractions play in enhancing the local economy and industries, with only a small fraction expressing skepticism.

Furthermore, through open-ended questions, respondents identified challenges to the destination which can hinder a positive experience with the destination through issues related to accessibility, security, orientation (Dumitrascu, 2023). Thus the encountered tourism-related challenges refer to *accessibility and infrastructure* which translated into poor road conditions; difficult access due to bad roads and lack of parking; insufficient public transport; inadequate or poorly indicated public transport options; challenges for people with mobility issues due to impractical paths and stairs. For *orientation and information* concerns are raised referring to the lack of clear signage; insufficient or unreadable signs; limited multilingual information; lack of information in multiple languages; absence or limited availability of guides. For *visitor experience* tourists complained that the tours are too lengthy; sites are overcrowded; there are challenges in reserving tickets in advance. For *services and amenities* complaints referred to insufficient restrooms; lack of well-maintained toilets; limited dining options; few places to eat or refresh; lack of resting areas; limited spaces for rest and shade.

For *safety and comfort* concerns were raised related to security; the unsafe feeling due to theft or lack of surveillance. In terms of *climate challenges*, complaints referred to the difficulty of managing heat or rain without proper infrastructure; slippery paths and dangerous animals. For *environmental and cultural preservation* tourists revealed pollution and waste management concerns which are poorly handled as well as site degradation. For the *emotional and cultural impact* was highlighted the emotional impact of learning about the history of slavery. For *specific site challenges* at the Temple of Pythons it was the fear of snakes and the challenge of handling them. In terms of *local interactions*, concerns were raised about the locals asking for money and inconsistent storytelling. In order to counteract these challenges, respondents also gave their opinions and suggestions for the destination's improvement through open-ended questions. Ideally a thriving tourist destination depends on cultural immersion and local engagement to create meaningful experiences supported by good infrastructure, smart site development and inclusive policies, all maintained through sustainable practices, effective promotion and consistent upkeep to ensure accessibility and enjoyment for every visitor which can therefore subsequently ensure a higher length of stay (Mihai et al., 2023).

The respondents provided some cornerstone intervention suggestions for a higher overall satisfaction level with the destination. Thus for *cultural immersion*, suggestions relate to the enhancement of the authentic cultural experience for visitors; promotion of the real vision of the local people regarding their culture. Suggestions also referred to the

provision of well-trained guides with accurate and engaging narratives as well as the need to train young professionals in tourism. For *infrastructure and accessibility* suggestions referred to regularly renovating and improving infrastructure, including roads and access routes to tourist sites as well as improving access for people with mobility issues and to clearly mark restaurants and artisan shops. For *site development* suggestions were done to construct and improve temples to highlight Beninese culture internationally; to renovate key sites, especially those on the Slave Route circuit as well as to maintain and enhance the authenticity of attractions. For *visitor experience* suggestions were made to offer horses for long-distance tours; set up refreshment stands to provide drinks, especially in hot weather; improve the overall welcome and hospitality services and to add entertainment options near attractions to attract more tourists; enhance visitor comfort with shaded areas, water points, and clean restrooms; create interactive and immersive experiences.

For *promotion and activities*, it was suggested to organize eco-tourism and cultural activities to promote Beninese tourism; invite community leaders or influential personalities to special events to generate word-of-mouth publicity; promote and market the attractions effectively; boost online visibility and run national and international promotion campaigns. For *maintenance and upkeep*, it was suggested to ensure regular maintenance and upkeep of sites and provide more guides to enhance the visitor experience. For *government and policy*, it was suggested that the government should provide qualified guides to educate the public about the city and that it should continue ongoing projects and ensure they do not compromise the authenticity of the sites. For *cultural and local engagement*, it was suggested to highlight local culture through workshops and tastings and involve the community in managing attractions.

For *environmental sustainability* it was suggested to implement eco-friendly practices to reduce environmental impact. Encouragingly, respondents offered a wide range of actionable suggestions, from enhancing cultural immersion and improving infrastructure to promoting eco-tourism and involving local communities.

These recommendations align with best practices in sustainable tourism and reflect a desire for more interactive, inclusive, and authentic experiences. The emphasis on workshops, tastings, and community-led initiatives points to a growing demand for participatory tourism that benefits both visitors and residents.

Despite all the above-listed challenges highlighted, respondents are eager to recommend Ouidah as a thriving tourist destination with a wide majority (i.e.70) who would further definitely recommend the destination to others for visitation (Figure 10). This enthusiasm fosters increased visibility and interest in the destination, boosts awareness, ultimately supporting local economic growth and preserving cultural heritage, as positive word-of-mouth often translates into greater tourism activity (Chang et al., 2025).

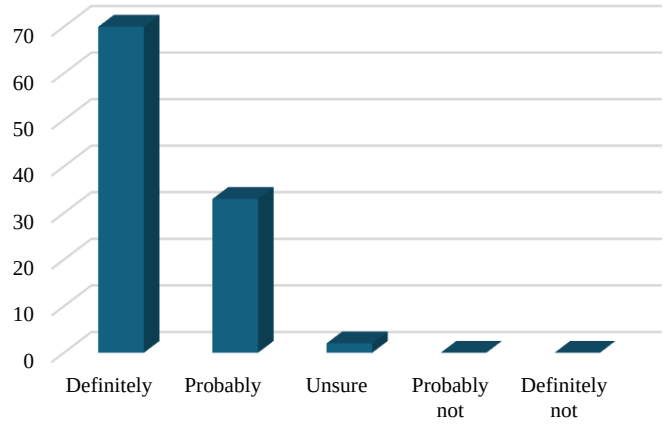


Figure 10. Participants' responses related to further recommendations

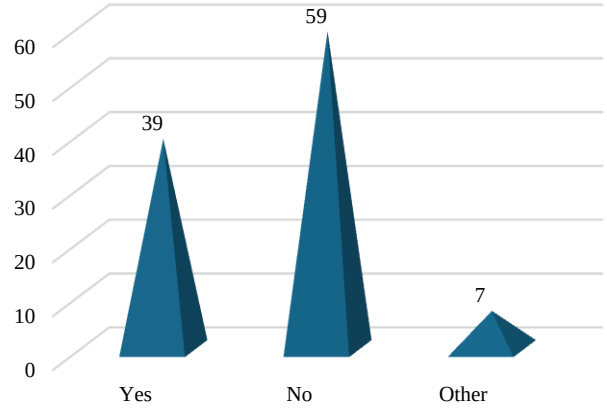


Figure 11. Participants' responses related to Vodun beliefs promotion and perception in the media

(Source: Online survey applied to Ouidah visitors during February-March 2025)

Given that many of Ouidah's attractions are in close connection to the Vodun religion (Sibani, 2020) and culture, another surveyed opinion was that of the Vodun beliefs which tended to indicate a prevailing sentiment that it is often misrepresented, which may influence global perceptions (Montgomery, 2019).

Fifty-nine respondents believe Vodun culture is not correctly promoted in international media, while 39 respondents think it is, and 7 respondents have other opinions (Figure 11). For tourism in Ouidah, a city deeply connected to Vodun heritage, understanding these perceptions (Herman et al., 2023) is vital as a misrepresentation could deter culturally curious tourists, while accurate promotion enhances Ouidah's appeal as a unique cultural destination. Recognizing the importance of religious beliefs like Vodun helps tourism studies develop strategies to preserve authenticity, educate audiences, and attract visitors, fostering local economic and cultural growth (Cousin, 2015; Gedecho & Nyikana, 2023).

DISCUSSIONS

The study reveals the enduring allure of Ouidah's cultural and historical landmarks, such as the Route of the Slaves and the Temple of Pythons, as pivotal attractions for visitors. This resonates with scholarly works by Rieucau, who identifies Ouidah as a significant spiritual and cultural hub (Rieucau, 2025).

Despite its rich historical memory, challenges such as infrastructure limitations and accessibility issues persist as identified in this study, referring to challenges such as poor road condition, as also noted in the broader tourism literature by Berepa (Berepa, 2022), emphasising the need for targeted improvements.



Figure12. The Route of Slaves, Ouidah (Source: Authors, 2025)



Figure13. Python Temple, Ouidah (Source: Authors, 2025)

The underutilization of digital marketing platforms (Hendrajana, 2024) highlights a critical gap in promoting Ouidah's attractions effectively. Forte's (2025) research suggests that storytelling and leveraging digital tools can elevate the visibility of such cultural heritage sites. Enhancing marketing strategies through collaborations with travel agencies and online campaigns could bring Ouidah to a broader audience, fostering its global presence.

Sustainable tourism practices (Mihalic, 2024; Joseph et al., 2021; Houenouho, 2022) emerge as a central theme, with the study underscoring the importance of community engagement (Ahrar, 2018) and ecological management (Buckley & Underdahl, 2023). This aligns with academic discussions on integrating local communities into tourism development to ensure authenticity and equitable benefits (Berepa, 2022). Visitor satisfaction, as reported, showcases Ouidah's capacity to delight its audience; however, there is room for refining experiences through interactive initiatives and better infrastructure maintenance. Amadoudji's findings on Vodun heritage underscore the need to cater to diverse visitor expectations, balancing cultural preservation with engaging experiences (Amadoudji, 2023).

The study's findings imply the necessity for strengthened infrastructure and accessibility, such as better roads and transport options, to enhance tourism in Ouidah. Sustainable practices, alongside the preservation of cultural authenticity, should be prioritized, ensuring that attractions like the Route of the Slaves and Temple of Pythons are maintained responsibly. Emphasizing digital marketing strategies, particularly leveraging social media and storytelling, could significantly amplify Ouidah's visibility and draw international audiences (Van-Dúnem et al., 2021). Visitor experiences could be further enriched by offering immersive and interactive cultural activities, alongside improving basic amenities such as shaded areas, restrooms, and refreshment stands. Community engagement in tourism planning is essential (Ahrar, 2018), ensuring equitable economic benefits and fostering local ownership of attractions.

CONCLUSION

The findings of this study reaffirm the significant potential of Ouidah's cultural and historical attractions to drive tourism development. Visitor feedback highlights the appeal of iconic sites such as the Route of Slaves and the Temple of Pythons, underscoring their role in preserving cultural heritage and fostering regional recognition.

However, challenges such as poor infrastructure, limited accessibility, and underutilised digital marketing platforms present barriers to achieving the town's tourism potential. To address these challenges, investments in infrastructure, including improved roads and visitor amenities, are crucial. Enhanced digital marketing efforts, leveraging storytelling and social media, can amplify the regional and global visibility of Ouidah's attractions. Engaging local communities in tourism planning and management ensures economic equity and cultural authenticity.

Furthermore, the promotion of flagship events such as Vodun Days can bolster Ouidah's reputation as a cultural hub.

By implementing these measures, Ouidah can secure its position as a sustainably managed, internationally recognised tourist destination, contributing to economic growth and cultural preservation in Benin. These findings not only serve as a blueprint for Ouidah but also provide broader insights into similar heritage destinations worldwide.

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ANTECEDENTS AND OUTCOMES OF BUSINESS INFORMATION TECHNOLOGY ALIGNMENT: AN EMPIRICAL STUDY ON JORDANIAN HOTELS

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Abstract: The current research paper aims to examine the role of antecedents of Business Information Technology (BIT) alignment encompassing the topics of shared domain knowledge, Information Technology (IT) success, organization size, IT management sophistication, employee satisfaction, and customer loyalty) in enhancing BIT alignment, and in turn, financial performance at five and four-star hotels operating in Jordan. In order to achieve the main goal, data of the study were acquired through 400 questionnaires of 37 items delivered to the study respondents. The study hypotheses were tested through Partial Least Squares Structural Equation Modeling (PLS-SEM). The results of the paper showed that that shared domain knowledge, IT success, IT management sophistication, Employee satisfaction, and customer loyalty impact BIT alignment, while organization size did not. Further, the results revealed an impact imparted by BIT alignment on hotel financial performance. The results of this study contribute to the hotel industry by examining antecedent factors that enhance BIT alignment, and in turn, financial performance at five and four-star hotels operating in Jordan. Thus, the current study is a valuable addition to the literature in two ways namely in theory and in practice. Business Information Technology Alignment could also help firms learn more about information technology and increase their usage of it. Furthermore, Business Information Technology Alignment has the potential to attenuate the relationship between IT expenditure and corporate performance. This indicates that organizations can improve their performance just by aligning their business and information technology, without increasing their information technology investment. Also, the usage of IT systems assists the service business by improving service performance and increasing operational efficiency.

Keywords: information technology, business intelligence, business information technology, financial performance, Jordanian hotels

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INTRODUCTION

Business Information Technology Alignment (otherwise known as BIA) facilitates organizations in many of their tasks, as gaining the best return on their investment in IT (Avison et al., 2004; Kashanchi & Toland, 2006; Sieber et al., 2022; Junidar et al., 2023). BIA also could facilitate organizations in finding out what IT entails (Njanka et al., 2021; Salama et al., 2025), in addition to facilitating organizations in increasing their use of IT (Beimborn et al., 2007). Furthermore, the relationship between IT investment and firm performance could be moderated through BIA (Byrd et al., 2006). This demonstrates the ability of firms to improving their performance by just making business and IT more aligned with one another, while their IT investment does not have to be increased. In this regard, the alignment level may be evaluated to increase its tangibility. In a study by Luftman (2000), the processes of alignment in organizations were evaluated. The author additionally proposed an alignment maturity scale, and the scale includes five levels as follows: the initial/ad hoc process level; the committed process level; the established focused process level, the improved/managed process level, and the optimized process level.

In a study by Weiss & Anderson (2004), an alignment value matrix was proposed based on Daft (2001) model. The matrix included two axes that demonstrate the organization's alignment profile. The first axis displays the level of integration between business and IT, followed by the second axis that displays the value contributed by IT to the business. The first axis denotes the organizational management aspect while the second axis denotes the complexity aspect of the system. Meanwhile, the organization's profile includes the organization's operational resource profile, the organization's strategic resource profile, as well as the organization's strategic weapon profile. Through these two axes, the BIA level of

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organization can be ascertained, allowing the organization to identify what to be done to achieve better alignment (Luftman, 2000; 20); the organization can decide to change or retain their current alignment level.

For organization, identifying and understanding the enablers or antecedents of BIA will allow the organization to focus on what can increase their BIA the most, to allow the organization to consequently increase their alignment level. When organization could identify what causes BIA, they could decrease the risk of alignment management failure from inefficient resources management (Weiss & Anderson, 2004; Junidar et al., 2023). Having such ability will decrease time and money wasting from having to resolve the IT issues from this poor management (Chan, 2002). Accordingly, the present work attempted to find out the theoretical conflicts as reported in the literature and then presented the latest discoveries on recent technology. The following key question had guided this work: "What are the antecedents of BIA as of today?"

The above question has been addressed by scholars for some time, resulting in varying answers – the answers vary owing to the continuous technological development in the business environment. Hence, BIA antecedents have been continuously studied. Utilizing the past findings on BIA antecedents and some new information from actual business practices, a model was constructed in this study. In the fast-developing digital world today, technology adoption is both a competitive advantage and a strategic necessity for any organization. Businesses today heavily rely on technological innovations to improve their decision-making, streamline operations, in addition to providing customers with superior value, in line with the requirements of the increasingly dynamic markets and customer demands towards efficiency, speed and personalization. Automation, cloud computing, data analytics and artificial intelligence are among the innovative technologies that are increasingly popular in use among organizations, as these technologies offer agility, scalability and resilience towards persistent changes in the market. Organizations with the ability to adopt and integrate technology effectively are more likely to achieve long-term success and sustainability.

Business Impact Analysis (BIA) is a systematic process of identifying and assessing the possible impacts of disruptions caused by unforeseen events or emergencies, to vital business operations. Using BIA facilitates organizations in prioritizing their most vital functions and resources, allowing organizations to manage their risks more effectively. BIA also facilitates organizations in their continuity planning. Organization needs to be sustainable, and sustainability can be achieved through adaptability of organization towards their present-day environment (Weiss & Anderson, 2004; 9). Furthermore, three research objectives were developed based on the problem statement, as follows:

1. To reevaluate the impact imparted by BIA on organizational performance within the present environment;
2. To identify the antecedents of BIA;
3. To corroborate the different impacts from the antecedents on BIA.

The remaining of this paper is organized as following. The next section provides an overview of relevant literature, while section 3 presents the theoretical model and hypothesis development. Section 4 presents the research methodology and section 5 presents the results of hypothesis testing. The last two sections present the research results discussion along with the implications of these results while last section concludes with key research output.

LITERATURE REVIEW

1. BIA Alignment

BIA encompasses the correct and timely use of information technology (IT), harmoniously with the strategies, goals and needs of business (Luftman et al., 1999; Luftman, 2000). It also involves connections between business and IT at the strategic or planning level, looking specifically at how far the IT mission, objectives, and plans provide support, and also at the same time are being supported by the mission, objectives, and plan of the business in question (Tan & Gallupe, 2006; Chan & Reich, 2007). Additionally, BIA studies were exploring various topics and contexts.

Some studies were examining alignment at various levels, including at the strategic level (Luftman, 2000; Cragg et al., 2002; Silva et al., 2007), the operational level (Beimborn et al., 2007; Junidar et al., 2023) as well at the IT project level (Jenkin & Chan, 2010). This allows the comparison to be made in the alignment between organizational structure and IT structure (Gordon & Gordon, 2000; Chan, 2002). As reported by Beimborn et al. (2007), the initial BIA studies were primarily looking at the alignment between business strategies and IT strategies. This could be attributed to the view that the alignment of strategies will lead to the alignment of the structure. Chan (2002) additionally reported that alignment at the strategic level has been reported in some case studies, as more crucial than that at the operational level.

This owes to the expectation of management towards the achievement of increased return from the strategic level in comparison to that from the operational level. Notably, for the context of this study, BIA comprises an alignment existing between the entire business entity and the IT unit from the strategic to the operational levels. The manner in which business and IT are combinable in managerial practice all during the operations of any organization, demonstrate the manner in which organization staffs are able to acquire knowledge among themselves and strategically employ that knowledge.

For an organization, having the strategic and operation levels in alignment with one another is imperative, as to improve performance. In fact, Bergeron et al. (2004) showed that better performance was manifested by organizations whose business strategies, IT strategies, business operations and IT operations were in alignment with one another. In other words, the strategies and operations were not conflicting. It is important for an organization to have a well-established strategic level and follow-ups on this level at the operational level. The effectiveness of a strategy is affirmed when it can be transformed into an actual operation (Feurer et al., 2000; Arefin et al., 2015). Organizations therefore need to be able to implement their strategies at the operational level seeing that this ability is also important, and for this reason, it is reasonable that an organization's BIA evaluation should include both strategic and operational levels.

This study is valuable because it bridges a major gap relating to the knowledge on the functioning of strategic alignment irrespective of organizational level, be it strategic, operational or project level. Cohesive exploration of such dimensions in

this study results in a more in-depth outlook on the alignment practices. Notably, this study illuminates how alignment improves organizational performance, in addition to offering the practitioners with some actionable insights into more effective alignment of IT and business strategies – this will also be a valuable addition to the extant literature.

The Disaster Recovery Institute International (DRII) reported that organizations with formal BIA are much more likely to have fast recovery from disruptions, considering the ability of BIA in identifying the critical functions and the effect of their disruption. This allows organizations to form the right strategies for recovery. Misalignment at the strategic level can cause the organization to engage in initiatives that do not support their achievement of long-term goals which results in the forfeiture of competitive advantage, in addition to resource wastage. Misalignment at the operational level may result in process inadequacies, impaired productivity, or incompatible departmental objectives. Misalignment at the project level can result in budget overruns, scope creep, and failure to deliver the anticipated outcomes, and all of these have effect on the overall performance of organization. The notion of "Strategic BIA" for organization, in the context of this study, encompasses the alignment between business and IT strategies and the alignment between business and IT infrastructure and processes. However, it has been reported that BIA related studies that addressed both levels were yet to be carried out (Beimborn et al., 2007), implying that there exists a gap in the literature. Hence, the present study attempted to introduce a model representing an organization's overall BIA which comprises both the Strategic BIA and Operational BIA. In showing the impact of both types of BIA, the model could be used in identifying the BIA antecedents.

KM mechanisms allow shared domain knowledge while also improving the social dimension of BIA. The findings accordingly demonstrated the significant impact of the practices of structured KM (e.g., communities of practice, shared repositories, and regular cross-functional dialogues) on the improvement of shared domain knowledge, as they (the practices) minimize communication barriers while preserving the social dimension of BIA. The mechanisms by which KM activities allow mutual understanding between business and IT was examined by Kloth & Jonathan (2025), focusing on the factors of social enablers and barriers. Based on the results, the authors indicated that BIA is strengthened by the factors of socialization, externalization (e.g., visual maps), and regular exchange of knowledge. Additionally, Őri & Szabó (2024) reported IT–business strategic alignment as key driver of organizational performance in the information systems domain, as evidenced by improved agility, responsiveness to market changes, and competitive advantage.

Moreover, previous studies (Gong & Ribiere, 2025; Hamzah Mohaisen et al., 2025) have reported that strategic alignment is significantly reinforced by IT success represented by superior project execution, high system quality, and user perceived usefulness. It has been reported that the connection between strategic alignment and overall business benefits is mediated by planning improvements and quality of implementation for IT initiatives. Additionally, strategic alignment is reinforced by investments in advanced IT sophistication. Here, investments in advanced IT sophistication moderate the impact of strategic alignment on firm performance outcomes. The critical role of organizational size was also reported, where, larger firms were found to show more likelihood to create executive-level IT leadership (e.g., appointment of Chief Information Officers which often can be linked to bigger capital expenditure, innovation, and past performance) which demonstrates the firm's strong desire to strategically align its IT in upper-level management.

Advanced IT governance and planning processes (e.g., structured, and integrative IT–business planning) considerably facilitate strategic alignment. It has been shown that cooperation between the business and IT units in comprehensive and meticulous planning processes will result in more effective alignment (Probojakti et al., 2025). Furthermore, advanced IT infrastructure and dynamic capabilities promote flexibility and alignment, enhancing firm performance amidst precarious environments. Also, extant literature showed direct causal connections between employee satisfaction and strategic alignment. Apart from that, past studies were examining several factors that could affect the perceptions of employees of the IT systems. Among these factors were value of system quality, training, support, and information quality. Therefore, a positive user experience, which can be denoted by the perception of usefulness and sense of satisfaction of user, can improve alignment, especially through support towards system adoption and proper integration of the system into the business workflows.

Notwithstanding, the reviewed literature is lacking in terms of explicit, direct studies that connect customer loyalty to IT–business alignment, albeit the common recognition that alignment is widely known to result in enhanced service delivery, innovation, and firm performance, resulting in stronger customer relationships and loyalty (Shao, 2025). Hence, this effect, even though indirect, is conceivable and aligns with the more general theories of alignment and organizational success.

This study examined the antecedents with major impact on Business–IT alignment in Jordanian hotels, focusing on the organizational, managerial, and technological factors. The impact of Business–IT alignment on the organizational outcomes were examined in the sector under study (the hotel sector). The interrelationships between the antecedents and the outcomes were examined as well. In particular, this study examined how the factors of IT management sophistication, shared domain knowledge, and leadership support contributed to alignment success. The findings of this study could guide hotel managers and IT leaders in their development of strategies to improve alignment and overall performance. Additionally, the study findings could theoretically add to the development of Business–IT alignment models as they could be used in validating the relationships between the antecedents and the outcomes within a service-oriented, tourism-driven economy.

2. Study Context

This study selected the service industry as the study target. Relevant to the study context, the service industry employs both skilled personnel and effective technology in their operations. In fact, this industry needs to have a good blend of human and technology resources to have a successful operation - the situation is different in the manufacturing industry in which technology has been used as replacement to human skills in its key operations (Jawabreh et al., 2024). The service industry benefits from the use of IT systems as these systems improve their service performance while making their operations more efficient. This study specifically selected the hotel sector to represent the service industry,

owing to its expansive IT usage in its operations and marketing, like in its room reservations and customer information tracking. Specifically, through the internet, customers from anywhere could make room reservations (Shatnawi et al., 2024). Also using the internet, the hotel could keep track of customer information, and using such information, the hotel could provide each customer with personalized attention and service in the customer's next visit. The hotel also could employ IT in other parts of operations, like in its back-office supply chain management and inventory control (Nawaf Ma'moun & Saleh Fahed, 2023), to govern activities such as food supplies management corresponding to customer's food order in the hotel restaurant – this order will then be forwarded to the kitchen and will also be applied in the inventory stock list update; a purchase order will then be produced when the stock drops to a minimum level.

IT has been found to increase the performance of hotel enterprises, by increasing the operational efficiency, market expansion service quality, and customer satisfaction as well (Chathoth, 2007; Lam et al., 2007; Junidar et al., 2023). In this regard, in order for business enterprise – in this case, the hotel enterprise - to achieve the highest investment value, the IT of the business should be aligned with the strategies and operations of business (Sigala et al., 2004). BIA is indeed important to business organizations but efforts in demonstrating its importance to business are still fairly recent. For organizations, they could learn how to benefit more from the current IT environment without having to expand their IT investment while also learning how to exploit the key factors as an effort to improve their alignment within.

HYPOTHESES DEVELOPMENT

1. Shared domain knowledge

Shared domain knowledge between the business and IT units encompasses understanding and learning between them (the units of business and IT), resulting in the businesspeople having the knowledge on how to adopt the IT knowledge and the IT people having the knowledge on how the business operates. Shared domain knowledge can be understood as IS and line managers' understanding and appreciation for the technology and processes impacting their joint performance (Nelson & Cooprider, 1996). Within the context of BIA, shared domain knowledge has been reported as among the key enablers – there were five key enablers for BIA altogether – as reported by Nath (1989), Luftman et al. (1999), as well as by Teo & Ang (1999). Furthermore, the link between shared domain knowledge and BIA has often been reported in many studies, including Reich & Benbasat (2000) and Chan et al. (2006). In this study, the factor of shared domain knowledge was examined to determine if it was still a factor of BIA. Evaluating this factor would show the understanding of IT and business towards one another, the appreciation of IT and business towards one another, and how business and IT become part of each other's main activities. The following hypothesis was hence proposed:

H1. Shared domain knowledge has a positive relationship with Business-IT Alignment.

2. IT success

The link between successful IT implementation and BIA has been reported in several studies including Chan et al. (2006), Reich & Benbasat (2000) and Teo & Ang (1999). Somehow, it should be noted that past success of IT implementation by organization will only be worthy if it also includes the current IT achievement of organization. This demonstrates the importance of having a consistently credible IT. In this regard, Thomas & Fernández (2008) presented the criteria to be employed in IT success evaluation. The authors proposed considering three aspects namely the aspects of project management encompassing the capability of IT projects management within certain budget and timeline, the technical aspect involving the capacity in delivering work of high quality to fulfil user requirements, and the business aspect comprising the capacity to fulfil the business requirements. The following hypothesis was hence brought forth:

H2. IT success has a positive relationship with Business-IT Alignment.

3. Organization size

Organization size is about to how large the organization is, and size of organization denotes the organization's management complexity, but past findings on this subject have not been conclusive. For instance, in a business organization, Chan et al. (2006) reported the presence of a link between organization size and BIA; however, the link did not seem to exist in academic organizations. Notably, in studying SMEs and large organizations, Gutierrez et al. (2009) indicated that neither did not differ in terms of their BIA factor ranking. Furthermore, IT studies that also examined firm performance mostly treated the factor of organization size as a control variable, not as a direct independent variable (Bhatt & Grover, 2005; Zhang, 2005). Considering this fact, it can be understood that the factor of organization size could have varied implications; it can also act as a moderator. The effect of organization size on BIA was examined in this study, by examining BIA as both antecedent and moderator to BIA. This study hence proposed the hypothesis below:

H3. Organization size has a positive relationship with Business-IT Alignment.

4. IT management sophistication

The subject of IT sophistication was taken into account in this study, in terms of its evaluation particularly. In this regard, studies on IT management sophistication have been carried out by several authors including (Gupta et al., 1997; Suraweera et al., 2005; Ilmudeen & Bao, 2020; Junidar et al., 2023). Among these studies, the one by Suraweera et al. (2005) was considered in this study owing to its relevancy. This study reported three components playing the role as the main factors of IT management sophistication as follows: IT planning (e.g., IT plan validity, thoroughness and competitiveness), IT project control or monitoring (e.g., IT direction, operation and resources control), and IT leader's leadership qualities (e.g., capability of leader of IT in resolving issues and inspiring IT staff in accomplishing the IT objectives). This paper hence proposed the following hypothesis:

H4. IT management sophistication has a positive relationship with Business-IT Alignment.

5. Employee satisfaction

For hotels, employee satisfaction significantly facilitates its accomplishment of the financial goals, and it has been reported that hotels with high-level employee satisfaction tend to provide customers with better experience. According to Chi & Gursoy (2009), when employees are satisfied, they are more likely to feel motivated and work harder; the situation is the opposite for dissatisfied employees. As such, the hypothesis below was proposed:

H5. Employee satisfaction is positively related with hotel financial performance.

6. Customer loyalty

Hotel industry is a highly competitive industry, where hotels consistently have to compete with one another to gain customers. For this reason, hotels need to achieve customer satisfaction and loyalty of highest level possible. The effect of customer satisfaction on firm profitability has been reported to be positive, and is manifested through positive word of mouth (WOM), more purchases from customers, lower price sensitivity, and lower chances of brand switching (Wilkins, 2010; Ahmed et al., 2020). The hypothesis below was hence proposed:

H6. Customer loyalty is positively related with hotel financial performance.

7. Business-IT Alignment and hotel financial performance

Oftentimes, an organization's performance is determined through its achieved revenue. However, the IT impact on an organization, including the impact of BIA, is often indirect rather than direct. Furthermore, IT imparts non-financial benefits to the organization, as it makes work more effective, decreases costs, and reduces waiting time for customers. For hotels, the use of IT makes them more competitive. Hence, the construct of organizational performance in this study was examined based on the non-financial aspects utilizing four measurements proposed by Reijers & Mansar (2005), proposed in the Devils' Quadrangle. Time, cost, quality, and flexibility are the aspects measured, and each is substitutable for one another upon the requirement of operational decisions. For instance, high quality service is very costly (high costs incurred), while fast service (high-speed service delivery) may impair flexibility. Therefore, this study proposed testing the hypothesis below:

H7. Business-IT Alignment is positively related to hotel financial performance.

Figure 1 presents the research model of the current research.

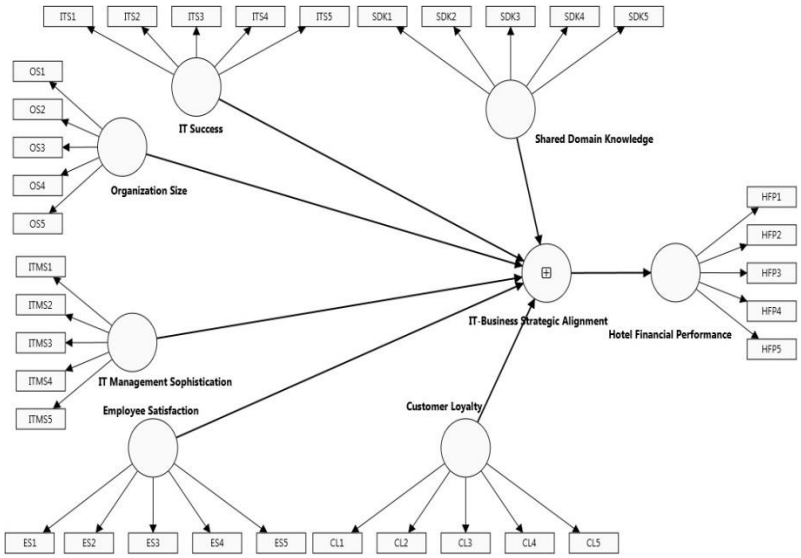


Figure 1. Research model (Developed by authors based on previous literature review)

RESEARCH METHODOLOGY

The methodology chosen to be utilized in this study is elaborated in this section, detailing on the research measures, tool used in gathering data, research population and the study sample.

1. Research measures

In essence, the construction of this study was grounded upon past theoretical and empirical works. Variables frequently used IT management were used in this study, specifically for measuring the variables of communication between IT and business, IT sharing knowledge with business, business sharing knowledge with IT, IT operation and implementation success, and business sharing planning with IT – these variables were based on Charoensuk et al. (2014), involving correspondingly seven, four, five, five, and three items. For IT-business operational alignment, it was measured based on three items from Chan et al. (2006). Four items adapted from Preston & Karahanna (2009) were used in measuring business IT strategic alignment, while three items adapted from Al-Refaie (2015) were used in measuring the financial performance of hotel.

2. Population and sampling

The study respondents were staffs from hotels of four stars and five stars in Aqaba city in Jordan. These staffs – the ones chosen to partake in this study – were those with familiarity with information management, and they were selected using a judgment sampling technique. Paper-based surveys were used in obtaining the empirical data.

The questionnaire survey items were adapted from past literature and were specifically tailored for hypotheses testing. There were two sections in the questionnaire. This study has selected Aqaba in Jordan owing to its status as a Special Economic Zone (ASEZ). Additionally, Aqaba is increasingly significant in contributing to the national economic development and technological advancement of Jordan. Aqaba is also currently a concentrated hub of business activity, logistics, and tourism. Hence, Aqaba is ideal for the study context. This study employed the Harman's one-factor test. In the first section, the items were for obtaining the respondent's demographic information like the respondent's gender, age, level of education, personal income, work position, and the class of the hotel.

The other section comprises questions representing the study's independent, mediating and dependent variables. Table 1 accordingly provides the demographic data of the study respondents.

Table 1 on the respondents' demographic profile for this study is demonstrating that the respondents were typically female, and most were between 30 and 40 years old. The table also shows that most were holder of bachelor's and master's degree, 46.6% of these respondents were working in four-star hotels, and most were holding the position of director.

The questionnaire was sent to four lecturers for reviewing – these lecturers were experts in hotel information management – and they were asked to find any possible problems with the instruments in terms of wording, content, as well as vagueness. A number of changes were accordingly made after the review, observing the feedback provided. Then, the revised questionnaire was distributed to six selected staff in a pilot study. Prior to the study, all likely participants were well-versed in the nature of the study. They were also asked to provide explicit approval beforehand.

In determining the sample size, the rules of thumb for Structural Equation Modeling (SEM) application within PLS were applied. This was to achieve results with validity and reliability. For a complicated path model, the sample size should be at least 200 (Kline, 2010). In this study, 400 questionnaires were returned, and 201 of these returned responses were considered usable based on Kline (2010) and Pallant (2005). Table 2 shows the constructs and measurement items.

Table 1. Description of the respondents' demographic profiles

Category	Category	Frequency	Percentage%
Gender	Male	119	0.298
	Female	281	0.702
Age	18 to 25 years old	55	0138
	25 to 30 years old	80	0.2
	30 to 40 years old	151	0.377
	More than 40 years old	114	0.285
Education level	Below high school	9	0.022
	High school	121	0.302
	Diploma	15	0.038
	Bachelor	116	0.29
	Master	114	0.285
	Doctorate	25	0.063
Personal income ($) monthly	Less than 750	55	0.138
	750- less than 1500	220	0.55
	More than 1500	125	0.312
Work Position	Head of Department	205	0.512
	Director	101	0.256
	Executive Manager	30	0.075
	Supervisor	64	0.16
Hotel Classification	Four Stars	222	0.555
	Five Stars	178	0.445

Table 2. Constructs and measurement items

Construct	Measurement Items
Shared domain knowledge	IT sharing with business • IT staff are aware of the business nature and of their own needs. • IT staff are aware of the main business operational issues or activities. • IT staff take part in major business operational issues or activities. • IT staff show appreciation to the business value to IT. Shared domain knowledge - Business sharing with IT • Business managers are aware of the nature of IT and what are required by IT staff. • Business staff have awareness of the nature of IT and what are required by IT staff. • Business staff know or take part in major IT operational issues or activities that are associated with the business. • Business staff show appreciation towards the IT contribution to business; particularly towards the increased productivity/efficiency of daily operations.
IT success	• Project is completed on-time. • Project is manageable within the budget, as planned. • Delivery of system is as required by users. • Delivery of a system of good quality. • IT projects outcomes fulfill the business objectives.
Organization size	• Number of rooms. • Number of staff.
IT	• Top management displays leadership on IT issues.

management sophistication	• Top management leads in dealing with IT as a critical success. • Top management leads the IT management. • Top management demonstrates leadership in accomplishing the IT objectives through the formation of vision for IT staff. • Top management demonstrates leadership in the accomplishment of IT objectives through providing the inspiration to IT staff. • Top management demonstrates leadership in the accomplishment of IT objectives through its guidance and direction to the IT staff. • Top management demonstrates leadership on IT training.
Employee satisfaction	• My job is secure. • At certain times like during urgent situations, the hotel shows empathy towards the employees. • My job does not make me feel unreasonably stressed out. • The Teamwork is encouraged and practiced.
Customer loyalty	• This hotel is first on my list for my future visit. • Next time visiting, I would consider using the various services offered by this hotel (e.g., room services and swimming pool). • I would recommend my family and friends to use this hotel. • The hotel thoroughly and quickly handles complaints.
Business IT strategic alignment (BS)	• The information systems strategy seems to be well-matched with our hotel's corporate business strategy. • In this hotel, decisions in information systems planning are fully associated with the hotel's strategic plan. • Our hotel has closely aligned business strategy and information systems strategy. • The information systems implemented in our hotel help ease the strategic business planning.
Hotel financial performance (FP)	• Our hotel achieves sales growth higher than average in the hotel industry. • Our hotel achieves high profitability as opposed to the hotel industry average. • Our hotel achieves market share higher than that of leading competitor.

DATA ANALYSIS AND RESULTS

1. Measurement model results

Table 3 displays the achieved Cronbach's alpha (α) and CR values for this study. Clearly, all values are greater than 0.7. Hence, the constructs can be said to have tolerable internal reliability. For the measurement item, the achieved factor loading is larger than 0.70 and this demonstrates acceptable convergent validity (Hair et al., 2021), for the achieved average variance extracted (AVE), it is higher than 0.50, which means that the model shows good convergent validity (Hair et al., 2021). Fornell–Larcker criterion was applied in the discriminant validity measurement of the study constructs. As indicated by Fornell & Larcker (1981), it is necessary that the square root of AVE is larger than the overall number of correlations in rows and columns. As evidenced by the data provided in Table 4, the discriminant validity of the constructs of this study can be affirmed.

Table 3. Convergent validity

Construct	Cronbach's α	CR	AVE
Shared Domain Knowledge	0.899	0.908	0.714
IT Success	0.926	0.928	0.776
Organization Size	0.910	0.967	0.678
IT Management Sophistication	0.924	0.933	0.767
Employee Satisfaction	0.930	0.934	0.782
Customer Loyalty	0.913	0.940	0.740
Business IT Strategic Alignment	0.915	0.922	0.747
Hotel Financial Performance	0.908	0.914	0.730

Table 4. Fornell-Larcker criterion

Construct	CL	ES	HFP	ITMS	ITS	BIA	OS	SDK
CL	**0.860**							
ES	0.138	**0.884**						
HFP	0.120	0.415	**0.854**					
ITMS	0.463	0.496	0.151	**0.876**				
ITS	-0.147	-0.368	0.094	-0.589	**0.881**			
BIA	0.291	0.602	0.599	0.427	-0.195	**0.864**		
OS	-0.290	0.175	0.259	-0.271	0.457	0.093	**0.823**	
SDK	0.134	0.355	0.286	0.189	-0.140	0.484	0.084	**0.845**
CL: Customer Loyalty, ES: Employee Satisfaction, HFP: Hotel Financial Performance, ITMS: IT Management Sophistication, ITS: IT Success, BIA: Business IT Strategic Alignment, OS: Organization Size, SDK: Shared Domain Knowledge								

Table 5. Heterotrait-monotrait ratio (HTMT) – Matrix

Construct	CL	ES	HFP	ITMS	ITS	BIA	OS	SDK
CL								
ES	0.138							
HFP	0.125	0.446						
ITMS	0.476	0.528	0.154					
ITS	0.206	0.395	0.116	0.638				
BIA	0.299	0.645	0.646	0.453	0.207			
OS	0.318	0.163	0.252	0.335	0.522	0.066		
SDK	0.140	0.384	0.313	0.206	0.155	0.526	0.089	
CL: Customer Loyalty, ES: Employee Satisfaction, HFP: Hotel Financial Performance, ITMS: IT Management Sophistication, ITS: IT Success, BIA: Business IT Strategic Alignment, OS: Organization Size, SDK: Shared Domain Knowledge								

As for the Heterotrait-Monotrait Ratio (HTMT); the achieved ratios need to be lower than the cut-off value of 0.85 proposed by Henseler et al. (2015). From the obtained HTMT values provided in Table 5; the values are all between 0.089 and 0.646. This shows the fulfilment of the discriminant validity condition.

2. Structural model results

2.1. Multicollinearity

Collinearity among predictors is ascertained through the variance inflation factor (VIF). In their study, Hair et al. (2021) indicated the need to have VIF values lower than 5 to affirm the non-presence of multicollinearity. Table 6 relevantly shows that all VIF values are less than 5, demonstrating no multicollinearity for all predictors.

Table 6. Multicollinearity test

Constructs	VIF
Shared Domain Knowledge -> Business IT Strategic Alignment	1.161
IT Success -> Business IT Strategic Alignment	2.123
Organization Size -> Business IT Strategic Alignment	1.715
IT Management Sophistication -> Business IT Strategic Alignment	2.289
Employee Satisfaction -> Business IT Strategic Alignment	1.799
Customer Loyalty -> Business IT Strategic Alignment	1.449
Business IT Strategic Alignment -> Hotel Financial Performance	1.000

2.2. R square

R^2, as described in Hair et al. (2011), can be applied in measuring the coefficient of determination and the significance level of the path coefficients (beta values). As illustrated in Figure 2, in this study, the achieved R^2 is 0.495. Worded another way; 49.5% of the variance of Business IT Strategic Alignment is explicable through the following factors: IT success, Organization size, IT management sophistication, Employ satisfaction, and Customer loyalty.

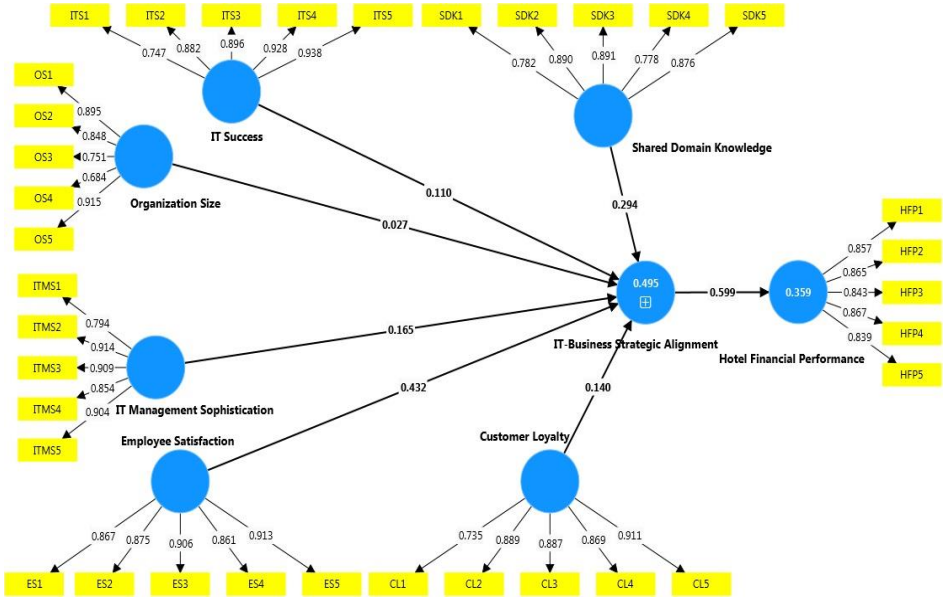


Figure 2. R^2 and Path coefficient

2.3. Hypotheses testing

The statistical significance was evaluated further in this study, through the structural model's path coefficients computation and bootstrap analysis. Table 7 accordingly shows positive statistical relationship between the factors of IT success, IT management sophistication, employee satisfaction and Customer loyalty, and Business IT Strategic Alignment. Meanwhile, the Business IT Strategic Alignment imparts significant positive impact on the hotel financial performance. Contrariwise, insignificant relationships appear to occur between Organization size and Business IT Strategic Alignment. Overall, the achieved results supported all hypotheses, with the exception of H2. Path coefficients, T value and P value are accordingly shown in Table 7.

Table 7. Hypotheses testing result

Hypotheses	Std. Beta	t-value	p-value	Result
SDK → BISA	0.294	7.545	*p*< .001	Supported
IT Success → BISA	0.110	2.668	0.008	Supported
Organization Size → BISA	0.027	0.497	0.620	Not supported
ITMS → BISA	0.165	3.748	*p*< .001	Supported
Employee Satisfaction → BISA	0.432	9.920	*p*< .001	Supported
Customer Loyalty → BISA	0.140	4.254	*p*< .001	Supported
Business IT Strategic Alignment → BISA	0.599	15.119	*p*< .001	Supported

DISCUSSION AND IMPLICATIONS

In essence, the present study attempted to present the latest BIA antecedents for today's business and technology setting. In particular, three specific objectives have been set for the purpose to recognize the antecedents of BIA from the strategic to the operational levels within the context of an organization; to identify the various impacts imparted by each antecedent on BIA; in addition to ascertaining the impact of BIA the firm, particularly on its operational performance. Utilizing the findings from prior studies and additional information provided by the industry experts, a theoretical model was proposed, and this study can be considered as one of its kind because it examines alignment within an organization from a higher level (Strategic BIA) to a lower level (Operational BIA). The fulfilment of the study's objectives can be viewed in Figure 2. Other important finding of this study is on the effect of the engagements of Jordanian managers in exploitative works on the financial performance of the firm. A positive relationship between exploitative strategic alignment and financial firm performance was also reported in past studies including Ahmed et al. (2023) and Shahzad et al. (2025), moderated by environmental competitiveness. Hence, IT managers should increase their exploitative activities to increase firm performance.

Results for objectives one and two affirmed the three direct factors impacting BIA in this following order (from the highest to lowest): shared domain knowledge between business and IT, success of IT operation from past to present, and IT management sophistication. As clearly shown, shared domain knowledge imparted the greatest impact on BIA, and this finding is agreement with that of past studies. Results also showed a strong role of communication effectiveness in promoting shared domain knowledge. This demonstrates the impact of the link between communication and shared domain knowledge on BIA. It also means that when communication is effective between the shared domain knowledge and the IT and business units, the organization's level of alignment will increase. For the second direct factor namely the success of IT operation from the past to the present; results showed that past and present successes of IT both facilitate alignment. Notably, this study is unique as it considered both past and present success, while past studies only considered past IT success. This finding showed the increase in the alignment in an organization due to the increase in trust and confidence resulting from the consistent satisfactory IT operations to the needs of business from past to present.

In order to affirm the results, the model, constructs, data, and relevant literature were analyzed again. The study constructs on IT management were carefully constructed from the literature, and in this study, IT sophistication was distinguished - at the managerial level and at the technical level – and this was not done in past studies (there was no distinction made between the two levels). With respect to the measurement of IT management sophistication, this study employed three proven key components reported in the literature. This finding could significantly add to the research domain. Additionally, the discovery of negative relationship between IT management and BIA is linkable to the fact that the dominance of IT management in an organization will make business and IT less aligned, because dominance of IT management makes business operation less flexible. According to the results, the level of planning sophistication between the business and IT units affects IT management. Relevantly, Chan et al. (2006) reported that BIA modeled planning sophistication had impact on shared domain knowledge. A similar approach was attempted in this study, but results were not significant, which means that the proposed model was not an ideal fit.

Findings showed organization size playing the role of a moderator rather than as a BIA antecedent as initially proposed in this study. In particular, as a BIA antecedent, a weak relationship value of organization size was demonstrated. Hence, organization size can affect the manner in which an organization executes the overall planning between the business and IT plan, and how organization manages the IT unit. In accomplishing the third research objective, results showed positive effect of BIA on organizational performance. This finding supports that of past relevant studies. Still, considering the use of qualitative measurement on performance in this study, the finding may be perceived as biased - personal judgments of performance may result in biased responses. However, quantitative measures were also used in this study, particularly with the use of questions on occupancy rate (or room utilization) during the interviews with respondents. Using occupancy rate value as a percentage allows comparison among hotels of varied sizes. The results obtained in this study supported the findings of studies that employed models with qualitative measure of performance.

The variances between different levels of alignment were also examined in this study and we found domination of the alignment at the strategic in the organization, despite considering the operational BIA. Hence, the strategic BIA can be said to represent the entire alignment of an organization with practical implications based on the obtained outcomes or results. Also, BIA consistently improves organizational performance from previous time to present time. These findings demonstrate the need for practitioners to understand the importance of alignment from the strategic to the operational levels as both become the building blocks to the organizational alignment. Additionally, the discovery of the domination of the strategic alignment on the general alignment implies the need for the organization to start its alignment from the strategic level.

Results showed shared domain knowledge as the factor with the most amount of impact on alignment. This implies the need for organization to emphasize knowledge sharing between business and IT units as a way of promoting alignment. Additionally, results showed the ability of effective communication in increasing the level of knowledge sharing and understanding across units. Furthermore, the IT operation outcome from past to present as the second key factor, were found to affect alignment with respect to user requirements fulfilment, business objectives accomplishment, good-quality work delivery, and timelines and budgets management. Although the finding in this study is in agreement with previous studies, the present study also stresses the present outcome in addition to the past outcome. It is necessary for organizations to assure that its IT unit always delivers outcomes that fulfill the needs of business.

Outcomes showed that strong IT management can lead to lower alignment, which implies the need for organization to be aware that the IT management does not dominate the business unit. There needs to be a decent balance between the business sphere and the IT sphere; the businesspeople focus on business management and utilize IT as a means to accomplish their

business goals, while the IT unit makes sure that it meets business needs and manages the IT unit. When business dominates, IT could lose the chance to show its ability. On the other hand, when IT dominates, business could lose flexibility.

With balanced business and IT, the organization could increase its performance both financially and non-financially, as both domains would have the optimal ability to support one another. The management success of the IT unit is affected by the ability of both business and IT in structuring their organizational plans. In other words, it is affected by the level of planning sophistication of both business and IT. This discovery is valuable for practitioners; it provides understanding of the need for organizations to construct both business and IT plans together as this will assure that both parties would lend support to one another. Lastly, results demonstrated the significance of organization size in the actual implementation of alignment model, and that alignment relationship level seems higher in larger organizations as opposed to in smaller counterparts. This finding demonstrates the need for large organizations management to increase their effort and resources in pursuing alignment.

Limitations and Recommendations

A number of limitations of this study can be highlighted, with the first being the study's research model as it was created for the hotel sector specifically. For this reason, the outcomes of the study should only be generalized to the hotel business. Results showed business operations and performance as the two constructs unique to the sector examined in this study – the hotel sector - in the operational aspects. Hence, the proposed model needs to be revised before being applied to other industries. Another limitation is the use of only the internal factors of BIA, while some external factors, for instance, changes that occur in the economic environment, can have an impact on the organizational strategies and BIA. However, the external factors were not addressed in this study – making this study limited in this matter.

Lastly, this study was conducted involving organizations with single IT units supporting the entire organization, disregarding those with autonomous business unit in its management of IT system.

By addressing the alignment at both strategic and operational levels and offering a more comprehensive alignment model, this study has filled the literary gap. Factors that affect alignment and the alignment impact were also empirically ascertained in this study. For the next studies, comparison should be made, focusing on identical industry, but in different countries or regions, with the proposed model and measurement instrument revised as needed to fit the study context. A comparison group should comprise different business or technological environments; comparison may be made between industries that utilize technically skilled people (providers of mobile phone) and the traditional businesses (finance, retail, and so forth).

Additionally, the evidence of moderating role of organizational size may imply the need to carry out a comparison study involving firms of different sizes – this would expand the study results. Another point worth noting is that BIA in an organization with different IT governance, in the IT management/governance proliferation particularly, may differ according to business and technical contexts of a particular industry, making the exploration of this aspect challenging, considering the constant technological evolution over time, and the adaptation capability of people to the continuously altering environments.

Also, some scholars may find the discovery of the negative relationship between IT management sophistication and alignment an interesting finding, that is worthy for further scrutiny. In theory, some results can be perceived as unexpected but in the actual setting, there are always possibilities. However, the model was revised prior to the presentation of this paper, and so, the resulting outcomes can be viewed as valid and reliable. Still, the resulting outcomes may be verified again using a different dataset, or, IT management could be remodeled using a fresh uni-dimensional construct – this was not possible in this study owing to the impossibility of performing an additional survey. Finally, a case study may also be carried out, particularly to observe alignment development in an organization over time, to show how the alignment emerges in an organization.

CONCLUSION

Business-IT Alignment in the hotel industry was examined in this research work were the factors that propel to the occurrence of alignment and the impact of these factors on the industry were explored. This work provides some key insights and addition to the literature in two ways namely in theory and in practice. Theory-wise, this study brings to the recognition of the value of a Business-IT Alignment at both strategic and operational levels. There were four components covered, as can be viewed in Henderson & Venkatraman's (1993) Strategic Alignment Model – it should be noted that studies in this area usually applied the model in part, not in full (Hussin et al., 2002; Junidar et al., 2023). This study essentially attempted to demonstrate how practitioners could employ alignment at the strategic level so that it could affect the operational level to achieve the maximum benefits. The proposed hypothesis on the positive impact of BIA on operational performance was supported by the findings. In practice, this study facilitates organization in understanding and appreciating the benefits of BIA and more.

Somehow, the primary goal of this study was to increase the IT value through BIA use, to achieve the maximum benefits in the shortest duration possible. However, as BIA value is intangible, it may not be noticeable immediately. Additionally, the findings demonstrated the benefits BIA and that organizations could manage the antecedents of BIA.

With good alignment, organizations could reap the benefits of the IT system and consequently improve its performance. Not only that, but organizations could also improve its management of people in business and IT, to prepare them for the impending future technology. Please fulfill the contribution of the authors following the Model above:

Author Contributions: Conceptualization, R.M.D. and A.B.M; methodology, R.M.D. and M.A.O.; software, R.M.D. and R.M.T.; validation, R.M.D. and D.A.A.; formal analysis, R.M.D. and R.M.T.; investigation, D.A.A. and T.M.J.; data curation, R.M.D. and D.A.A.; writing - original draft preparation, R.M.D. and D.A.A.; writing - review and editing, R.M.D. and M.A.O.; supervision, R.M.D. and T.M.J.; project administration, R.M.D. and D.A.A. All authors have read and agreed to the published version of the manuscript.

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THE IMPACT OF SUZHOU EMBROIDERY EXPERIENCE ON TOURIST ENGAGEMENT IN INTANGIBLE HERITAGE TOURISM THE MEDIATING ROLE OF FLOW AND SELF-EXPRESSION

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Abstract: This study aimed to explore how ritualized experiences in intangible cultural heritage tourism influence tourists' engagement through flow experiences and self-expression motivations. Using quantitative methods, the study collected questionnaires from 439 tourists at the Suzhou Embroidery Art Museum. Structural equation modeling (SEM) and exploratory factor analysis were used to assess the relationships between these variables. The results showed that ritualized experiences had a significant positive impact on tourist engagement. This finding highlights the importance of interactivity in intangible cultural heritage tourism, suggesting that cultural presentations alone are insufficient to stimulate engagement and require contextualized and interactive design to enhance the experience. Flow experiences and self-expression played a mediating role, enabling tourists to transform their focus and emotional engagement and foster sustained engagement. Notably, while the mediating effect was not highly significant, the findings suggest that this mechanism remains valuable in explaining the psychological and behavioral transformation processes of tourists. This suggests that psychological mechanisms may differ across cultures and contexts, and future research should further examine the moderating effects of context, individuals, and cross-cultural factors. These insights have important implications for tourism stakeholders in Suzhou. The study suggests that intangible cultural heritage tourism should foster contextual ambiance in event planning to enhance immersion and incorporate self-expression to stimulate participation. Digital tools also have great potential for providing personalized interactions, thereby deepening visitor engagement and cultural connection. Overall, this finding supports a visitor-centered approach and provides important insights for the sustainable development of Suzhou's intangible cultural heritage tourism industry.

Keywords: intangible cultural heritage, cultural tourism, Suzhou embroidery, ritualized experience, tourist engagement

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INTRODUCTION

In recent years, intangible cultural heritage (ICH) tourism has attracted widespread global attention for its role in cultural protection, identity enhancement and sustainable development (Innocente et al., 2024). The United Nations Sustainable Development Goals (SDG 11.4) point out that protecting and preserving cultural heritage is an important foundation for building an inclusive and resilient society (Innocente et al., 2024). With the evolution of cultural tourism, tourists' experience is shifting from the traditional "sightseeing" to a more immersive and participatory model (Moneta et al., 2025).

Compared with traditional tourism models, intangible cultural heritage tourism emphasizes psychological perception and interactive participation of cultural significance (Zhang et al., 2025). It better responds to tourists' diverse experience needs and provides a new way to spread traditional skills (Lv et al., 2025). The interactive ritual theory further points out that ritualized interpersonal and social interaction is an inseparable practice that aims to strengthen social and emotional cohesion, stimulate collective vitality, and highlight its social function (Collins, 2014). The emphasis on psychological perception and deep experience in intangible cultural heritage tourism has triggered people's reflection on traditional tour modes, further highlighting the importance of sustainable development concepts and high-quality intangible cultural heritage tourism product design (Ye et al., 2025; Zhou & Ramli, 2025).

Although existing studies have focused on the role of real interactive experiences in promoting cultural cognition (Lu et al., 2024), research on how tourists transform ritual experiences into deep participation driven by psychological mechanisms is still relatively limited (Yan et al., 2024).This research gap prompted this study to use Suzhou embroidery as an empirical scenario, combining concepts such as flow, self-expression, and tourist engagement to integrate the impact of ritualized intangible cultural heritage experience. Based on the data of Suzhou Chinese Embroidery Art Museum, this study

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uses structural equation modelling (SEM) to verify a conceptual model that integrates ritual experience, flow, self-expression and tourist engagement. At the same time, the research results provide practical guidance for the communication and marketing of intangible cultural heritage tourism product design, and suggest that the interaction between ritual structure and tourist psychology should be emphasized in the design to enhance tourist engagement.

Tourist Perception and Tourist Engagement in Cultural Tourism

In recent years, cultural tourism has played an increasingly important role in meeting tourists' deep cultural perception and participation needs. Research on cultural tourism has shifted from the early focus on "visiting" to an emphasis on "immersion" and "participation"(Idris et al., 2024). Yang & Wang（2023) proposed that the essence of cultural tourism is shifting from visiting physical spaces to the construction of individual emotions and meanings. Intangible cultural heritage plays a key role in the development of cultural tourism. It not only improves tourists' subjective satisfaction, but also helps to protect the sustainability of destination traditions and culture (Abd Halim et al., 2025).

Tourists' positive perception of the environment is the basis for entering the flow state (Yan et al., 2024). Pine & Gilmore proposed the "experience economy" model, arguing that sensory, emotional and mental perception constitute the core of experience quality, which in turn affects immersion and flow state (Mehmetoglu & Engen, 2011; Moneta et al., 2025). Many studies have confirmed the relationship between flow and behavioral intention, and found that flow can have a positive impact on consumers' behavioral intention (Liu et al., 2024). The concept of tourism participation has been widely studied in the marketing literature, but most of the studies exploring tourism participation are focused on brand marketing, festivals, scenic spot services and other fields (Martin et al., 2022; Steriopoulos et al., 2024; Zhang et al., 2025). Less in-depth exploration of the impact of contextualized experience on tourists' deep psychological state and behavioral transformation (Chang et al., 2025). Some scholars have found that good customer experience and emotional response can inspire more lasting cultural identification (Liu et al., 2024)and behavioral investment (Cao et al., 2024; Ivancsóné Horváth et al., 2025). In the field of tourism, the impact of tourists' engagement and emotional response on future behavior is very important for destinations and other stakeholders (Moneta et al., 2025; Steriopoulos et al., 2024).

Ritualized Experience

Ritualized experience is an important topic in cultural tourism research in recent years. The concept was first proposed by Collins (2014) in the interactive ritual chain theory, which believes that individuals can gain emotional energy, group belonging and meaning recognition by participating in the ritual process under a specific time and space structure (Collins, 2014). This theory has been widely used in tourism scenarios in recent years, especially in explaining tourists' cultural resonance and deep participation (Yang et al., 2024).

Ritual interaction is widely regarded as a form of cultural participation with structural, symbolic and emotional arousal (Yang et al., 2022; Yang et al., 2023b). Its core lies in guiding individuals into a specific state of situational experience through elements such as spatial layout, behavioral procedures and symbolic symbols (Xie & Li, 2023). Despite this, existing research on the detailed psychological processes and behavioral transformation mechanisms of tourists in actual experience is still relatively limited. In particular, most studies focus on the unilateral cognition of local residents (Lan et al., 2021; Abd Halim et al., 2025), ignoring tourists' perception of the destination and behavioral intention in the context of intangible cultural heritage tourism (Chuamuangphan et al., 2025). Therefore, how tourists' participation behavior can stimulate psychological immersion, cultural identity and long-term cultural participation through traditional cultural activities (Huynh, 2025) , is still an area that urgently needs further research.

Conceptual Framework and Assumptions

Based on the interaction ritual chain theory (Lu et al., 2024), flow theory (Bai et al., 2024) and self-determination theory (Ciki & Tanriverdi, 2024), this study constructed a chain mediation model to explore how ritualized cultural experience indirectly affects tourist engagement through flow and self-expression motivation, as shown in Figure 1.

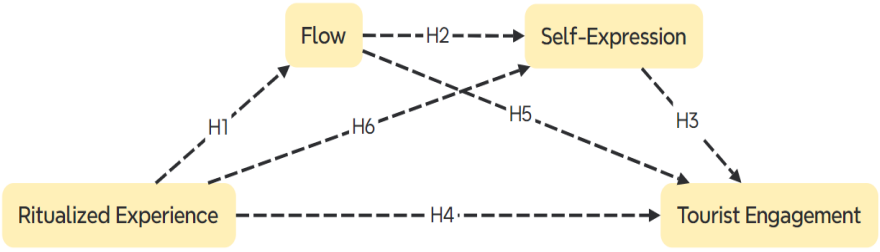


Figure 1. Chain mediation model between ritual experience and tourist engagement

In this model, tourists are regarded as informal learners who experience deep emotional and cognitive absorption (flow) in immersive cultural fields and gradually develop intrinsic motivation to express themselves through cultural activities (self-expression). Based on this, this study proposes six hypotheses, H1–H6.

H1: Ritualized experience has a significant positive impact on flow.

H2: Flow has a significant positive impact on self-expression.

H3: Self-expression has a significant positive impact on tourist engagement.

H4: Ritual experience has a significant positive direct impact on tourist engagement.
H5: Flow partially mediates between ritual experience and tourist engagement.
H6: Self-expression partially mediates between ritual experience and tourist engagement.

MATERIALS AND METHODS

Study Design

This study employed a quantitative approach to examine tourists' cultural perception and learning engagement in the ritualized experience of Suzhou embroidery, with flow and self-expression as mediating variables. Data were collected on November 22, 2024, at the Suzhou Chinese Embroidery Art Museum, yielding 439 valid responses through convenience sampling during the "Suzhou Embroidery Art Exhibition Week." The context included ICH demonstrations, interactive sessions, and cultural exhibitions. Tourists completed a questionnaire measuring ritual experience, flow, self-expression, and engagement using validated five-point Likert scales. Data analysis was conducted using SPSS 26.0 for reliability and validity tests, and Smart PLS 4.1 for SEM modelling to explore direct and indirect effects and validate the chain mediation structure. Because chain mediation was applied to capture sequential effects through multiple mediators(Zhou et al., 2025).

Suzhou embroidery, as one of China's most renowned forms of intangible cultural heritage, has a history spanning over two millennia. It is celebrated for its exquisite craftsmanship and refined aesthetics, with works that depict subjects in strikingly vivid and delicate detail. Such artistic expression not only demonstrates technical mastery but also evokes a sense of tranquility and emotional resonance in viewers, as shown in Figure 2.

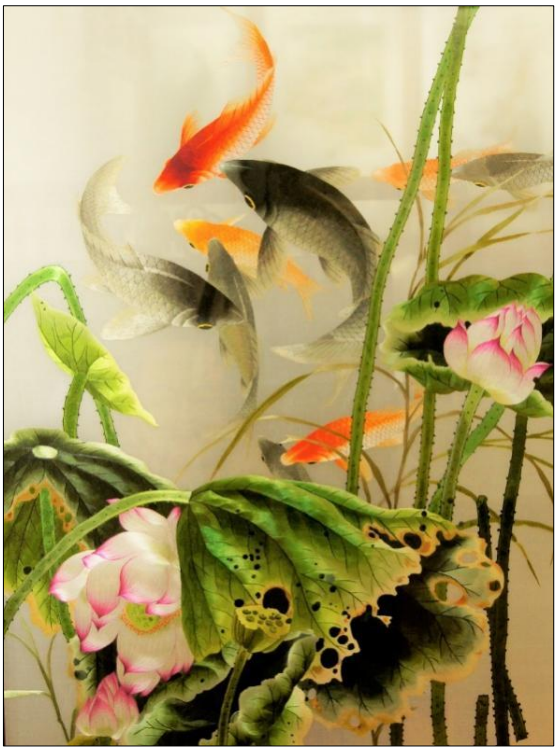


Figure 2. The embroidery work "Lotus and Carp" , Suzhou, 2022 by intangible cultural heritage inheritor Ca Meiying

Study Location

Suzhou, located in southeastern Jiangsu Province, is a hub of intangible cultural heritage and immersive cultural experiences (Ying & Yaacob, 2025). As the birthplace of Suzhou embroidery, its museums and cultural institutions offer informal learning spaces and skill-based activities (Lu et al., 2025). This study draws on the "Suzhou Embroidery Art Exhibition Week" held in December 2024 at the China Embroidery Art Museum, themed "Splendid China, Beautiful Jiangnan." The event featured ritualised, education-oriented activities such as ICH demonstrations, interactive workshops, and cultural exhibitions, creating a rich learning context to test the "ritualized experience–psychological mechanism–learning engagement" pathway. Suzhou's diverse tourist base also ensures a representative sample for this research. It has become a key place to study the intergenerational transmission of traditional knowledge among tourists.

Participants

To ensure statistical validity, this study set the sample size to no less than 384 according to Cochran's (1977) formula, adopted convenience sampling, and conducted a questionnaire survey at the Suzhou Chinese Embroidery Art Museum. A total of 480 questionnaires were collected, and after eliminating invalid items, 439 were retained, with an effective rate of 91.5%. The sample was gender balanced (46.2% male, 53.8% female), with a wide range of age levels, and diverse educational and professional backgrounds, with good representativeness and universality.

Measurement

This study employed a structured questionnaire as the primary data collection tool, following informed consent principles to ensure participants understood the study's purpose and data usage. The questionnaire included 32 items across four sections, covering personal information (e.g., gender, age, education, occupation) and measurements of ritual experience (RS）(Yan et al., 2024), flow (FL) (Zhang & Abd Rahman, 2022), self-expression (SE) (Khademi-Vidra & Bujdosó, 2020) and tourist engagement (TE) (Melón et al., 2021).

To improve response fluency, items were arranged using a To improve response fluency, items were arranged using a Ritualized experiences-Flow-Self-expression-Tourist Engagement format (Table 1).

A pilot survey was conducted at Suzhou Art Museum in October 2024, yielding 80 valid responses. Reliability and validity tests showed strong results: Cronbach's $\alpha = 0.889$, KMO = 0.885, and Bartlett's test $p < 0.01$. Based on expert feedback, ambiguous items were revised to enhance clarity and usability.

Table 1. Statements of variables

Dimension	Items
Ritualized experiences-Uniqueness	I felt the uniqueness of the ritual
	It made the moment different for me
	I felt like at the actual occasion of the ritual
	The ritual arouses feelings of unique history and culture
Ritualized experiences-Commitment	I dealt with the ritual activities carefully
	I spent time and energy on the ritual activities
	I took a serious attitude during the process
Ritualized experiences-Ceremoniality	The process embodied the spirit of inheritance
	I felt traditional customs during the process
	I feel like practising the ritual its original setting
	The accompanying objects and visual cues are ceremonial
Ritualized experiences-Nonfunctionality	In this process, some actions are not necessary
	In a sense, some actions are optional
	In a sense, some actions are repetitive
	In a sense, some actions are time-consuming
Flow	I found a lot of pleasure while participating in the Suzhou embroidery experience.
	while participating in the Suzhou embroidery experience., my attention was focused on the activity
	while participating in the Suzhou embroidery experience, l felt in control
Self-expression	Because the success I feel from the object I create and the process itself inspires to make new things, to do new activities
	Because it makes me feel satisfied if my work has a successful result
	Because I like trying out new things and to learn new skills
	Because I can express myself through these objects and projects
Tourist Engagement	I have a good understanding of the event
	I think participating in the event will give me great satisfaction
	I feel comfortable participating in the event
	Participating in the event is an enriching experience for me
	I think participating in the event allows me to demonstrate my knowledge and experience on certain topics
	I think participating in the event allows me to interact with other people who are interested in the same things

Data Collection

To ensure the validity and reliability of the data, this study established cooperation with the China Embroidery Art Museum, clarified the survey process and obtained support from the museum. Five staff members who assisted in the distribution of questionnaires were provided with a thank-you note of RMB 50 each. The survey was conducted at the entrance of the exhibition hall, and visitors (i.e. informal learners) were guided to scan the code to fill in the questionnaire and sign the informed consent statement before filling it out. To increase the response rate, respondents were rewarded with a RMB 3 electronic voucher. All questionnaires were supervised by the research team to ensure the integrity and consistency of the data. All questionnaires were processed anonymously, and the personal identity information of the participants would not be recorded, thereby fully protecting their privacy and data security.

Data Analysis

To test the research model and hypothesis path, this study used SPSS 26.0 and SmartPLS 4.1 for statistical analysis. In the pre-test, Cronbach's α of each dimension of the scale exceeded 0.80, and the reliability and validity were good. The 439 valid samples of the formal questionnaire were extracted through exploratory factor analysis (KMO = 0.833, Bartlett test $p < 0.001$), and seven factors that met the expected structure were extracted, with a cumulative total variance of 68.21%. Subsequently, a structural equation model (SEM) was constructed to verify the six path relationships and reveal the process by which ritual experience affects tourist behavior through psychological mechanisms. This provides strong support for this study to reveal the mechanism of action between psychological mechanisms and tourist behavior in intangible cultural heritage tourism.

RESULTS AND DISCUSSION

Reliability and Validity Analysis

The reliability levels of different dimensions of this measurement are all above 0.7, so the reliability of the questionnaire is reasonable. The KMO value of the questionnaire measured in this measurement is 0.833, the Chi-square value of Bartlett's sphericity test is 5900.942, the degree of freedom is 378, and the significance is 0.000<0.05, which means that the data has passed the validity test and is suitable for subsequent factor analysis.

Exploratory Factor Analysis

An examination of the overall variance explained by the measurement constructs revealed that the total variance accounted for reached 68.234%, surpassing the commonly accepted threshold of 60%. The individual contributions of the seven identified factors were 14.225%, 9.954%, 9.912%, 9.752%, 9.459%, 7.928%, and 7.003%, respectively, aligning well with the structural expectations of the questionnaire design, as summarized in Table 2.

Extraction method: principal component analysis.

Table 2.Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Percentage of variance	Cumulative %	Total	Percentage of variance	Cumulative %	Total	Percentage of variance	Cumulative %
1	7.294	26.050	26.050	7.294	26.050	26.050	3.983	14.225	14.225
2	2.645	9.446	35.496	2.645	9.446	35.496	2.787	9.954	24.179
3	2.396	8.556	44.052	2.396	8.556	44.052	2.775	9.912	34.091
4	2.036	7.272	51.324	2.036	7.272	51.324	2.731	9.752	43.843
5	1.737	6.203	57.527	1.737	6.203	57.527	2.648	9.459	53.302
6	1.561	5.576	63.104	1.561	5.576	63.104	2.220	7.928	61.231
7	1.436	5.130	68.234	1.436	5.130	68.234	1.961	7.003	68.234

Structural Equation Model Analysis

The findings reveal that ritual experience positively influences tourist engagement, flow, and self-expression, with corresponding standardized path coefficients of 0.361, 0.351, and 0.442, all reaching significance at the $p < 0.001$ threshold. Flow, acting as a mediating factor, also exerts a statistically significant influence on both tourist engagement and self-expression. Specifically, the effect of flow on tourist engagement yielded a coefficient of 0.155 ($p < 0.01$), while its impact on self-expression was 0.112 ($p < 0.01$).

Additionally, self-expression demonstrated a positive contribution to tourist engagement, with a path estimate of 0.097 ($p < 0.05$). These results collectively underscore the interconnectedness among ritual experience, flow, and self-expression in shaping tourist engagement, as summarized in Table 3.

Table 3. Analysis of pathway relationships

	β	SE	T	p
Ritualized experiences→ Tourist Engagement	0.361	0.052	6.923	0.000
Ritualized experiences→ Flow	0.351	0.040	8.727	0.000
Ritualized experiences→ Self-expression	0.442	0.042	10.519	0.000
Flow→ Tourist Engagement	0.155	0.058	2.693	0.007
Flow→ Self-expression	0.112	0.043	2.621	0.009
Self-expression→ Tourist Engagement	0.097	0.049	1.976	0.048

The direct effect of ritual experience on tourist engagement is significant, and both flow and self-expression serve as meaningful mediators. Although the full path from ritual experience → flow → self-expression → tourist engagement shows a small coefficient (0.004), it remains statistically significant with a confidence interval of [0.001–0.010].

Flow positively influences both self-expression and engagement, while self-expression further connects ritual experience to tourist engagement, enhancing participants' involvement and satisfaction.

These results confirm the existence of a valid chain mediation effect, as shown in Table 4.

From the above table we can get Figure 3.

Table 4. Analysis of the mediation impact relationship

Path	β	SE	T	2.5%	97.5%
Ritualized experiences - Flow - Self-expression	0.039	0.016	2.477	0.010	0.073
Ritualized experiences - Self-expression - Tourist Engagement	0.043	0.022	1.908	0.002	0.089
Ritualized experiences - Flow - Tourist Engagement	0.054	0.021	2.585	0.014	0.095
Ritualized experiences - Flow - Self-expression - Tourist Engagement	0.004	0.003	1.410	0.001	0.010
Flow - Self-expression - Tourist Engagement	0.011	0.007	1.472	0.002	0.028

Figure 3 shows: the SEM results of this study indicate that ritualized experiences have a significant and direct positive impact on tourist engagement ($\beta = 0.361$), partially mediated by flow (FL, $\beta = 0.351$) and self-expression (SE, $\beta = 0.442$).

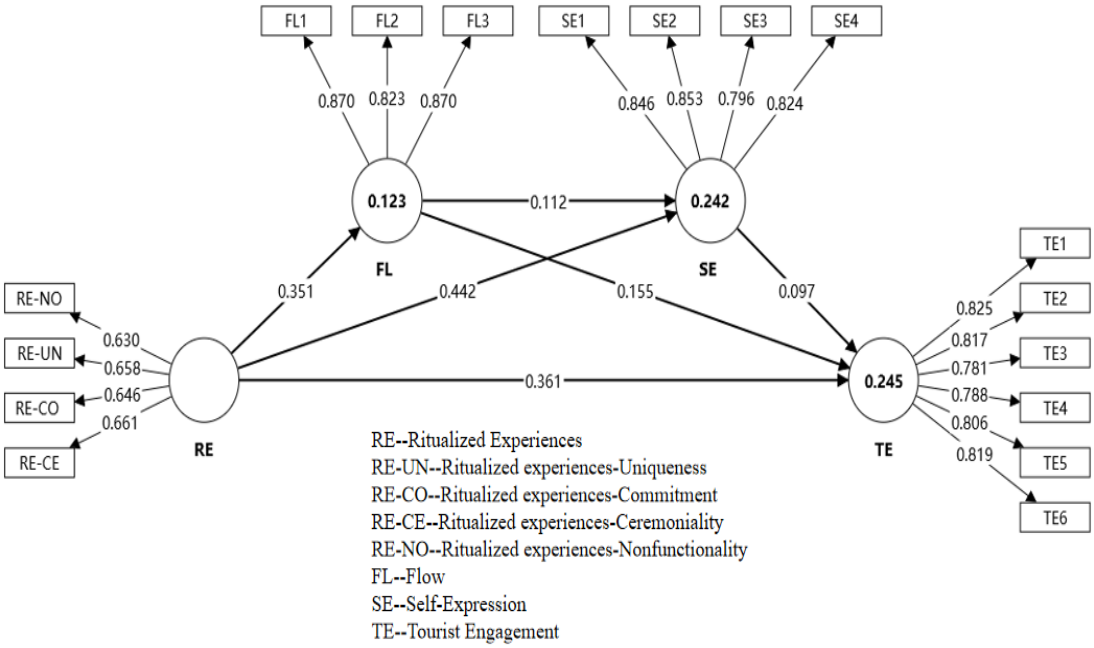


Figure3. Significant standardized direct impacts of variables in the model

In contrast, the mediating effects of flow and self-expression were relatively limited, with flow having a significant impact on tourist engagement (β = 0.155), flow and self-expression having a significant impact (β = 0.112), and self-expression having a relatively weak positive effect on engagement (β = 0.097). This suggests that the ritualized nature of cultural tourism itself is a key factor in promoting sustained tourist engagement. At the measurement level, the four dimensions of ritual experience—non-functionality (RE-NO, λ = 0.630), uniqueness (RE-UN, λ = 0.658), engagement (RE-CO, λ = 0.646), and ritual (RE-CE, λ = 0.661)—ranged from 0.630 to 0.7, indicating acceptable convergent validity, although some indicators fell slightly below the ideal level of 0.70 (Liébana-Cabanillas et al., 2025). The results reveal that ritual experience not only has a significant direct impact on tourist engagement but also partially mediates through flow and self-expression. The direct effect is more significant, indicating that the ritual characteristics of cultural tourism are themselves key drivers of tourist engagement. Furthermore, the existence of the mediating effect reveals the psychological pathways through which tourists achieve engagement, driven by immersive experiences and self-construction motivation.

DISCUSSION

This study found that ritualistic experiences have a significant direct positive impact on tourist engagement, partially mediating this effect through flow and self-expression. This finding stems from the fact that ritualistic features of cultural tourism can strongly stimulate tourists' motivation for immersion and identity construction in the short term, thereby driving their behavioral engagement.

Consistent with previous research, scholars have shown that ritualistic and unique experiences can enhance tourist satisfaction and willingness to participate (Shang & Li, 2024; Yan et al., 2024). Flow has also been repeatedly demonstrated to be an important psychological mechanism driving engagement and well-being (Zhang & Abd Rahman, 2022; Moneta et al., 2025). Furthermore, some studies have emphasized that self-expression can promote social interaction and cultural identification in tourism experiences (Ki et al., 2025), which aligns with some of the pathways identified in this study. These consistent findings indicate that this study not only validates existing theoretical perspectives but also extends their applicability to the ICH tourism context. By confirming the mediating roles of flow and self-expression, this study underscores their cross-context robustness and provides an expandable conceptual framework for explaining tourist engagement.

However, the mediating mechanism effects found in this study regarding the effects of flow and self-expression on engagement are inconsistent with some other studies. For example, Liu et al（2024) emphasize that self-expression is the core driver of memorable travel experiences, while Moneta et al (2025) point out that tourists' feelings of flow often directly influence their depth of engagement, and that the mechanism by which flow experiences influence self-expression and behavior (Zheng & Huang, 2025) is quite significant. However, the results of this study show that the role of self-expression is relatively weak, and the promoting effect of flow on self-expression is also limited. This suggests that although existing research confirms the importance of psychological mechanisms, these mediating mechanisms are often generalized, ignoring the differences and complexity between different contexts.

CONCLUSION

This study is one of the first quantitative studies to empirically explore how ritual experience in intangible cultural heritage tourism affects tourists' participation behavior through flow and self-expression motivation.

The study systematically explores how ritual experience affects tourists' participation behavior through flow experience and self-expression motivation. Based on the field survey data of Suzhou Chinese Embroidery Art Museum,

the chain mediation model of "ritual experience-flow experience-self-expression motivation-tourist participation behavior" was verified using structural equation model (SEM). In practice, this study found that the relationship between ritual experience and tourist participation is not only significant, but also moderated by the mediating role of key psychological variables. From a theoretical perspective, this study integrates flow theory, self-determination theory and interactive ritual chain theory, and further clarifies that "psychological mechanism" is an important mediating process for the transformation of cultural experience into long-term behavior.

This study not only deepens the understanding of the path of cultural context-psychological reaction-behavioral performance, but also provides a solid theoretical support for future exploration of how cultural experience in intangible cultural heritage tourism can be transformed into long-term development behavior, and also provides path guidance and empirical basis for related educational practice, cultural and creative design and cultural policy formulation.

This study makes theoretical and empirical contributions, but it also has limitations. First, the sample was primarily from Suzhou, potentially influenced by regional culture. Future research should compare a wider range of intangible cultural heritage projects and regions. Second, while structural equation modeling (SEM) reveals relationships between variables, it fails to capture the nuanced perceptions of tourists. Additional qualitative interviews and observations could be added. Alternatively, additional mediating or moderating variables could be introduced in the future to further enrich our understanding of the mechanisms of tourist participation in intangible cultural heritage tourism.

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THE IMPACT OF NATURAL FACTORS INTERACTION ON THE MANIFESTATION OF HAZARDOUS GEOLOGICAL AND GEOMORPHOLOGICAL PROCESSES IN THE CHARYN STATE NATIONAL NATURAL PARK: ASPECTS OF SAFE NATURAL RESOURCES MANAGEMENT

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Abstract: Charyn State National Natural Park (SNNP), located in the Sharyn River basin of southeastern Kazakhstan, is characterized by unique geomorphological landscapes and increasing tourist activity. The combination of complex natural conditions and intensive recreational use creates a heightened risk of hazardous geological and geomorphological processes, necessitating effective risk management strategies. The primary aim of this study to assess the impact of interacting natural factors on the manifestation of hazardous geological and geomorphological processes to ensure sustainable and safe natural resources management. The methodological framework integrates geoinformation analysis and remote sensing data within a Multi-Criteria Decision Analysis (MCDA) approach. The Analytic Hierarchy Process (AHP) was applied to assign weights to heterogeneous natural factors, enabling a quantitative assessment of their relative contribution to hazard development. Seven spatial indicators were analyzed: probability of precipitation, lithological composition, slope gradient, vertical dissection of terrain, drainage network density, Topographic Wetness Index (TWI), and Normalized Difference Water Index (NDVI). These datasets were processed, normalized, and combined using a weighted overlay technique in Geographic Information System (GIS) to generate an integral map. The application of multivariate analysis using remote sensing data and GIS enabled the creation of an integrated map reflecting the interactions of key natural factors. This integrative, multi-parameter spatial approach allowed for the objective identification and classification of areas according to the degree of manifestation of geological and geomorphological processes, thereby delineating zones with varying levels of risk. According to the results, the largest portions of the territory fall into the moderate (27.1%, 346.8 km^2) and high (26.5%, 339.6 km^2) categories, indicating widespread areas with elevated geodynamic activity. Very high degree zones account for 10.9% (139.9 km^2) of the study area and represent localized sites requiring targeted monitoring and risk mitigation. Relatively safer areas include those with a low degree (22.5%, 288.1 km^2) and a very low degree (12.9%, 165.7 km^2). Slope steepness, lithology, and terrain dissection were found to be dominant factors, while vegetation cover and moisture conditions acted as significant modifiers of hazard potential. The accuracy of the obtained data has been validated through field verification, ensuring the study's high practical relevance for environmental management planning and vulnerability assessment of the area.

Keywords: natural factors; geological and geomorphological processes; AHP, MCDA, GIS; safe environmental management; Charyn state national natural park

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INTRODUCTION

Since 2023, a scientific project No. AP19677559 titled "Instrumental and methodological assessment of hazardous natural phenomena and processes in Charyn State National Natural Park" has been implemented on the territory of Charyn SNNP, which is funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan. As part of the project, comprehensive studies are being conducted aimed at monitoring hazardous natural phenomena and processes using high-precision field equipment, as well as modern geoinformation and remote sensing methods. As a result of a reconnaissance survey of the Charyn SNNP territory, 12 monitoring sites were identified, characterized by the highest intensity and frequency of hazardous climatic and hydrological phenomena, as well as geological and geomorphological processes. These areas cover the most vulnerable natural systems, including river valleys, foothill slopes, and zones of tectonic faults. The Charyn SNNP, located in an arid and seismo-tectonically active zone of southeastern Kazakhstan, is characterized by a high rate of geomorphological transformations. The most common processes

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include planar wash, gully and lateral erosion, landslide and rockslide processes, as well as mudflow phenomena, which significantly impact both natural ecosystems and the tourism and conservation infrastructure of the park. In a number of existing studies, attention is primarily focused on individual aspects of geological and geomorphological processes, while their comprehensive analysis in relation to various natural factors of different origins remains insufficiently developed. Meanwhile, the activation of these processes is determined by the combined influence of climatic conditions, lithological and morphometric features of the terrain, hydrological characteristics, as well as soil and vegetation cover parameters.

The lack of an integrated approach using modern geoinformation technologies limits the capabilities of spatial analysis and natural risk forecasting. Consequently, this reduces the effectiveness of nature conservation measures and hampers the implementation of sustainable natural resource management principles, particularly within specially protected natural areas. This study is dedicated to a comprehensive assessment of the impact of natural factors on the activation of geological and geomorphological processes within the Charyn SNNP. The analysis is based on considering the interactions among five primary groups of factors: climatic, geological, geomorphological, hydrological, and biotic. Each of these factors can act independently or in conjunction with others to serve as a trigger for hazardous geological and geomorphological processes.

Climatic conditions are one of the key factors initiating the development of geological and geomorphological processes. Variations in precipitation levels, snowmelt, and temperature fluctuations contribute to soil over-saturation and a reduction in soil strength, thereby increasing the likelihood of landslides, erosion, and mudflow phenomena (Harris et al., 2008; Peiro et al., 2024). The greatest hazard in arid conditions is posed by intense precipitation events with a low probability of occurrence (e.g., ≥10 mm within 12 hours) that exceed the climatic norm (Chelariu et al., 2023; Miklin et al., 2022), since it is the exceeding of threshold precipitation levels, rather than their total annual amount, that most frequently initiates active geodynamic processes (Rosi et al., 2023). According to Heo et al. (2024), precipitation ranks third in significance among natural factors, following only soil characteristics and slope. The importance of the precipitation regime, along with accompanying climatic parameters such as temperature background and snow cover, has been emphasized in various studies (Piroton et al., 2020; Rom et al., 2023; Yuniawan et al., 2022; Zúñiga et al., 2020; Hidayat et al., 2019; Karmakar et al., 2023; Zhanibek et al., 2025; Chelariu et al., 2023; Miklin et al., 2022; Rosi et al., 2023).

The lithological composition of rocks (including their mineralogy, structure, mechanical properties, and stability) is determined by the intensity of weathering, erosion, landslides, and ravine formation. The study by Yanites et al. (2017) demonstrated that lithological heterogeneity influences erosion rates and landform development, thereby driving local variations in morphological evolution. Similarly, Yunus et al. (2016) emphasizes the role of lithological differences in erosion activity and watercourses morphology. Weakly cemented and porous deposits (loess, sands) are susceptible to intensive erosion, whereas stable rocks (granites, quartzites) provide relative slope stability (Ott, 2020; Arabameri et al., 2020). Under arid climate conditions, as demonstrated in the work of Yu et al. (2024), erosion activity significantly increases in areas dominated by loose sedimentary rocks and characterized by poorly developed vegetation, which limits the natural protection of slopes. Lithological variation of the rocks is a key factor in understanding the spatial heterogeneity in the nature and intensity of geological and geomorphological processes in arid climate conditions.

Key morphometric parameters of the relief – the surface slope and vertical dissection – determine the intensity of surface runoff and the activation of slope processes (Meghdad et al., 2021). An increase in slope steepness accelerates runoff and enhances erosion, particularly under conditions of heavy precipitation and weak soil cover. Vertical dissection serves as an indicator of relief maturity and tectonic activity, as evidenced by studies conducted in various regions, including the Sierra Nevada (Deng et al., 2019; Guzzetti et al., 2009). In the Charyn SNNP, as in other seismically active zones of Central Asia, slopes with inclinations exceeding 25° and high vertical dissection pose the greatest danger, especially in the presence of lithological heterogeneity and extreme precipitation events (Sharapkhanova et al., 2024; Abitbayeva et al., 2024). Hydrological characteristics of the terrain play a significant role in the formation of slope and erosion processes, particularly in mountainous and foothill regions. One of the key indicators is the drainage network density, which reflects the degree of terrain dissection by watercourses and indicates the potential intensity of water erosion. High drainage density values correlate with an increased capacity of water flows to washout and transport sediments (Sarkar & Kanungo, 2004; Makaya et al., 2019). Another important indicator is the TWI, which characterizes the landscape's capacity to accumulate moisture and predict areas with potential waterlogging. It is defined as a function of slope and catchment area and is widely used in modelling surface runoff and slope stability (Moore et al., 1991; Gómez-Gutiérrez et al., 2015; Tahmassebipoor et al., 2016). Elevated TWI values may indicate zones with an increased likelihood of water erosion and landslides, particularly when combined with lithological vulnerable rock formations.

Vegetation cover significantly influences slope stability and water erosion processes by serving as a protective barrier that reduces the impact of raindrop impact forces and slows surface runoff. The NDVI index is widely used in assessing vegetation density and its spatial variability (Uddin et al., 2018; Barakat et al., 2023). Low NDVI values generally indicate exposed areas that are more susceptible to erosion, landslides, and other geomorphological phenomena, whereas dense vegetation contributes to soil retention and slope stabilization. Vegetation cover also influences the infiltration properties of soil, evaporation, and biological activity, thereby indirectly affecting hydrological processes. Consequently, the biotic factor must be considered in the modeling of natural hazards, particularly in the context of climate change and landscape degradation.

Cimpoeșu et al. (2025) examined the relationship between natural hazards and tourism activities on the left bank of Lake Izvoru Muntelui (Romania). Based on field observations, surveys, GIS analysis, and statistical methods, the study found that landslides cause substantial damage to road infrastructure (73 affected sections) and increase the vulnerability of tourism facilities (from medium to very high), with most operators perceiving landslides and floods as serious threats.

Gacu et al. (2025) conducted a study in Odiongan, Romblon, using GIS and the AHP to assess building vulnerability to floods, landslides, and fires. A multi-hazard map was developed by integrating hazard exposure, building vulnerability, and spatial risk distribution. The analysis classified 4,043 buildings into five risk categories, identifying significant spatial variations in susceptibility, with certain barangays showing a higher concentration of high-risk structures. Previous studies in the Sharyn River basin, where the Charyn SNNP is located, have emphasized the importance of geomorphological and hydrological factors in assessing landslide susceptibility and demonstrated the effectiveness of GIS and remote sensing-based multi-criteria approaches (Kerimbay et al., 2025). The aim of this study is to quantitatively evaluate the influence of climatic, geological-geomorphological, hydrological, and biotic (vegetation) factors on the occurrence and spatial distribution of hazardous geological and geomorphological processes within the Charyn SNNP, in order to develop an integrated hazard map to support safe and sustainable natural resource management.

MATERIALS AND METHODS

Study Area

The study area encompasses the territory of the Charyn SNNP, located in the southeastern part of the Republic of Kazakhstan. The protected territory covers an area of 127,050 hectares and includes the administrative boundaries of Uigur, Yenbekshikazakh, and Kegen districts of Almaty Region (Kerimbay et al., 2019). The geological structure of the area is represented by Paleozoic sedimentary, volcanic, and intrusive rocks, overlain by Neogene-Quaternary deposits with a thickness of up to 150 meters. The relief exhibits a high degree of morphostructural contrast and encompasses a wide range of landforms from denudational and erosion-tectonic to accumulative-erosional and accumulative types. The most characteristic morphological features include outcrop cones, erosion terraces, canyon-like valleys, and alluvial plains (Medoyev, 1967). The hydrographic network is led by the Sharyn River, with the right-bank tributary Temirlik.

The rivers exhibit a mixed type of water regime, predominantly fed by snowmelt; the average annual water flow in the area is 49.4 m^3/s. The region's climate is characterized by a sharply continental, arid type. Annual precipitation varies from 125 to 325 mm. The average monthly air temperature at the hydrological station “Sarytogay Tract” ranges from –4.7 °C in winter to +21.5 °C in summer. Spatial heterogeneity of climatic conditions is determined both by latitudinal and altitudinal zonation, as well as by the influence of orographic barriers, which contribute to the formation of inversion thermal regimes within intermountain valleys (Kerimbay et al., 2019).

Justification of the methodology and selection of the AHP-MCDA approach

Assessment of the manifestation of hazardous geological and geomorphological processes within the Charyn SNNP requires the application of methodologies capable of accounting for the complex interactions of natural factors under conditions of limited reliable data. Contemporary spatial analysis approaches encompass a wide range of methods; however, not all of them allow for the integration of heterogeneous parameters into a unified analytical model. Heuristic methods based on expert evaluations are characterized by flexibility and ease of application, particularly in environments where archival information is scarce. Nevertheless, their subjective nature and limited reproducibility constrain the ability to obtain verifiable and comparable results (Sandić et al., 2023; Huang et al., 2020). Among statistical methods, the Frequency Ratio (FR) has gained the most widespread use – being a simple and widely employed approach based on the analysis of the spatial distribution of observed events (Sandić et al., 2023; Addis et al., 2024; Tadesse et al., 2024). Its primary advantages include objectivity, reproducibility, and the capacity for quantitative assessment of the significance of individual factors (Sandić et al., 2023; Yuan et al., 2020). At the same time, the FR assumes independence of factor influences, which does not reflect the complex interaction structures present in natural systems. Moreover, its application requires extensive and reliable archival data, which complicates its use in operational environments such as protected areas (Alamrew et al., 2024; Leoni et al., 2015; Melese & Gashure, 2024; Shano et al., 2020; Demisie et al., 2024). Nevertheless, the FR remains an effective tool for analyzing large volumes of spatial data with minimal subjective bias (Renza et al., 2022; Bezie et al., 2024; Kassa, 2024; Swain et al., 2023).

Deterministic approaches, such as the Limit Equilibrium Method and Finite Element Method, provide high predictive accuracy in local slope stability assessments. However, they require detailed geotechnical data and substantial computational resources, which limit their applicability for regional mapping (Renza et al., 2022). Machine learning techniques, including Random Forest and Support Vector Machine, enable the identification of complex nonlinear relationships between factors and offer high forecasting accuracy (Swain et al., 2023). Nonetheless, these methods demand large volumes of training data and are characterized by low interpretability, constraining their use in scenarios with limited observational data (Kassa, 2024). Considering the objective of this study – to assess the extent of influence and interactions of natural factors on the development of hazardous geological and geomorphological processes within protected areas – the most appropriate approach appears to be the AHP within the framework of MCDA.

This method provides a structured and systematic representation of the research problem, allows for the incorporation of expert knowledge, facilitates pairwise comparisons of factors, and enables weighted evaluation of their significance with subsequent consistency verification of judgments (Addis et al., 2024; Tadesse et al., 2024; Alamrew et al., 2024; Melese & Gashure, 2024; Shano et al., 2020; Saaty & Vargas, 2001; Pellicani et al., 2014). The AHP method is particularly effective under conditions of limited statistical data, especially when field observations and expert assessments are available, making it a relevant tool for monitoring natural processes in protected areas (Kassa, 2024; Al-kordi et al., 2025). Thus, the application of AHP-MCDA within the framework of assessing the hazard of geological and

geomorphological processes in the Charyn SNNP enables a formalized, reproducible, and comprehensive interpretation of interacting natural factors. This, in turn, facilitates the development of scientifically justified recommendations for sustainable natural resource management and the conservation of protected areas.

Initial data and methods for acquiring spatial data using GIS

For the implementation of the AHP-MCDA methodology, the following spatial and thematic data were used, reflecting key natural factors that contribute to the activation of geological and geomorphological processes within the Charyn SNNP.

Climatic Factor

The probability of precipitation ≥10 mm within 12 hours was calculated based on data from the Charyn automatic weather station (AWS) operated by the Republican State Enterprise Kazhydromet and two temporary AWSs established as part of the project at the sites Ash Grove and Ulken Bugyty. This indicator reflects the likelihood of extreme rainfall events and serves as one of the key climatic triggers.

The probability of precipitation is calculated according to formula (1) (Brier & Panofsky, 1956) of an empirical or frequency-based probability estimate: $P(E) = f/N$ (1) P(E) – the probability of event E, f – the number of cases when event E occurred, N – total number of cases (sampling size).

The values of the calculated probabilities for each observation point were normalized to the interval from 0 to 1 using the formula (2) (Magalhães et al., 2023): $I_i = (v_{obs} - v_{min})/(v_{max} - v_{min})$ (2)

Normalized data (I_i) calculated based on observed (v_{obs}), minimum and maximum values of the sample. The unit is based on the maximum probability of precipitation within the specified range and, accordingly, the maximum impact of precipitation as a trigger. Zero is taken as the minimum probability for the area under study (Magalhães et al., 2023). For the construction of the map, the precipitation assessment results across the Charyn SNNP were divided into intervals (Table 1), each assigned a score ranging from 1 to 3, with 3 indicating areas with the highest likelihood of precipitation according to the specified criterion. The number of classes (K) was determined based on the total number of disasters (*f*) (3) (Magalhães et al., 2023): $K \approx 1 + 3{,}33 \log f$ (3)

Amplitude (A) calculated according to Number of classes (K), maximum (v_{max}) and minimum (v_{min}) value of rain probability (4) (Magalhães et al., 2023): $A = (v_{max} - v_{min})/K$ (4)

Geological Factor

To assess the stability of rocks against geological and geomorphological processes, a lithological map at a scale of 1:200,000 (Medoyev, 1967) was used. The lithological composition of the rocks, as depicted on this map, is a key factor in understanding the territory's resilience to natural processes.

The classification of rocks is based on their susceptibility to erosion and destruction (Yermolovich et al., 2018). The rocks were divided into three main groups depending on their stability:

1) weak stability – this group includes rocks that have low resistance to erosion processes, washout, and other destructive effects: gravelly soils, sands, and loess-like loams;

2) moderate stability: this group includes rocks that have medium resistance to washout and mechanical impacts. These rocks are less susceptible to degradation compared to rocks from the first group: boulder-aggregate, conglomerates, sandstones, clays, granosyenites, quartz syenites;

3) high stability – this category includes rocks that are most resistant to washout, erosion, and other geomorphological processes: tuff sandstones, shales, quartzites, granites (Table 1).

Geomorphological factors

To assess the geomorphological conditions influencing the stability of the study area, digital elevation models (DEMs) reflecting both macro- and mesoforms of the terrain were used. The primary source of spatial data was the AW3D30 model with an approximately resolution of 30×30 meters, derived from satellite observations by ALOS, enabling a quantitative analysis of morphometric parameters relevant to evaluating geodynamic activity. One of the key parameters is the slope of the surface, which impacts water erosion processes, slope stability, and soil cover degradation conditions. The slope was calculated using the Slope tool in the Spatial Analyst extension within ArcGIS 10.8, based on the processed DEM. The slope values were classified into three hazard levels (Table 1):

1) up to 8° – low erosion risk; areas resistant to degradation (weak hazard degree);

2) 8–35° – areas with moderate risk, susceptible to erosion and vegetation changes (moderate hazard degree);

3) over 35° – high risk of erosion and geodynamic processes that contribute to ecosystem degradation (severe hazard degree). The second significant parameter is the vertical dissection of the relief, which reflects the complexity and activity of geomorphological features. Its calculation is based on the analysis of relative surpassing within 1 km^2 grid cells, allowing for the consideration of both absolute and local morphometric differences. A high degree of dissection correlates with an increased likelihood of processes such as landslides, rockslide, and debris flows. The classification of vertical dissection (Table 1) was carried out as follows:

1) 6.4–48.3 m/km^2 – low degree of dissection, characteristic of stable areas;

2) 48.4–130.5 m/km^2 – average indicator indicating zones of potential geodynamic activity;

3) 130.5–451.6 m/km^2 – high degree, reflecting the presence of intense geomorphological processes and risks.

The applied methodology for the classification and interpretation of geomorphological parameters is based on the approaches of Pozachenyuk & Petlyukova (2016) and Spiridonov (1970). A comprehensive analysis of slope and vertical dissection within a geospatial environment provides an objective assessment of landscape stability and the spatial distribution of natural risks. This approach facilitates the accurate identification of potentially hazardous zones and supports reasonable decision-making in environmental protection and infrastructure planning.

Hydrological factors

Drainage density is an important morphometric parameter that characterizes the degree of development of the erosion-hydrological network within the studied area. In this research, this indicator was calculated based on a DEM using Flow Accumulation and Line Density tools within ArcGIS 10.8 environment. Since the same DEM was used for analysis, the obtained values reflect differences in the erosional dissection of the landscape and the potential activity of surface runoff. According to approaches described in references (Sarkar & Kanungo, 2004; Makaya et al., 2019), drainage density was classified into three categories: low (0.2–1.8 m/km^2), medium (1.8–2.7 m/km^2), and high (2.7–5.2 m/km^2), as presented in Table 1. This classification allows for the identification of areas with varying susceptibility to the formation of erosion processes and the development of gully networks. Additionally, the TWI was calculated as an integrated indicator assessing the likelihood of soil waterlogging and moisture accumulation depending on slope morphology. The TWI considers both the catchment area (As) and the slope gradient (β) (Moore et al., 1991) (formula 5): $TWI = \ln(A_s/\tan\beta)$ (5)

For the calculations, tools such as Hydrology and Raster Calculator in ArcGIS 10.8 were used. The TWI values within the study area ranged from 2.9 to 30.1, indicating significant heterogeneity in moisture conditions. Following the methodology accepted in works (Gómez-Gutiérrez et al., 2015; Tahmassebipoor et al., 2016), the index was classified into three groups: low (2.9–7.8), medium (7.8–11.3), and high (11.3–30.1) values, allowing for the identification of zones with varying probabilities of surface water accumulation and the formation of over humidified areas (Table 1). Comparison of the spatial distribution of drainage network density and TWI values allows for the identification of areas susceptible to intense surface runoff, erosion, and water accumulation. These parameters play a crucial role in modeling the vulnerability of territories to geological and geomorphological processes and serve as a basis for subsequent natural risk zoning.

Table 1. Parameters for assessing the degree of hazardous geological and geomorphological processes (Source: Modified by authors from Yermolovich et al., 2018; Yegemberdiyeva et al., 2020; Leontyev & Rychagov, 1988; Sharapkhanova et al., 2024; Abitbayeva et al., 2024)

Factor	Parameter	Hazard manifestation degree		
		Weak (1)	Moderate (2)	Strong (3)
Climatic	Rainfall	<0.3	0.3 – 0.6	>0.6
Geological	Lithology	Tuffaceous sandstones, shales, quartzites, granites	Boulder and pebble deposits, conglomerates, sandstones, clays, granosyenites, and quartz syenites	Gravelly deposits, sands, and loess-like loams
Geomorphological	Slope, °	Up to 8	8 – 35	more than 35
	Vertical Dissection, m/km^2	6.4 – 48.3	48.4 – 130.5	130.5 – 451.6
Hydrological	TWI	2.9 – 7.8	7.8 – 11.3	11.3 – 30.1
	Drainage density, m/km^2	0.2 – 1.8	1.8 – 2.7	2.7 – 5.2
Vegetation cover	NDVI	–0.07 – 0.1	0.1 – 0.4	more than 0.4

Biotic factor

To assess the vegetation condition in the study area, the NDVI index was used, calculated from a multispectral Landsat-8 OLI (spatial resolution 30×30 meters) image dated April 26, 2025. The data were obtained from the USGS Earth Explorer open geospatial portal, which provides access to archival and real-time satellite imagery. NDVI calculation was performed using the well-known formula 6 (Rouse et al., 1973): $NDVI = NIR - R/NIR + R$ (6) where NIR – near-infrared band, R – red band. NDVI is an important biophysical indicator widely used in remote sensing for quantitative assessment of vegetation condition, density, and productivity. NDVI values range from –1 to +1. Negative values (less than 0) typically indicate the absence of vegetation and correspond to open soils, urbanized areas, or rocky surfaces. Positive values (greater than 0) reflect varying degrees of vegetative cover development. The higher the NDVI value, the greater the vegetation productivity and ecological stability (Table 1) (Uddin et al., 2018; Barakat et al., 2023). Based on NDVI data, vegetation cover was classified into three categories reflecting varying levels of biotic activity and, consequently, vulnerability to natural impacts: areas with minimal or no vegetation cover (–0.07 to 0.1) (indicating high vulnerability); zones with fragmented or degraded vegetation (0.1 to 0.4) (indicating medium vulnerability); and areas with dense vegetation cover (>0.4) (indicating low vulnerability). This classification aligns with the approaches proposed in references (Uddin et al., 2018; Barakat et al., 2023) and enables the application of NDVI data within an integrated assessment of environmental hazard and landscape stability. To ensure comparability of heterogeneous spatial data presented in various physical units (including climatic, geological and geomorphological, hydrological, and biotic factors), all indicators were normalized and converted into a unified scoring scale. A three-tier classification system was employed to assess the hazard manifestation degree: weak (1 point), moderate (2 points), and strong (3 points). This approach enables the qualitative integration of various parameters into a unified multi-criteria analysis system, which is critically important for a comprehensive assessment of the territorial resilience to dangerous geological and geomorphological processes. The consolidated classification of factors according to the severity of geological and geomorphological hazards and their corresponding scoring values are presented in Table 1.

Determination of weights and construction of vulnerability maps

AHP–MCDA is an effective decision-making approach that allows for the integration of various input parameters to achieve specified goals (Ziadi et al., 2025; Aher et al., 2013; Assefa et al., 2015). The method's effectiveness has been demonstrated through its successful application in different areas, including land suitability analysis for agriculture (Parihari et al., 2021), assessment of potential zones of groundwater distribution (Biswas et al., 2020; Çelik et al., 2024), evaluation of landslide susceptibility (Zhou et al., 2023; Liu et al., 2024; Demirel et al., 2025, Al-kordi et al., 2025), and identification of areas prone to soil erosion (Ziadi et al., 2025). In this study, the AHP–MCDA methodology within a GIS environment was used to assess the factors influencing the susceptibility of the territory to hazardous geological and geomorphological processes and to subsequently develop a map depicting the degree of manifestation of these processes (Figure 1). The AHP method enables the integration of expert assessments, field observation results, and statistical data. This semi-quantitative approach is based on constructing pair-wise comparison matrices and calculating weight coefficients for the factors affecting the spatial distribution of the phenomena under study (Saaty, 1990; 1994; Saaty & Vargas, 2001).

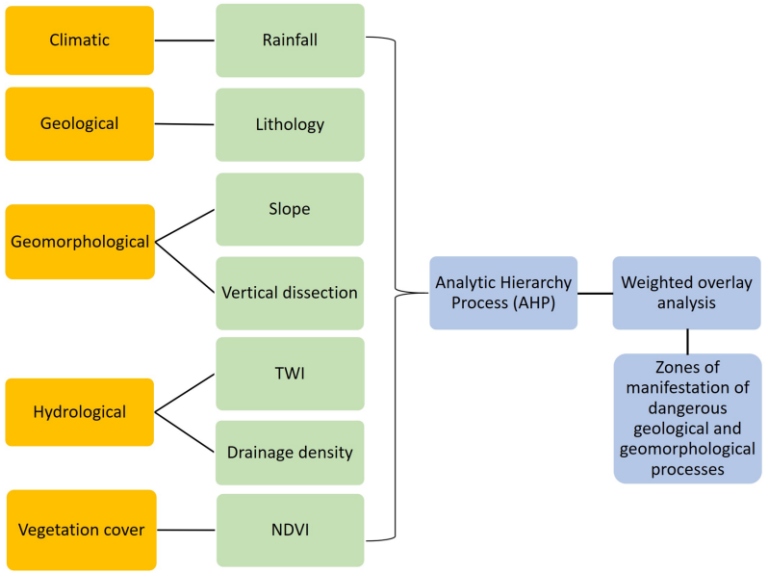


Figure 1. Flowchart of the method for the assessment of manifestation degree of hazardous geological and geomorphological processes using AHP-MCDA (Source: Modified by authors from Ziadi et al., 2025)

The AHP methodology involves a step-by-step process: formulating the objective, constructing a hierarchy of factors and parameters, performing pair-wise comparisons, normalizing the resulting values, calculating weights, and verifying the consistency of expert judgments. In the first stage, key factors potentially influencing the manifestation of hazardous geological and geomorphological processes were identified: precipitation, lithology, surface slope, vertical dissection of the terrain, drainage density, TWI, and NDVI. Each pair of factors was compared based on the Saaty nine-point scale, where values from 1 to 9 reflected the relative importance of one factor compared to another (Saaty, 1980). The results of pairwise comparisons were organized into a reciprocal matrix, which served as the basis for calculating the relative weights of the factors. To do this, the matrix was normalized using the following procedure: first, the sums of the values in each column were computed; then, each individual value was divided by the corresponding column sum, resulting in a normalized matrix where the sum of values in each column equals one. Next, the arithmetic mean of the normalized values in each row was calculated, allowing the determination of the relative weight of the corresponding parameter (Kebeba et al., 2024).

The obtained values form a priority vector that reflects the contribution of each factor to the overall susceptibility. The higher the weight, the greater the influence of the corresponding parameter on the resulting assessment. However, the interpretation of these weights is only valid if they are consistent with the judgments in the initial comparison matrix. Therefore, a crucial step is to verify consistency, ensuring the reliability and logical coherence of the expert evaluations.

The reliability of results obtained using the AHP method is largely determined by the consistency of expert judgments employed in pair-wise comparisons of factors. To quantitatively assess this consistency, the Consistency Ratio (CR), proposed by Saaty, is used as an indicator of logical coherence of the judgments.

The procedure involves calculating the maximum eigenvalue (λmax) of the pair-wise comparison matrix, which is a critical parameter for verifying the correctness of the weight distribution. This is achieved by first determining the priority vector (the eigenvector), then computing λmax as the sum of the products of each normalized vector element and the sum of the corresponding column in the matrix. Based on this value, the Consistency Index (CI) is calculated using formula 7 (Saaty, 1990): $CI = (\lambda \max - n)/(n-1)$ (7) where, λmax – the largest or principal eigenvalue of the analyzed matrix, and n — the order of the square matrix. Next, the CR is calculated as follows (8) (Saaty, 1990): $CR = CI/RI$ (8)

where RI is the consistency index, it measures the concordance of a randomly generated pair-wise comparison matrix. It depends on the number of elements being compared. A CR value < 0.1 indicates an acceptable level of consistency, suggesting that the expert assessments are logically justified and suitable for further analysis. If this threshold is not met,

the comparison matrix must be reviewed and revised accordingly (Saaty, 1980; Saaty, 2000; Saaty, 2008; Mengstie et al., 2024). After determining the weight coefficients for each factor, a spatial analysis was performed using a weighted summation procedure. As a result, an integral map illustrating the degrees of manifestation of geological and geomorphological processes (DMP) was produced based on Formula 9 (Ziadi et al., 2025): DMP $= \sum_{i=1}^{n} R_i * W_i$ (9) where R_i represents the evaluation classes for each layer, and W_i denotes the weight coefficients for each factor that influence the manifestation of geological and geomorphological processes. The resulting values were classified using the "natural breaks" method into five levels of process manifestation: very low, low, moderate, high, and very high.

Considering the spatial distribution characteristics of precipitation, an initial classification of the territory into three classes was performed based on the probability of rainfall ≥10 mm within 12 hours. However, when this layer was overlaid with other factors using the Weighted Overlay tool in the Spatial Analyst module, the resulting map exhibited blurred (coarse) boundaries between zones of different hazard levels. To improve the spatial analysis accuracy and obtain smoother gradients of values, the normalized precipitation data were visualized using a stretch mode, which allowed the creation of a raster with a continuous probability distribution within the specified spatial resolution. The resulting smoothed layer was then incorporated into a multi-criteria analysis, where it was integrated with other factors according to the established weights.

RESULTS

Climatic factor: classification of precipitation

To assess precipitation as a key trigger of geological and geomorphological processes – especially under conditions of water scarcity typical of desert environments – the Rainfall indicator was used. This indicator measures the probability of liquid precipitation ≥ 10 mm within a 12-hour period (based on data from AMS meteorological stations) (Figure 2).

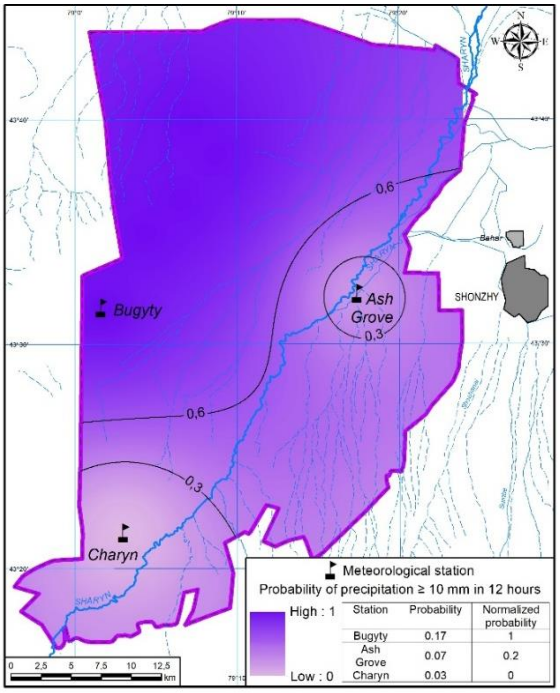


Figure 2. Probability of precipitation ≥10 mm in 12 hours;

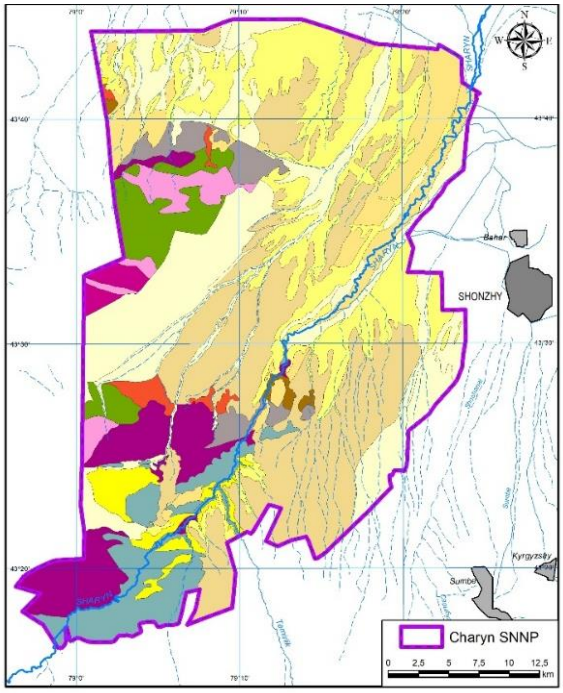


Figure 3. Lithological composition of rocks (Source: Geological maps, scale 1:200 000)

* Legend to the Figure 3

	Lithological composition of rocks
	Pebblestones, sands
	Pebblestones, sands and loess-like loams
	Boulders-pebbles, conglomerates
	Conglomerates, sands, clays
	Sands, clays
	Conglomerates, sands
	Tuff sandstones (variegated tuff lavas and tuffs of liparitic and dacitic porphyries, rare interlayers of tuffs of mixed composition and porphyrites, tuff sandstones)
	Tuff sandstones (tuffs and lavas of andesitic porphyrites, dacite, tyrachydacite porphyries and mixed composition of effusives)
	Shales (chlorite-sericite and phyllitic shales)
	Shales, quartzites (chlorite-siliceous, micaceous-quartz shales, silica and quartzites)
	Shales (sericite-quartz, chlorite-siliceous, chlorite-sericite and phyllitic shales)
	Granite syenites, quartz syenites
	Coarse-grained granites

Rain events with low probability can nevertheless initiate geomorphological changes and hydrological phenomena (Miklin et al., 2022; Rosi et al., 2023; Piroton et al., 2020). The highest likelihood of intense precipitation occurs predominantly in the northeastern part of the Charyn SNNP, which is influenced by the presence of an orographic barrier. It should be noted that, during west-to-east airflow, the ridge promotes precipitation on the windward side; that is, west of the Bugyty station, precipitation events are more frequent during both winter and summer. In the Ash grove, the recurrence of precipitation in the 5.0–9.9 mm range is higher than ≥ 10 mm or more. This can be explained by increased moisture availability in the area due to dense vegetation and more intensive transpiration compared to the Charyn AMS. Spatial analysis of extreme precipitation within the Charyn SNNP indicates a decreasing likelihood of heavy rainfall from the northeastern area toward the west and south, where the probability is lowest. However, this does not exclude the possibility of river water level rises and debris flow formation due to more intense precipitation events typical of the Northern Tien Shan mountains (near the eastern foothills of the Ili River and Kungei Alatau, Uzynkara ridge). Precipitation amounts of 35 mm or more are particularly critical and should be considered when forecasting hydrological phenomena.

Geological factor: lithology and erodibility of rocks

The lithological composition of rocks is a key factor controlling slope stability against erosion, landslides, and other destructive processes. The properties of the rocks determine the landscape features, the type of soil-forming processes, and sensitivity to external influences (Mushtaq et al., 2023). The results indicate that areas composed of rocks with a high degree of erodibility include valley-upland hills and proluvial-sloping plains around the Ulken Bugyty mountains, the floodplains and the first alluvial terraces of the Sharyn River (from the Sarytogay locality to the northeastern part of the SNNP), as well as the southeastern part of the national park (Figure 3). Regions exhibiting a strong degree of erosion cover an area of 429.7 km^2, which is approximately 31.4% of the park's total area (1 368.6 km^2). Areas with a moderate rock erosion degree occupy a significant portion of the studied territory, stretching from the north to the southeast of the national park. These areas are situated on valley-terraced hills on the right and left banks of the Sharyn River, as well as on secondary floodplain terraces and erosion hills known as "bedlands" (on the right bank). Territories exhibiting a moderate level of manifestation of geological and geomorphological processes cover an area of 603.6 km^2, accounting for 44.1% of the park's total area. Territories with a weak rock erosion degree include the Toraigyr and Ulken Bugyty mountains, the hilly ridges between them, and the southwestern part of the national park. These areas encompass 335.3 km^2, or 24.5% of the park's territory.

Geomorphological factors: slope and vertical dissection of the relief

To analyze the influence of geomorphological factors on the formation and spatial distribution of hazardous geological and geomorphological processes, key morphometric parameters of the terrain were utilized, including the slope angle and the degree of vertical dissection of the surface (Conforti et al., 2011; Achour et al., 2017; Rahmati et al., 2017).

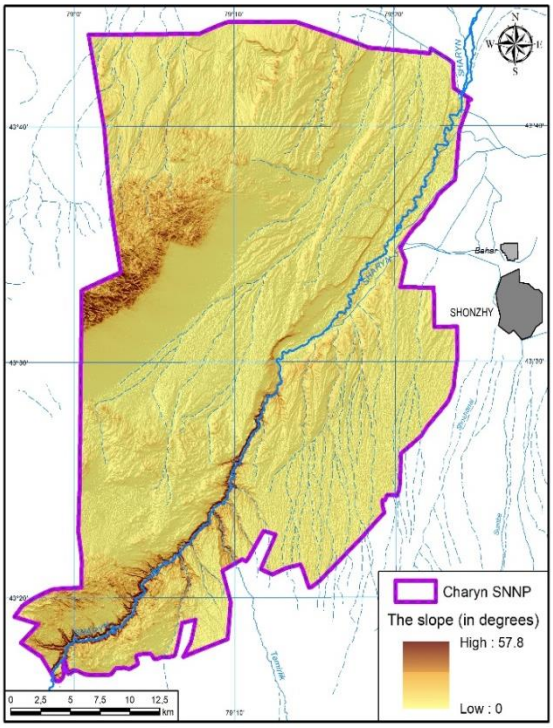


Figure 4. Curvature (Slope)
(Source: Based on AW3D30, 2024);

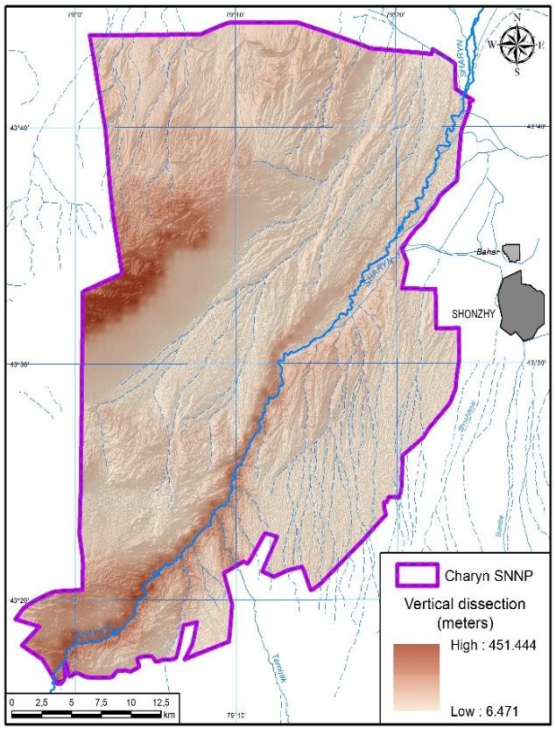


Figure 5. Vertical dissection of the relief
(Source: Based on AW3D30, 2024)

The slope angle is traditionally regarded as a fundamental parameter in geomorphological mapping, as it significantly affects surface runoff patterns and intensity, soil infiltration characteristics, the morphology of drainage networks, and the

development of water erosion (Conforti et al., 2011; Arabameri et al., 2020; Chakrabortty et al., 2020). The character and intensity of slope processes, including landslides, falls, and erosion, are largely determined by the steepness of the slopes. In the Charyn SNNP, areas with the highest slope gradients (exceeding 35°, covering 12.2% of the park's area) are characterized by a high degree of hazardous process activity. These zones are predominantly localized within the Ulken Bugyty and Toraigyr mountain ranges, as well as in the upper section of the Sharyn River canyon before it transitions into the plains (Figure 4). Areas with slopes ranging from 8° to 35% (about 43% of the territory) are associated with denudationally inclined pediments, sloping and ridge-shaped hills southwest of the Toraigyr mountain, and with accumulative-erosional landforms in the interfluve between the Sharyn and Temirlik rivers. Additionally, such slopes are characteristic of erosion hills (badlands) south of Sarytogai and valley-rolling elevations north of the Ulken Bugyty mountains. The majority of the park's area (44.8%) features low slopes (less than 8°), which are generally linked to the development of planar wash processes (Zúñiga et al., 2020; Hidayat et al., 2019). The intensity of vertical terrain dissection, expressed through the amplitude of relative heights (the difference between the peaks of positive landforms and the nearest negative landforms), serves as an indicator of the activity of modern hazardous processes (Figure 5). According to morphometric analysis, 71.4% of the park's territory exhibits a weak degree of vertical dissection (up to 976.9 m/km^2), while moderate and high levels of dissection account for 20.6% (281.8 m/km^2) and 8% (109.9 m/km^2), respectively. Areas with pronounced vertical dissection and steep slopes - including the left and right banks of the southern part of the Sharyn River valley, as well as the Toraigyr and Ulken Bugyty mountains – are prone to active development of landslides and rockslides, as confirmed by both field observations and remote sensing data interpretation (Zúñiga et al., 2020; Hidayat et al., 2019).

Hydrological factors: the TWI and drainage network density

The hydrological variable of drainage density, calculated based on the AW3D30 DEM, is a key indicator of the development level of the watershed network and plays a crucial role in initiating erosion processes in mountainous regions (Makaya et al., 2019). Spatial analysis of hydrological characteristics revealed a pronounced dependence of erosion intensity on the morphometric parameters of the terrain in the study area. The values of river network density obtained from AW3D30 data range from 0.2 to 5.2 m/km^2. The maximal values (2.7–5.2 m/km^2), observed in areas with highly dissected terrain – characterized by low erosion and accumulative-erosive hills – are located southeast of the Bugyty mountains and in the southeastern part of the Charyn SNNP, on the right bank of the Sharyn River (Figure 6).

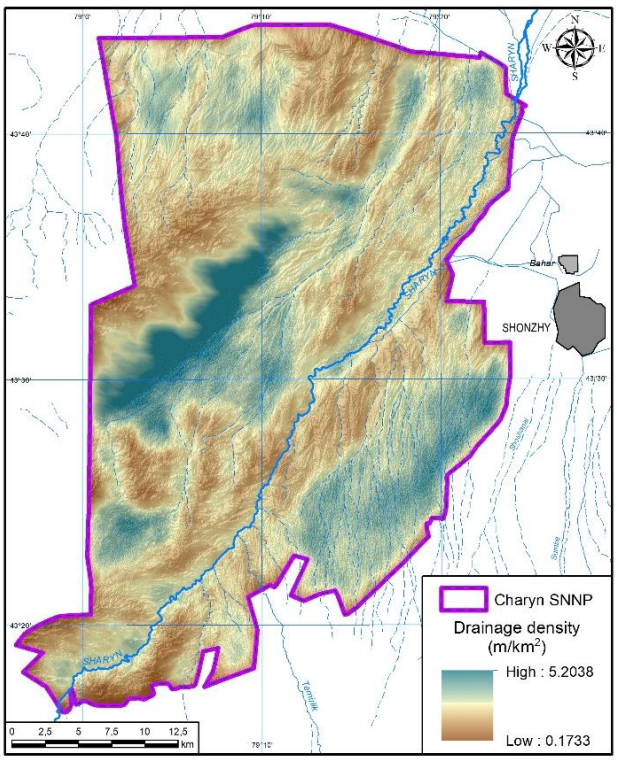


Figure 6. Drainage network density
(Source: Based on AW3D30, 2024);

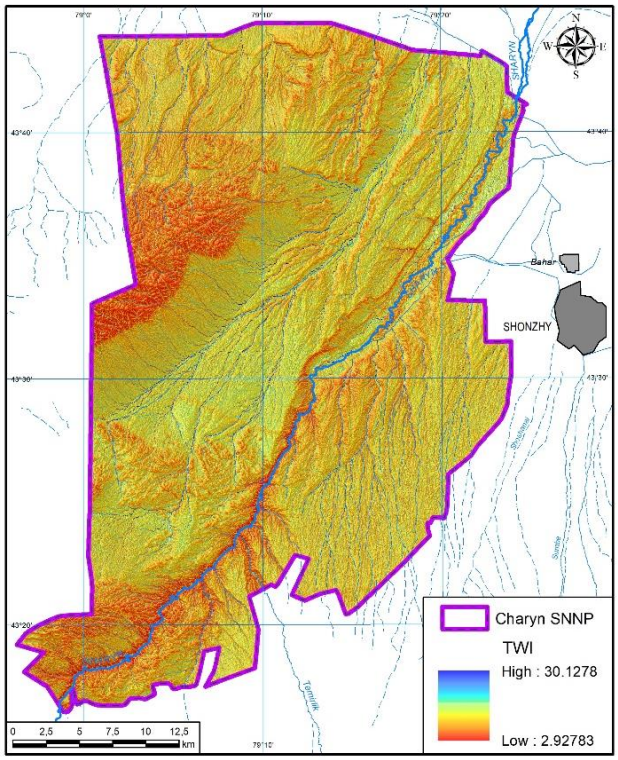


Figure 7. Topographic Wetness Index
(Source: Based on AW3D30, 2024)

This indicates a high degree of drainage and an elevated erosion potential in these territories. The spatial coincidence of areas with high drainage density and zones of intense terrain dissection confirms a strong relationship between watershed morphology and the development of erosion processes. The minimum values of river network density (0.2–1.8 km/km^2) are associated with the denudation-tectonic low mountains of Ulken Bugyty and Toraigyr, erosional hills (on both sides of the Sharyn River), and accumulative-erosional hills (in the northern part of the park). The TWI is widely used to assess the influence of landscape morphology on the spatial distribution and extent of zones experiencing

soil saturation due to surface runoff accumulation (Moore et al., 1991). The obtained results indicate that the highest TWI values (11.3–30.1) are observed in the low-lying areas of the terrain, along the valleys of the Sharyn and Temirlik rivers, near the footslopes. This suggests that these zones are prone to moisture accumulation and saturation due to reduced surface runoff. This indicates potential areas of moisture accumulation and surface runoff processes (Figure 7). A joint analysis of drainage density and TWI distribution revealed an inverse correlation between these parameters in several areas: zones with a high density of river networks often exhibit lower TWI values, which may indicate more intensive drainage and minimal moisture accumulation, thereby promoting active linear erosion.

Biotic factor: NDVI classification

NDVI – the vegetation density index. NDVI is important for stimulating dangerous geological and geomorphological processes. The NDVI values range from –1 to +1. Negative values generally indicate the presence of water bodies, while values close to zero (from –0.1 to 0.1) point to areas with minimal or absent vegetation cover, which is typical for rocky, eroded, and strongly dissected slopes. Within the Charyn SNNP, such areas are predominantly found in the canyon zone, on steep slopes, and in regions with exposed bedrock, where the most intense forms of water and slope erosion occur. These areas are characterized by heightened geodynamic activity and pose potential hazards.

Moderate NDVI values (ranging from 0.2 to 0.4) correspond to areas with sparse herbaceous and shrub vegetation, typical of foothill and sloped regions prone to surface runoff and localized erosion (Figure 8).

Higher values (from 0.4 and above) indicate the presence of relatively dense vegetation cover, primarily located in floodplain zones along perennial and intermittent watercourses, including the Sharyn River valley and the channels of temporary streams within the Ulken Bugyty and Toraigyr mountains. The presence of dense vegetation in these areas signifies stable landscape conditions and a lower susceptibility to hazardous geomorphological processes. Thus, spatial analysis of NDVI enables the use of this indicator to differentiate areas based on the degree of their resilience to geological and geomorphological impacts. When combined with morphometric characteristics of the terrain, its application enhances the accuracy of assessing hazardous natural processes and facilitates the identification of zones with potential risk.

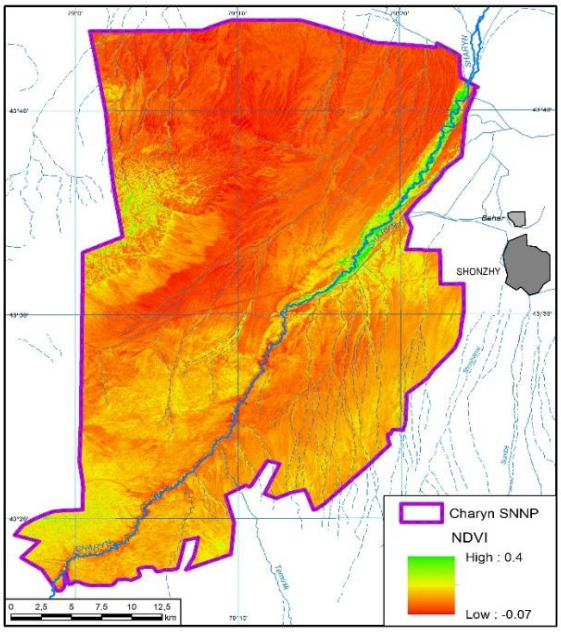


Figure 8. NDVI (Source: Based on Landsat-8, 2025)

Integral map

The results obtained are the outcome of calculations based on multi-criteria analysis and refined through expert assessments. During the study, a method integrating GIS with AHP was employed to identify and spatially delineate areas susceptible to hazardous geological and geomorphological processes.

The assessment was conducted using 7 key parameters that influence terrain stability: precipitation, lithology, slope inclination, vertical dissection of the terrain, drainage network density, TWI, and NDVI.

The AHP model is based on a multi-expert procedure, during which specialists collaboratively determined the significance of factors contributing to the emergence and development of geological and geomorphological processes. The assessments were refined at each stage until a consensus was reached on the weights of the parameters (El Jazouli et al., 2019). As indicated in the “Materials and Methods” section, the quantitative assessment of weight coefficients was carried out using a pair-wise comparison matrix constructed according to Saaty's methodology. The comparison matrix, which reflects the relative importance of normalized values, is presented in Tables 2 and 3. These matrices were used to determine the normalized principal eigenvector through an approximation method (Table 4). As a result of the analysis, the following indicators were obtained: the principal eigenvalue $\lambda max = 7.68$; the CI = 0.1132; with the number of parameters n = 7, the

random consistency index (RI) = 1.32; and the CR = 0.085, which is below the acceptable threshold (< 0.1). This confirms the adequacy of the consistency level of the expert assessments and the validity of the obtained weights. Table 4 presents the normalized weight coefficients obtained through the application of the AHP method for seven factors influencing the degree of manifestation of hazardous geological and geomorphological processes in the Charyn SNNP. Each value reflects the relative importance of the corresponding criterion, determined based on expert assessments and pair-wise comparison procedures. The most significant contributors to the overall susceptibility index are surface slope (0.211), vertical dissection (0.178), and lithology (0.154), indicating the dominant influence of morphometric and geological parameters.

Table 2. Pairwise comparison matrix (Source: on materials from the analysis of AHP calculations)

Parameter	Rainfall	Lithology	Slope	Vertical Dissection	Drainage density	TWI	NDVI
Rainfall	1	0.33	0.2	0.5	3	1	1
Lithology	3	1	1	0.5	2	1	1
Slope	5	1	1	1	1	2	2
Vertical Dissection	2	2	1	1	2	1	1
Drainage density	0.33	0.50	1	0.5	1	1	1
TWI	1	1	0.5	1	1	1	2
NDVI	1	1	0.5	1	1	0.50	1

Table 3. Pairwise comparison matrix of the seven factors using the AHP method
(Source: on materials from the analysis of AHP calculations)

Parameter	Rainfall	Lithology	Slope	Vertical Dissection	Drainage density	TWI	NDVI	Normalized weight
Rainfall	0.075	0.049	0.038	0.091	0.273	0.133	0.111	0.110
Lithology	0.225	0.146	0.192	0.091	0.182	0.133	0.111	0.154
Slope	0.375	0.146	0.192	0.182	0.091	0.267	0.222	0.211
Vertical Dissection	0.150	0.293	0.192	0.182	0.182	0.133	0.111	0.178
Drainage density	0.025	0.073	0.192	0.091	0.091	0.133	0.111	0.102
TWI	0.075	0.146	0.096	0.182	0.091	0.133	0.222	0.135
NDVI	0.075	0.146	0.096	0.182	0.091	0.067	0.111	0.110

Table 4. Overall contribution of parameters (Source: on materials from the analysis of AHP calculations)

Rainfall	Lithology	Slope	Vertical Dissection	Drainage density	TWI	NDVI
0.110	0.154	0.211	0.178	0.102	0.135	0.110

Based on these values, an integrated map illustrating the degree of manifestation of hazardous geological and geomorphological processes (Degree of Manifestation of Processes – DMP) was created within a GIS environment. The calculation was performed on a pixel grid using the following formula (10) (Ziadi et al., 2025):

DMP = Rainfall ∗ 0.110 + Lithology ∗ 0.154 + Slope ∗ 0.211 + Vertical Dissection * 0.178 + TWI ∗ 0.135 + Drainage density ∗ 0.102 + NDVI ∗ 0.110 (10). According to the results of the spatial analysis (Figure 9), the distribution of areas with varying degrees of manifestation of processes is as follows: moderate – 27.1% (346.8 km^2); high – 26.5% (339.6 km^2); very high – 10.9% (139.9 km^2). Relatively safer areas include zones with low degree – 22.5% (288.1 km^2), and very low degree – 12.9% (165.7 km^2) of the total studied area (Table 5).

Table 5. Areas of degree of manifestation of processes (Source: on materials from the analysis of AHP calculations)

Degree of manifestation	Area (km^2)	Area (%)
Very low	165.7	12.9
Low	288.1	22.5
Moderate	346.8	27.1
High	339.6	26.5
Very high	139.9	10.9

The analysis of the integrated map of the degrees of manifestation of hazardous geological and geomorphological processes allowed for the identification of areas with varying degrees of hazard within the studied zone. The most vulnerable regions were found to be the high-altitude areas located on the left and right banks of the upper Sharyn River. These areas include the Toraigyr, Katu mountain ranges, as well as the Moyyntogai, Taskora, and Ulken Bugyty mountain ridges. These territories are characterized by highly dissected terrain, predominance of solid and semi-rocky rocks, and slopes exceeding 35°. Collectively, these morphometric and lithological factors justify classifying these zones as areas of high to very high hazard. The Valley of Castles area, one of the most popular tourist routes within the Charyn SNNP, particularly warrants attention. Due to the morphodynamic features of this region, there are potential hazards associated with geodynamic processes, such as landslide and rockslide activity, as well as gully and lateral erosion.

These factors necessitate careful consideration of natural risks when developing tourist infrastructure and organizing excursions. Conversely, areas classified as having moderate, low, or very low risk levels are predominantly characterized by sheet wash processes. Locally, there may be mild forms of gully erosion; however, these are limited in extent and typically observed in transitional zones between flat plains and hilly, ridged terrain.

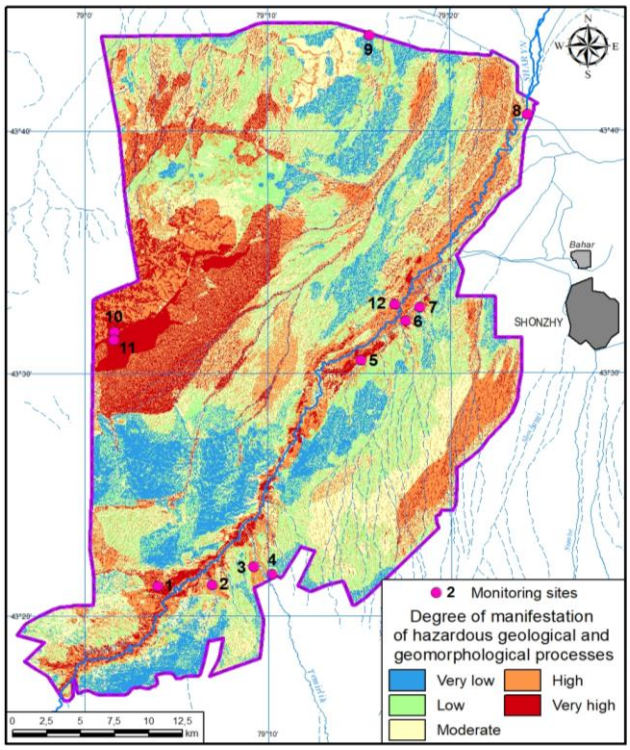


Figure 9. Integral map of the degree of manifestation of hazardous geological and geomorphological processes (Source: Developed by authors, 2025)

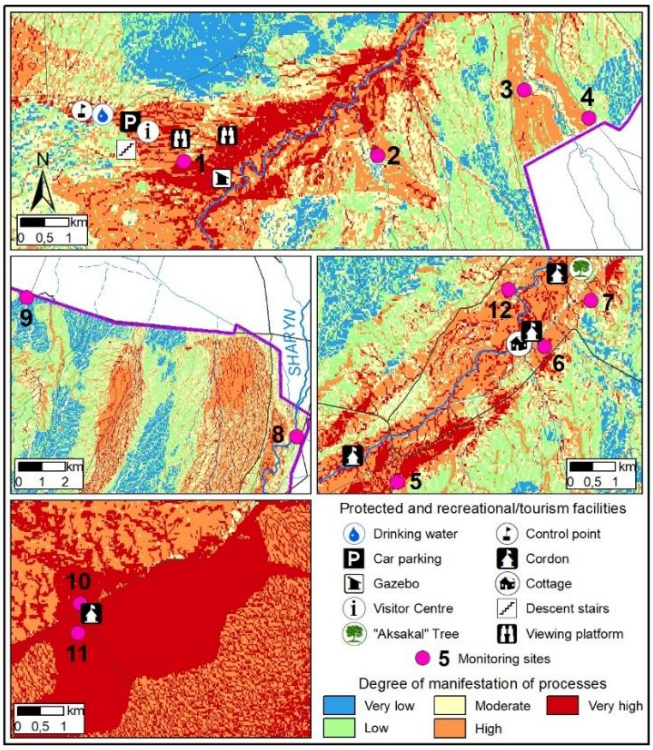


Figure 10. Placement of natural resource use facilities in the zone of manifestation of hazardous geological and geomorphological processes of the Charyn SNNP (Source: Developed by authors, 2025)

On the territory of the Charyn SNNP, the modern relief, characterized by a wide variety of geomorphological forms, is the result of long-term geological and geomorphological processes that developed during the Alpine tectono-magmatic era. Field studies have established that currently, the most widespread processes in the studied area are planar wash processes. At the same time, geomorphological processes such as landslides, rockslides, gully and lateral erosion tend to be localized and fragmentary, primarily occurring on steep slopes, areas with significant relief dissection, and specific lithological compositions of the rocks. To assess the adequacy of the model, field verification surveys were carried out at key sites of the study area. The verification included georeferencing of the observed processes, photo documentation, description of geomorphological forms, visual assessment of process activity (e.g., recent rockslides, signs of water erosion, soil cracks, etc.), as well as comparison with the model-derived integral map. At the same time, when interpreting the obtained results, it is necessary to consider a number of uncertainties related to the input data. For example, precipitation is represented by averaged long-term data that do not account for extreme weather events capable of triggering sudden geodynamic manifestations; the DEM with a 30 m resolution does not capture small-scale landforms typical of gully networks and slopes with micro-ridges, which reduces the accuracy of slope, TWI, and dissection calculations; NDVI and TWI may vary seasonally and also depend on the quality of satellite imagery (cloud cover, acquisition time, topographic shadowing); the lithological map was used at a 1:200,000 scale, which implies generalization of lithological units and omission of minor faults or lithological lenses. Despite the presence of certain sources of uncertainty, the combination of undertaken measures ensured the reliability and reproducibility of the integrated map, as well as its practical applicability for the assessment of geomorphological risks, natural resource management, and infrastructure planning within the Charyn SNNP.

It is important to note that natural resource use objects, including recreational and tourism zones, are situated within territories exhibiting a high to very high degree of activity of geological and geomorphological processes. This must be taken into account to ensure sustainable and safe natural resource management (Figures 10, 11).

DISCUSSION

This study is aimed at a comprehensive analysis of how interacting natural factors impact the activation of hazardous geological and geomorphological processes, with the goal of developing approaches for safe and sustainable resource management in the Charyn SNNP. The findings confirm that the activation of hazardous geological and geomorphological processes in the study area results from the complex interaction of multiple natural factors, each contributing to the spatial variability of risk. An integrated approach is of particular importance, as it allows for the identification of synergistic effects among climatic, geological and geomorphological, hydrological, and biotic components of the natural environment.

The uniqueness of the regional findings obtained for the Charyn SNNP lies in their association with a sharply arid climate and a complex orographic structure characterized by alternating canyons, mountain ranges, and intermontane basins. Similar studies in other arid and semi-arid regions of the world also emphasize the role of lithological vulnerability and relief; however, the degree of these factors' significance and their interactions varies.



a) zone of active landslide processes along the tourist route in the Charyn canyon (monitoring site №1)



b) slope with actively progressing rockslide processes in the area of the Charyn SNNP border checkpoint (monitoring site 10)



c) destruction of the roadway surface caused by a recent mudflow (monitoring site 9)



d) process of bank erosion of the Sharyn River caused by lateral erosion. The section is located in close proximity to a hydraulic structure (monitoring site 8)

Figure 11. Manifestations of hazardous geological and geomorphological processes within monitoring sites (Source: Photo taken by employees of the laboratory of geotourism and geomorphology of the JSC "Institute of Geography and Water Security")

For example, a study conducted in the upper reaches of the Minjiang River in China found that the combination of steep slopes and the loose composition of Quaternary deposits significantly increases the risks of landslides and erosion under monsoonal climate conditions (Wang & Bai, 2023). A comparison with the Charyn region shows that under a more arid climate, similar processes are activated mainly during extreme precipitation events, which are often of a torrential nature.

The identified patterns confirm that the most significant impact on the development of hazardous processes comes from the combination of extreme climatic conditions, lithological vulnerability of rocks, and morphometric parameters of the terrain. For example, areas with slopes steeper than 25°, located in zones with loose sedimentary rocks and high TWI values, exhibit the greatest susceptibility to slope processes, including erosion, falls, and mudslides. These findings are consistent with previous research, which emphasizes the vulnerability of arid regions when climatic and lithological factors are combined (Yu et al., 2024; Heo et al., 2024; Zhanibek et al., 2025). The comprehensive assessment revealed that biotic parameters, particularly NDVI values, play a mitigating role regarding geomorphological instability. Areas with high vegetation density are characterized by a relatively lower level of hazard. This is supported by previous findings emphasizing the role of vegetation in slope stabilization and reduction of runoff (Chelariu et al., 2023; Miklin et al., 2022).

It is especially important to highlight the significance of the river network density and its influence on erosion processes. Regions with high drainage density exhibit consistent correlations with increased water erosion intensity, necessitating additional measures for surface runoff management and hydrological monitoring, particularly during periods of intense precipitation. It is worth noting the comparison with a study conducted in the steppe regions of Romania, which established a direct relationship between erosion processes and river network density, particularly in areas with small elevation differences (Chelariu et al., 2023). In the Charyn SNNP, despite a more pronounced relief, a similar trend is observed: areas with high drainage density exhibit significantly increased water erosion intensity. This is especially relevant for canyon-like sections with ephemeral streams that, during extreme rainfall, transform into debris flows.

In South Korea an analysis of slope processes using GIS and remote sensing data revealed that high drainage density and lithological heterogeneity, under monsoonal rainfall conditions, act as catalysts for large-scale geodynamic phenomena (Lee et al., 2004). In contrast, within the Charyn SNNP, a similar drainage network configuration, combined with lower

precipitation volumes, results in more localized manifestations of water erosion, highlighting the specific role of climatic conditions. The application of multivariate analysis using remote sensing data and GIS enabled the development of an integrated hazard map reflecting the interactions of key natural factors. This integrative approach, based on multi-parameter spatial analysis, allows for objective identification and classification of areas according to the degree of manifestation of geological and geomorphological processes, thereby highlighting zones with varying levels of risk. The largest portions of the territory are classified as moderate (27.1%, 346.8 km^2) and high (26.5%, 339.6 km^2) hazard, indicating widespread regions with increased geodynamic activity. Very high hazard zones cover 10.9% of the area (139.9 km^2), pointing to localized areas that require special attention. The most hazardous areas are located in the high-altitude regions along the upper reaches of the Sharyn River, where the Toraigyr, Katu mountain ranges, the Ulken Bugyty ridge, and the Moyyntogai and Taskora localities are situated. The Charyn Canyon also features complex geomorphological conditions characterized by a heightened risk of hazardous processes such as landslides, rockslides, gully formation, and lateral erosion.

Zones with moderate, low, and very low degree of hazard (collectively covering 62.5% of the area) are primarily affected by sheet wash and weakly expressed erosion. These processes are generally localized, occurring mainly in transitional zones between flat plains and hilly, undulating terrain, with limited spatial extent. Field observations confirmed that currently, the most widespread process on the studied area is surface runoff. At the same time, landslide and rockslide processes – primarily associated with steep slope sections and areas with significant vertical relief – along with ravine and lateral erosion, are localized and fragmentary in nature. The obtained data have practical significance for planning environmental conservation activities and for spatial zoning of the park territory, as well as for developing eco-tourism routes. The proposed approach can be adapted and scaled for other protected areas with similar natural and climatic conditions. Despite these significant findings, it is advisable in the future to expand the range of factors considered by including anthropogenic impacts, tectonic activity, and dynamic climate scenarios. This will not only improve the accuracy of spatial analysis but also lay the foundation for developing effective strategies for the safe and sustainable use of natural resources within the Charyn SNNP.

CONCLUSION

This study presents a comprehensive approach to assessing hazardous geological and geomorphological processes within the Charyn SNNP, based on the integration of field observations, remote sensing data, GIS analysis, and the AHP within the framework of MCDA. The findings indicate that the activation of geodynamical hazardous processes is driven by the combined influence of several natural factors, including extreme atmospheric precipitation, lithological vulnerability of rocks, slope steepness, vertical terrain dissection, drainage network density, TWI, and NDVI. Areas with slopes exceeding 25°, characterized by loose sedimentary deposits and high TWI values, exhibit the highest susceptibility to the development of hazardous processes, where erosion, landslides, and mudflows are most likely to occur. The AHP method provided a formalized integration of factors into a reproducible spatial assessment model.

The reliability of the model has been confirmed through field verification results. The developed composite map depicting the intensity of hazardous geological and geomorphological processes serves as an effective tool for risk zoning and decision-making within the framework of sustainable management of protected areas. The proposed approach can be adapted and applied to other arid and tectonically active regions with limited observational data.

The present study provides valuable insights into the influence of natural factors on the activation of geological and geomorphological processes within the Charyn SNNP; however, it has several methodological and informational limitations. The key constraints are associated with the insufficient spatial resolution of the input data, particularly the absence of high-resolution satellite imagery, detailed DEMs, and up-to-date soil maps. These limitations reduce the accuracy of topographic analysis and the comprehensive assessment of factors contributing to the development of hazardous processes. Overcoming these challenges could be achieved through the use of advanced remote sensing technologies, such as LiDAR, which would enhance the spatial detail and reliability of the input data. Future research could benefit from integrating hybrid approaches and machine learning methods capable of improving multi-criteria decision-making procedures and increasing the accuracy of geological and geomorphological process assessments. Expanding the model to incorporate anthropogenic factors, parameters of tectonic activity, and climate change scenarios would further improve forecast accuracy and the validity of adaptive management strategies for vulnerable natural systems.

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TOURISM CONSUMPTION IN CRISIS: THE IMPACT OF COVID-19 ON TOURIST EXPENDITURE IN CROATIA

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Abstract: This study examines the impact of the COVID-19 pandemic on tourism expenditure patterns in Croatia between 2019 and 2023. It aims to provide a comprehensive comparison across the pre-pandemic period, the peak of the pandemic, and the subsequent recovery phase. The analysis focuses on fiscalized transaction data from tourism-related activities, offering a detailed temporal and regional perspective. Official financial records were processed using the JASP statistical software package, applying analysis of variance, estimated marginal means, and planned contrast testing to detect significant differences between years and across regions. Complementary qualitative insights were gathered from focus groups to capture shifts in tourist behavior, such as booking preferences, payment methods, and budgeting strategies. Results reveal a pronounced contraction in tourism expenditure in 2020, attributed to global travel restrictions and public health measures, followed by partial recovery in 2021 and a strong rebound in 2022 and 2023. The rebound was especially marked in coastal counties heavily dependent on international arrivals, while inland regions with more diversified economies experienced moderate fluctuations. Focus group findings indicate increased reliance on digital booking platforms, a growing preference for contactless payments, and more cautious trip budgeting. These findings hold practical relevance for policymakers, tourism boards, and industry stakeholders, highlighting the importance of crisis preparedness, market diversification, and the sustained adoption of digital tools. The study contributes to a deeper understanding of how systemic shocks shape tourism consumption patterns and provides actionable insights for fostering resilience in the face of future disruptions.

Keywords: tourism expenditure, pandemic recovery, COVID-19, consumer adaptation, regional tour-ism impact

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INTRODUCTION

Tourism, as a highly sensitive and complex economic sector, reflects the broader social and economic conditions in which it operates. Its intensity and stability are directly influenced by both global and local circumstances, and crises such as the COVID-19 pandemic profoundly disrupt travel patterns, consumer expenditures, and tourist behavior. The year 2020 stands out as a major turning point in the history of modern tourism, not only because of strict travel restrictions and border closures, but also due to significant changes in perceptions of safety, trip planning habits, and the very structure of tourism related consumption. During that period, many destinations faced a sudden drop in arrivals and revenues, with tourist activity reduced to a minimum or completely halted. Croatia, as a country heavily reliant on tourism, was no exception.

The closure of markets, limited mobility, and general economic slowdown led to a clear disruption in tourism flows and expenditures, with different regions displaying varying levels of resilience and adaptation. Following the initial shock, the year 2021 brought a mild recovery, driven by the eas-ing of restrictions and the sector's adjustment to new circumstances, including service digitalization, more flexible booking systems, and the implementation of health and hygiene standards. By 2022 and 2023, most destinations were witnessing a stronger return of tourists, although changes in consumer behavior, such as shorter stays, greater interest in domestic travel, and a shift toward individual travel experiences remained evident.

The study by Mikulić et al., 2022 shows that Adriatic Croatia, due to its strong reliance on tourism, experienced a significantly larger economic decline during the pandemic compared to the continental part of the country. Continental regions demonstrated greater resilience thanks to their more diversified economic structure. The study by Payne et al., 2022 shows that COVID-19 caused lasting changes in Croatian tourism, particularly in foreign arrivals and overnight stays. The authors conclude that returning to pre-pandemic trends will require a shift from traditional tourism development models. In their study, Mikac & Kravarščan, 2021 conclude that the Croatian tourism sector operated reactively and insufficiently coordinated during the COVID-19 pandemic, without developed effective plans and crisis management systems. Although the results were better than expected, the crisis management system was fragmented, communication was uncoordinated, and the sector's response was largely based on improvisation instead of preprepared action plans.

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This study focuses on analyzing these changes over a five-year period (2019-2023), with particular attention to the comparison of tourism expenditures before, during, and after the pandemic. Based on fiscal transactions from tourism related activities and using quantitative methods, the research seeks to identify patterns of recovery and adaptation, as well as possible long-term shifts in expenditure behavior. Beyond aggregate trends, the analysis also considers regional differences between coastal and inland areas, urban and rural settings to provide a more comprehensive picture of the sector's dynamics during a period of extraordinary crisis.

LITERATURE REVIEW

Structural Disruptions and Changes in Tourist Expenditure During the COVID-19 Pandemic

According to the research by Efthimiou (2025), the COVID-19 pandemic caused sig-nificant changes in the trends and volume of the tourism industry, with the sector demon-strating resilience through digital transformation and adaptation to new forms of tourism, which impacted the economic development and social stability of countries before, during, and after the pandemic. According to Wu et al. (2022), the COVID-19 pandemic significantly reduced the contribution of domestic tourism to the economy of China's Guangdong province, with the share of domestic tourism in GDP falling from 2.53% to 1.20% during the analyzed period, according to data from the Tourism Satellite Account (TSA). The COVID-19 pandemic had a strong negative impact on tourism in developing countries, especially in the private sector, with a significant decline in international arrivals, pronounced seasonality in recovery, and a need for government support and new safety standards to restore travelers' confidence and stimulate spending (Kumar & Ekka, 2023). According to research by Allan et al. (2022), tourism spending in Scotland decreased by 54.3% in 2021, resulting in a GDP drop of 1.76% and putting 100,000 jobs at risk, with the loss of income from foreign tourists having a greater negative economic impact than the reduction in domestic spending. Satisfied tourists are essential for fostering loyalty and sustainable growth tourism sector, as they either return themselves or actively promote the destination to others.

Crisis periods such as the pandemic cause a prolonged decline in tourist arrivals, especially in developing countries, and highlight the need for policies that promote safety, sustainability, and diversification of tourism offer to increase sector resilience and enable recovery without permanent losses (Aronica et al., 2021). It also led to a significant increase in overall tourist spending by participants in a cycling event in Italy, mainly due to increased spending on associated products, which is partially attributed to the phenomenon of "revenge spending" after a period of restrictions (Guerra et al., 2024). A study by Ren et al. (2024) showed that both local and national COVID-19 situations significantly influenced the spending of residents and domestic tourists, with social distancing measures strongly reducing tourist spending, while state support increased residents' spending, although with uneven effects across economic sectors. Research by Varzakas & Metaxas (2024) showed that the spread of COVID-19 negatively impacted international tourism spending in 38 countries, both directly through increased fear of infection and indirectly through reduced tourist income. It was estimated that an increase of one COVID-19 case reduced tourism spending by USD 859,237.

The COVID-19 pandemic caused a historic decline in demand for international travel in the euro area, and research predicts that demand recovery will depend on macroeconomic factors, using a forecasting model that considers asymmetric income elasticities of tourism demand through 2022 (Plzáková et al., 2021). Inadequate government responses further exacerbated the negative consequences (Cheng et al., 2021). These disruptions affected Spanish regions unevenly, depending on their tourism specialization. Regions more reliant on international tourism suffered greater losses, while rural and less saturated destinations experienced a smaller decline and could potentially contribute to more sustainable tourism development in the future (Rodríguez et al., 2023). The COVID-19 pandemic revealed the vulnerability of European tourist regions, with urban destinations dependent on foreign guests and high seasonality suffering the most significant losses, while regions with natural resources and lower guest density were more resilient. This emphasizes the importance of diversifying the tourism offer to enhance resilience in future crises (Curtale et al., 2023). It represents a turning point highlighting the need for transforming the global tourism system toward sustainability, with particular attention to the vulnerability of low paid jobs and the disproportionate impact of the crisis on lower income countries (Gössling et al., 2020).

According to Ströhm (2020) and the study by Mikulić et al. (2022), the Croatian economy suffered one of the largest declines in Central, Eastern, and Southeastern Europe (CESEE) in 2020 due to its heavy dependence on tourism, with tourist overnight stays falling by 58.9% in the first seven months of 2020, the largest drop occurring in the Adriatic region. According to Mikulić et al. (2021), the contribution of foreign tourists to gross value added and employment fell by around 50%, and although some negative effects were partially mitigated by growth in other domestic sectors, long-term recovery will depend on accelerating structural reforms and well-considered economic policies. Government support had a positive impact on the survival and employment of firms, with support being more effective when smaller amounts were directed toward smaller enterprises, emphasizing the need for a more targeted and tailored approach in shaping future support policies (Stojčić & Vizek, 2024). On the other hand, Ružić & Biškupec (2021) stress the need for stronger macroeconomic policies to mitigate the consequences and accelerate the recovery of the sector. Croatia's future development should be based on sustainable strategies that include digitalization, individualized services, the promotion of local products, and cultural and natural resources to recover and adapt to new market conditions (Tomić et al., 2021; Lončarić & Kapeš, 2022). The study by Payne et al. (2021) suggests that the shock is long-lasting and that the recovery should include a shift from the traditional growth model toward a more sustainable form of tourism aligned with sustainable development goals. Despite its strong dependence on tourism, Croatian tourism demonstrated greater resilience to the pandemic compared to competing Mediterranean countries, thanks to its geographic proximity to large European markets and car accessibility. This further highlights the need for strategic development of more resilient types of tourism such as continental, cultural, and

gastronomic tourism, and increasing the share of domestic tourists to better prepare the sector for future global crises (Devčić & Pražić, 2023; Roška, 2021). Maintaining a positive destination image, enhancing safety, and leveraging word-of-mouth are key to boosting tourist confidence and promoting sustainable growth in touristic regions (Praprom & Laipaporn, 2025).

Adaptive Consumer Behavior and the Transformation of Tourist Expenditure in the Post-Pandemic Reality

According to the research by Toubes et al. (2021) and Araújo-Vila et al. (2021), the COVID-19 pandemic significantly altered consumption and promotion patterns in the Spanish tourism sector, accelerating digitalization, increasing the importance of online channels and personalized services, and highlighting health safety as a key factor in consumer decision making. Different generations exhibited varying consumption patterns, with increased orientation toward online shopping, greater reliance on digital technologies, and heightened sensitivity to safety and health aspects when making purchasing decisions (Ahmad et al., 2023). According to the study by Kumar & Reddy (2023) and Efthimiou (2024), the pandemic caused changes in travel demand and attitudes toward safety, creating the need to adapt marketing strategies and policies to ensure sector sustainability. This was particularly evident in changes in human resources and increased awareness of risk (Brozović & Saito, 2022). In the context of tourism and the pandemic, strategic use of the marketing mix can help rebuild and strengthen customer loyalty in the tourism sector, where traveler confidence and expectations have shifted significantly due to COVID-19, while staff interactions, although important, may have a lesser role in driving loyalty post-pandemic (Šostar et al., 2024).

There was a significant decrease in the use of public transport among tourists on the Catalan coast, with perceived health risks and changes in mobility patterns becoming key factors in transport decisions (Delclòs-Alió et al., 2022). According to the study by Algassim & Abuelhassan (2021), hygiene, safety, and fear of infection became key factors in travel decisions, with observed differences in perception and behavior between genders. Research in the Chinese context shows that issuing digital tourism vouchers significantly increases tourist arrivals, especially when implemented through large and reliable digital platforms, supported by high internet penetration and frequent distribution. The effects also spread to neighboring cities, making digital vouchers an effective tool for tourism recovery in the post-pandemic period (Chen et al., 2024). Furthermore, the importance of domestic tourism for economic recovery accelerated digital innovations and changed the career outlook of future tourism workers (Huang et al., 2023). The study by González-Reverté et al. (2022) confirms that the pandemic encouraged new tourist behaviors, with environmentally conscious travelers showing less interest in mass tourism, although some changes are temporary and linked to perceived health risks rather than a permanent decline in the importance of tourism in their lives. Research by Baños-Pino et al. (2021) conducted in Asturias shows that tourists shortened their stays by an average of 23.8% after the outbreak of COVID-19, maintained overall daily spending, but altered their ex-penditure structure in favor of activities and mobility within the destination. Tourists are behaving more responsibly and cautiously, which presents an opportunity for tourism managers to stimulate demand and build tourist loyalty during crises through media strategies, positive promotion, and adapting offerings (Fitriadi et al., 2022). In Portugal, the profile of cultural tourists also changed, encouraging domestic tourism, a greater tendency to stay in a single location and in rural areas, while maintaining high levels of satisfaction and intention to return, which has important implications for the development of cultural tourism in the post-pandemic period.

Crises can sometimes be opportunities, as seen in the increased openness of Croatian tourists to the concept of virtual tourism, with XR technologies and historical video games serving as temporary substitutes for cultural tourism, stimulating interest in real locations and offering a sustainable alternative during crises (Mavrin et al., 2022). The COVID-19 pandemic represents a transformative moment for tourism, requiring a redefinition of research approaches, adaptation of tourism organizations, empowerment of social entrepreneurship, and adoption of more sustainable, personalized, and technologically advanced models of tourism development (Abbas et al., 2021). In Taiwan, alongside reduced frequency and duration of travel, avoidance of public transport, and increased sensitivity to health risks, trust in public health measures and perceived safety play a crucial role in restoring domestic and international tourism (Kuo, 2021). Travel frequency, duration, and motivations also declined among older adults in Taiwan, yet overall spending increased, indicating the need to adapt tourism offerings to one-day trips, improve transportation accessibility, and enhance health and safety measures to meet the needs of the growing elderly population (Chan, 2022).

Research by Rahman et al. (2021) and Orîndaru et al. (2021) shows that perceptions of risk and travel management during the COVID-19 pandemic significantly influence tourist behavior, including avoidance of overcrowded destinations, changes in travel patterns, choice of safer distribution channels, focus on hygiene and safety, and service adaptations aligned with increased health demands. The study by Škare et al. (2021) shows that the COVID-19 pandemic has far-reaching and long-lasting negative effects on the global tourism industry compared to previous pandemics, with recovery requiring coordinated public and private support to ensure sector sustainability and resilience. The research Chang & Wu (2021) indicates that "quality management" was the most important factor in decision making for stakeholders in the tourism industry during the COVID-19 pandemic, especially in planning and managing safe international tourism "bubble zones." The study Jafari et al. (2021) shows that the COVID-19 pandemic severely affected the tourism sector in Famagusta, Northern Cyprus, with significant losses in hospitality, food services, travel agencies, and transportation, while only internet and technology related sectors saw positive outcomes.

Despite uncertainties caused by the pandemic and new virus variants such as Omicron, the recovery of the tourism industry remains promising due to constant travel demand, with emphasis on the future development of sustainable, low-carbon tourism driven by government policies (Feng et al., 2022). The study by Li et al. (2022) highlights that the COVID-19 pandemic has long-term effects on the tourism industry but also offers an opportunity for transformation through

technological innovation, crisis management, and sustainable development. It emphasizes the need for researchers, policymakers, and tourism stakeholders to recognize, study, and implement strategies that will help the industry adapt to the "new normal" and strengthen the resilience and mental well-being of both employees and tourists. Using the Analytic Hierarchy Process (AHP), the study of Šostar & Ristanović, 2023a found that the COVID-19 pandemic significantly influenced consumer behavior, particularly in tourism, by altering consumption habits, increasing online purchasing, and reducing physical travel, highlighting the need for adaptable and sustainable strategies in the tourism sector. Other study of Šostar & Ristanović, 2023b examines how changes in tourist behavior and destination management, driven by sustainability concerns and influenced by the COVID-19 pandemic, can support the transition toward more resilient and sustainable tourism systems. The study by Saputra (2023) shows that the COVID-19 pandemic had a significant negative impact on the hotel sector in Europe, with spatial effects indicating that recovery or decline in the tourism sector in one country affects neighboring countries as well. In Colombia, there was also a significant decline in income and employment, with recommendations to further strengthen integrated financial, market, and sustainable business strategies (Perilla et al., 2022).

The COVID-19 pandemic seriously affected the tourism sector but also stimulated digital transformation, sustainability, and the development of domestic tourism, with flexibility, technology, and collaboration being key to a more resilient tourism future (Cerda, 2024; Aldao et al., 2022). The "Phuket Sandbox" program enabled the relaunch of tourism in Thailand during the COVID-19 pandemic through strict health measures and community collaboration, showing that tourists did not contribute to the spread of infection, while the project achieved significant economic contributions and high visitor satisfaction (Thaicharoen et al., 2023). The COVID-19 pandemic highlighted the need for more sustainable tourism development on Croatian islands, with residents' perceptions of tourism benefits and risks significantly influencing their willingness to support tourism, requiring the inclusion of local communities in policymaking and alignment of measures with island-specific conditions (Villa & Slijepčević, 2022).

Significant changes occurred in Croatian tourism as well, encouraging a shift toward more individualized, sustainable, and nature oriented forms of tourism, presenting an opportunity to redirect the sector's future development toward greater ecological and social sustainability (Šulc & Fuerst-Bjeliš, 2021). The COVID-19 pandemic also had positive effects, providing an opportunity to reset and redefine the industry in a more sustainable direction, including the development of digital solutions, new forms of tourism, strengthening responsible stake-holder behavior, and the need for permanent sustainable strategies for future crises (Seabra & Bhatt, 2022; Yu et al., 2024).

The pandemic brought a profound change in assumptions about travel and stimulated post-traumatic growth, manifesting in tourism through contradictory behavior patterns such as returning and withdrawing, connection and alienation, self-transcendence and self-diminishment (Miao et al., 2022). The study by Akhtar et al. (2021) emphasizes the role of digital technologies in the development of digital tourism during and after the COVID-19 pandemic, as well as their potential for sustainable development and international cooperation.

MATERIALS AND METHODS

The aim of this research was to examine how the COVID-19 pandemic influenced tourism-related spending in Croatia over a five-year period from 2019 to 2023. The study is based on a quantitative analysis of total consumption in the tourism sector, supplemented by qualitative insights gathered through focus groups.

Spending data were obtained from the annual fiscalization reports of the Tax Ad-ministration of the Republic of Croatia for the period 2019 to 2023. These are aggregated data at the county level, covering all fiscalized transactions within tourism-related activities, including hotels and accommodation services, campsites and private rentals, hospitality venues (restaurants, cafés, bars), and associated tourism services.

The data includes all forms of payment (cash and card) and encompass all types of consumers (foreign and domestic tourists), as well as residents who made purchases within the tourism sector. Figures are aggregated at the level of the calendar year (12 months) for each of Croatia's 21 counties, yielding a total of 105 observation units (21 counties × 5 years). The data are part of an internal report by the Tax Administration and are not publicly available; however, they can be provided upon official request for the purpose of scientific verification. Statistical analysis was performed using the JASP software package, applying a combination of univariate and multivariate methods. The primary analytical method was one-way analysis of variance (ANOVA) to assess differences in total tourism expenditure across years. In addition, a two-way ANOVA was conducted to evaluate interaction effects between year and region (e.g., coastal vs. continental counties). Post-hoc contrast analyses (pairwise comparisons) were used to explore specific year-on-year differences, applying a 95% confidence interval. To enhance analytical precision, Estimated Marginal Means (EMM) were calculated to control for potential confounding variables. Assumptions of normality and homogeneity of variance were tested using the Kolmogorov-Smirnov and Levene's tests. Model fit and stability were evaluated using AIC and BIC criteria.

In addition to the quantitative approach, the study incorporated a qualitative component through five focus groups with a total of 40 participants of diverse ages, socioeconomic backgrounds, and regional affiliations. The goal was to gain deeper insight into evolving tourist preferences, habits, and risk perceptions. Data was analyzed using thematic analysis, without the use of automated coding software, to preserve interpretative depth. All participants gave informed consent for the recording and analysis of their responses. While the data reflects overall fiscalized spending in the tourism sector, the study does not include transaction-level detail or a clear breakdown by tourist origin (domestic vs. international). Furthermore, although the focus group findings provided valuable context, their results are not statistically representative of the wider population. Despite these limitations, the combination of a large, structured dataset and rich qualitative insights provides a strong foundation for analyzing consumer behavior before, during, and after the crisis.

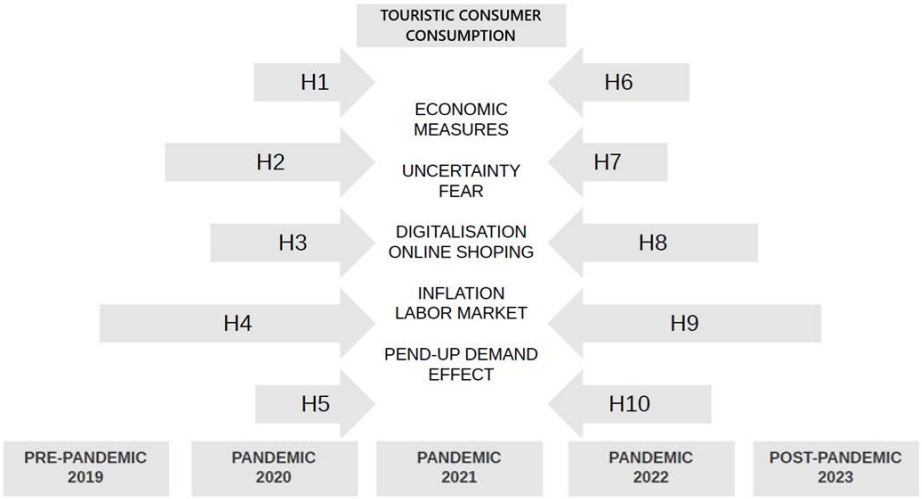


Figure 1. Framework for Analyzing Tourism Consumer Trends during the Pandemic and Post-Pandemic Period (Source: Author, based on survey results)

Figure 1 outlines the analytical framework used to examine consumer behavior trends in Croatia during the different stages of the pandemic and the post-pandemic period. It displays the core hypotheses (H1–H10) to be tested, along with the main factors believed to have shaped tourism-related spending during these years. At the base of the diagram, the key time periods are identified:

- Pre-pandemic period (2019) - serves as a baseline year for evaluating changes in tourism consumption throughout the pandemic and recovery phases.
- Pandemic years (2020–2022) - a critical phase marked by significant disruptions in consumer behavior. The steepest decline is expected in 2020 due to the initial wave of the pandemic and associated restrictions, with a gradual recovery anticipated over 2021 and 2022.
- Post-pandemic period (2023) - used to assess whether tourism consumption returned to pre-pandemic levels or if more permanent shifts in tourist behavior emerged.

The following hypotheses have been developed based on macroeconomic conditions and trends that are thought to have influenced consumer spending during the observed period:

H1: Tourist expenditure in Croatia varied significantly across the years. A decline is expected during the pandemic period (2020–2022) compared to 2019, with signs of recovery and/or changes in consumer patterns evident in 2023.

H2: Spending in the first year of the pandemic (2020) was significantly lower than in 2021 and 2022.

H3: A notable increase in tourism expenditure occurred in 2021 compared to 2020.

H4: Expenditure in 2022 showed a significant rise relative to 2021.

H5: Tourism consumption in 2023 exceeded the pre-pandemic benchmark set in 2019.

H6: The City of Zagreb experienced a smaller drop in tourist expenditure in 2020 compared to other counties.

H7: Coastal counties saw a sharper decline in tourist spending during the pandemic, while continental counties were less affected and recovered more steadily.

H8: A substantial rebound in tourism expenditure took place in 2022 and 2023.

H9: Structural changes in tourist spending patterns have emerged, with some sectors experiencing sustained growth and others stagnating or declining.

H10: Urban areas recovered more quickly in terms of tourism expenditure than rural regions.

After establishing these hypotheses, data on total tourism-related revenues were collected for the periods before, during, and after the COVID-19 pandemic.

Table 1. Analysis of Variance Summary (Source: Ministry of Finance, Internal report, 2024)

Region	Pre-pandemic year (2019) – billion EUR	Pandemic 1st year (2020) – billion EUR	Pandemic 2nd year (2021) – billion EUR	Pandemic 3rd year (2022) – billion EUR	Post-pandemic year (2023) – billion EUR
Bjelovar-Bilogora	0.20	0.14	0.15	0.23	0.29
Brod-Posavina	0.21	0.15	0.15	0.25	0.32
Dubrovnik-Neretva	2.77	0.82	1.88	3.52	4.46
City of Zagreb	4.40	3.00	3.54	5.43	6.82
Istria	5.35	2.70	5.57	7.84	9.68
Karlovac	0.44	0.30	0.36	0.55	0.72
Koprivnica-Krizevci	0.18	0.13	0.13	0.22	0.28
Krapina-Zagorje	0.38	0.26	0.33	0.46	0.54
Lika-Senj	0.54	0.30	0.52	0.82	0.94
Medimurje	0.26	0.18	0.19	0.31	0.40
Osijek-Baranja	0.50	0.38	0.45	0.69	0.88
Pozega-Slavonia	0.10	0.07	0.07	0.12	0.15

Primorje-Gorski Kotar	3.48	2.10	3.51	5.02	6.12
Sisak-Moslavina	0.24	0.17	0.18	0.26	0.33
Split-Dalmatia	4.01	2.07	3.93	6.19	7.56
Sibenik-Knin	1.15	0.62	1.13	1.57	1.88
Varazdin	0.34	0.24	0.26	0.42	0.57
Virovitica-Podravina	0.11	0.08	0.07	0.11	0.14
Vukovar-Srijem	0.20	0.15	0.16	0.24	0.30
Zadar	1.77	1.08	1.78	2.63	3.33
Zagreb County	0.65	0.47	0.47	0.75	1.02

Table 1 and Figure 2 outlines total tourism revenue (i.e., consumption) in Croatia from 2019 to 2023, highlighting shifts in consumer behavior throughout the pre-pandemic, pandemic, and post-pandemic phases. The data show a marked decline in tourism-related spending at the beginning of the pandemic, followed by a gradual recovery beginning in the second year. Further analysis helped identify the drivers behind these trends, establishing links between the underlying causes and the observable outcomes in consumer activity. This research into tourism consumption patterns during and after the pandemic was carried out using quantitative analytical methods. The study relied on tourism expenditure data from various Croatian counties over the five-year period (2019–2023). The dataset was processed and analyzed using JASP, a statistical software platform that supports a range of analytical techniques including Analysis of Variance (ANOVA), regression models, and estimation of Estimated Marginal Means (EMM).

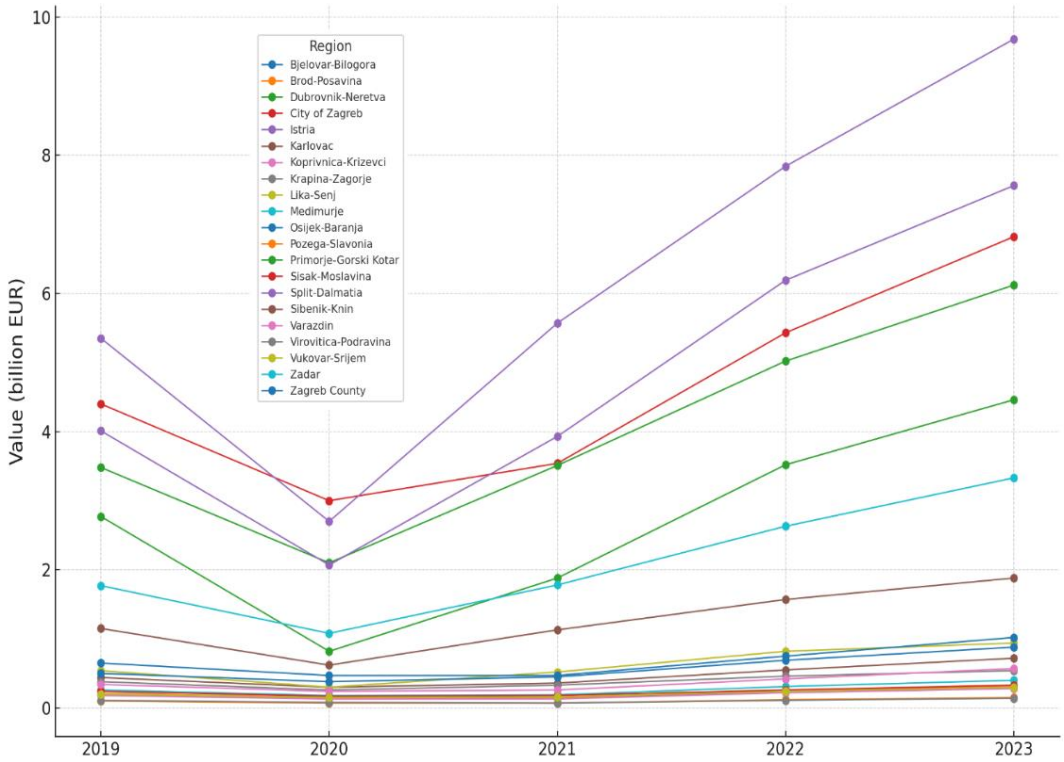


Figure 2. Visual Trends in Regional Values (2019–2023) (Source: Author own calculation)

The analysis incorporated multiple data categories, including macroeconomic indicators (monthly or annual consumption values by region), regional classifications (coastal vs. inland, urban vs. rural), temporal dimensions (pre-pandemic, during-pandemic, and post-pandemic periods), and contextual variables such as inflation rates, fiscal policy measures, and labor market trends. Statistical testing in JASP included one-way ANOVA to detect differences in spending between years and two-way ANOVA to explore interac-tions between geographic region and year, revealing regional disparities in how the pandemic impacted tourism consumption. The results were interpreted using F-statistics and p-values.

Estimated Marginal Means were calculated to provide adjusted comparisons of average tourism consumption by year and region, while accounting for influencing variables. Confidence intervals of 95% were applied to ensure robustness of the statistical estimates. Additional contrast tests were used to directly compare specific years (e.g., 2020 vs. 2019; 2023 vs. 2019), enabling an assessment of recovery progress and validation of hypotheses about a return to pre-pandemic spending levels. To understand how broader macroeconomic forces shaped tourism consumption, linear regression analysis was applied to examine relationships between variables such as inflation, public subsidies, and employment trends, and their effects on tourism-related expenditure. Residual analysis was also used to detect the presence of any unaccounted for factors that may have influenced consumption behavior during this period.

In addition to quantitative data analysis, the study incorporated qualitative insights through a series of semi-structured focus groups. These sessions encouraged open discussion and were designed to capture a wide range of

perspectives on how tourism behaviors and preferences evolved during and after the pandemic. Five separate focus groups were held, each consisting of eight participants, for a total of 40 individuals. The groups were intentionally diverse in terms of demographic background, economic status, and regional representation, offering a more holistic view of consumer trends. Participants included younger travelers (ages 18-30), middle-aged adults (31-50), seniors (51+), self-employed individuals and business owners, as well as rural residents and agricultural workers. The qualitative data supported the statistical findings, providing deeper insight into the motivations and concerns that influenced consumer decision making during this volatile period. These insights helped explain why certain behavioral shifts occurred and contributed to a more nuanced understanding of tourism consumption in the context of crisis and recovery.

RESULTS

To examine the impact of the COVID-19 pandemic on tourism-related consumption in Croatia, a multilevel statistical analysis was conducted using an ANOVA model with fixed and random effects. The following section presents an interpretation of the results contained in each statistical table, with each interpretation linked to the hypotheses established in the research framework. The results presented in Table 2, titled Analysis of Variance Summary, indicate the existence of statistically significant differences in tourism expenditures across both years and Croatian regions. Specifically, for the variable "year," an F-value of 10.091 was obtained with a p-value of less than 0.001, providing strong statistical evidence that consumption patterns during the observed period (2019–2023) varied significantly. Similarly, the variable "region" yielded an F-value of 8.786, also with a p-value below 0.001, suggesting notable differences in tourism consumption between counties. These findings confirm the fundamental hypothesis H1, which posits that there are significant temporal differences in tourism-related expenditures. This result provides a strong statistical foundation for a more detailed analysis of interannual and regional variations.

Table 2. Analysis of Variance Summary (Source: Authors own calculation) (Note: Model terms tested with Satterthwaite test Method)

Effect	df	F	p
Year	4.80	10.091	< .001
Region	20.80	8.786	< .001

Table 3. Statistical Model Fit Metrics (Source: Authors own calculation)

Deviance (Restricted Maximum Likelihood)	Log- Likelihood	Degrees of Freedom	Akaike Information Criterion	Bayesian Information Criterion
446.170	-223.085	27	500.170	571.827

Table 3 and Figure 3 contains metric values used to assess the overall statistical adequacy of the model. The reported values, including a deviance of 446.170, a log-likelihood of -223.085, and AIC and BIC scores of 500.170 and 571.827 respectively, suggest that the model fits the data well. Although these values do not directly offer conclusions about differences in expenditure, they confirm that the model used in the analysis is appropriate, stable, and interpretable. In other words, the model is not overfitted, and the risk of incorrect inferences is minimized.

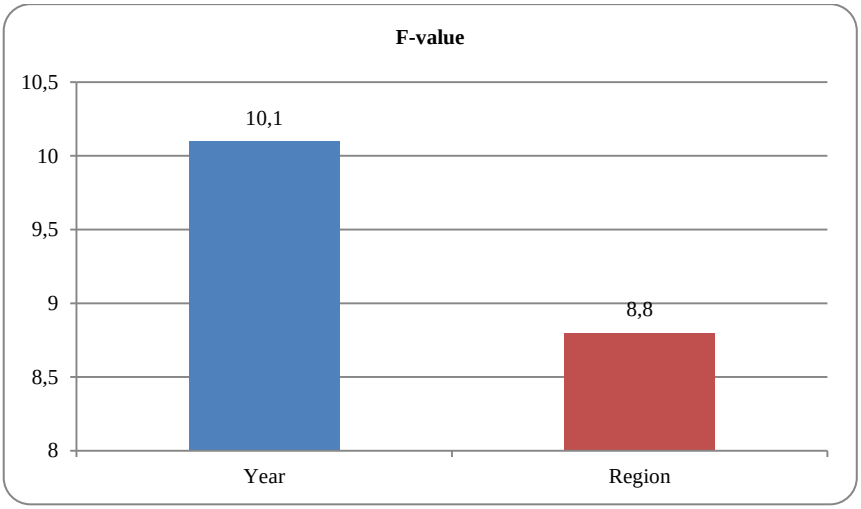


Figure 3. ANOVA: F-values by Effect – Visual (Source: Author own calculation)

A more detailed insight into the effects of individual years and regions is provided in Table 4 and Figure 4, which presents the fixed effects coefficients within the model. The reference year is 2019, and all other years are displayed relative to it. The year 2020 recorded a negative coefficient of -0.847 with a p-value of less than 0.001, clearly indicating that the pandemic crisis in that year led to a significant decline in tourism expenditures compared to the pre-pandemic baseline. The year 2021 shows a slightly smaller negative effect (-0.303), but the result is not statistically significant ($p = 0.132$), nor is the modest positive shift observed in 2022 ($\beta = 0.306$; $p = 0.128$).

Table 4. Fixed Effects Estimates (Source: Authors own calculation)

Term	Estimate (β coefficient)	Standard Error	Degrees of Freedom	t-value (Test Statistic)	p-value
Intercept	1.486	0.135	80.000	11.004	< .001
Year (1)	-0.847	0.199	80.000	-4.254	< .001
Year (2)	-0.303	0.199	80.000	-1.523	0.132
Year (3)	0.306	0.199	80.000	1.538	0.128
Year (4)	1.031	0.199	80.000	5.176	< .001
Region (1)	-1.284	0.604	80.000	-2.126	0.037
Region (2)	-1.270	0.604	80.000	-2.103	0.039
Region (3)	3.152	0.604	80.000	5.221	< .001
Region (4)	1.204	0.604	80.000	1.995	0.049
Region (5)	4.742	0.604	80.000	7.855	< .001
Region (6)	0.210	0.604	80.000	0.348	0.728
Region (7)	-1.298	0.604	80.000	-2.149	0.035
Region (8)	-1.092	0.604	80.000	-1.808	0.074
Region (9)	-0.862	0.604	80.000	-1.427	0.157
Region (10)	-1.218	0.604	80.000	-2.017	0.047
Region (11)	-0.906	0.604	80.000	-1.500	0.138
Region (12)	-1.384	0.604	80.000	-2.292	0.025
Region (13)	2.560	0.604	80.000	4.241	< .001
Region (14)	-0.216	0.604	80.000	-0.357	0.722
Region (15)	-1.250	0.604	80.000	-2.070	0.042
Region (16)	2.866	0.604	80.000	4.748	< .001
Region (17)	-1.120	0.604	80.000	-1.854	0.067
Region (18)	-1.384	0.604	80.000	-2.292	0.025
Region (19)	-1.276	0.604	80.000	-2.113	0.038
Region (20)	0.632	0.604	80.000	1.047	0.298

In contrast, 2023 shows a significant increase relative to 2019 ($\beta = 1.031$, $p < 0.001$), which may indicate a strong recovery and a potential return to a growth trajectory in tourism expenditures.

This table allows for the evaluation of multiple hypotheses: hypothesis H2 is partially confirmed, as the difference between 2020 and subsequent years is evident, while the differences between 2021 and 2022 are not statistically significant, leading to the rejection of hypotheses H3 and H4. On the other hand, the strong increase in 2023 confirms hypothesis H5, which states that post-pandemic expenditures surpassed pre-pandemic levels.

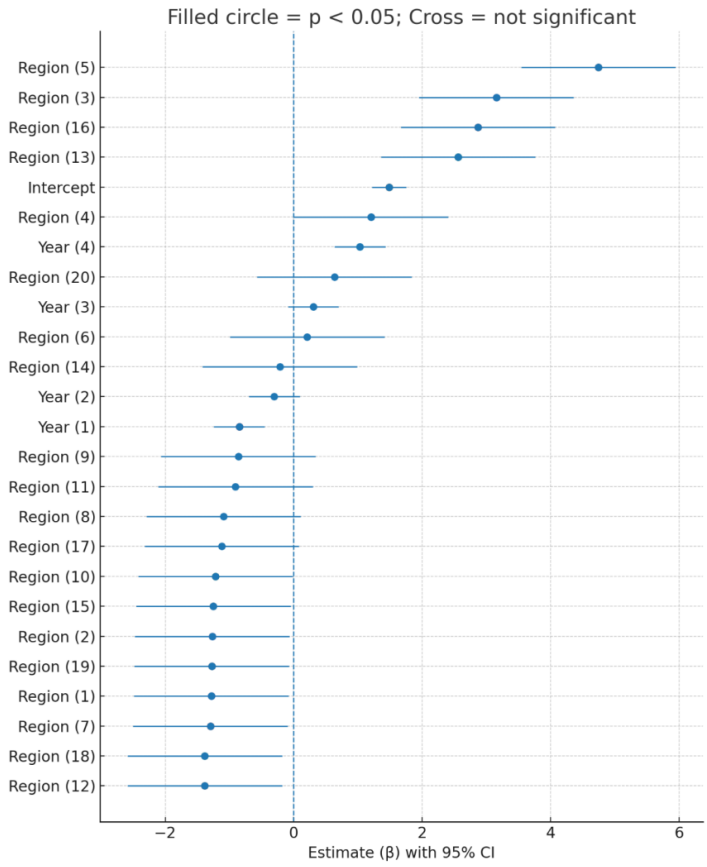


Figure 4. Fixed Effects Coefficients (Reference: Year 2019) – Visual (Source: Authors own calculation)

Tables 5 and 6 show the variance estimates for random effects and residual errors. The standard deviation of the random effects is 0.418, while the residual deviation is notably higher - 1.020. This suggests that while the model explains the primary patterns in expenditures, there is still a considerable degree of variability arising from factors not included in the model. These tables do not confirm any specific hypothesis but provide further insight into the reliability and generalizability of the model. The most comprehensive insight into the spatio-temporal dynamics of consumption is provided in Table 7, which presents the estimated marginal means by year and region. The values clearly show that the City of Zagreb is the only region where tourism expendi-tures in 2020 exceeded that of 2019 (4.335 versus 3.791), with a steady increase maintained in the following years. This resilience of the capital during the pandemic supports hypothesis H6. Furthermore, in coastal counties such as Istria, Split-Dalmatia, and Dubrovnik-Neretva, 2020 was marked by a decline or stagnation in expenditures compared to 2019, but this was followed by a strong recovery in 2022 and 2023, confirming hypothesis H7, which anticipates stronger fluctuations in regions reliant on international arrivals. In contrast, continental counties such as Bjelovar-Bilogora, Koprivnica-Križevci, and Virovitica-Podravina demonstrated more moderate fluctuations but steadier growth, particularly during the 2021-2022 period. This pattern additionally confirms hypothesis H8, which posits a rebound in tourism expenditures in the third pandemic year and the first post-pandemic year.

Table 5. Random Intercept Variance Estimates (Source: Authors own calculation)

Model Term	Standard Deviation	Variance
Intercept	0.418	0.175

Table 6. Residual Variance Estimates (Source: Authors own calculation)

Standard Deviation	Variance
1.020	1.041

Table 7. Estimated Marginal Means (Source: Authors own calculation)

Year	Region	Estimate	Standard Error	95% Confidence Interval		z-score	p-value
				Lower	Upper		
2019	Bjelovar-Bilogora	-0.645	0.650	-1.919	0.629	-3107.612	< .001
2020	Bjelovar-Bilogora	-0.101	0.650	-1.375	1.173	-3106.776	< .001
2021	Bjelovar-Bilogora	0.508	0.650	-0.765	1.782	-3105.838	< .001
2022	Bjelovar-Bilogora	1.233	0.650	-0.041	2.506	-3104.723	< .001
2023	Bjelovar-Bilogora	0.015	0.650	-1.258	1.289	-3106.596	< .001
2019	Brod-Posavina	-0.631	0.650	-1.905	0.643	-3107.591	< .001
2020	Brod-Posavina	-0.087	0.650	-1.361	1.187	-3106.754	< .001
2021	Brod-Posavina	0.522	0.650	-0.751	1.796	-3105.816	< .001
2022	Brod-Posavina	1.247	0.650	-0.027	2.520	-3104.702	< .001
2023	Brod-Posavina	0.029	0.650	-1.244	1.303	-3106.574	< .001
2019	City of Zagreb	3.791	0.650	2.517	5.065	-3100.787	< .001
2020	City of Zagreb	4.335	0.650	3.061	5.609	-3099.950	< .001
2021	City of Zagreb	4.944	0.650	3.671	6.218	-3099.012	< .001
2022	City of Zagreb	5.669	0.650	4.395	6.942	-3097.898	< .001
2023	City of Zagreb	4.451	0.650	3.178	5.725	-3099.770	< .001
2019	Dubrovnik-Neretva	1.843	0.650	0.569	3.117	-3103.784	< .001
2020	Dubrovnik-Neretva	2.387	0.650	1.113	3.661	-3102.947	< .001
2021	Dubrovnik-Neretva	2.996	0.650	1.723	4.270	-3102.009	< .001
2022	Dubrovnik-Neretva	3.721	0.650	2.447	4.994	-3100.895	< .001
2023	Dubrovnik-Neretva	2.503	0.650	1.230	3.777	-3102.768	< .001
2019	Istria	5.381	0.650	4.107	6.655	-3098.340	< .001
2020	Istria	5.925	0.650	4.651	7.199	-3097.503	< .001
2021	Istria	6.534	0.650	5.261	7.808	-3096.566	< .001
2022	Istria	7.259	0.650	5.985	8.532	-3095.451	< .001
2023	Istria	6.041	0.650	4.768	7.315	-3097.324	< .001
2019	Karlovac	0.849	0.650	-0.425	2.123	-3105.313	< .001
2020	Karlovac	1.393	0.650	0.119	2.667	-3104.477	< .001
2021	Karlovac	2.002	0.650	0.729	3.276	-3103.539	< .001
2022	Karlovac	2.727	0.650	1.453	4.000	-3102.424	< .001
2023	Karlovac	1.509	0.650	0.236	2.783	-3104.297	< .001
2019	Koprivnica-Krizevci	-0.659	0.650	-1.933	0.615	-3107.634	< .001
2020	Koprivnica-Krizevci	-0.115	0.650	-1.389	1.159	-3106.797	< .001
2021	Koprivnica-Krizevci	0.494	0.650	-0.779	1.768	-3105.859	< .001
2022	Koprivnica-Krizevci	1.219	0.650	-0.055	2.492	-3104.745	< .001
2023	Koprivnica-Krizevci	0.001	0.650	-1.272	1.275	-3106.618	< .001
2019	Krapina-Zagorje	-0.453	0.650	-1.727	0.821	-3107.317	< .001
2020	Krapina-Zagorje	0.091	0.650	-1.183	1.365	-3106.480	< .001
2021	Krapina-Zagorje	0.700	0.650	-0.573	1.974	-3105.542	< .001
2022	Krapina-Zagorje	1.425	0.650	0.151	2.698	-3104.428	< .001
2023	Krapina-Zagorje	0.207	0.650	-1.066	1.481	-3106.301	< .001

2019	Lika-Senj	-0.223	0.650	-1.497	1.051	-3106.963	< .001
2020	Lika-Senj	0.321	0.650	-0.953	1.595	-3106.126	< .001
2021	Lika-Senj	0.930	0.650	-0.343	2.204	-3105.188	< .001
2022	Lika-Senj	1.655	0.650	0.381	2.928	-3104.074	< .001
2023	Lika-Senj	0.437	0.650	-0.836	1.711	-3105.947	< .001
2019	Medimurje	-0.579	0.650	-1.853	0.695	-3107.511	< .001
2020	Medimurje	-0.035	0.650	-1.309	1.239	-3106.674	< .001
2021	Medimurje	0.574	0.650	-0.699	1.848	-3105.736	< .001
2022	Medimurje	1.299	0.650	0.025	2.572	-3104.622	< .001
2023	Medimurje	0.081	0.650	-1.192	1.355	-3106.494	< .001
2019	Osijek-Baranja	-0.267	0.650	-1.541	1.007	-3107.031	< .001
2020	Osijek-Baranja	0.277	0.650	-0.997	1.551	-3106.194	< .001
2021	Osijek-Baranja	0.886	0.650	-0.387	2.160	-3105.256	< .001
2022	Osijek-Baranja	1.611	0.650	0.337	2.884	-3104.142	< .001
2023	Osijek-Baranja	0.393	0.650	-0.880	1.667	-3106.014	< .001
2019	Pozega-Slavonia	-0.745	0.650	-2.019	0.529	-3107.766	< .001
2020	Pozega-Slavonia	-0.201	0.650	-1.475	1.073	-3106.929	< .001
2021	Pozega-Slavonia	0.408	0.650	-0.865	1.682	-3105.992	< .001
2022	Pozega-Slavonia	1.133	0.650	-0.141	2.406	-3104.877	< .001
2023	Pozega-Slavonia	-0.085	0.650	-1.358	1.189	-3106.750	< .001
2019	Primorje-Gorski Kotar	3.199	0.650	1.925	4.473	-3101.698	< .001
2020	Primorje-Gorski Kotar	3.743	0.650	2.469	5.017	-3100.861	< .001
2021	Primorje-Gorski Kotar	4.352	0.650	3.079	5.626	-3099.923	< .001
2022	Primorje-Gorski Kotar	5.077	0.650	3.803	6.350	-3098.808	< .001
2023	Primorje-Gorski Kotar	3.859	0.650	2.586	5.133	-3100.681	< .001
2019	Sibenik-Knin	0.423	0.650	-0.851	1.697	-3105.969	< .001
2020	Sibenik-Knin	0.967	0.650	-0.307	2.241	-3105.132	< .001
2021	Sibenik-Knin	1.576	0.650	0.303	2.850	-3104.194	< .001
2022	Sibenik-Knin	2.301	0.650	1.027	3.574	-3103.080	< .001
2023	Sibenik-Knin	1.083	0.650	-0.190	2.357	-3104.953	< .001
2019	Sisak-Moslavina	-0.611	0.650	-1.885	0.663	-3107.560	< .001
2020	Sisak-Moslavina	-0.067	0.650	-1.341	1.207	-3106.723	< .001
2021	Sisak-Moslavina	0.542	0.650	-0.731	1.816	-3105.785	< .001
2022	Sisak-Moslavina	1.267	0.650	-0.007	2.540	-3104.671	< .001
2023	Sisak-Moslavina	0.049	0.650	-1.224	1.323	-3106.544	< .001
2019	Split-Dalmatia	3.505	0.650	2.231	4.779	-3101.227	< .001
2020	Split-Dalmatia	4.049	0.650	2.775	5.323	-3100.390	< .001
2021	Split-Dalmatia	4.658	0.650	3.385	5.932	-3099.452	< .001
2022	Split-Dalmatia	5.383	0.650	4.109	6.656	-3098.338	< .001
2023	Split-Dalmatia	4.165	0.650	2.892	5.439	-3100.210	< .001
2019	Varazdin	-0.481	0.650	-1.755	0.793	-3107.360	< .001
2020	Varazdin	0.063	0.650	-1.211	1.337	-3106.523	< .001
2021	Varazdin	0.672	0.650	-0.601	1.946	-3105.585	< .001
2022	Varazdin	1.397	0.650	0.123	2.670	-3104.471	< .001
2023	Varazdin	0.179	0.650	-1.094	1.453	-3106.344	< .001
2019	Virovitica-Podravina	-0.745	0.650	-2.019	0.529	-3107.766	< .001
2020	Virovitica-Podravina	-0.201	0.650	-1.475	1.073	-3106.929	< .001
2021	Virovitica-Podravina	0.408	0.650	-0.865	1.682	-3105.992	< .001
2022	Virovitica-Podravina	1.133	0.650	-0.141	2.406	-3104.877	< .001
2023	Virovitica-Podravina	-0.085	0.650	-1.358	1.189	-3106.750	< .001
2019	Vukovar-Srijem	-0.637	0.650	-1.911	0.637	-3107.600	< .001
2020	Vukovar-Srijem	-0.093	0.650	-1.367	1.181	-3106.763	< .001
2021	Vukovar-Srijem	0.516	0.650	-0.757	1.790	-3105.825	< .001
2022	Vukovar-Srijem	1.241	0.650	-0.033	2.514	-3104.711	< .001
2023	Vukovar-Srijem	0.023	0.650	-1.250	1.297	-3106.584	< .001
2019	Zadar	1.271	0.650	-0.003	2.545	-3104.664	< .001
2020	Zadar	1.815	0.650	0.541	3.089	-3103.827	< .001
2021	Zadar	2.424	0.650	1.151	3.698	-3102.890	< .001
2022	Zadar	3.149	0.650	1.875	4.422	-3101.775	< .001
2023	Zadar	1.931	0.650	0.658	3.205	-3103.648	< .001
2019	Zagreb County	-0.175	0.650	-1.449	1.099	-3106.889	< .001
2020	Zagreb County	0.369	0.650	-0.905	1.643	-3106.052	< .001
2021	Zagreb County	0.978	0.650	-0.295	2.252	-3105.114	< .001
2022	Zagreb County	1.703	0.650	0.429	2.976	-3104.000	< .001
2023	Zagreb County	0.485	0.650	-0.788	1.759	-3105.873	< .001

Table 8 presents the results of contrast analysis between selected time points. The first contrast, with an estimated difference of 101.430 and a p-value of less than 0.001, indicates a statistically significant difference between an earlier and a later year. In

contrast, the second contrast (estimate = 10.637, p = 0.446) is not statistically significant, suggesting that differences between certain years, likely 2021 and 2022, were not pronounced enough. These findings partially confirm hypothesis H9 regarding the existence of structural changes in consumption patterns. While a clear recovery and shift are evident in some sectors, the changes were not uniform across the board. Additionally, data from Table 7 indicate that urban areas such as Zagreb, Split, and Rijeka entered a phase of recovery more rapidly than rural regions, thereby confirming hypothesis H10.

This analysis provides valuable insights into how tourism consumption responds to major disruptions over time and in different regional contexts. In examining the effects of the COVID-19 pandemic, the study identifies clear phases marked by contraction, adjustment, and eventual recovery, with the pace and intensity of change varying across geographic areas and time periods. The application of ANOVA, along with contrast analysis and estimated marginal means, has helped validate many of the initial hypotheses, while others were not supported due to insufficient statistical significance.

Table 8. Contrasts Table (Source: Authors own calculation)

	Estimate	Standard Error	Degrees of Freedom	95% CI		z-score	p-value
				Lower	Upper		
Contrast 1	101.430	11.927	∞	78.053	124.807	8.504	< .001
Contrast 2	10.637	13.963	∞	-16.730	38.004	0.762	0.446

DISCUSSION

The obtained results clearly show that the COVID-19 pandemic had a deep and mul-tidimensional impact on tourism expenditure in Croatia. The statistically significant decline in 2020 confirms the predictions of numerous authors who identified the crisis as one of the most serious in the history of modern tourism (Škare et al., 2021; Fotiadis et al., 2021; Deb & Nafi, 2020). Given the high dependence of Croatian tourism on international visitors, the results from the Adriatic counties further confirm their vulnerability and stronger fluctuations during the period from 2020 to 2023 (Bonacci & Anwar, 2020; Dedeoğlu et al., 2022; Vu et al., 2022; Arshad et al., 2023).

The city of Zagreb proved to be an exception, showing a positive trend in expenditure even during 2020, which aligns with research findings pointing to the resilience of urban areas due to local demand, institutional infrastructure, and digital adaptation (Yeoman et al., 2022; Hu & Zhu, 2023; Liu et al., 2022; Nyikana & Bama, 2023). Such resilience confirms the importance of diversification and the domestic market in the development of sustainable and flexible tourism.

In line with findings on the increase in domestic travel and the decline in international arrivals (Olaleye & Oluwoye, 2022; Villa & Sljepčević, 2022; Tubić et al., 2023), our research confirms that inland regions, such as central Slavonia and continental Croatia, experienced more stable development. Particularly noteworthy is the recovery in the third year of the pandemic (2022) and continued growth in 2023, which is consistent with global observations on "deferred demand" and the return of traveler confidence (Fernandez et al., 2022; Liu et al., 2022; Arjomandi et al., 2023; Yepez & Leimgruber, 2024). Changes in tourist behavior identified through focus groups, such as a preference for contactless payments, digital bookings, and more cautious spending, confirm trends described in international literature on tourist behavior during crises (Liu et al., 2022; Saragih et al., 2024; Yeoman et al., 2022; Dedeoğlu et al., 2022). Psychological factors, such as trust in authorities and personal risk perception, also played a significant role in shaping travel decisions, particularly in the Chinese context, though analogously applicable to the Croatian case (Liu et al., 2022; Dedeoğlu et al., 2022).

Tourism stakeholders, both domestic and international, have emphasized the importance of coordination between the public and private sectors and the inclusion of local communities in tourism planning (Fernandez et al., 2022; Olaleye & Oluwoye, 2022; Drammeh, 2023). In Croatia, this would imply the need for a stronger regional strategy based on resilience, technological innovation, and the involvement of local actors in decision-making. Another important insight from this research is the confirmation of differences in expenditure between regions, with those less dependent on foreign tourists showing greater stability (Villa & Sljepčević, 2022; Sass et al., 2023; Tubić et al., 2023). For example, data from the Azores and island destinations show how demand structures can shift rapidly, while risk perception in smaller communities further shapes the local response to the crisis (Villa & Sljepčević, 2022; Sass et al., 2023). This study also contributes to discussions on the need for greater theoretical and methodological consistency in crisis analysis in tourism. As Yang et al. (2021) point out, early pandemic studies were often descriptive and ad hoc, whereas it is now clear that structured, longitudinal approaches that include both quantitative and qualitative methods are necessary.

Furthermore, the results support conclusions that COVID-19 influenced the perception of tourism both as an activity associated with negative externalities and as an opportunity for sustainable transformation of the sector (Krejić et al., 2021; Jeyacheva & Hampton, 2022). Examples of positive ecological effects, such as reduced emissions and nature recovery, further highlight the need for a green transition in tourism planning. Financial indicators and experiences from other countries, such as Greece, Bangladesh, Jordan, and China, point to the vulnerability of tourism enterprises to liquidity issues, revenue declines, and the need for fiscal support (Tabouratzi et al., 2022; Strouhal et al., 2024; Deb & Nafi, 2020; Harb et al., 2022).

The Croatian context is no exception, confirming the need to strengthen fiscal instruments and crisis management at both national and regional levels (Arjomandi et al., 2023; Arshad et al., 2023). This research also confirms that structural changes in spending have indeed occurred, although they were not distributed evenly. Contrasting analysis shows differences between the various phases of the pandemic but also indicates that changes were neither linear nor universal, further supporting the conclusion about the high complexity of crises in tourism (Drammeh, 2023; Demir et al., 2021; Bogdan et al., 2021).

Regarding our study, a clear contrast was observed between Adriatic and continental counties in terms of recovery dynamics, pointing to differing levels of resilience within Croatia's tourism system. Counties such as Istria, Split-Dalmatia, and Dubrovnik-Neretva were among the hardest hits in 2020, but their recovery in 2022 and 2023 was remarkably strong,

often exceeding pre-pandemic levels. This pattern likely reflects a strong wave of "revenge spending," a psychological and market-driven reaction to earlier restrictions, but also signals a renewed interest in already well-established destinations after a period of enforced inactivity. In contrast, continental counties experienced slower but more stable growth, showing less volatility overall. Precisely because of that consistency and their lower dependence on international arrivals, these regions may play a key role in the future of sustainable tourism in Croatia. Their potential, rooted in cultural content, local products, natural assets, and tighter integration with regional economies, opens space for building distinctive tourism identities that are less exposed to seasonal and crisis-related risks. From a long-term perspective, these patterns suggest the need to rethink the role of continental regions in national tourism policy. Consistent support for decentralization, digital transformation, and sustainable business models could foster more balanced development, improve crisis resilience, and reduce overdependence on mass markets. It's especially important to recognize that the tourism market is becoming increasingly polarized between highly digitalized and locally embedded experiences, something continental regions can capitalize on if given adequate infrastructural and institutional support. It is also worth noting that counties like the City of Zagreb and Primorje-Gorski Kotar demonstrated notable resilience as early as 2020.

Their example highlights the importance of developed infrastructure, responsive institutions, and fast adaptation to digital tools, as well as the presence of a domestic market that can cushion the blow when international flows are disrupted. Given the rising frequency of global disruptions (whether epidemiological, environmental, or geopolitical) it is becoming clear that resilience and adaptability can no longer be treated as peripheral concerns in tourism planning. Instead, they should be seen as core strategic priorities at all levels of governance, from local communities to national policy frameworks.

CONCLUSION

The COVID-19 pandemic brought an unprecedented global shock to the tourism sec-tor, and its impact on Croatia was particularly severe due to the country's strong economic dependence on tourism. This study provides a comprehensive analysis of changes in tourism spending over a five-year period (2019-2023), with a focus on yearly differences, regional disparities, and shifts in consumer behavior. The findings clearly show that the pandemic acted as a catalyst for deep changes, both in overall spending and in the way tourists approach travel.

The year 2020 was marked by a sharp drop in tourism-related spending nationwide, with significant variation between regions. Data shows that counties most dependent on international tourism, especially coastal and island destinations like Istria and Dubrovnik-Neretva, suffered the greatest declines. In contrast, counties in continental Croatia showed more resilience, likely thanks to a more diverse economic base and less reliance on international visitors. This highlights the importance of economic diversification in building resilience against global disruptions. A gradual, yet uneven, recovery began in 2021 and continued into 2022. While overall spending did increase, the pace of recovery varied widely between regions. Urban areas with stronger institutional capacity (such as the City of Zagreb) bounced back faster, suggesting that infrastructure, digital readiness, and local demand all play a critical role in keeping tourism activity alive during a crisis.

By 2023, spending levels had surpassed those of the pre-pandemic year, confirming the presence of pent-up demand and a "revenge spending" effect among travelers. Qualitative insights gathered from focus groups added another layer to the analysis. Participants pointed to noticeable behavioral shifts: greater use of online booking tools, contactless payments, shorter and more frequent trips, and a stronger focus on health and safety. These trends align with global observations and suggest that some changes in tourist behavior may be here to stay. The pandemic sped up the digitalization of tourism services, lowered people's risk tolerance, and pushed many toward more personalized and locally grounded travel experiences.

From a theoretical perspective, these results reinforce the relevance of resilience as a guiding concept in tourism development. Future strategies should not aim solely to increase visitor numbers or revenue, but rather to build a system that can absorb shocks, adapt, and bounce back stronger. The early months of the pandemic revealed major weaknesses in crisis management, particularly in terms of coordination and communication. Going forward, the sector must develop more proactive crisis response plans and scenario-based strategies that allow for swift, coordinated action.

Another key takeaway is the clear difference in recovery patterns across regions, pointing to the need for a more decentralized approach to tourism development. While continental regions have often taken a backseat to Croatia's popular coastal destinations, the pandemic brought new opportunities for these areas, especially as domestic travel gained ground. To make the most of this potential, a long-term strategy is needed, one that builds on cultural heritage, local food and wine tourism, nature-based activities, and rural experiences. This would help reduce seasonality and ensure a more balanced distribution of tourism benefits. This study also offers solid evidence to guide both policy and practice.

The ability of Croatia's tourism sector to recover was not a matter of luck or improvisation, but rather the result of institutional readiness, digital transformation, local adaptability, and community engagement. In an era of increasingly complex crises, whether health-related, environmental, or geopolitical, the challenge is not avoiding disruption altogether but building a system that can with-stand it and emerge stronger. Croatian tourism, as one of the country's key economic pillars, must take these lessons seriously and move toward a more sustainable, decentralized, and tech-enabled future.

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SUSTAINABLE DEVELOPMENT OF ECOTOURISM AS A DRIVER OF LOCAL DEVELOPMENT IN THE "KULUN-ATA" NATURE RESERVE, KYRGYZSTAN: PERCEPTIONS OF LOCAL COMMUNITIES

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Abstract: This article assesses the potential of sustainable ecotourism in the "Kulun-Ata" State Nature Reserve (Kyrgyzstan) as a catalyst for local development. The study aims to explore opportunities and constraints for implementing community-based ecotourism in a remote protected area. Methodologically, it combines household surveys, GIS mapping, functional zoning, and multi-criteria analysis. Results reveal strong community willingness to participate, despite institutional and infrastructural barriers. Based on the findings, a development model is proposed that integrates landscape mosaicism, local stakeholder involvement, and adaptive management principles. The research contributes to the understanding of ecotourism as a tool for promoting socio-economic resilience in peripheral mountainous regions. The study examines sustainable ecotourism as a lever for inclusive development in Kyrgyzstan's remote protected areas. Focusing on the Kulun-Ata State Nature Reserve, it identifies opportunities and constraints for community-based ecotourism. It situates the case within sustainable territorial development and community participation frameworks. The aim is to propose a spatially integrated, governance-ready model balancing conservation and local livelihoods. A mixed-methods design combines GIS-based suitability modelling, functional zoning, and field observations. Household surveys (N=197; Konduk and Oy-Tal, July 12–25, 2024) assess perceptions, capacities, and readiness. A 20-item Likert instrument spans ecological, socio-cultural, economic, and institutional-political dimensions. Multi-Criteria Decision Analysis and a Sustainability Barometer synthesize indicators to prioritize development options. Communities show high willingness to participate, with strongest scores in environmental awareness and socio-cultural identity. Institutional trust is weakest, and infrastructure remains inadequate. Spatial analysis reveals a heterogeneous landscape mosaic suitable for phased, low-impact route development outside core zones. Functional zoning delineates strict protection, buffer, regulated ecotourism use, and adjacent interaction belts. Priorities include capacity-building, micro-enterprise support, trained guiding, and minimal-footprint trail infrastructure. The framework aligns visitation with conservation thresholds while enhancing local income diversification and cultural stewardship. Findings position Kulun-Ata as a representative case for integrating secondary, hard-to-reach areas into national strategies. Policy implications stress phased implementation, cross-sector coordination, and monitoring using integrated sustainability indicators.

Keywords: ecotourism, local communities, spatial modeling, Kyrgyzstan, community-based tourism, environmental awareness, institutional barriers

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INTRODUCTION

Amid escalating global environmental challenges and socio-economic disparities in peripheral regions, ecotourism is gaining particular significance as a tool for integrating nature conservation with the sustainable development of local communities. As a form of tourism that emphasizes minimal impact on natural and cultural landscapes, ecotourism not only contributes to biodiversity conservation but also stimulates local economies by creating employment opportunities, diversifying income sources, and enhancing environmental awareness among the population (Weaver & Lawton, 2007).

The issue of ecotourism development is particularly relevant in Kyrgyzstan – a country with significant natural potential and a high concentration of specially protected natural areas. However, in most cases, these areas remain isolated from broader socio-economic processes, resulting in their perceived marginalization from the spatial and economic structure of regional development. A representative example is the "Kulun-Ata" State Nature Reserve – a unique natural cluster that encompasses diverse ecosystems and endemic species, located in a remote area of the Osh Region. Theoretically, this study is grounded in the concept of sustainable territorial development (Akbar et al., 2022), the theory of sustainable tourism

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(Butler, 1999), and the principles of community-based ecotourism, which emphasize active participation of local residents in the management of tourism activities (Scheyvens, 1999). These approaches allow ecotourism to be viewed not only as a form of recreation, but also as a platform for institutional and economic empowerment of marginalized regions.

Kyrgyzstan, as a country with a high level of natural diversity, has in recent years shown growing interest in developing a green economy and utilizing natural capital as a driver of sustainable growth. At the same time, the southern regions of the country continue to experience a high degree of socio-economic vulnerability, caused by limited access to infrastructure, labor migration, and insufficient employment diversification. Under such conditions, ecotourism may serve as a compensatory mechanism and a tool for integrating remote areas into the national economic space.

At the regional level, similar characteristics are observed in the Aksu-Zhabagly Biosphere Reserve in Kazakhstan and the Chatkal Biosphere Reserve in Uzbekistan (Akbar & Yang, 2022). These protected areas share geographical isolation, high levels of biodiversity, and at the same time, a limited degree of institutional integration into regional sustainable development strategies. Comparative analysis reveals that, in all these cases, the sustainability of ecotourism is determined by the interplay of natural value, local community involvement, and territorial accessibility. The "Kulun-Ata" Nature Reserve may thus be viewed as a representative case for analyzing the ecotourism potential of remote protected areas in Central Asia that lie outside major tourism routes and require new models of spatial integration.

Despite the growing number of publications on ecotourism, there remains a lack of well-developed spatial and economic mechanisms for realizing ecotourism potential in the context of Kyrgyzstan. This study is the first to propose a comprehensive model for the spatial integration of a protected area – the "Kulun-Ata" Nature Reserve – into a sustainable regional development framework. The scientific novelty of the research lies in the integration of approaches from conservation management, ecotourism planning, and local economic modeling. To date, the scientific literature has paid insufficient attention to the applied aspects of utilizing ecotourism as a strategic resource in the context of sparsely urbanized areas of Kyrgyzstan. There is a lack of comprehensive studies linking the spatial potential of protected areas with the socio-economic development of adjacent settlements. Meanwhile, the development of ecotourism activities in the "Kulun-Ata" Nature Reserve could serve as a catalyst for spatially balanced growth, contribute to improving the quality of life of local residents, and strengthen conservation management mechanisms through community-based conservation approaches.

The aim of this study is to provide a comprehensive assessment of ecotourism opportunities in the context of local development within the "Kulun-Ata" Nature Reserve. The research examines the natural-geographical and institutional prerequisites, analyzes infrastructural constraints and risks, and proposes a model of ecotourism that ensures a balance between conservation priorities and the socio-economic needs of the region. The methodological framework is based on systemic and spatially-oriented approaches, incorporating GIS analysis, expert evaluations, and field observations.

LITERATURE REVIEW

The concept of ecotourism gained widespread recognition in the late 20th century as a response to the growing demand for tourism that integrates nature conservation with community-based resource management (Honey, 2008). In academic literature, ecotourism is regarded as a sustainable mechanism for balancing environmental, economic, and cultural objectives (Fennell, 2020). The development of ecotourism within protected areas is viewed in contemporary research as part of the sustainable territorial development paradigm, which combines environmental protection with the inclusion of local communities in the low-impact economy (Koshim et al., 2023; Morais et al., 2019; Blank & Li, 2021).

A central element in determining the success of ecotourism initiatives is the so-called "local effect" – the ability of ecotourism to generate added value within the local economy and to strengthen conservation outcomes through community participation (Stronza & Gordillo, 2008; Kiss, 2004). Within the framework of sustainable regional development, ecotourism is explored as a multifunctional process capable of driving the spatial integration of remote areas (Kaplan, 2015; Sergeyeva & Omirzakova, 2023). Several studies emphasize that the most successful cases of sustainable ecotourism occur when there is a genuine redistribution of benefits in favor of local communities involved in tourist services, interpretation of natural heritage, and infrastructure development (Purnomo et al., 2020; Akbar et al., 2020; Dey et al., 2021).

Ecotourism is often employed as a tool of exogenous resource management without adequately considering the interests of local communities, which can lead to social conflicts, unequal distribution of income, and environmental degradation in cases of unbalanced exploitation (Palmer, 2006; Ivancsóné Horváth et al., 2023; Gudkovskikh & Dirin, 2023). These challenges are particularly relevant in developing countries, where comprehensive tourism management and ecosystem impact monitoring are frequently lacking. In particular, researchers advocate for the integration of biodiversity conservation and ecosystem health indicators into the evaluation of tourism project effectiveness, alongside metrics related to employment, local income, and visitor satisfaction (Aliyeva et al., 2024). It has been noted that without such tools, it is difficult to assess the true contribution of ecotourism to sustainable development: for instance, an increase in tourist numbers and revenues does not necessarily guarantee improved environmental conditions or equitable benefit-sharing within communities.

According to a study conducted in Kazakhstan's national parks, only the combination of high visitor satisfaction, active local community participation, and the preservation of natural attractions indicates sustainable ecotourism development (Tiberghien et al., 2018; Aliyeva et al., 2020; Artemyev et al., 2025). Monitoring initiatives in the region are often limited to either ecological indicators (e.g., rare species counts, trail load) or economic indicators (e.g., tourism revenue, visitor numbers). Social effects – such as income distribution, women's and vulnerable groups' participation, and cultural heritage preservation – remain peripheral to evaluation frameworks. Some studies propose approaches for the development of integrated indicators. For instance, global literature suggests specific sustainability indices for rural tourism, and their adaptation for Central Asia could help fill this gap. Overall, the lack of cross-sectoral indicators

hampers the ability to determine whether ecotourism in the region is truly achieving its stated triple-win goals – for nature, people, and the economy. A final notable gap is the lack of attention to lesser-known, secondary, and hard-to-reach areas in ecotourism planning and research. Both academic publications and national strategies tend to focus primarily on a few flagship sites – popular national parks, nature reserves, and cultural-historical landmarks that already attract tourists. Meanwhile, vast areas with considerable ecotourism potential –such as remote mountain gorges, nature reserves, and borderland mountain villages – remain largely overlooked by researchers and policymakers.

Scholarly literature highlights that Central Asia contains unique ecosystems and communities that remain outside the scope of mass tourism and academic research, representing a missed opportunity for ecotourism development (Mukhambetov et al., 2014; Shadymanova et al., 2014; Alieva & Usmonova, 2021; Kurniawan & Khademi-Vidra, 2024; Apollo et al., 2021). It is recommended to expand the geographical scope of research and to include small and remote areas in development plans, drawing on local initiatives. Without such an approach, ecotourism risks developing in a one-sided manner, failing to engage vast parts of the region and falling short of its stated goal of inclusivity.

The literature review indicates that in order to fully unlock the ecotourism potential of post-Soviet Central Asia, it is essential to address the identified scientific and practical gaps. Strengthening local community participation through institutional reforms and education can ensure a more equitable distribution of benefits and greater support for conservation goals at the local level. The development and implementation of cross-sectoral indicators would enable objective measurement of the success of ecotourism initiatives across environmental, social, and economic dimensions, allowing for strategic adjustments when necessary. Finally, incorporating secondary and hard-to-reach areas into academic discourse and development planning could open new pathways for travelers and provide a stimulus for the revitalization of economically depressed regions. Central Asian countries are increasingly recognizing many of these challenges and have begun to take steps toward addressing them – ranging from regional cooperation in the tourism sector to the promotion of rural hospitality and ecological routes with the support of international organizations. Nevertheless, as the literature review demonstrates, these issues persist and continue to require the attention of both researchers and practitioners.

Addressing these gaps will not only enrich the academic understanding of ecotourism but also contribute to the development of a more sustainable and inclusive tourism industry across Central Asia. Kyrgyzstan is characterized by a high density of protected natural areas; however, there remains a significant gap between nature conservation and the economic activities of local populations. Studies by Nizamiev et al. (2023); Kadyrova (2024) highlight the considerable potential for ecotourism in the country's mountainous regions, particularly in the southern provinces, while also emphasizing the presence of institutional and infrastructural barriers. Despite the growing number of studies, key issues remain underexplored, including territorial planning for ecotourism, spatial analysis of tourist flows, land-use scenarios, and the integration of ecotourism models into regional sustainable development strategies. Particularly understudied are small and remote protected areas, such as the "Kulun-Ata" Nature Reserve, which possess high biogeographic and sociocultural potential but remain outside the focus of tourism and research initiatives. This study aims to address these gaps by developing a comprehensive model for assessing the ecotourism potential of the reserve – one that considers not only natural resource parameters, but also spatial connectivity, sociocultural practices, and institutional conditions.

STUDY AREA

The "Kulun-Ata" State Nature Reserve was established by a Resolution of the Government of the Kyrgyz Republic on August 11, 2004. The primary objective of the reserve's creation is the preservation of biodiversity, including the rich gene pool of juniper-coniferous forests, as well as the conservation of local flora and fauna and the enhancement of biological resource protection. The reserve is located between the Fergana and Alai Mountain ranges, in the upper reaches of the Tar River, within the Karakulja District of Osh Region. Currently, the territory of the reserve comprises two designated areas: "Kulun-Ata" (21,435.5 ha) and Ton-Zoo (6,000.7 ha) (NABU Kyrgyzstan, 2025). According to the current forest management data, the total area of the reserve since its establishment in 2004 amounts to 27,434.2 hectares. The reserve is administratively divided into two forestry units (Borombaev, 2022). The study area is the "Kulun-Ata" State Nature Reserve, located in the southwestern part of the country, within the Karakulja District, along the southern slopes of the Fergana Range (Figure 1).

This area is characterized by high biological and landscape heterogeneity, encompassing rare and endemic species of flora and fauna. It also serves as a vital water source and ecological corridor for the southern region of Kyrgyzstan. The study area includes several rural "ayil" districts located within the buffer zone of the reserve, whose populations are primarily engaged in subsistence agriculture, pasture-based livestock herding, and seasonal labor migration. Despite its considerable natural and recreational potential, the reserve remains one of the least developed regions in the country in terms of tourism. It lacks adequate tourism infrastructure, and the interaction among the conservation administration, local communities, and potential investors is limited by institutional and resource constraints. The selection of this area is justified by its representativeness for remote and socioeconomically vulnerable protected zones in Central Asia, as well as by the presence of preconditions for the development of community-based ecotourism as a tool for sustainable and locally driven development.

MATERIALS AND METHODS

This study aims to assess the potential for sustainable ecotourism within the boundaries of the "Kulun-Ata" State Nature Reserve. The primary objectives include evaluating local residents' attitudes toward the development of ecotourism activities, identifying factors that facilitate or hinder community participation in this sector, and formulating recommendations for sustainable tourism planning. The methodological framework is based on the principles of community-based ecotourism and integrated sustainability, encompassing four key dimensions: ecological, socio-

cultural, economic, and institutional-political. The research employs a combination of empirical field analysis, spatial modeling, and perception assessment through structured questionnaires.

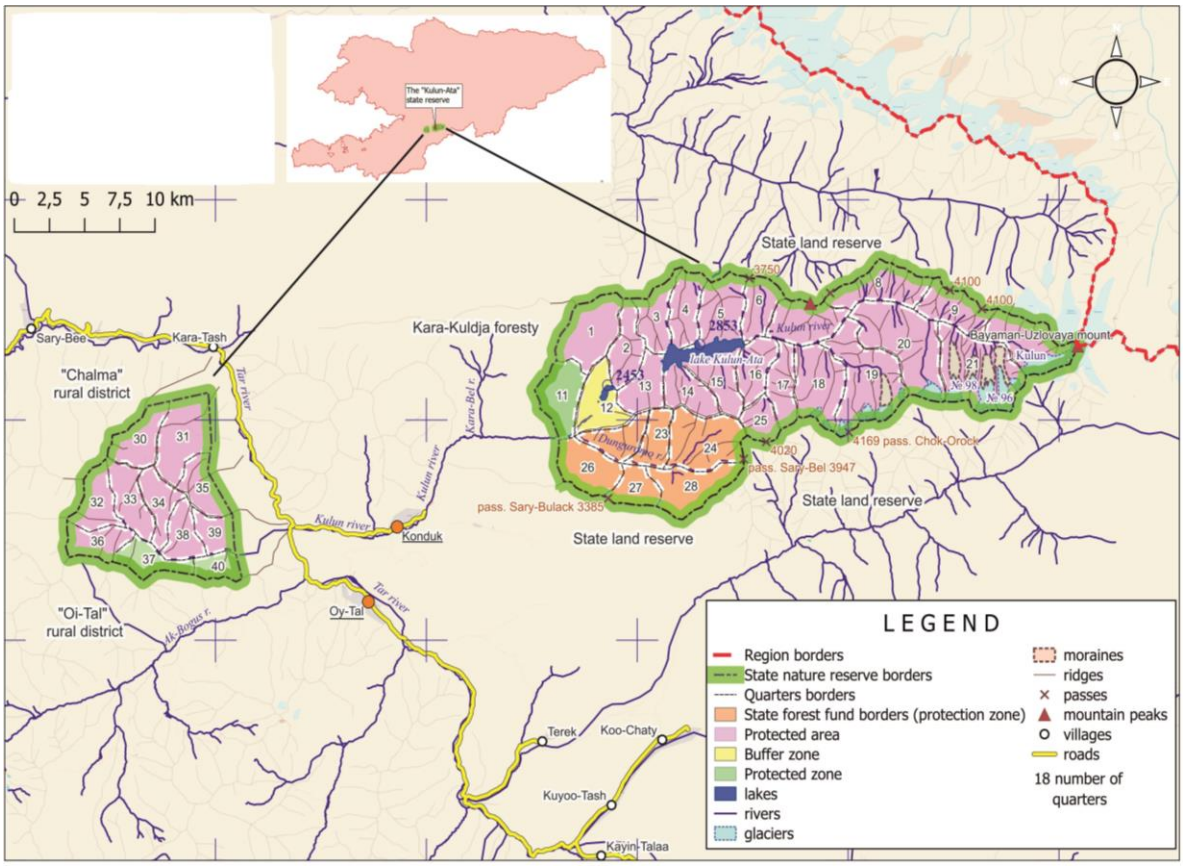


Figure 1. Geographical location of the "Kulun-Ata" Nature Reserve (Source: NABU Kyrgyzstan (2025), State Agency for Environmental Protection and Forestry, and own GIS processing)

A As part of the empirical stage of the research, a comprehensive field expedition was conducted in July 2024 within the territory of the "Kulun-Ata" State Nature Reserve and adjacent rural settlements. The purpose of the fieldwork was to collect primary data on local residents' perceptions of ecotourism as a mechanism for sustainable local development, as well as to assess the presence and quality of institutional, environmental, and economic preconditions for its establishment.

A quantitative research method was employed for data collection and analysis. A structured questionnaire was developed to assess the prospects for sustainable ecotourism development in the reserve. The field survey was carried out from July 12 to July 25, 2024, involving respondents selected from the villages of Konduk and Oy-Tal. A stratified sampling method was applied, ensuring gender, age, and occupational representativeness. The main respondent categories included individuals directly or indirectly involved in subsistence and potential tourism-related activities: farmers, herders, households with experience hosting tourists, as well as local youth representatives. Total of 197 respondents participated in the study, including 102 residents from the village of Konduk and 95 residents from the village of Oy-Tal.

The sociological field survey conducted in Konduk (n = 102) and Oy-Tal (n = 95) revealed several significant differences in the demographic composition and educational level of the local populations, which are critical for analyzing the social dimension of sustainable ecotourism development. Figure 2 illustrates the demographic and educational composition of respondents in Konduk and Oy-Tal. The data reveal a predominance of women in both settlements, alongside a relatively balanced age structure with a slight dominance of older groups. Educational attainment shows that secondary education is prevalent, while higher education levels differ notably between the two villages. These patterns highlight the socio-demographic contrasts that may influence local engagement in ecotourism.

The collected data provide a deeper understanding of the social context within which ecotourism development is envisioned, allowing for the consideration of local community specificities when designing sustainable engagement strategies.

The questionnaire consisted of 20 statements evaluated using a five-point Likert scale (ranging from 1 – "strongly disagree" to 5 – "strongly agree"), grouped into four thematic dimensions: environmental awareness, socio-cultural identity, economic expectations, and institutional trust. In addition, open-ended questions and a comment section were included to complement the quantitative data with qualitative insights. All data collected were systematized and prepared for subsequent analysis using Multi-Criteria Decision Analysis (MCDA) and the Sustainability Barometer (Ko, 2005).

All participants provided informed voluntary consent to take part in the study, and full anonymity was guaranteed. The expedition was approved by local self-governing bodies and the administration of the nature reserve. To verify the results of spatial modelling, a combined strategy was applied. In the initial phase, expert assessments were conducted involving

local specialists – reserve administration staff, guides, and researchers familiar with the actual recreational pressure and landscape characteristics. These experts cross-validated the high-suitability zones identified by the GIS model with empirical field route data and observational records. In the second phase, cartographic overlay of the modelling results was conducted using known trails and areas of traditional land use (based on GPS tracking data and surveys).

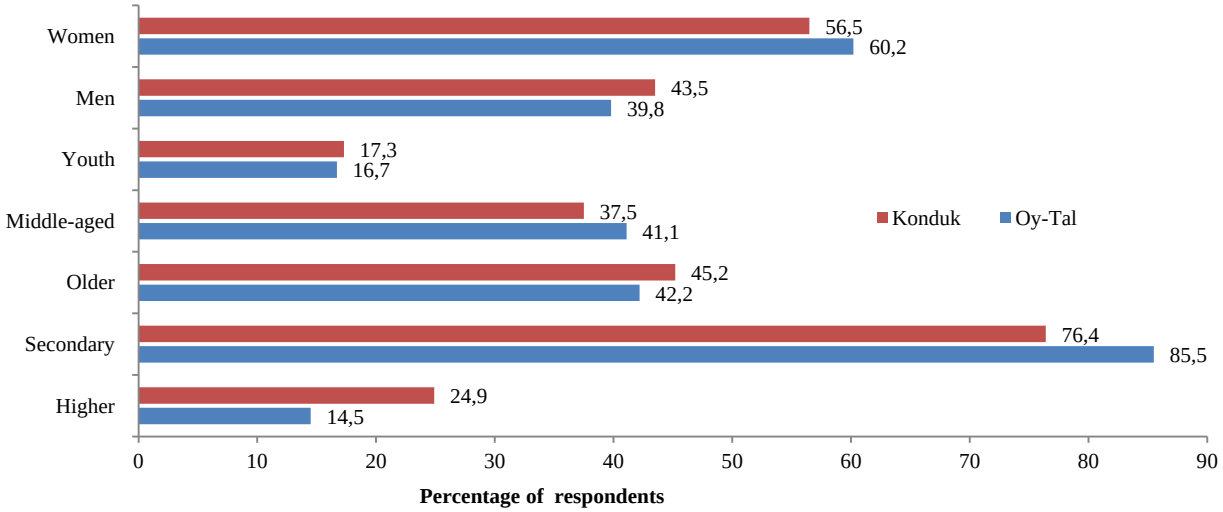


Figure 2. Socio-demographic characteristics of respondents in Konduk and Oy-Tal (Source: Own editing)

This allowed for validation of the accuracy in identifying key nodes of potential tourist activity. The methodological framework was adapted in accordance with guidelines for the application of geospatial technologies in nature-based tourism (Hennig, 2018) and best practices in the design of ecotourism routes using Multi-Criteria Decision-Making (MCDM) methods (Kolkos et al., 2024). The expeditionary work included route-based landscape and recreational observations within the buffer zone of the reserve. During transect walks, sites with potential tourist appeal were documented, alongside infrastructure conditions, evidence of traditional land use, and elements of cultural heritage. Spatial data collection involved the use of GPS loggers, photographic documentation, and route mapping, followed by vectorization in ArcGIS 10.8. The spatial analysis involved the construction of a suitability model for ecotourism using multi-criteria analysis methods within the ArcGIS 10.8 environment. The selected criteria included slope, distance to roads, water accessibility, degree of anthropogenic pressure, and the presence of protected objects.

RESULTS

One of the fundamental tools for maintaining ecological balance and ensuring the sustainable use of resources in protected areas is functional zoning. This approach involves the spatial allocation of protection regimes and permissible activities based on natural, institutional, and socio-cultural factors. Functional zoning allows for the consideration of both ecosystem constraints and the opportunities for spatial integration of conservation objectives with those of sustainable tourism, scientific research, and environmental education. It serves as an essential foundation for the development of long-term management strategies for protected areas, particularly in border and mountainous regions such as the Karakulja District of Osh Region.

This study examines the functional zoning of the "Kulun-Ata" State Nature Reserve, which encompasses unique mountain-forest and river ecosystems. The spatial structure of zoning within the reserve is viewed as a key prerequisite for assessing the potential of sustainable ecotourism and for justifying directions in conservation and recreational planning.

Figure 3 presents the spatial-structural scheme of the functional zoning of the reserve, developed on the basis of data provided by the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic. The territory of the reserve includes areas within the Karakulja District and is structured in accordance with international recommendations for the management of protected areas, as well as in alignment with regional environmental policies.

Functional zoning aims to optimize the allocation of territory based on ecological value, the sensitivity of natural complexes, and the admissibility of specific types of human activity. Within the framework of this zoning system, the territory of the reserve is classified into four main functional zones:

1. Strict Protection Zone (Core Area) – This zone encompasses the largest portion of the reserve and includes ecologically vulnerable landscapes characterized by primary biocenoses and habitats of rare and endemic species of flora and fauna. All forms of human intervention are strictly prohibited in this zone, including tourism, grazing, and the extraction of natural resources. The only permitted activity is scientific monitoring, conducted under the supervision of the reserve's administration. The core zone plays a critical role in maintaining ecological representativeness and serves as a reference area for assessing anthropogenic impacts on adjacent territories.

2. Buffer Zone (Ecological Stabilization Zone) – Surrounding the core area, this zone functions as a transitional ecological filter. Strictly regulated traditional land-use practices are permitted here, including seasonal livestock grazing, the collection of medicinal plants for scientific purposes, and activities aimed at increasing environmental awareness among the local population. The buffer zone also serves as a spatial reserve for organizing environmental education activities, scientific internships, and observational studies that do not exert direct pressure on the core ecosystem.

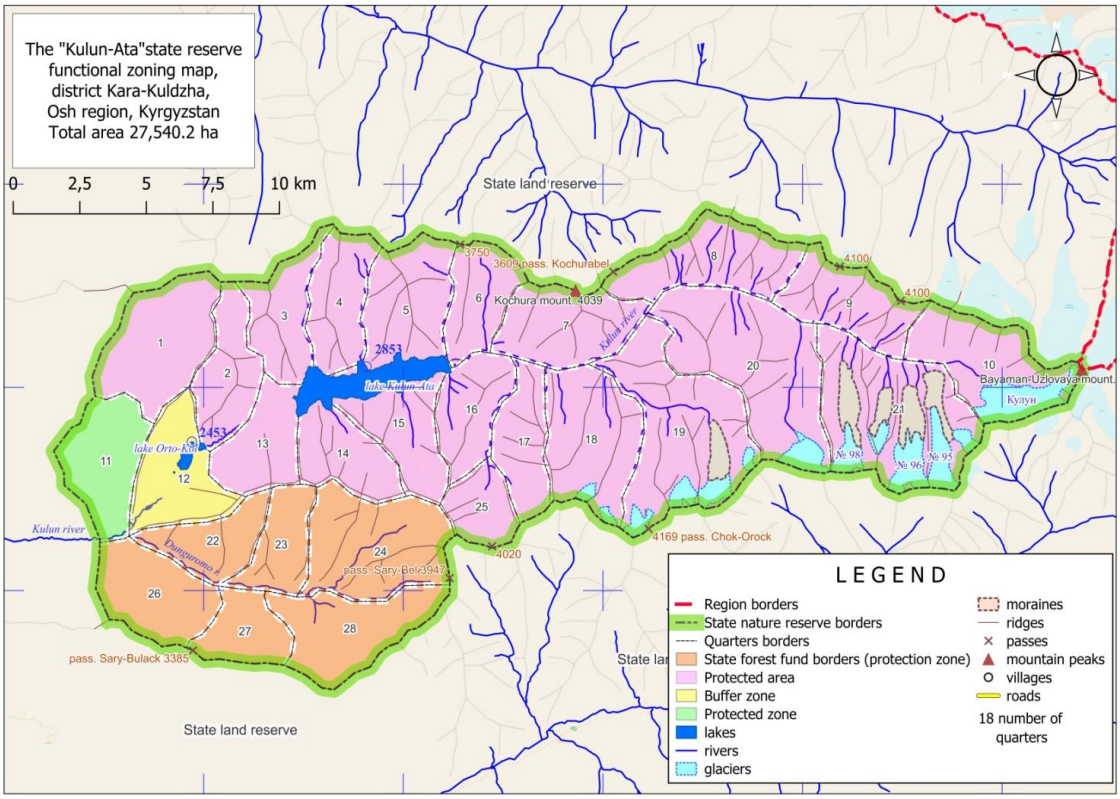


Figure 3. Functional zoning map of the "Kulun-Ata" Nature Reserve (Source: Own editing)

3. Regulated Ecotourism Use Zone – Located in the southern part of the reserve, adjacent to nearby settlements and access roads, this zone is characterized by a favorable combination of natural and landscape conditions, accessibility, and relative resilience to controlled tourist flows. This area is designated for the development of ecological infrastructure, including the establishment of marked trails, scenic viewpoints, informational displays, and temporary visitor facilities. The primary objective is to create a managed recreational environment that maintains ecological balance while offering an alternative source of income for local communities and preserving biodiversity.

4. Adjacent Areas and State Land Reserve Zones – While not formally part of the reserve, these areas hold strategic importance in terms of landscape and ecological connectivity. They form an external interaction belt between the protected area and the region's agro-pastoral system. These zones are critical for implementing protective ecosystem corridors, promoting sustainable pasture management, and fostering local initiatives in agro-ecotourism.

Functional zoning not only enables the optimization of conservation policies at the level of the individual reserve but also serves as a tool for integrating the protected area into the broader regional socio-economic fabric. The application of this zoning framework is a necessary condition for the development of a spatial strategy for ecotourism, minimizing conflicts between conservation and livelihood activities, and facilitating coordination among the reserve administration, local communities, and potential investors in sustainable tourism.

Based on the analysis of functional zoning, topographical characteristics, and the natural and cultural resources of the "Kulun-Ata" State Nature Reserve, the feasibility of developing tourism routes aligned with the principles of sustainable land use has been substantiated. The spatial structure of the reserve – which includes strictly protected areas, buffer zones, and areas designated for regulated tourism, creates favorable conditions for formalising and regulating visitor access without compromising ecosystem stability. The proposed routes are designed to integrate natural and cultural attractions, including: Mountain passes and scenic viewpoints providing visual dominance (panoramic segments along the ridge in the eastern part of the reserve); Springs and river valleys featuring unique flora (the valleys of the "Kulun-Ata" and Tar Rivers); Forest and subalpine ecosystems rich in biodiversity; Sacred sites and seasonal herding camps that reflect elements of intangible cultural heritage (notably within the Oy-Tal and the Karakulja mountain range) (Figure 4).

Figure 4 illustrates the spatial distribution of designated tourist routes within the "Kulun-Ata" State Nature Reserve, located in the Kara-Kuldzha district of Osh region, Kyrgyzstan. The mapped trails, marked in red, traverse key ecological and scenic landmarks of the reserve, including alpine lakes (Kulun-Ata, Orto-Köl), mountain passes (Sary-Bulak, Chok-Orock, Sary-Bel, Oyruma), glacier areas, and panoramic peaks such as Bayaman-Uzlovaya (4,773 m) and Kochura Mountain.

The tourist trails were planned to balance landscape diversity, ecological sensitivity, and visitor accessibility, avoiding the core protected zone. Most of the routes are concentrated in the buffer and forested transition zones to ensure minimal environmental disturbance. Green triangle symbols indicate designated tourist campsites, strategically located for overnight stays and resting points along multi-day routes. The trails vary in length and difficulty – from short radial hikes to high-altitude circuits crossing several passes. The most visited routes include those leading to Kulun-Ata Lake and to the glacier belt in the eastern section of the reserve. All proposed routes should adhere to the principles of low-impact tourism,

including the use of existing trails, avoidance of permanent infrastructure construction, installation of minimal navigational signage, and mandatory accompaniment by trained guides. The sociological field survey conducted in the settlements of Konduk and Oy-Tal (N = 197) revealed a representative distribution of key demographic and socio-economic groups.

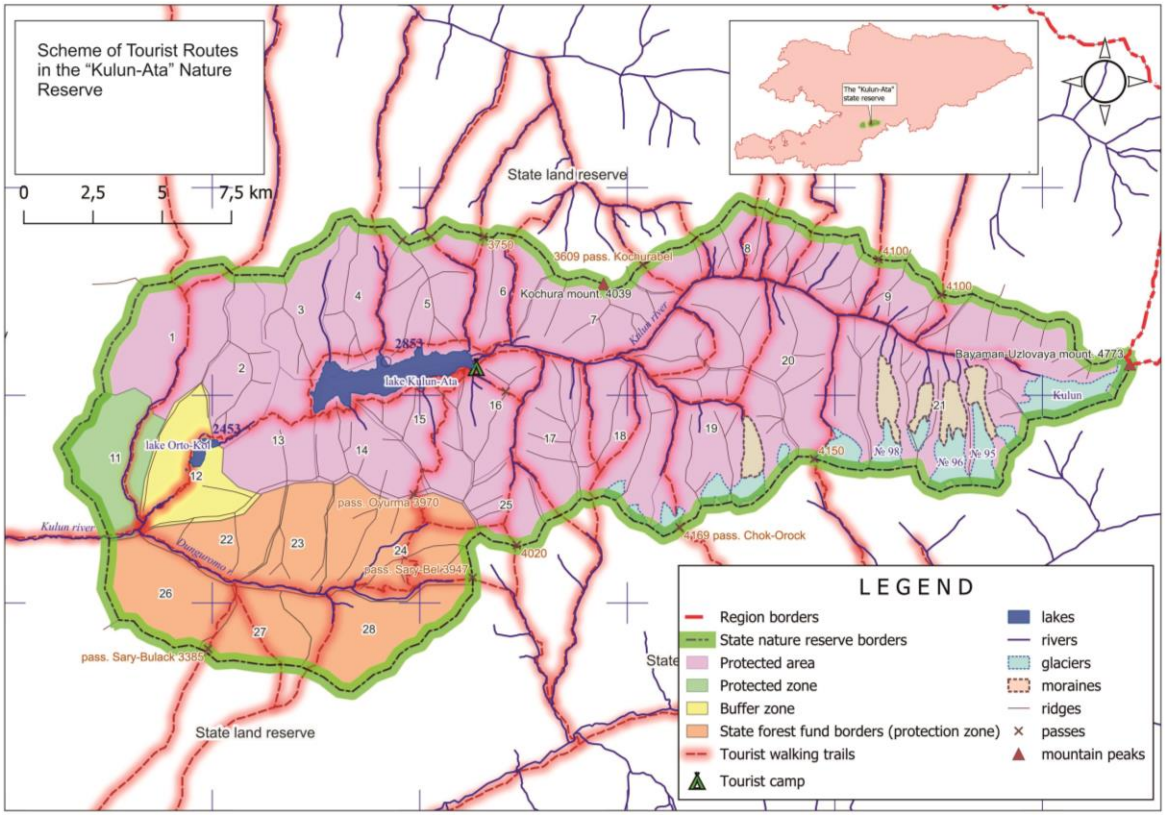


Figure 4. Scheme of Tourist Routes in the "Kulun-Ata" Nature Reserve (Source: Own editing)

Women constituted the majority of respondents (56.5% in Konduk and 60.2% in Oy-Tal), which may indicate the feminization of local economic practices and the predominance of female social capital in the context of migratory imbalance caused by the outmigration of working-age men. The age structure of respondents – dominated by middle-aged and older generations – reflects a dual dynamic: on the one hand, the presence of a valuable repository of traditional ecological knowledge; on the other, a shortage of human resources for developing tourism services that require digital and entrepreneurial competencies. Analysis of educational attainment among respondents revealed a predominance of basic (secondary) education, with over 75% of participants falling into this category. This indicates the presence of a minimum cognitive and socio-cultural capacity to engage in interpretive and environmental education programs.

However, the relatively low rate of higher education – particularly in the village of Oy-Tal (14.5%) – highlights the need for tailored capacity-building programs in sustainable land use, ecotourism management, and small-scale entrepreneurship, specifically adapted to rural contexts and gender dynamics. The survey results, organized across four key dimensions of sustainability (ecological, socio-cultural, economic, and institutional-political), enable a comparative interpretation of ecotourism perceptions in the two target locations – Konduk and Oy-Tal. Responses were standardized using a five-point Likert scale, ensuring comparability and consistency in interpretation (Figure 5).

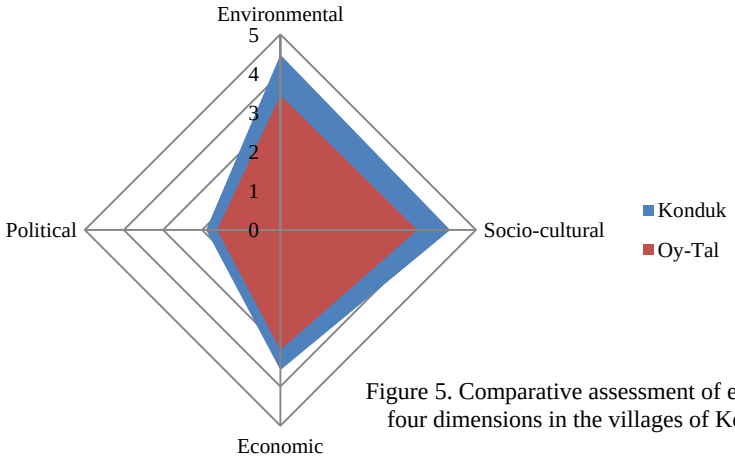


Figure 5. Comparative assessment of ecotourism sustainability perceptions across four dimensions in the villages of Konduk and Oy-Tal (Source: Own editing)

The highest sustainability scores were observed in the domain of environmental awareness: the average score in Konduk was 4.48, compared to 3.44 in Oy-Tal. These differences suggest a deeper understanding among Konduk residents of the ecological significance of natural complexes and, likely, a stronger connection to the reserve's territory. This supports the interpretation of Konduk as a potential hub for eco-interpretation activities. Conversely, in Oy-Tal, it is advisable to strengthen environmental education initiatives aimed at fostering ecological consciousness.

Socio-cultural sustainability also showed high levels in both samples (4.34 in Konduk and 3.50 in Oy-Tal), indicating the presence of local cultural practices, traditions of hospitality, and a strong sense of identity. However, the higher score in Konduk may be attributed to better preservation of intangible heritage, more effective intergenerational knowledge transmission, and more active forms of community self-governance. In contrast, Oy-Tal demonstrates signs of partial erosion of socio-cultural capital, likely linked to youth outmigration and the weakening of extended family structures.

Economic sustainability scores demonstrated moderate levels: 3.58 in Konduk and 3.06 in Oy-Tal. The gap between the two villages may indicate the presence of micro-entrepreneurial activities in Konduk linked to tourism – such as private households offering accommodation or local products, whereas in Oy-Tal such forms of employment have yet to become institutionalized. Low income diversification, seasonality, and limited access to markets remain constraining factors in both locations. These findings highlight the need to develop support programs for rural eco-businesses, including microcredit schemes, training, and marketing assistance. The most vulnerable dimension in both samples was institutional trust, with particularly low scores: 1.90 in Konduk and 1.62 in Oy-Tal. These values reflect limited community participation in the management of conservation and tourism activities, weak legal and regulatory frameworks, and a general lack of awareness regarding participation mechanisms. Coupled with the exogenous nature of most development initiatives, this leads to widespread distrust and, in some cases, resistance to change. Overcoming this barrier requires the institutionalisation of co-management approaches, the inclusion of local communities in advisory councils and decision-making processes, and the establishment of effective cross-sectoral coordination mechanisms.

Comparative analysis indicates that the village of Konduk exhibits a more sustainable profile across all dimensions, particularly in the ecological and socio-cultural aspects. In contrast, Oy-Tal is characterized by a higher degree of institutional vulnerability, which requires targeted attention from project teams, local governance bodies, and non-governmental organizations. The observed differences underscore the importance of localized ecotourism development strategies that are tailored to the socio-cultural and institutional specificities of individual communities. Based on the integrated analysis, the key barriers and opportunities within the "Kulun-Ata" State Nature Reserve were identified (Table 1).

Table 1. Key Barriers and Opportunities for Ecotourism Development in the "Kulun-Ata" State Nature Reserve

Category	Barriers	Opportunities	Significance Rating (on a scale from 1 to 5)
Environmental	Risk of ecosystem degradation due to unregulated tourism	High natural and landscape heterogeneity	5
Socio-cultural	Lack of experience among the local population	Strong traditions of hospitality, local identity	4
Economic	Absence of initial investment, seasonal income patterns	Potential for micro-business development and agrotourism	2
Institutional	Weak regulatory framework, limited administrative capacity	Engagement of NGOs, potential international support	3

DISCUSSION

The results of this study support the thesis that ecotourism, as an integrative form of natural resource use and local community development, can serve as an effective instrument for sustainable development in marginal territories of Central Asia. The specific case of the "Kulun-Ata" State Nature Reserve illustrates several patterns and challenges previously identified in global and regional literature, while also contributing new empirical data derived from a remote rural context characterized by high conservation value and limited economic opportunities.

The high levels of environmental and socio-cultural awareness demonstrated by respondents reinforce findings from earlier studies emphasizing that local communities possess significant latent potential for participation in ecotourism. This is particularly important, as the success of community-based tourism largely depends on the willingness and readiness of local populations to engage and their recognition of the cultural and ecological value of their territory.

For the sustainable implementation of ecotourism in the reserve, it is not sufficient to merely inform the local population. Their role must be institutionally embedded in management processes, benefit-sharing mechanisms, and decision-making structures. The results of the spatial analysis confirm the high suitability of several areas within the reserve for the development of ecotourism routes with minimal ecological impact. This aligns with the findings of Fennell & de Grosbois (2023), who emphasize that landscape heterogeneity, natural diversity, and buffering capacity are key criteria for the establishment of "green corridors" in ecotourism. However, the lack of tourism infrastructure, identified through on-site route assessments, indicates the structural unpreparedness of the region to accommodate even a limited number of visitors. In such contexts, it is essential to pursue a phased, low-impact infrastructure development strategy (eco-trails, guesthouses, trained local guides) in order to avoid rapid environmental degradation and visitor dissatisfaction.

The institutional barriers identified – such as weak coordination, limited resources, and underdeveloped legal frameworks – are common across many rural protected areas in the post-Soviet space. Nevertheless, this study reveals an important positive dynamic: the presence of engaged local leaders, non-governmental organizations, and grassroots

initiatives. These actors represent a potential institutional "growth point" that can be activated with appropriate multi-level support – at the local, national, and donor levels. It is important to emphasize that the absence of comprehensive sustainability indicators – both ecological and social – complicates the regular assessment of ecotourism impacts. In this regard, the sustainability barometer framework proposed in the study may be adapted for broader application at the level of local administrations and protected area (PA) management. The findings reinforce the relevance of expanding the scope of ecotourism beyond flagship destinations and integrating "secondary" or underrepresented areas into national and regional strategies. Despite its remoteness, the "Kulun-Ata" Nature Reserve demonstrates significant potential to serve as a nodal center for local sustainable development, particularly given the persistent social vulnerability of southern Kyrgyzstan.

Therefore, ecotourism in the reserve should not be viewed as an isolated initiative but rather as part of a broader strategy for territorial resource redistribution, institutional renewal, and infrastructure decentralization. Without a systemic approach and support from both bottom-up and top-down levels, such initiatives risk remaining fragmented and short-lived.

CONCLUSION

This study provided a comprehensive assessment of the potential for sustainable ecotourism within the "Kulun-Ata" State Nature Reserve of the Kyrgyz Republic. The analysis, based on a combination of spatial modeling, questionnaire surveys, expert interviews, and field observations, identified several key findings of both theoretical and practical relevance.

The high ecotourism potential of the area is supported by its biogeographic diversity, cultural heritage, and favorable landscape-geographic conditions. The spatial suitability model revealed zones that meet the criteria for sustainable tourism with minimal anthropogenic pressure. The local population demonstrates a strong level of support for ecotourism initiatives, particularly regarding environmental and socio-cultural dimensions. However, moderate levels of institutional distrust and limited readiness for entrepreneurial engagement without external support persist. This highlights the need for mechanisms of accompaniment, capacity building, and coordination.

Institutional barriers remain a significant challenge for initiating ecotourism activities, including a lack of cross-sectoral coordination, regulatory ambiguity in buffer zone management, and limited involvement of local structures in decision-making. Nevertheless, the presence of interested stakeholders – such as non-governmental organizations and community-based groups – offers the potential to serve as intermediaries in transforming the governance model.

A lack of infrastructure remains a systemic constraint, necessitating the adoption of an adaptive, phased approach to development – beginning with short-distance routes, the establishment of guesthouses, and the training of local guides. It is essential to avoid large-scale, unregulated projects that could disrupt the fragile ecological balance of the area.

The use of Multi-Criteria Decision Analysis (MCDA) and the Sustainability Barometer enabled an objective assessment of current conditions and helped establish development priorities. This approach can be adapted as a tool for territorial planning and monitoring of ecotourism initiatives in other regions of Kyrgyzstan and Central Asia.

Ecotourism in the "Kulun-Ata" Nature Reserve holds potential to become a strategic vector for local sustainable development, provided there is institutional support, spatial integration, and active participation of the local population. The findings of this study contribute to the advancement of sustainable tourism concepts in peripheral areas and may inform the development of regional green economy programs and territorial planning strategies in post-Soviet countries.

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CINEMATIC ECONOMIES AND CULTURAL TOURISM LANDSCAPES: MACHINE LEARNING-BASED REVENUE PREDICTION IN BOLLYWOOD

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Abstract: For film-makers, producers, and investors, knowing and forecasting Bollywood box office receipts is important. Interactions between budget, genre, release date, number of screens, and critical acclaim determine box office results. Predicting domestic box office receipts for Bollywood releases between 2005 and 2022 is the goal of this study. In order to guide decisions about manufacturing and distribution, we also seek to determine the elements that most strongly influence commercial success. A data set of Bollywood films from 2005 to 2022 was assembled, comprising information on the budget, genre, number of screens, release date, critic ratings, cast metrics, and marketing indicators. Data pre-processing generated release-timing variables for holidays and seasons, encoded categories, and dealt with missing values. In order to avoid look-ahead bias, we employed a time-aware train/test split. Multiple linear regression, CART decision tree, random forest, and XGBoost were the models that were trained, and cross-validation was used to adjust the hyperparameters. Tree-based models' feature relevance and held-out data were evaluated using RMSE, MAE, and R-squared. In order to determine linear and monotonic associations, we also conducted Pearson and Spearman correlation studies. With the lowest RMSE and highest R-squared on the test set, XGBoost produced the best prediction performance. Random forest trailed closely after, outperforming both linear regression and single decision trees on nonlinear patterns. In correlation and importance studies, budget, screen count, and release date were consistently the best predictors. There were moderately positive correlations between genre and critical response, particularly for action and family films with higher review ratings. Although they differed per film, cast metrics and marketing variables provided additional explanatory power. The results indicate that while investing in components that enhance crucial reception, budget allocation and screen strategy should be prioritised around opportune release times. These findings suggest future research on global markets and social media signals and provide helpful advice for planning releases and investments.

Keywords: cultural tourism, Bollywood, revenue prediction, multiple linear regression, decision tree, random forest, XGBoost

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INTRODUCTION

The film industry, or the "motion picture industry," involves a complex network of cultural tourism with artistic and business activities that make movie-making possible. These activities include scriptwriting, casting, directing, filming, and editing. Independent filmmakers, production companies, and studios all play a role in the film production. After production, distributors work to get the film in front of audiences by setting it up with theatres, streaming services, and other venues. The final step is an exhibition, which is the last public screening of the film. This can occur in theatres, streaming services, or other venues. Bollywood is the informal name for the Hindi-language film industry in India, which produces the highest number of films annually, more than any other film industry in the world. Bollywood influences fashion, music, and social trends, and has great cultural significance in India. Bollywood movies are loved by people not only in India but also by the Indian diaspora worldwide. The Bollywood film industry is a fascinating blend of artistic expression and commercial success, a colourful tapestry of entertainment, culture, and storytelling. The industry captures the attention of viewers worldwide with its vibrant fusion of music, dance, drama, and passion. However, beneath the surface of glamour and glitz is a complex ecology driven by the relentless pursuit of box office success. Figure 1 contains the number of movies released per year. It is observed that there is a gradual decrease in the number of movies released in the theatre over time. There is a great dip in the graph that from 2020 and 2021, there are only 29 movies were released in theatres. It is due to the COVID-19 pandemic and lockdowns in India, without considering that in two years, an average of 64 Bollywood films are released in theatres.

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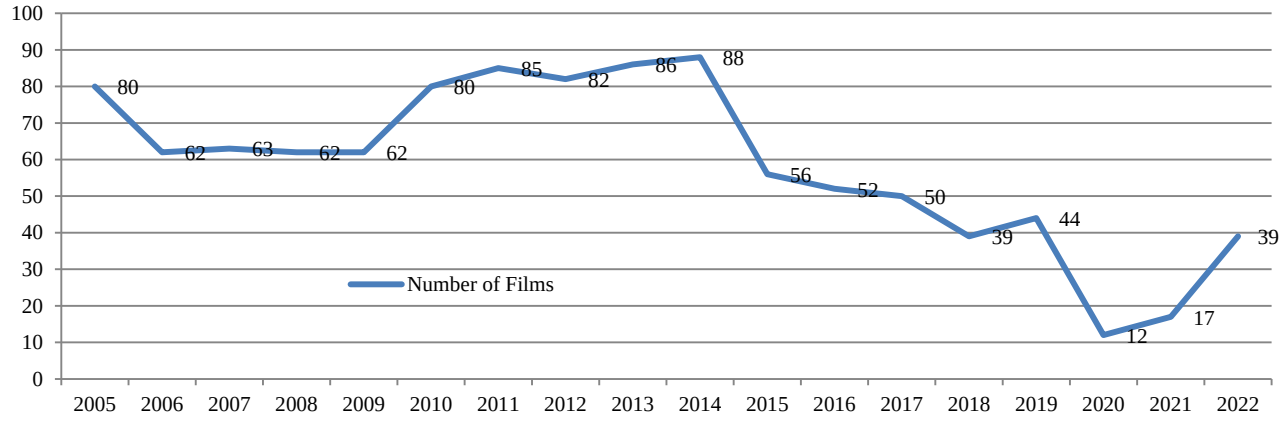


Figure 1. Number of movies during 2005-2022 (Source: Author's Calculation)

In recent years, the Indian film and television market has experienced significant growth. In 2020, despite the impact of the pandemic on the film industry, the overall box office of Indian films continued to rise (Figure 1). According to initial reports, 2023 could be a great year for Bollywood, as the Indian Box Office Collection (GBOC) is expected to exceed pre-pandemic levels and cross the ₹12,000 crore milestone. As box office revenue is crucial for measuring audience interest and a major source of income for future productions, the rise of Bollywood indicates not only its cultural influence but also its potential to lead the Indian film industry towards a brighter future. Table 1 demonstrates that India's box office income increased gradually from ₹66.80 billion in 2010-11 to ₹142.01 billion in 2019-20, with a small decline to ₹138.08 billion in 2020-21, suggesting general growth with small variations. Table 2 clearly demonstrates that Digital/OTT, Gaming, and Music saw consistent growth from 2019-20 to 2021-22. In contrast, TV, Printing, Films, Animation, Out-of-Home, and Radio experienced a precipitous decline in 2020-21, but started to bounce back in 2021-22. Digital sectors grew at a faster rate than any other.

Table 1. Box Office Revenue for the Indian Film Industry from the Financial Year 2010-11 to 2020-21(in billion Indian rupees) (Source: https://www.statista.com/statistics/316810/box-office-revenue-india/; Boxoffice Pro https://share.google/L79X6KxeWSloYNBPr)

Year	Box office revenue in billion Indian rupees	Year	Box office revenue in billion Indian rupees
2010-11	66.80	2016-17	111.06
2011-12	75.07	2017-18	113.07
2012-13	92.07	2018-19	123.07
2013-14	101.07	2019-20	142.01
2014-15	101.02	2020-21	138.08
2015-16	103.07		

Table 2. Performance Forecasting of Revenue (in billion) (Source: KPMG India Analysis 2020, Based on Primary and Secondary research, Published in Financial Express, 1st October 2020, p.1.; Boxoffice Pro https://share.google/L79X6KxeWSloYNBPr)

Source	2019-20	2020-21	2021-22
Digital and OTT	218	254	338
TV	778	708	769
Printing	306	188	296
Films	183	61	181
Animations	101	49	77
Gaming	90	99	143
Out of Home	31	16	28
Radio	25	12	17
Music	19	14	17

LITERATURE REVIEW

The prediction of movie revenue has garnered significant scholarly attention, with various approaches and influencing factors explored in the literature. Ahmad et al. (2020) conducted a comprehensive survey of machine learning techniques used in predicting movie revenues, highlighting the effectiveness of algorithms such as regression models, decision trees, and neural networks in forecasting box office performance. Social media has also emerged as a critical tool for prediction. Apala et al. (2013) explored how social media data could be leveraged to predict box office outcomes, finding that platforms like Twitter provided significant predictive power due to user-generated sentiments and buzz. In terms of economic modelling, Brewer et al. (2009) provided a robust blueprint for financial success in the U.S. film industry, emphasising factors such as marketing budget, genre, star power, and timing of release. Similarly, De Vany& Walls (1999) examined the uncertainty in movie revenue, noting that star power plays a significant role in reducing box office risk.

From a marketing perspective, product placement has been an effective promotional strategy. Chan et al. (2015) studied young adults' perceptions of product placement in films in the UK and Hong Kong, noting cultural differences in acceptance and effectiveness. De Gregorio & Sung (2010) also investigated consumer attitudes toward product placement, framing their findings within a consumer socializationframework. Indian cinema has also been explored from a global

perspective. Chitrapu (2012) analyzed the influence of Indian films in international markets, positioning them as tools of cultural diplomacy. Chon (2003) further contributed to this discourse by examining the global reception structure of popular films, emphasizing the role of cultural proximity and audience segmentation. The Central Board of Film Certification (CBFC) plays a pivotal role in the Indian film industry by regulating content and ensuring adherence to ethical standards (CBFC, 2016). Diwanji (2020) provided a statistical overview of the Indian film industry, presenting key trends such as rising revenues and digital distribution models. Branding within films has been increasingly utilized as a strategic tool. Ambwani (2014) described in-film branding as a win-win for both filmmakers and advertisers, noting its growing prevalence in the Indian market. Dutta& Bhatt (2017) provided a case analysis of the film *Dangal*, emphasizing how its cinematic elements aligned with competitive marketing strategies to enhance its commercial performance.

Eliashberg et al. (2006) provided a foundational overview of critical issues in the motion picture industry, covering marketing, distribution, and consumer behavior, while Eliashberg et al. (2007) introduced a novel method for evaluating movie scripts before production, shifting decision-making from intuition to data-driven assessments. Several studies have analysed box office prediction using statistical and machine learning models. Li & Liu (2022) applied machine learning techniques to forecast box office revenues, demonstrating their potential in capturing complex patterns. Similarly, Quader et al. (2018) compared seven machine learning algorithms for predicting movie success, while Zhang (2020) proposed an alternative forecasting model based on historical trends and performance metrics. Tang (2018) used both multiple regression and neural networks to model Chinese box office data, reinforcing the value of hybrid techniques. Hao (2023) also analysed influencing factors of film revenue, emphasizing variables like genre, marketing, and audience preferences. Studies have also explored the impact of sequels and brand strategies. Yong et al. (2013) applied signal and brand extension theory to show how successful movies enhance sequel performance. Kim (2019) examined brand extension strategies in the film industry, particularly how adaptations and sequels affect financial outcomes. Pokorny et al. (2019) analysed Hollywood sequels and found that sequels help manage financial uncertainty. Likewise, Wallace et al. (1993) investigated the economic value of star power, quantifying its influence on a film'ssuccess. In terms of broader industry trends, Hadida et al. (2021) discussed the competing logics between traditional Hollywood studios and streaming platforms like Netflix, signalling a shift in production and distribution norms. Hong & Lee (2010) also reflected on the cultural and commercial dynamics of sequels and remakes, illustrating differing audience perceptions.

Cultural and gender representation in cinema is another key area of interest. Ozen (2021) explored how representation evolved in Turkish cinema during the 1980s and 1990s. Gupta & Gupta (2013) examined the portrayal of social issues in Indian films, using Slumdog Millionaire as a case study to highlight cinema's social commentary role. Naik & Malpani (2019) discussed the challenges faced by regional cinema in India, focusing on Marathi films and the constraints of distribution and budget. Branding and marketing remain crucial to cinematic success. Sonal &Vandana (2011) compared in-film placement strategies in Bollywood and Hollywood, revealing differing integration styles and consumer engagement. Kohli et al. (2021) analysed how UK consumers engage with film brands, noting that films function as both artistic products and marketing tools. The KPMG-FICCI (2013) report emphasized the growing power of India'sentertainmentsector, driven by digitization and increasing audience reach. Several earlier empirical studies have shaped our understanding of box office drivers. Smith & Smith (1986) provided one of the first econometric analyses of film success, while Sochay (1994) built upon that by refining predictive models. Song & Han (2013) contributed to this tradition by focusing specifically on domestic films and their revenue determinants in the Korean context.

Al-Shiyab (2025) finds that films viewed on internet platforms greatly influence Jordanian viewers' perceptions of tourism spots: A large number of respondents mentioned that visually pleasing film depictions piqued their attention and created positive mental impressions of the trip. Ding and Haris (2025) state that governments, educators, and media professionals must work together to make sure that traditional art forms are accessible, relevant, and sustainable; that is, until they combine MCT with digital marketing, which is more effective than digital marketing alone. This is particularly true in the presence of high cultural awareness and government support. Gurdeep et al. (2021) believe that films in the UK are more than just a source of entertainment ; they are brands that influence customers' allegiance and sense of self through the emotional, symbolic, and sensory value they hold. More than just a one-time viewing experience, it shows that story worlds, characters, and marketing tie-ins boost customer engagement, turning films into long-term brand connections. Michael et al. (2019) suggest reasons why sequels profit from preexisting audiences, consistent demand, and established plot worlds include the fact that they considerably decrease financial uncertainty in the Hollywood film industry. The data also demonstrates that sequels are a useful tool for creative industries' risk management strategies, as they produce more consistent and larger profits than single films.

Finally, Schaefer & Karan (2015) highlighted the globalization of Bollywood, examining how Hindi cinema projects soft power and adapts to global markets, an extension of earlier analyses such as those by Chitrapu (2012) in the previous review. Films, according to the literature on diaspora and Bollywood, act as cultural conduits, shaping how communities outside view India. In addition to enjoying the entertainment value, research shows that diasporic populations often watch Bollywood to keep their cultural identity and emotional links to their home country alive. Further study indicates that Bollywood significantly influences people's travel motivations, since they aspire to visit the locations depicted in films, rather than merely rediscover their ancestral roots. Theorising on the connection between films and vacations has made use of concepts like "film-induced tourism," which emphasise how the media influences people's travel habits. By highlighting how diasporic audiences plan their trip experiences around Bollywood locations, the concept of "cinematic itineraries" contributes to this scholarship. All things considered, the literature presents Bollywood as a spatial and cultural force in the dynamics of diaspora-tourism (Nanjangud & Reijnders, 2020). Takhar et al.'s (2012) study of Bollywood and the diaspora has shown how films have the power to shape "diasporic consciousness" by constructing imagined identities that go beyond

geographical or legal constraints. Bollywood is a valuable cultural resource for British Sikhs because it promotes romantic ideals, highlights Indian heritage, and supports family values even in a diaspora. Academics have highlighted the ways in which Bollywood affects diasporic communities' everyday lives and the process of self-discovery through the globalisation and localisation of Indian cultural narratives. The concept of the "Indian imaginary" sums up the way young people in India absorb and navigate film-based concepts in their pursuit of a middle ground between modernity and tradition.

Studies have shown that Bollywood provides a hybrid setting where Eastern and Western views on courtship and marriage may coexist. The way that films like Kabhi Khushi Kabhie Gham (K3G) unite expatriates with a wider cultural family and foster a sense of "Indianness" is highlighted in literature on Bollywood's interactions with the diaspora. In contrast to previous Hindi films, K3G more clearly addresses the identity difficulties of Indians living outside, according to scholars. India's attempts to interact with its diaspora in the face of economic liberalisation and globalisation are reflected in the movie, which is viewed as a component of a larger cultural citizenship endeavour.

Studies highlight the emotional resonance of Bollywood's representational tactics with first-generation immigrants, strengthening their bonds with their own country. These studies collectively demonstrate Bollywood as a crucial location for negotiating identity, belonging, and symbolic nationhood in cross-border settings (Punathambekar, 2005).

Objectives of the Study

These insights offer valuable guidance for stakeholders in the film industry and contribute significantly to the development of predictive modeling in the context of cultural tourism in terms of Bollywood movie economics.

In line with this, the primary objectives of the study are twofold: first, to predict the box office revenue of Bollywood movies released between 2005 and 2022 using Machine Learning techniques; and second, to perform a correlation analysis to identify the key factors that influence box office performance.

Data Source

The data used in this paper was gathered from both the IMDB website and the Box Office India website. The study aimed to collect information on the box office revenue of Bollywood movies released between 2005 and 2022. Initially, we corrected around 1600 movie data entries and then removed films that had missing information. We excluded data from 2023 as the revenue details were not fully updated on the respective websites. Our dataset now includes observations from movies that were released theatrically and contains 16 variables, including year, runtime, number of screens, genre, IMDB ratings, budget (INR), revenue (INR), lead star, director, release period, new actor, whether franchise, whether remake, new director, and IMDB votes. Table 3 provides a concise explanation of the meaning of each variable used in film analysis, including but not limited to: duration, genre, screens, IMDb ratings/votes, release period, budget, revenue, and markers such as new actor, new director, franchise, and remake.

Table 3. Variable Description (Source: Author's Calculation)

Variable	Variable Explanation
Runtime	Duration of the movie (by min)
Genre	Type of Movie. Genres are classified into 13 different types. Action, Adventure, comedy, drama, fantasy, horror, masala, mythological, Rom-com, Romance, Sports, suspense, thriller
Number of screens	The total number of screens whereover released theatrically
IMDb Ratings	It's a rating method on a scale of 1 to 10. Calculated by taking an average of the ratings given by the members on the website.
IMDb Votes	The number of people who rated this movie
Release Period	Holiday or Normal day
Budget	The investment in the movie
Revenue	The specific amount of box office
New Actor	Whether the lead actor is new. Yes or No.
New Director	Whether the director of the film is new. Yes or No.
Whether Franchise	Is this a squeal or a continuation of a brand name? Yes or No.
Whether Remake	Yes or No.

METHODOLOGY

All the graphs, tables, and analyses are done using R 4.3.3, MS Excel, and IBM SPSS Statistics. By using Multiple Linear Regression, Decision Tree Analysis, as well as Random Forest, uses multiple decision trees to make precise predictions. Further, Extreme Gradient Boosting, also known as XGBoost, is a powerful machine learning technique that is widely recognized for its efficiency and accuracy in predictive modelling. In this paper, the performance of the forecasting models is assessed using 3 metrics: MAE, RMSE, and MASE. Lower values of these metrics indicate better performance of the model.

Analysis of Data

This dataset comprises 1059 Bollywood movies that were released in theatres between 2005 and 2022. The variables included in this dataset are Movie Name, Year, Run Time, Number of Screens, Genre, IMDB Ratings, Budget (INR), Revenue (INR), Lead Star, Director, Release Period, New Actor, Whether Franchise, Whether Remake, New Director, and IMDB Votes. Please note that this dataset only contains movies that were released through theatrical distribution. Table 4 states that the movie run time indicates a central tendency of around 130.9 minutes, with both the mean and median falling close together, suggesting a relatively balanced distribution. However, there's notable variability with a standard deviation

of 20.2 minutes, reflected in the range of 159 minutes from the shortest to the longest movie, and positive skewness indicating a slight right-leaning distribution. Moving on to the financial components, the budget data shows a significant central tendency, with a median of ₹123,040,000 and a mean of almost ₹403,720,398.7. But there is also a lot of variability around this central tendency, as seen by the enormous standard deviation of ₹728,796,821.7 and the broad range from ₹14,000 to ₹7,024,750,000. Given the vast standard deviation of 26198.67, which makes the distribution appear less prominent, the distribution has high kurtosis (239.37) and is substantially skewed to the right (skewness of 12.99), suggesting a significant concentration of ratings at the higher end of the scale.

Table 4. Descriptive Statistics (Source: Author's Calculation)

Parameters	Run Time	Number of Screens	IMDB ratings	Budget	Revenue	IMDB voting
Mean	130.90085	1001.137866	5.5752597	403720399	200380302	8831.898961
Standard Error	0.62093383	31.43928731	0.0457592	22395383	8197275.6	805.0655705
Median	131	650	5.7	123040000	100000000	2050
Mode	120	100	6.2	200000000	110000000	9
Standard Deviation	20.2066028	1023.106097	1.4891072	728796822	266758040	26198.66937
Sample Variance	408.306795	1046746.085	2.2174403	5.311E+17	7.116E+16	686370276.6
Kurtosis	0.40172444	1.196518989	-0.554541	23.130519	10.220285	239.3689276
Skewness	0.09615767	1.317669612	-0.276011	4.0626886	2.8224154	12.9971296
Range	159	4999	7.6	7.025E+09	2.1E+09	574122
Minimum	57	1	1.2	14000	60000	6
Maximum	216	5000	8.8	7.025E+09	2.1E+09	574128

Figure 2 shows the frequency of Bollywood movies in each of the 13 different genres from 2005 to 2022. Among the top 13 genres, the most common are drama, comedy, and thriller. The genre drama has the greatest number of films with some 345. The least common genres are adventure and mythological. Figure 3 shows the financial aspects of various genres in the entertainment sector. It includes information on the total revenue, total budget, average revenue, and average budget for each genre. The Bollywood producers spend more budget on the production of drama genre and action genre movies.

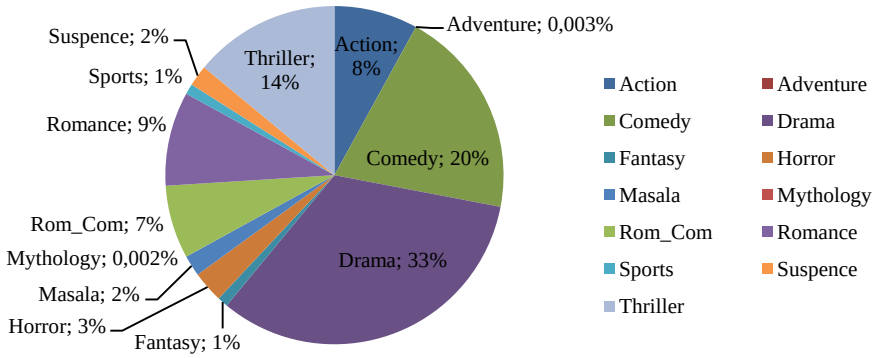


Figure 2. Frequency Distribution of Bollywood Movies Across 13 Different Genres from 2005 to 2022 (Source: Author's Calculation)

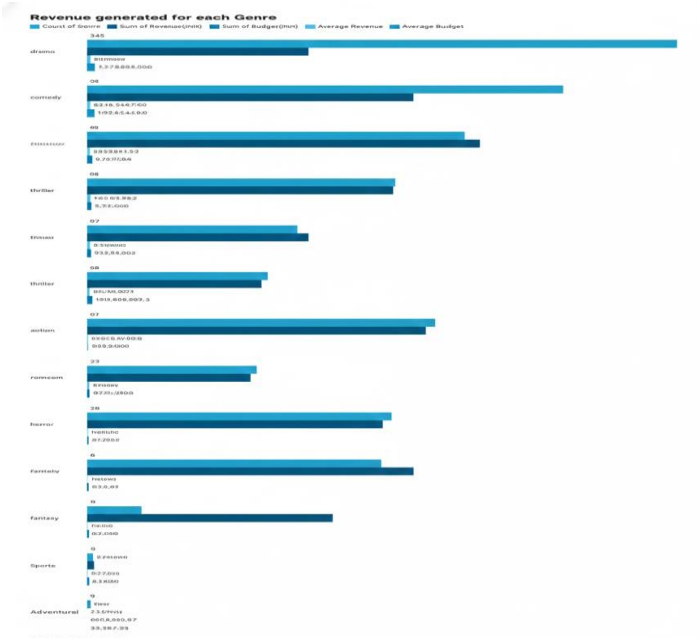


Figure 3. Bar Diagram of Total Revenue Generated in Each Genre (Source: Author's Calculation)

Drama has an average budget of 677,365,862.1 INR. Action movies have the highest average revenue, followed by Adventure and Animation. Comedy, Drama, and Fantasy movies also tend to have higher average revenue than the overall average. Genres like Thriller, Suspense, and Mythological movies have an average revenue around the overall average. Horror, Romance, Rom-Com, Masala, and Sports movies tend to have a lower average revenue than the overall average. Some movies within a genre will be much more successful than others. From Figure 3, there appears to be a strong positive correlation between budgets and the following genres: Action, Adventure, Fantasy, and Thriller. In Figure 3, this dataset, the Release period is classified into two categories: "Normal Day" and "Holiday".It simply indicates in which period the movie was released in theatre. The shows over the years during which most of the films were released. On normal days, most of the Bollywood films are released (Figure 4). There are 653 Bollywood films released on normal days and 406 films released on holidays. But the films released in the holiday period have mean revenue returns. Figure 5 shows the correlation coefficients between many variables. Each cell in the table shows the correlation between two variables. The color and size of the square represent the strength and direction of the correlation. Darker colors and larger squares indicate stronger correlations. Correlation values range from -1 to 1. A value of 1 means a perfect positive correlation (as one variable increases, so does the other), a value of -1 means a perfect negative correlation and a value of 0 means no correlation.

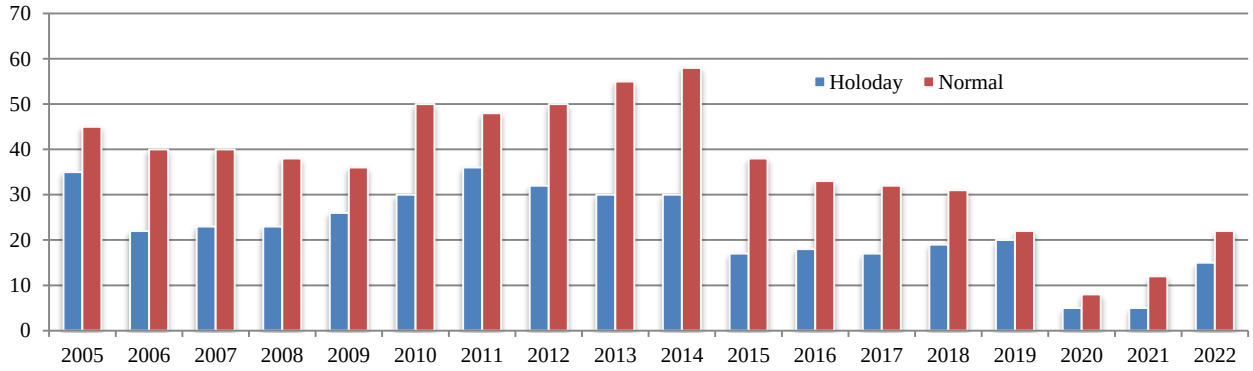


Figure 4. Release Period of Films from 2005 to 2022 (Source: Author's Calculation)



Figure 5. Correlation Plot (Source: Author's Calculation)

MODEL ANALYSIS

Model 1: Multiple Linear Regression

In total, 1059 movie data from the IMDb website and Box-Office India website are used for the analysis. Multiple linear regression is used to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. We employed a multiple regression model to forecast the box office receipts, and it was:

$$\text{Revenue.INR}=\beta_0+\beta_1\times\text{Run.Time}+\beta_2\times\text{Number.of.Screens}+\beta_3\times\text{Genreaction}+\beta_4\times\text{GenreAdventure}+\beta_5\times\text{Genrecomedy}+\beta_6\times\text{Genredrama}+\beta_7\times\text{Genrefantasy}+\beta_8\times\text{Genrehorror}+\beta_8\times\text{GenreMasala}+\beta_{10}\times\text{Genremythological}+\beta_{11}\times\text{Genrerom_com}+\beta_{12}\times\text{GenreRomance}+\beta_{13}\times\text{GenreSports}+\beta_{14}\times\text{Genresuspense}+\beta_{15}\times\text{Genrethriller}+\beta_{16}\times\text{IMDB.Ratings}+\beta_{17}\times\text{Budget.INR}+\beta_{18}\times\text{Release.Period.Normal}+\beta_{19}\times\text{Release.Period.Holiday}+\beta_{20}\times\text{New.Actor}+\beta_{21}\times\text{New.Director}+\beta_{22}\times\text{Whether.Remake}+\beta_{23}\times\text{Whether.Franchise}+\varepsilon$$

Where: Revenue INR is the predicted revenue in Indian Rupees. *B0, ß1, ß2..., ß23* are the regression coefficients corresponding to each predictor variable. Run Time, Number of Screens, Genre action, Genre Adventure, Genre Comedy,

Genre drama, Genre fantasy, Genre horror, Genre Masala, Genre mythological, Genre romcom, Genre Romance, Genre Sports, Genre suspense, Genre thriller, IMDB Ratings, Budget INR, Release period Normal, Release Period Holiday, New Actor, New Director, Whether Remake, whether franchise are the predictor variables used in the model.

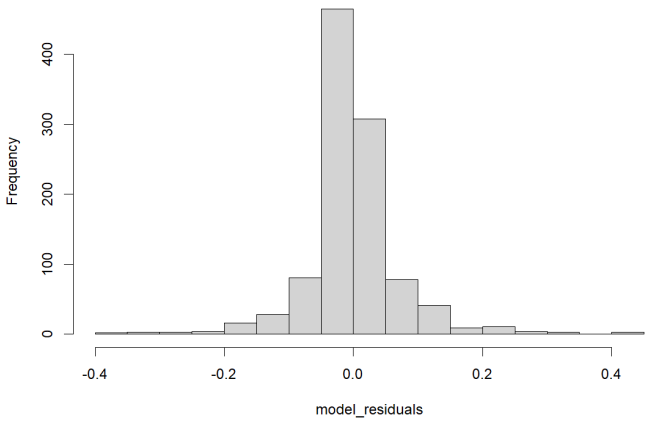


Figure 6. Histogram of Model Residuals (Source: Author's Calculation)

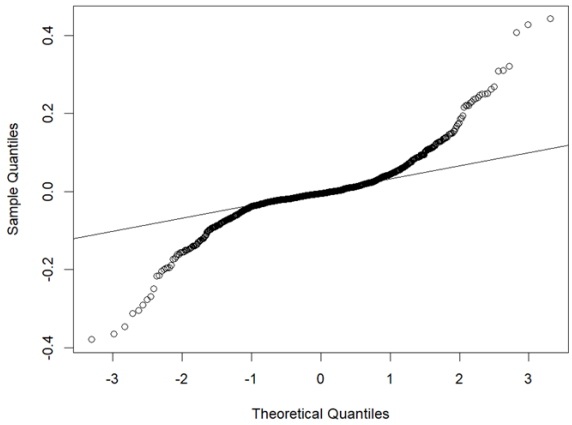


Figure 7. Normal Q-Q Plot

This is a histogram showing model residuals (Figure 6). It displays the distribution of residuals around zero, with values ranging from -0.4 to 0.4. The histogram looks like it is skewed to the center. From the Q-Q plot (Figure 7), we can observe that a few portions of the residuals lie in a straight line. Then we can assume that the residuals of the model do not follow a normal distribution. The assumption of multicollinearity has been checked.

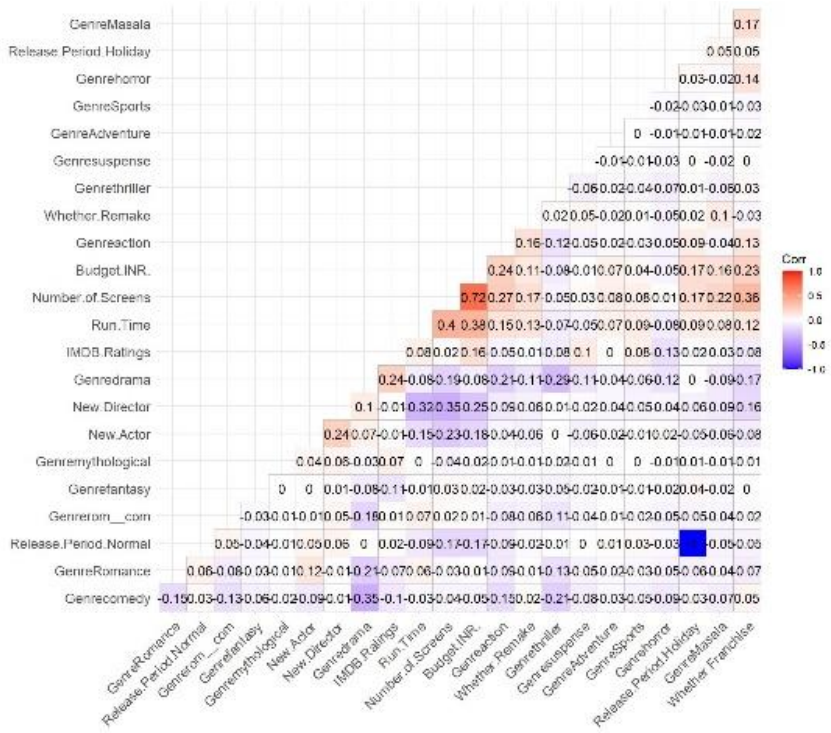


Figure 8. Correlation Matrix (Source: Author's Calculation)

There is a strong positive correlation 0.72 (Figure 8) between "Number of Screens" and "Budget INR.", indicating that movies with higher budgets tend to have more screens. There is a moderate positive correlation (0.36) between "Number of Screens" and "Whether Franchise", suggesting that movies with more screens are more likely to be part of a franchise. Run Time and Number of Screens: There is a moderate positive correlation (0.40) between the duration of the movie ("Run Time") and the number of screens it's shown on ("Number of Screens"). This suggests that longer movies tend to be shown on more screens, which might indicate higher demand or popularity. The correlations between different genres and other variables vary. For example, there is a weak positive correlation between "Run Time" and "Genre Action" (0.15), suggesting that action movies tend to have slightly longer run times, there is a moderate negative correlation between "Genre Comedy" and "Genre Drama" (-0.35), indicating that movies classified as comedy are less likely to be classified as drama, and vice versa. IMDB Ratings and Budget INR.: There is a weak positive correlation (0.08) between IMDb ratings and budget, suggesting that movies with higher budgets may tend to have slightly higher IMDb ratings. Release Period:

There are weak correlations between release period variables ("Release Period Normal" and "Release Period Holiday") and other variables, suggesting that release periods might not have a strong linear relationship with other factors in the dataset. Franchise and Remake Status: There is a moderate positive correlation (0.36) between "Number of Screens" and "Whether Franchise", indicating that movies associated with a franchise tend to be shown on more screens. There is a weak positive correlation (0.13) between "Whether Franchise" and "Whether Remake", suggesting that movies associated with a franchise might be more likely to be remade. New Director and New Actor: There are weak negative correlations between "New Director" and "Number of Screens" (-0.35) and "Budget INR." (-0.25), indicating that movies with new directors may tend to have fewer screens and lower budgets. There are also weak negative correlations between "New Actor" and "Number of Screens" (-0.23) and "Budget INR" (-0.18), suggesting a similar pattern for movies with new actors. Table 5 shows the results of the regression model are shown in the table. The model is statistically significant (Sig = 0.001), and it explains a considerable percentage of the variation, as seen by the strong overall fit (F = 96.101).

Table 5. ANOVA Table(a. Dependent Variable Revenue INR) (Source: Author's Calculation)

Model		Sum Square	df	Mean Square	F	Sig
1	Regression	11.278	21	.537	96.101	(0.001b
	Residual	5.795	1037	.006		
	Total	17.073	1058			

Table ANOVA Table

The regression model has a sum of squares of 11.278 with 21 degrees of freedom, resulting in a mean square of 0.537. The F-value of 96.101 is highly significant with a p-value of less than 0.001. This suggests that the independent variables included in the regression model collectively have a significant impact on the dependent variable, Revenue (INR). In simpler terms, the regression model can explain a substantial amount of the variability in Revenue (INR) based on the predictors included in the analysis. Residuals in the context of ANOVA represent the differences between the observed values and the values predicted by the regression model. In this specific analysis, the residual sum of squares is 5.795 with 1037 degrees of freedom, resulting in a mean square of 0.006. This indicates the average squared difference between the observed values and the values predicted by the model. Lower residual values suggest that the model fits the data well, while higher residuals may indicate that there are unexplained variations in the data that the model does not account for. In this case, the relatively low residual value of 5.795 suggests that the regression model is effective in explaining the variability in the dependent variable, Revenue (INR).

The model demonstrates a multiple correlation coefficient (R) of 0.813, indicating a strong linear relationship between the predictor variables and the response variable. The R-squared value is 0.661, meaning that approximately 66.1% of the variability in the response variable is explained by the predictors included in the model. This suggests a reasonably good fit.

To account for the number of predictors and avoid overestimating the model's explanatory power, the Adjusted R-squared is reported as 0.654, offering a more conservative estimate of model performance. The Standard Error of the Estimate is 0.07475, representing the average distance that the observed values fall from the regression line, and thus reflects the typical size of the residuals. Additionally, the Mean Squared Residual is 0.00527, which quantifies the average squared difference between the observed and predicted values, further supporting the model's accuracy.

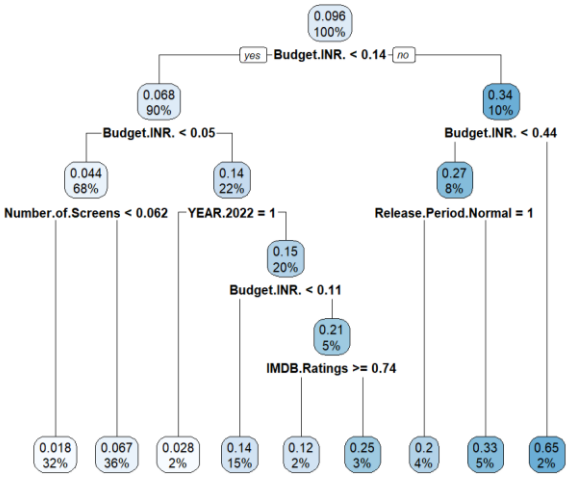


Figure 9. Decision Tree Illustration (Source: Author's Calculation)

Model 2: Decision Tree

This decision tree (Figure 9) categorizes movies based on several factors: Number of screens, Budget, Release period, and IMDb rating. The leftmost branch denotes films with fewer than 0.062 screens (representing a specific percentile of 2022 releases), while the rightmost branch indicates movies with 0.062 screens or more. a potential breakdown of how the decision tree operates, moving from left to right: If screens are under 0.062, the movie is labelled as a standard runtime film (run period = 1) with a 0.22 probability. For screens under 0.062, the movie might also be tagged as having a high IMDB

rating (IMDB Ratings >= 0.74) with a 0.15 probability or a low budget (Budget (INR) < 0.11) with a 0.21 probability. When screens are under 0.05, the film is classified as a very low-budget movie (Budget (INR)< 0.14) with a 0.9 probability. For screens between 0.05 and 0.044, the film is labelled as a low-budget movie (Budget (INR) < 0.44) with a 0.8 probability. If screens are 0.062 or more but less than 0.14, the film is considered a low-budget movie (Budget (INR) < 0.14) with a 0.68 probability. For screens between 0.14 and 0.27, the film is categorized as a medium-budget movie (0.14 <= Budget (INR) < 0.44) with a 0.8 probability. The model's predictive performance is summarized by an RMSE of 0.0889, an MAE of 0.0514, and an R-squared value of approximately 0.474.

Residual Summary

The value of 0.088949919 is the root mean square error, or RMSE. The discrepancy between the actual values and the values the model predicted is measured by the Root Mean Square Error (RMSE). The average difference between the model's predictions and the real values in this instance is 0.089 units. A model's performance improves with a decreased root mean square error. This is 0.051368087, the mean absolute error. No matter which way the forecasts are oriented, the MAE calculates the average magnitude of the mistakes in the collection. Each difference is given equal weight, and the result is the average of the absolute differences between the actual observation and the forecast over the test sample. Thus, the model's average deviation from the genuine values is around 0.051 units. The predicted and actual revenue is plotted (Figure 10).

R-squared is 0.473540694 in this case. The percentage of the dependent variable's variation that can be predicted from the independent variable(s) is measured by R-squared, sometimes referred to as the coefficient of determination. It shows the goodness of fit, or how well the data fit the regression model. With an R-squared of 0.473540694, the model accounts for around 47.35% of the variability in the outcome variable. The figure compares actual and predicted revenue.

The x-axis represents the index or sequence of the data points. The y-axis represents the revenue. It shows the actual and predicted revenue values. The blue line represents the actual revenue. Each point on this line corresponds to the actual revenue value for a particular data point. The red line represents the predicted revenue. Each point on this line corresponds to the revenue value predicted by the model for a particular data point. Where the blue and red lines are close together, the model's predictions are close to the actual values, indicating good performance. Where the blue and red lines diverge, the model's predictions are far from the actual values, indicating errors in the prediction.

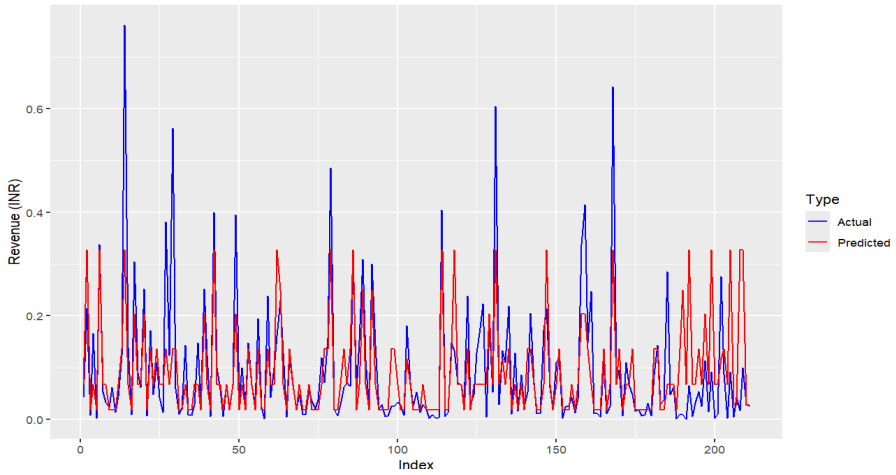


Figure 10. Predicted vs Actual Revenue (Source: Author's Calculation)

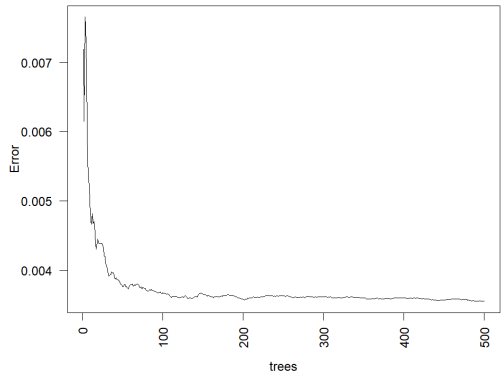


Figure 11. Fitting of Random Forest Model (Source: Author's Calculation)

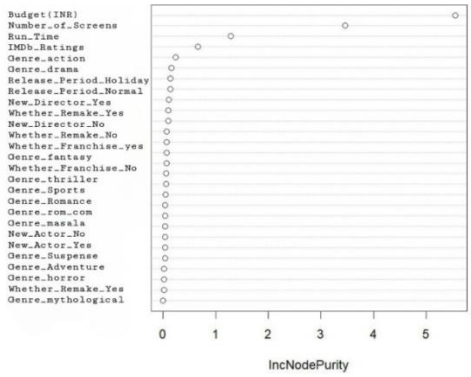


Figure 12. Variable Importance

Model 3: Random Forest

The number of trees in the forest (x-axis) in Figure 11 is probably plotted against a performance parameter, such as mean squared error (y-axis). The model's fit to the training set becomes better as the number of trees rises, eventually reaching an ideal level. The significance of the various variables (or features) included in the model is ranked in Figure 12.

The degree to which a variable's data permutation reduces the model's prediction accuracy indicates how important the variable is. Therefore, a greater decline in accuracy indicates the significance of the variable. The variables in this figure are ordered of relevance from top to bottom. At the top is the variable that matters the most. According to both figures, Budget, and number of screens have more importance in the prediction of the value. According to the information provided in the table 6, the random forest model (which consists of 500 trees) is doing well. It accounts for almost 70 percent of the variance and achieves a very low mean squared error, which suggests that it has a high degree of predictive accuracy.

Table 6. Model Summary (Source: Author's Calculation)

Random Forest Regression Results	
Type of random forest	Regression
Number of trees	500
No. of variables tried at each split	13
The mean of squared residuals	0.00313781377293783
% Variance explained	70.49%

The X-axis represents the number of trees in the forest. The y-axis represents the minimal depth (Figure 13). This refers to the shallowest level at which a variable is used to split the data in a tree. A lower minimal depth indicates that the variable is informative and can be used to make important splits earlier in the tree. Bars: The height of each bar shows the number of trees where a variable was used for splitting at a specific minimal depth. Vertical line: This line indicates the average minimal depth across all trees in the forest for each variable. Looking at the bar heights for a particular variable across the X-axis shows how many trees used that variable to split at each minimum depth level. In general, variables that are consistently used for divisions at shallower depths tend to be more important to model predictions.

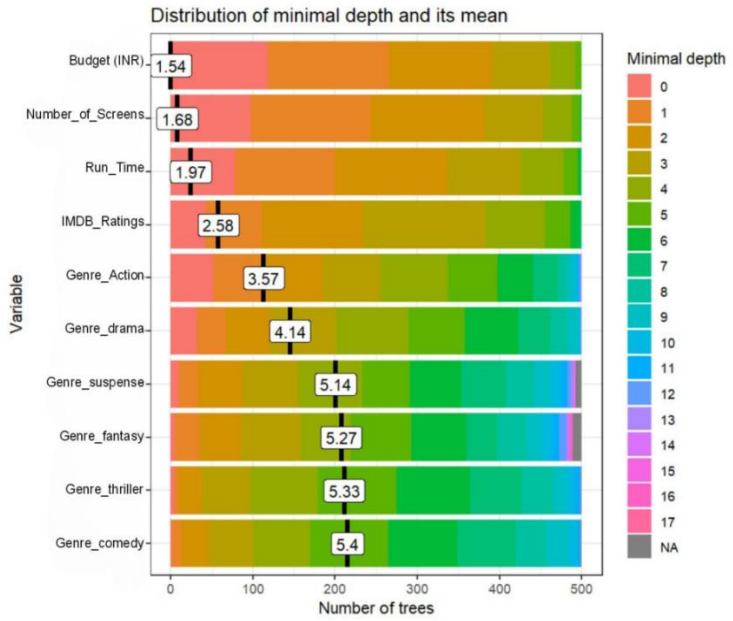


Figure 13. Distribution of Minimal Depth (Source: Author's Calculation)

Figure 14 is a variable importance graph that illustrates the importance of each feature to the model's predictions. In this Figure, the most important features are "node purity increase" and "mean min depth", which contribute most to predicting the value of "p-value". The features are ranked by importance, with the most important feature at the top and the least important feature at the bottom. The height of the bar represents the importance of the feature. The features on the left side of the plot are more important than the features on the right side of the plot. The correlation between each feature and "p value" is displayed next to the corresponding feature name. For instance, there is a very strong positive correlation (0.909) between "node purity increase" and "p-value". In addition to scatter plots and correlation coefficients, a density estimate is included for each importance measure. The value of the Mean Absolute Error (MAE) is 0.038974439. Without taking into account their direction, this is a measurement of the average size of the mistakes in a set of forecasts. It is the mean, with each difference carrying equal weight, of the absolute differences between the observed and predicted values over the test sample. The forecasts are more accurate the closer this is to 0. The model appears to be quite accurate based on its low MAE.The mean square error, or MSE, is 0.005131229. This measurement represents the average squared difference between the estimated and actual values, which is the average of the squares of the errors. The squared error loss's anticipated value is represented by the risk function known as MSE. MSE is nearly 0, indicating good accuracy for the model. R-squared: With an R-squared of 0.704987204, the model can account for almost 70% of the variation in the dependent variable. The percentage of a dependent variable's variation that can be accounted for by an independent variable or variables in a regression model is expressed statistically as R-squared. Hence, if a model's R2 value is 0.70, its inputs can account for around 70% of the variation in the data.

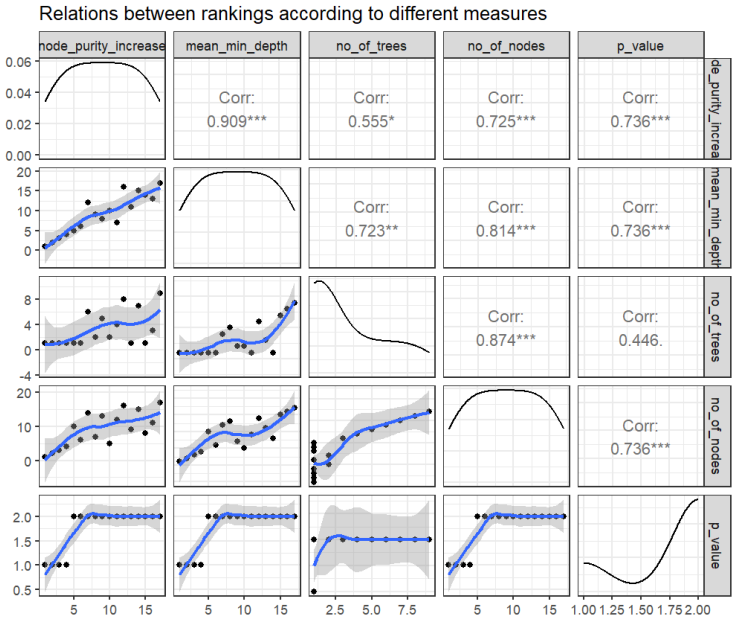


Figure 14. The relation between the rankings of different measures (Source: Author's Calculation)

Actual vs Predicted Value Graph

The actual and expected revenue amounts are displayed in Figure 15. The real revenue is shown by the blue line. The expected revenue is shown by the red line. Every point on this line represents the revenue value that the model projects for a certain data point. The model is doing well when the blue and red lines are closely apart from one another, showing that the predictions are close to the actual values. The model's predictions are far from the actual values where the blue and red lines diverge, suggesting prediction errors. The figure shows that the red and blue lines are often near together, but there are some places where they are not.

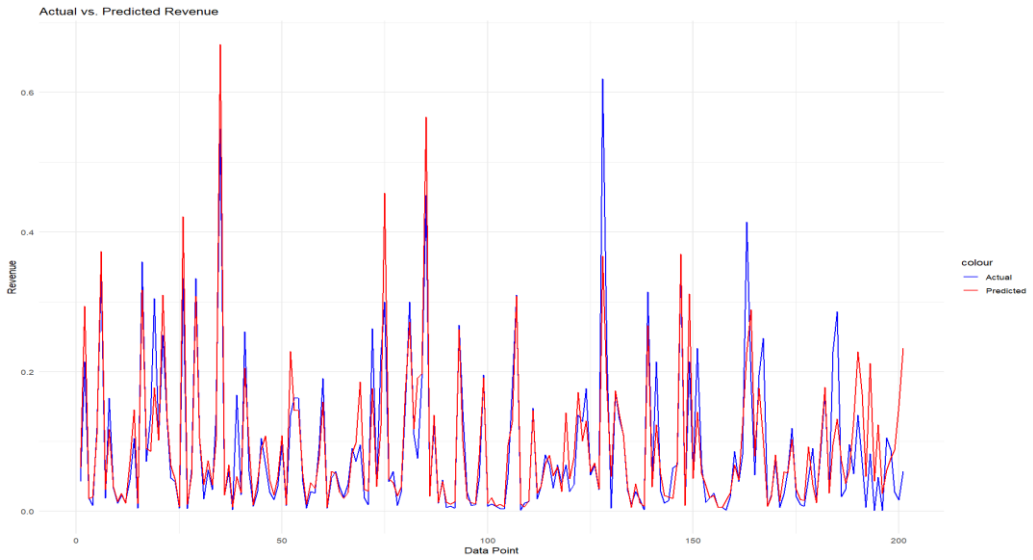


Figure 15. Actual and Predicted Graph (Source: Author's Calculation)

Model 4: XGBoost

Figure 16 appears to be a Normal Q-Q Plot. This type of plot is used to visually check if data is normally distributed. The x-axis represents the theoretical quantiles. This means what the data should follow if they were normally distributed. The y-axis represents the actual data's quantiles. The points on the plot are pairs of actual and theoretical quantiles. The straight line in the plot represents where our data should lie if they were normally distributed. From the Figure, we can see that most of the part lies in a straight line. The significance of the various variables (or features) included in the model is ranked in Figure 17.

The degree to which a variable's data permutation reduces the model's prediction accuracy indicates how important the variable is. Therefore, a greater decline in accuracy indicates the significance of the variable. The variables in this figure are ordered by relevance from top to bottom. At the top is the variable that matters the most. According to the figure, the Budget and the number of screens have more importance in the prediction of the value. The RMSE of the model is 0.0528, which measures the average magnitude of the error between predicted and actual values. A lower RMSE indicates better predictive accuracy. In this case, the low RMSE suggests that the model's predictions are generally close to the actual values.

The MAE is 0.0289, representing the average absolute difference between the predicted and actual values. Like RMSE, a lower MAE reflects higher forecasting accuracy. This value indicates that, on average, the model's predictions deviate only slightly from the observed values. The model has an R-squared value of 0.8235, meaning it explains approximately 82.35% of the variance in the dependent variable. R-squared indicates the proportion of variability in the outcome variable that can be explained by the predictor variables in the model. Thus, the model demonstrates strong explanatory power.

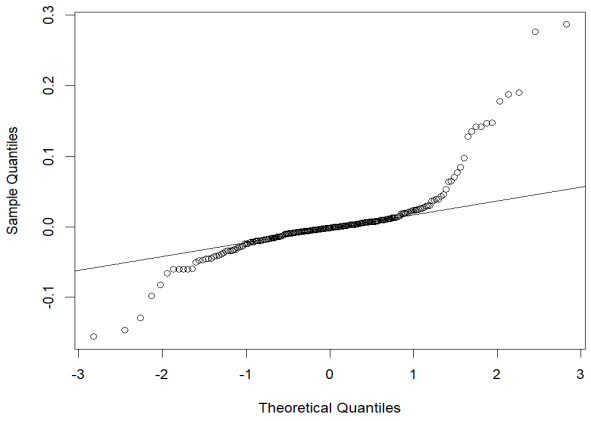


Figure 16. Normal Q-Q plot of XGBoost (Source: Author's Calculation)

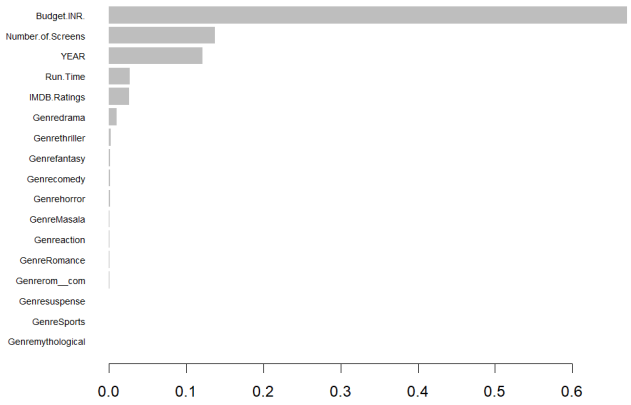


Figure 17. Variable Importance plot

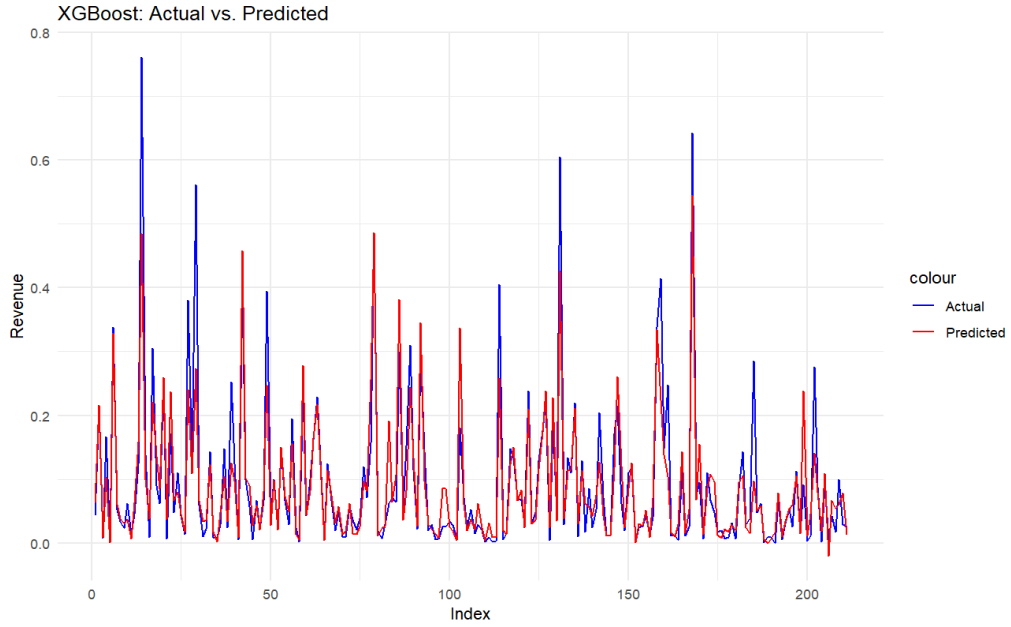


Figure 18. XGBoost Actual vs Predicted Revenue (Source: Author's Calculation)

The data points' index or sequence is shown on the x-axis. The revenue is shown on the y-axis (Figure 18). It displays the expected and actual income figures. The real revenue is shown by the blue line. The real revenue value for each data point is represented by a point on this line. The expected revenue is shown by the red line. Every point on this line represents the revenue value that the model projects for a certain data point. The model is doing well when the blue and red lines are closely apart from one another, showing that the predictions are close to the actual values. The model's predictions are far from the actual values where the blue and red lines diverge, suggesting prediction errors.

RESULT AND DISCUSSION

To anticipate the box office receipts of Bollywood films, we experimented with four distinct models. According to Table 7, XGBoost is the best-performing model out of all the models that were assessed. Random Forest, Multiple Linear Regression, and Decision Tree are the next best models. The volatility in Bollywood box office receipts may be explained by the multiple linear regression model to the tune of about 66.06%. When compared to more sophisticated models, it predicts revenue rather well, but it might not fully represent the intricacy of the data.

With an R-squared value of 0.4735, the decision tree model demonstrates sufficient performance, explaining around 47.35% of the variance in box office receipts. When compared to other models, it shows more mistakes, which might indicate overfitting or a failure to fully capture the underlying relationships. With an R-squared value of 0.7050, which indicates that it explains almost 70.50% of the variance in box office sales, the random forest model performs qu ite well. Out of all the models, it has the lowest RMSE, indicating strong prediction skills and applicability for intricate datasets.

With the greatest R-squared value of 0.8235, which indicates good explanatory power and captures about 82.35% of the variation in box office receipts, the XGBoost model beats the other models. Its low RMSE and MAE further demonstrate its exceptional prediction accuracy and ability to capture nonlinear interactions

Table7.Comparison Table of different models (Source: Author's Calculation; Boxoffice Pro https://share.google/L79X6KxeWSloYNBPr)

No.	Model	RMSE	MAE	R-Squared
1	Multiple Linear Regression	0.056016	0.035279	0.6605694
2	Decision Tree	0.08895	0.051368	0.47354069
3	Random Forest	0.005131	0.038974	0.7049872
4	XGBoost	0.052786	0.028868	0.82351306

CONCLUSION

As box office revenue is crucial for measuring audience interest and a major source of income for future productions, the rise of Bollywood indicates not only its cultural influence but also its potential to lead the Indian film industry towards a brighter future. Moving on to the financial components, the budget data shows a significant central tendency, with a median of ₹123,040,000 and a mean of almost ₹403,720,398.7. But there is also a lot of variability around this central tendency, as seen by the enormous standard deviation of ₹728,796,821.7 and the broad range from ₹14,000 to ₹7,024,750,000. Given the enormous standard deviation of 26198.67, which makes the distribution appear less prominent, the distribution has high kurtosis (239.37) and is substantially skewed to the right (skewness of 12.99), suggesting a significant concentration of ratings at the higher end of the scale. Drama has an average budget of 677,365,862.1 INR. Action movies have the highest average revenue, followed by Adventure and Animation.

Comedy, Drama, and Fantasy movies also tend to have higher average revenue than the overall average. Genres like Thriller, Suspense, and Mythological movies have an average revenue around the overall average.

Horror, Romance, Rom-Com, Masala, and Sports movies tend to have a lower average revenue than the overall average to anticipate the box office receipts of Bollywood films, we experimented with four distinct models. XGBoost is the best-performing model out of all the models that were assessed. Random Forest, Multiple Linear Regression, and Decision Tree are the next best models. The volatility in Bollywood box office receipts may be explained by the multiple linear regression model to the tune of about 66.06%. When compared to more sophisticated models, it predicts revenue rather well, but it might not fully represent the intricacy of the data. Filmmakers, producers, and investors can utilize these predictive models to make informed decisions and optimize resource allocation for maximizing box office returns. Future research could focus on incorporating additional features such as star value, Director value, Month of release, etc., exploring ensemble techniques, and refining models to further enhance predictive accuracy and robustness.

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INTEGRATED UAV, GNSS AND GPR METHODS FOR KARST TERRAIN ANALYSIS IN AN ARID REGION: A CASE STUDY FROM THE SAURA VALLEY, WESTERN KAZAKHSTAN

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Abstract: Karst processes have a significant impact on the formation of the relief in the Mangystau region (Western Kazakhstan), where arid climatic conditions and the predominance of carbonate rocks contribute to the development of both surface and subsurface karst forms. The aim of this study is the identification of potential geohazards in the Saura Valley (Mangystau region) through an integrated surface and subsurface investigation method. The methodological framework combines high-resolution photogrammetry using an unmanned aerial vehicle (UAV), GNSS georeferencing, and low-frequency ground-penetrating radar profiling. UAV surveys with the Autel EVO II RTK Pro (V3) produced orthophotomaps and a digital elevation model (DEM), which formed the basis for detailed morphometric analysis. Subsurface investigations using the GPR Zond Aero LF identified three distinct loosening zones that coincided with structural faults. GNSS measurements with the SOUTH Galaxy G9 receiver ensured centimeter-level spatial accuracy across all datasets. The collected data were integrated and analyzed within a GIS environment to establish spatial correlations between surface morphology, geophysical anomalies, and tectonic structures. The results confirm the structurally controlled nature of karst development and demonstrate the effectiveness of an integrated approach for detecting potentially unstable karst zones in arid environments. Geotourism represents a promising direction for the rational use of karst terrains, offering scientific, aesthetic, and recreational benefits. However, the environmental vulnerability of karst terrains requires a balanced approach to tourism development, incorporating long-term monitoring and planning to preserve their natural integrity.

Keywords: Karst terrain, arid regions, morphometric analysis, lineaments, Saura Valley

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INTRODUCTION

Karst landscapes are the result of long-term chemical weathering and dissolution of soluble rocks, such as carbonates (limestones, dolomites) and evaporites, leading to distinctive surface and subsurface features including sinkholes, dolines, caves, and karst valleys. The dominance of dissolution processes over mechanical erosion gives rise to complex morphologies and hydrological dynamics that pose significant geohazards, particularly in regions affected by structural deformation and groundwater flow variability (Gutiérrez et al., 2014; Potapova & Bekkuliyeva, 2010a).

In recent years, there has been growing international interest in applying high-resolution remote sensing and geophysical methods to the analysis of karst terrain. UAV-based photogrammetry, GNSS positioning, and ground-penetrating radar (GPR) are increasingly used to detect, map, and characterize karst landforms and subsurface voids with high spatial accuracy (Gutiérrez et al., 2011; Siart et al., 2009; El Hameedy et al., 2023; Ebraheem & Ibrahim, 2019; Moslemi et al., 2023). These technologies have proven particularly effective in humid and temperate regions (Diercks et al., 2023; Tallini, 2006; La Salandra, 2022; Öztürk et al., 2025), yet their application in Central Asian arid karst systems remains limited. Arid environments introduce specific challenges for karst development and detection, including low precipitation, sparse vegetation, and limited surface water, which often mask subsurface instability (Large & Heritage, 2009; Al-Rawabdeh et al., 2016; Theilen-Willige et al., 2014).

The Mangystau region in western Kazakhstan is one such arid zone, characterized by a unique geological setting dominated by fractured Neogene limestones and marl interlayers. Despite evidence of extensive karst formation, including sinkholes, collapsed depressions, and shallow caves, the region remains understudied using modern geospatial and geophysical techniques. Most prior investigations, particularly those conducted during Soviet-era geological surveys, lacked the resolution and precision required to fully assess karst morphometry or subsurface structure (Potapova & Bekkuliyeva, 2010b; Iskakov, 2019; Aliyev, 2015). The first specialized work on the karst of Ustirt and Mangystau was authored by geomorphologist Yu.Ya. Kuznetsov, who highlighted the wide development of surface and underground karst

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formations in the desert region (Kuznetsov, 1965). The Saura valley in the Mangystau region provides an optimal setting for advanced karst investigations, characterized by pronounced surface deformation, steep erosional slopes, and a partially water-filled depression indicative of active subsurface karstification. Beyond its geomorphological importance, the site attracts increasing numbers of tourists, raising concerns about slope stability and public safety. These conditions make Saura a representative case study for assessing geohazards in arid karst environments.

The karst processes observed in the Saura valley show significant similarities with karst systems in arid regions of other countries. Comparative analysis suggests that the karst valley Saura has a number of common geological and hydrological characteristics with western Iran and Saudi Arabia. The study by Ghadimi et al., emphasizes that karst formation in western Iran is associated with seasonal moisture, mainly due to snowmelt and episodic rainfall, which is also typical for the conditions of Saura (Ghadimi et al., 2022). A similar situation is observed in Saudi Arabia, where karst forms develop in a hyper-arid climate. According to Youssef et al., the presence of easily soluble rocks (carbonates and evaporites) in combination with natural and anthropogenic factors leads to the widespread occurrence of sinkholes and soil instability (Youssef et al., 2016).

Karst terrains represent one of the most challenging environments for engineering, mining, and construction activities due to their highly heterogeneous subsurface structures. The presence of cavities, sinkholes, and dissolution zones often leads to severe geotechnical hazards, including ground subsidence and structural failure. Therefore, the application of advanced geophysical methods plays a crucial role in improving the reliability of karst mapping and in mitigating risks associated with subsurface instability. Among these methods, Ground Penetrating Radar (GPR) has proven to be particularly effective for detecting near-surface structural anomalies that may otherwise remain undetected.

The ability of GPR to provide high-resolution imaging makes it valuable not only for mapping subsurface cavities but also for supporting accident prevention (Yalcin, 2025). In the context of risk assessment and monitoring of karst areas in arid zones, the use of remote sensing methods seems relevant. In the study of Aigner et al., detailed mapping of sinkholes in arid areas of the Mangystau region (Kazakhstan) was carried out using open satellite data. Geospatial analysis revealed spatial relationships between karst sinkholes, takyrs, vegetation cover and potential surface runoff, which opens up new opportunities for early diagnosis of karst risks in conditions of limited water supply (Aigner et al., 2025).

The aim of this study is identification of potential geohazards in the Saura Valley (Mangystau region) through an integrated surface and subsurface investigation methods. We used UAV-based digital elevation modeling, GNSS ground control, and low-frequency GPR profiling to: Generate a detailed DEM; Detect zones of subsurface soil loosening and void development; Analyze the spatial correlation between geomorphic features and structural lineaments. The integrated use of UAV, GNSS, and GPR technologies enables accurate identification and spatial analysis of karst-related features in arid landscapes, offering significant advantages for geohazard assessment and long-term monitoring in data-scarce regions.

STUDY AREA

The study was conducted in the Saura Valley, located in the northwestern part of the Mangystau region of western Kazakhstan. This region lies within an arid climatic zone between the Caspian and Aral Seas and is characterized by predominantly desert landscapes. The Saura Valley is situated approximately 90 km northeast of the city of Aktau and represents a distinct karst-erosional depression within a geologically and geomorphologically complex setting (Figure 1). Due to its unique geological formations, nature contrast, and relative accessibility from the city of Aktau, the Saura has become a popular destination for domestic and international tourists, including hikers, and nature photographers.

The valley exhibits a semi-circular planform bounded by steep escarpments and is defined by a range of surface karst features, including sinkholes, collapsed blocks, and erosional scarps. Particularly on the right slope of the valley, debris flow and landslide processes are active, with individual rock fragments reaching up to 5 meters in diameter. These features indicate ongoing gravitational instability exacerbated by lithological variability and precipitation events.



Figure 1. Overview map of the study area

A key geomorphic element within the valley is the Saura Grotto, a horseshoe-shaped karst sinkhole partially filled with water (Aliyev, 2015) (Figure 2). Its vertical walls reveal distinct horizontal stratification, consistent with the sedimentary origin of the host limestones (Kulbayeva, 2018). The persistent presence of water and moisture-loving vegetation around the depression margins suggests ongoing groundwater emergence and localized infiltration processes.



Figure 2. Saura Valley (Source: Photo taken by employees of the laboratory of Geotourism and geomorphology of the "Institute of Geography and Water Security" JCS, 06.05.2025)

Geologically, the area is composed predominantly of Neogene-age carbonate rocks, including limestones and marl interlayers, with widespread fracturing and thin Quaternary cover (Gvozdetczky, 1972; Nechayev & Strokova, 2023; Kuznetsov, 1965; Kleiner, 1970). The site lies within a structural transition zone where platform-type tectonic blocks intersect folded belts, creating fracture networks that promote subsurface water circulation (Tsirélson & Popov, 2010). These structural conditions are favorable for both surface and subsurface karst development. Multiple phases of uplift and denudation from the Neogene to Quaternary periods have further enhanced karstification by exposing carbonate strata to water infiltration (Chikishev, 1973; Vlasov, 1988; Ford & Williams, 2007; Goldscheider & Drew, 2007; Akziz et al., 2022).

From a geomorphological perspective, the valley is positioned at the boundary between an abrasion-accumulative marine terrace and a structurally armored plateau surface. This transitional setting contributes to surface runoff concentration and vertical moisture migration through fractured rock layers (Le Mesnil et al., 2021).

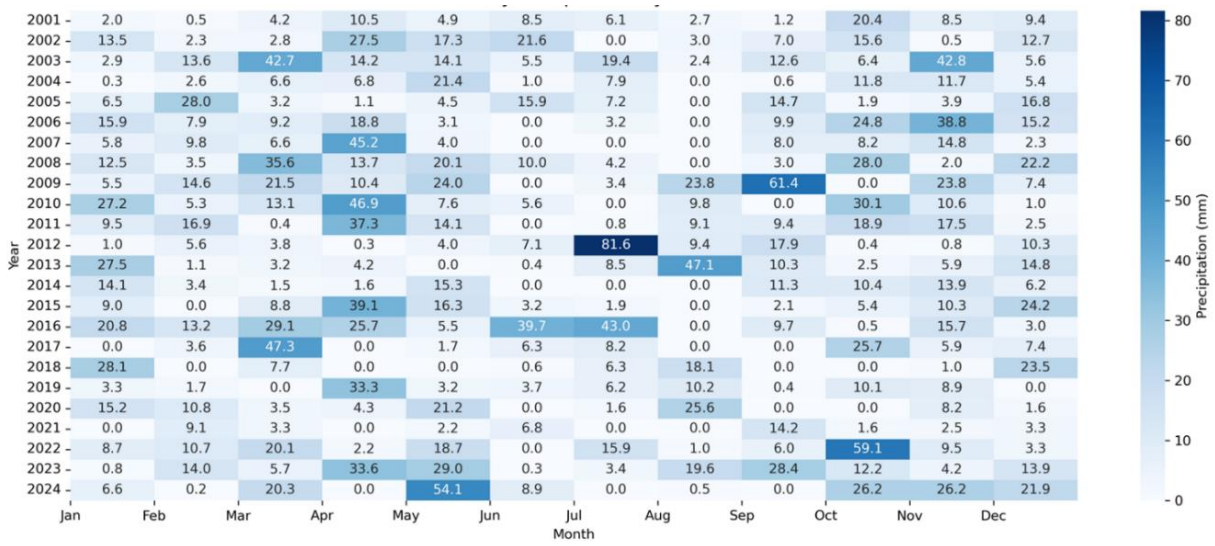


Figure 3. Monthly Precipitation by Year (Source: https://kazhydromet.kz)

The landscape is dominated by shallow depressions, cliffs, collapsed zones, and disrupted morphostructures features typical of karst systems in arid regions with minimal surface drainage (Torsuyev, 1980). Climatically, the region

experiences a desert-continental regime with average annual temperatures of 11.5–12 °C. Seasonal extremes range from –37 °C in winter to +42 °C in summer. Annual precipitation averages 130–170 mm, with peak values occurring in spring (particularly April) (http://ecodata.kz) (Figure 3). Despite the low total precipitation, episodic snowmelt and storm events generate highly aggressive infiltration, contributing to the chemical weathering of exposed carbonates. The area also experiences persistent wind activity exceeding 5 m/s, predominantly from the east and southeast (https://kazhydromet.kz).

The local soil and vegetation conditions further reflect karst-related hydrological dynamics. Moisture-loving species are concentrated in zones of groundwater emergence and seepage, while brown solonetzic and non-solonetzic soils dominate across the valley floor and slopes. These edaphic variations serve as indicators of subsurface water pathways and infiltration intensity. Due to the presence of well-developed karst landforms, extensively fractured carbonate lithology, seasonally variable hydrological conditions, the Saura Valley constitutes an optimal arid-zone karst systems in Mangystau, it offers a unique opportunity to investigate geomorphic evolution, assess terrain stability, and identify potential geohazards within a structurally complex and environmentally sensitive karst landscape. The increasing number of visitors highlights the need for detailed geomorphological and geohazard assessments, especially considering the presence of unstable slopes, rockfalls, and potential subsidence zones. Despite its popularity, the area remains insufficiently studied using modern, high-resolution techniques that could inform risk management and sustainable tourism development.

MATERIALS AND METHODS

A comprehensive field investigation of the Saura Valley was conducted using an integrated methodology, combining archival research, UAV-based (Unmanned Aerial Vehicle) photogrammetry, GNSS (Global Navigation Satellite System) surveying, and GPR (ground-penetrating radar) profiling. This multi-method approach enabled both surface and subsurface characterisation of the karst landscape.

Prior to fieldwork, a literature review was conducted to examine the geological, geomorphological, and hydrogeological context of the study area. The analysis revealed a lack of prior high-resolution studies focused specifically on the Saura Valley.

1. GNSS Surveying and Data Integration

High-precision georeferencing was achieved using the SOUTH Galaxy G9 GNSS receiver, which supports multi-frequency and multi-constellation tracking. Its integrated RTK functionality and 4G modem provided real-time kinematic corrections, ensuring centimetre-level accuracy. GNSS data were used not only for positioning UAV imagery and GPR profiles, but also for constructing spatial base layers in GIS (Geographic Information System).

2. UAV-Based Photogrammetry

UAV-based photogrammetry is an increasingly adopted technique in karst terrain analysis, offering cost-effective, high-resolution data acquisition in areas where satellite imagery is limited or unavailable (Prodanov et al., 2019; Vassilakis & Konsolaki, 2022). High-resolution aerial surveys were carried out using the Autel EVO II RTK Pro (V3) UAV. This drone is characterized by the following technical parameters: 6K resolution camera with a 1-inch CMOS sensor (20 MP), 29 mm equivalent lens, adjustable aperture from f/2.8 to f/11. The RTK module provides centimetre-level positioning accuracy for high-precision photogrammetric data acquisition (https://www.autelrobotics.com). The UAV survey covered an area of 70 582 m^2. The flight was performed in autonomous mode, with the route preloaded into the drone controller. The drone was launched to an altitude of 120 m at an average speed of approximately 8 m/s; longitudinal and transverse image overlap was maintained at 80%, and the camera angle was set to 90^0. The UAV flight area was selected within the most frequently visited zone, where the majority of tourist activity is concentrated.

Ground control points were pre-marked and measured using the SOUTH Galaxy G9 GNSS receiver, with horizontal and vertical accuracy of 1-2 cm, referenced to UTM Zone 39N. Photogrammetric processing was conducted in Agisoft Metashape using Structure-from-Motion (SfM) techniques (Garova et al., 2025; Westoby et al., 2012; Jarzyna et al., 2024). The workflow included photo alignment, dense point cloud generation, mesh reconstruction, and texture mapping. Ground control points were manually identified and assigned GPS (Global Positioning System) coordinates with elevation values. The resulting orthophoto and digital elevation model (DEM) were exported and further analysed in ArcGIS.

3. Ground-Penetrating Radar (GPR) Survey

Karst cavities, often lacking direct surface access, are well-suited for investigation using non-invasive geophysical techniques. GPR is particularly effective in dry, carbonate terrains due to strong dielectric contrasts between voids and host rock (Funk et al., 2024; Abdeltawab, 2013). GPR is based on the transmission of electromagnetic waves into the subsurface and the recording of reflected waves from objects or interfaces with different dielectric constants. A radar system comprises a signal generator, antennae (for transmission and reception), and a receiver. The system has an onboard computer that facilitates data processing both while acquiring data in the field and post-recording (La Salandra et al., 2022; Takasu & Yasuda, 2009). As the antenna is moved along ground surface, the signals of the reflected waves are displayed as a function of their two-way travel time, i.e. the time elapsed between the transmission and detection by the receiver, in the form of radargram. In low-loss medium the reflection depth of an electromagnetic wave (S) is:

$$S = \frac{t*C}{2\sqrt{\varepsilon_r}} \qquad (1)$$

where t is the two-way travel time, determined from the radargram, C is the speed of light in free space and ε_r is the relative dielectric constant.

The GPR survey was conducted using the Zond Aero LF system. This single-channel, unshielded dipole GPR operates with interchangeable antennas with centre frequencies of 75, 150, and 300 MHz, providing operating bandwidths of 38-150 MHz, 75-300 MHz, and 150-600 MHz (-12 dB), respectively. Data acquisition was performed in real-time sampling mode with hardware stacking, allowing 256 to 8192 samples per scan, a sampling rate of up to 1,280,000 samples s^{-1}, and a scanning speed of up to 2,500 scans s^{-1}. The system records 32-bit digital raw data in standard SEGY (.sgy) geophysical format with geotagged traces. The time range per sample varies from 18 ps to 2.5 ns, enabling a probing depth of up to 12 m in soils with a relative dielectric permittivity of about 5 and a specific attenuation of up to 5 dB m^{-1}. Data processing modes include vertical filtering (off or digital), horizontal filtering (hardware stacking or background removal), and linear gain adjustment from 0 to +168 dB with 1-10 gain points. Raw data are stored with the applied gain parameters, and file size is limited only by the available storage capacity (https://cdn.shopify.com/).

Processing of the radargrams was carried out using Radar Systems Prism2 software. All profiles were subjected to an identical sequence of operations: (i) removal of the background signal; (ii) application of an Ormsby band-pass filter centered on the main frequency with a ±50 % bandwidth; and (iii) adjustment of linear gain to enhance data readability. The reflections marking layer boundaries were then manually identified (Tjoelker et al, 2024).

GPR data acquisition focused on identifying zones of loosening, underground cavities, and subsurface structural heterogeneity. The collected profiles were processed using standard filtering, amplitude correction, and migration techniques to enhance the visibility of anomalies.

4. Post-Processing and Spatial Analysis

In post-fieldwork conditions, the collected datasets were integrated within a GIS framework. A comparative analysis of UAV-derived topographic data, GPR anomalies, and GNSS ground control points was performed to assess spatial correlations between surface morphometric features and subsurface structures. This enabled the identification of zones with increased karst potential and structural instability within the valley.

A particular focus was placed on the detection and interpretation of lineaments, which are linear or curvilinear features often corresponding to geomorphological discontinuities or tectonic structures (El Hadani, 1981). These features may represent fault lines (Faure, 2001), fracture zones, morphological boundaries (Samuel et al., 2010), or zones of mechanical weakness within the Earth's crust (Masoud et al., 2006; Pour et al., 2013; Lacina, 1996; Hobbs, 1912). Lineaments are frequently associated with drainage alignments and lithological contacts, and their presence is often indicative of intense fracturing, brecciation, and enhanced groundwater flow (Strokova et al., 2020).

To extract lineament patterns, the digital elevation model (DEM) was processed to enhance terrain shading and micro-topographic gradients (Abdelouhed et al., 2021). This was achieved by generating four shaded relief raster layers using the Hillshade tool in ArcGIS (https://pro.arcgis.com), applying varying illumination azimuths (0°, 45°, 90°, and 135°) while maintaining constant solar elevation. The use of multi-directional hillshading improved the visibility of subtle linear features, reducing directional bias and enhancing the detection of tectonically influenced geomorphic structures.

RESULTS AND DISCUSSION

The analysis of the Saura Valley was conducted through a comprehensive integration of GNSS-based georeferencing, UAV photogrammetry, morphometric terrain analysis, ground-penetrating radar (GPR) surveys, and digital lineament detection. This section summarizes the key findings obtained from each methodological component.

1. GNSS Survey and Data Georeferencing

High-precision GNSS data were collected using RTK (Real Time Kinematic) and PPK (Post Processing Kinematic) modes to georeference UAV imagery, ground control points (GCPs), and GPR profiles. Five GCPs (Table 1) were distributed evenly across key terrain features and measured with centimetre-level accuracy (horizontal ~2 cm, vertical ~3 cm), thereby enhancing the accuracy of both the DEM and orthophotomap. Geophysical profile coordinates were synchronised with GNSS data, enabling precise spatial alignment of surface and subsurface datasets.

Table 1. Coordinates of the established ground control points in the Saura Valley (Source: SOUTH Galaxy G9 GNSS receiver)

Point Name	True Latitude	True Longitude	Ellipsoid Height
Mark1	44° 13' 54.16" N	50° 48' 15.88" E	-4.836
Mark2	44° 13' 56.14" N	50° 48' 11.91" E	-2.574
Mark3	44° 13' 54.93" N	50° 48' 11.32" E	-12.790
Mark4	44° 13' 54.82" N	50° 48' 9.74" E	-1.498
Mark 5	44° 13' 52.23" N	50° 48' 12.93" E	-3.415

2. UAV Photogrammetry and Data Processing

UAV-based aerial surveys were conducted using the Autel EVO II RTK Pro (V3), flown at 120 meters altitude with 80% forward and lateral image overlap. Photographic centers were post-processed using TEOBOX software, with PPK correction referencing base station data in RINEX format. The flight area covered approximately 70 582 m^2. Number of images – 195.

Photogrammetric processing was carried out in Agisoft Metashape Professional using Structure-from-Motion (SfM) methods (La Salandra et al., 2022; Takasu & Yasuda, 2009; Zhang et al., 2010). This workflow included photo alignment, dense point cloud generation, classification, and DEM and orthophotomap creation. The final data products were exported in GIS-compatible formats for terrain analysis. A summarised flowchart of the described process is shown in Figure 4.

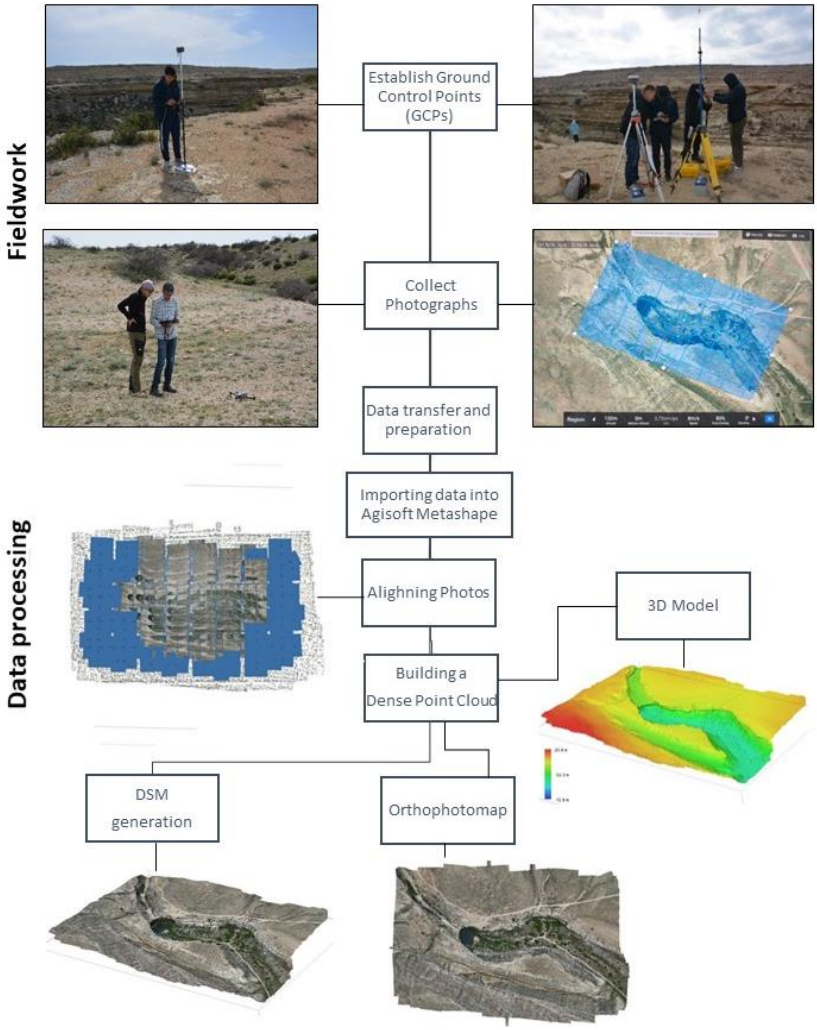


Figure 4. Generalised workflow outline (Source: Prodanov et al., 2019)

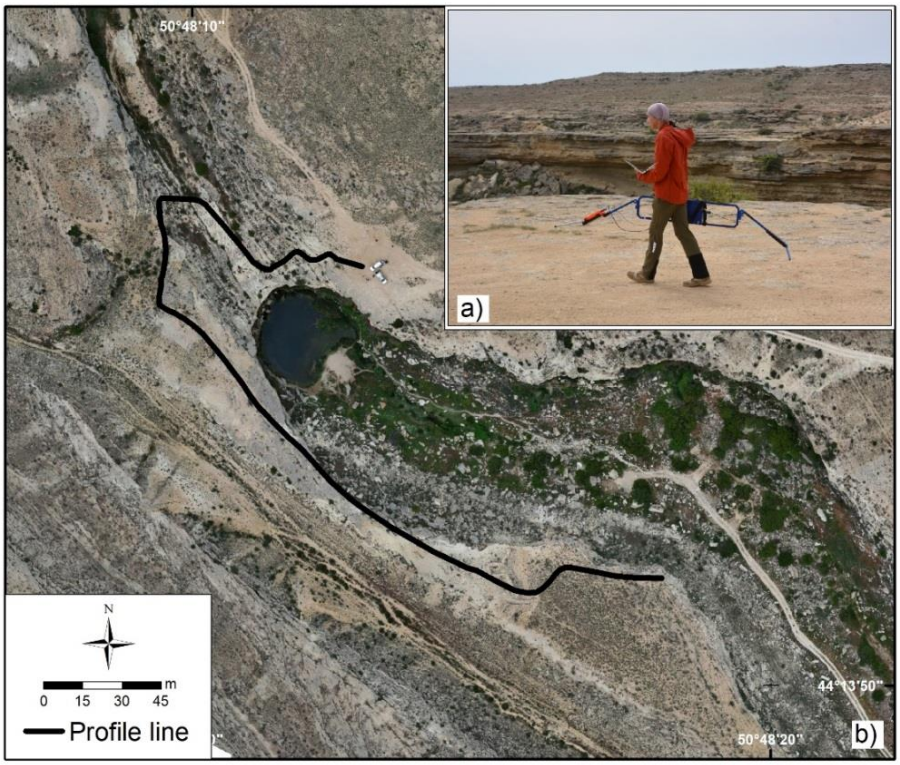


Figure 5. Georadar survey using Zond aero LF 100 MHz (a); Profile diagram of the georadar survey (b). (Source: GPR survey made by Rakhimov & Taskynbayev, 2025)

3. Ground-Penetrating Radar Survey

Subsurface investigations were performed using the Zond Aero LF radar system at 100 MHz (Figure 5). The survey method involved profile-based scanning and data processing in Prism software (Reynolds, 1997). Standard procedures, including background subtraction and gain correction, were applied. Radargrams were interpreted using colour-coded amplitude maps to visualise wave reflections (Frumkin et al., 2011; Batayneh et al., 2002; Tallini et al., 2006; Pueyo-Anchuela et al., 2010; Billi, 2016). In this visualisation, a zero signal amplitude corresponds to a green background on the radargram, positive signal amplitudes are represented by warmer tones progressing to yellow, and negative amplitudes are depicted by cooler tones progressing to blue (Figure 6). Three major zones of subsurface loosening were identified: Zone 1– Adjacent to cliff edges, likely linked to void formation and potential slope failure. Zones 2 and 3 – Possibly associated with water infiltration, filtration flow, or internal erosion. Although GPR anomalies were not yet verified by drilling, their spatial consistency with morphometric and structural indicators supports their interpretation as zones of loosening.

These zones were spatially referenced via GNSS and further visualized in Figure 7.

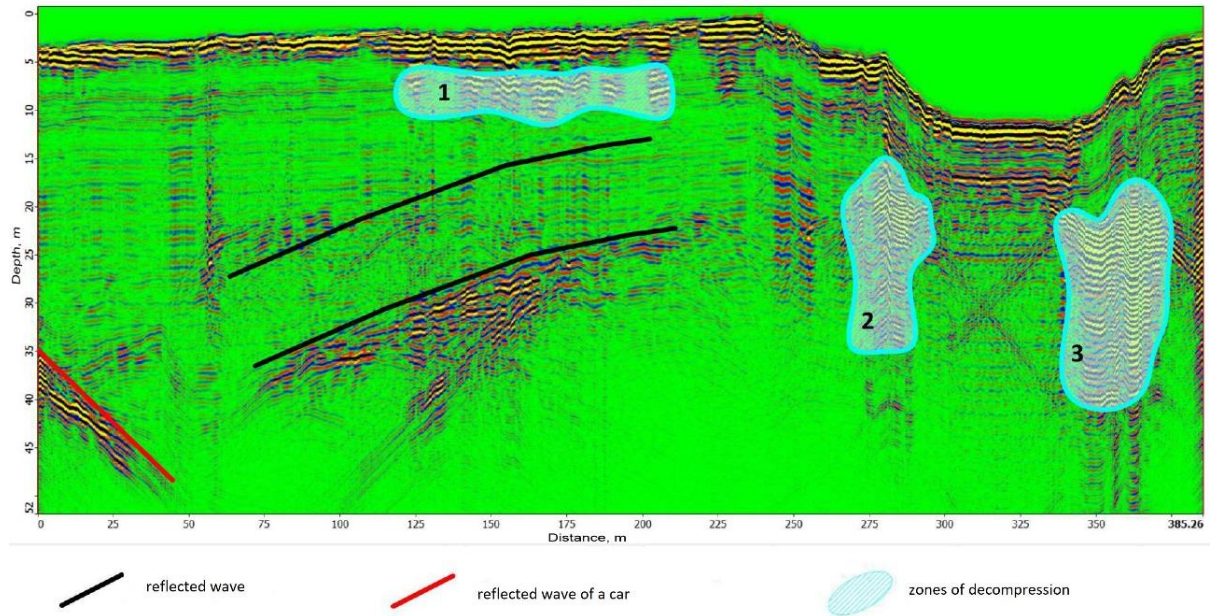


Figure 6. Radar chart with interpretation (Source: interpreted by Rakhimov & Taskynbayev)

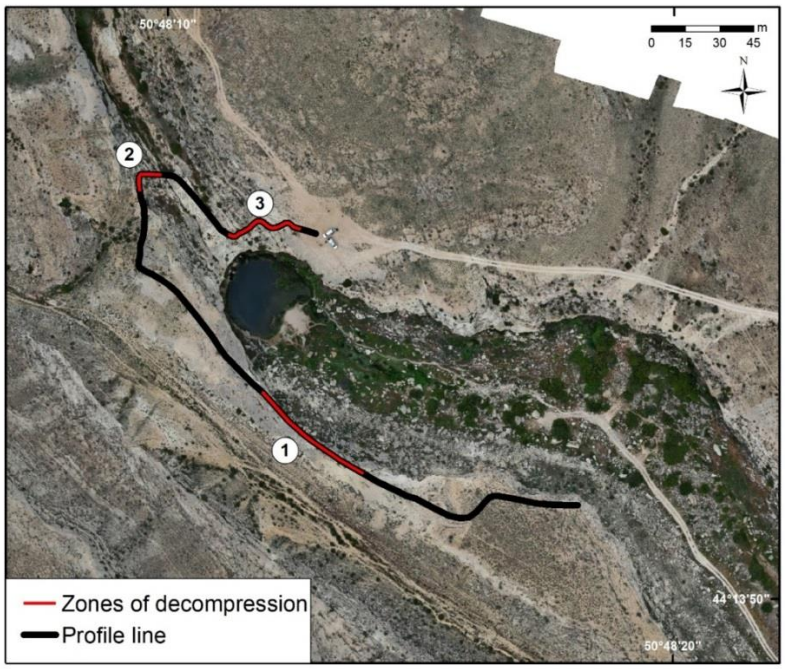


Figure 7. Zones of loosening on the profile diagram (Source: interpreted by Rakhimov& Taskynbayev)

4. Morphometric Terrain Analysis

A DEM generated from UAV imagery was analyzed using ArcGIS Spatial Analyst tools to calculate slope, aspect, curvature, and vertical dissection metrics (Figure 8) (Table 2).

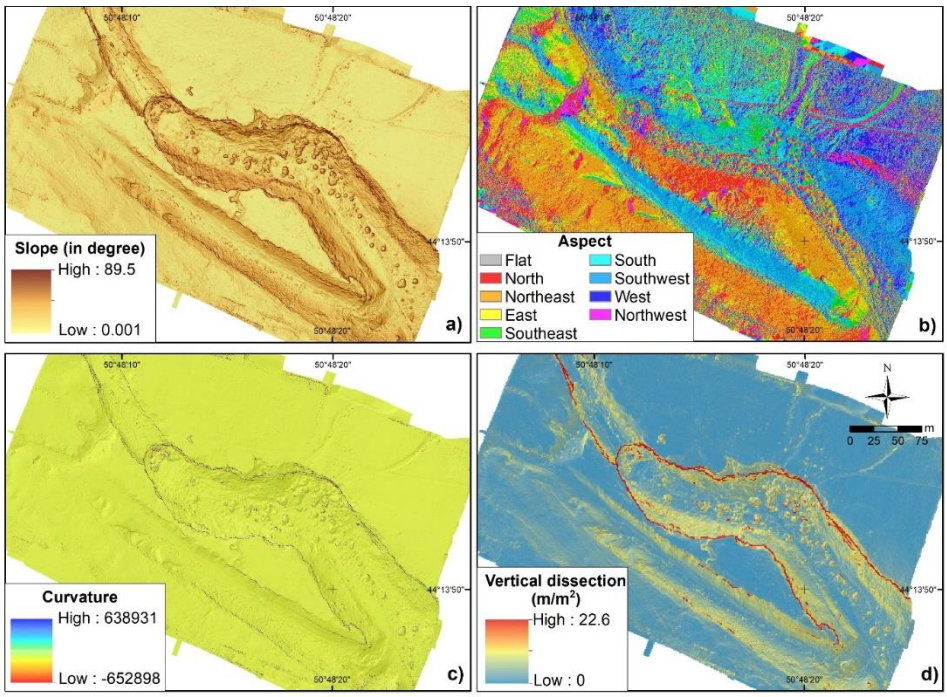


Figure 8. Morphometric characteristics of the terrain in the Saura Valley: a – slope, b – aspect, c – curvature, d – vertical dissection (Source: Based on DEM from UAV, 2025)

Slope ranged from 0.001° to 89.5°, with the steepest areas (>60°) observed along escarpments and rock outcrops. Aspect predominantly faced northeast, southwest, southeast, and south, indicating moisture and vegetation distribution patterns. Curvature values ranged from -652,898 to +638,931, identifying convex and concave terrain forms (https://pro.arcgis.com). Vertical dissection, calculated using Zonal Statistics, reached up to 22.6 m/ml, especially along collapse zones and valley slopes (Pozachenyuk & Petlyukova, 2016; Spiridonov, 1970; Rohaendi et al., 2021; Sharapkhanova et al., 2024).

Table 2. Morphometric characteristics of the Saura Valley and the adjacent area

Morphometric parameters	Min	Max	Mean	St.Dev
Curvature	-652898	638930,6	8,1	3749,5
Slope °	0,001	89,53	14,57	14,28
Vertical Dissection, m/m^2	0	22,6	0,38	0,79

These morphometric parameters provide insights into terrain instability, erosional processes, and moisture flow pathways. Integration with orthophotomaps supports targeted monitoring of geomorphologically hazardous zones.

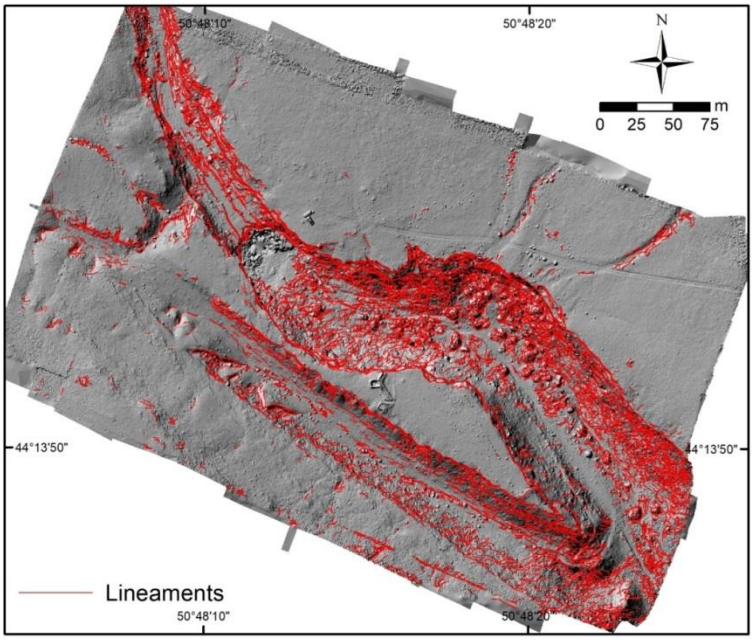


Figure 9. Lineaments obatined in the PCI Geomatica 2018 software (Source: Based on DEM from UAV, 2025)

5. Lineament Detection Using DEM

Lineament analysis was performed to identify tectonic and structural controls on karst development. Shaded relief models were generated using the Hillshade tool with four azimuth angles (0°, 45°, 90°, 135°) to enhance microrelief expression.

Lineament extraction was conducted using the LINE MODULE in PCI Geomatica 2018 (Figure 9).

After semi-automatic detection, features were filtered and interpreted to identify structural alignments. Dominant orientations included SE-NW, E-W, and N-S. The highest density of lineaments corresponded with slope breaks, morphological edges, and ring-shaped fault structures in the valley center.

These linear features coincide spatially with GPR-detected loosening zones, reinforcing the role of tectonic controls in karst formation, groundwater flow, and geohazard development in the study area.

6. Correlation of morphometric characteristics of relief, lineaments and zones of decompression in the Saura Valley

The integration of DEM data, lineament interpretation, and GRR profiles revealed distinct spatial patterns in the development of karst processes in the Saura Valley. Analysis of morphometric parameters (slope, aspect, curvature, and vertical dissection) showed that the loosening zones detected by the GPR are confined to areas with significant slopes ($>15\text{-}20^0$) and local slope breaks, where high values of vertical dissection (up to 22.6 m/m^2) are recorded.

These conditions promote the development of gravitational processes such as landslides and scree – that increase the permeability of the rock formations. Analysis of slope aspect revealed that the main loosening zones are concentrated on northern, north-eastern, and eastern slopes. Comparison with the relief curvature map showed that most anomalies are associated with areas of positive curvature (convex ridges and slopes) and zones of abrupt transitions between convex and concave forms, where tensile stresses accumulate and subsurface faults are exposed. Lineament analysis of the DEM using PCI Geomatica revealed several dominant lineament systems (SE-NW, E-W, and N-S) and a high lineament density in the eastern and southern sectors of the valley. The most pronounced GPR anomalies spatially coincide with the intersection points of these lineaments, confirming the structural control of karstification and the development of decompression zones along tectonic faults. The mapped lineaments and decompaction zones exhibit a strong spatial correlation, particularly along the framing cliffs and within the central depressed portion of the valley.

This configuration indicates the presence of tectonic faults and zones of enhanced fracturing, which facilitate moisture infiltration and localized leaching of carbonate rocks. The combined analysis of relief morphometric parameters and GPR data confirms that karst processes in the Saura Valley are structural-tectonic in origin and develop predominantly along zones of tectonic weakening. The results highlight the importance of considering tectonic conditions and morphometric indicators when predicting geodynamic hazardous areas.

The integrated application of UAV surveys, GNSS measurements, morphometric analysis, and GPR has proven effective for identifying potentially unstable karst zones in arid environments and has enabled a comprehensive reinterpretation of karst morphodynamics in the Saura Valley (Chen, 2020; Plan, 2021). The spatial correlation between GPR-detected zones of soil loosening, lineament concentrations, and morphometric indicators such as steep slopes (>25°), extreme curvature values, and vertical dissection exceeding 22.6 m/mI confirms the structurally controlled nature of karst development in the study area. Notably, these zones coincide with ring-shaped fault structures and are concentrated in the eastern and southern sectors, where SE–NW and E–W lineament orientations dominate. The intersection of lineaments appears to intensify gravitational instability, suggesting a heightened risk of ground collapse.

These findings emphasize the role of tectonic lineaments as preferential pathways for groundwater flow and zones of rock weakening, thereby supporting previous studies indicating that fault systems serve as principal controls on karstification in arid carbonate terrains (Nechayev & Strokova, 2023). The observed alignment of structural elements with geophysical anomalies provides a strong basis for interpreting the spatial evolution of karst in the region.

Morphometric analysis further supports this conclusion, indicating that karst features are concentrated within fractured Neogene limestones with high porosity and permeability. This lithological setting, typical of arid-zone karst, facilitates both surface dissolution and subsurface cavity formation. The presence of sinkholes, collapsed niches, and open fractures points to a polyphase genesis likely linked to neotectonic uplift and episodic humid intervals during the Late Neogene-Quaternary, consistent with broader geomorphological reconstructions.

The UAV-based data acquisition, processed via Structure-from-Motion (SfM) techniques in Agisoft Metashape, proved effective for producing detailed digital surface models, while GNSS data from the SOUTH Galaxy G9 system ensured precise spatial referencing. The integration of these datasets significantly improved the reliability of surface–subsurface correlation. Ground-penetrating radar surveys using the Zond Aero LF system identified three distinct decompression zones at depths up to 20 meters. The heterogeneous geological environment marked by abrupt lithological transitions and structural discontinuities enhanced geophysical contrasts and facilitated the detection of features indicative of potential subsidence or void formation. These results underscore the value of GPR as a non-invasive tool for karst hazard assessment in inaccessible or infrastructurally limited areas. Importantly, these geophysical anomalies require verification through borehole drilling and further correlation with geotechnical and hydrogeological data. Such investigations are critical for assessing surface stability and validating subsurface models.

In conclusion, this study demonstrates the effectiveness of a multidisciplinary geospatial approach for characterizing karst systems in arid regions. Continued application of high-precision technologies will advance our understanding of the spatial and temporal dynamics of karst evolution in the Mangystau region.

Beyond scientific relevance, the results have practical implications for geohazard monitoring, slope stability assessment, and environmental management in vulnerable karst landscapes.

CONCLUSION

For the first time, a comprehensive approach to studying the karst terrain of the Saura valley has been implemented, based on the use of high-precision data collection and analysis methods such as UAVs, GNSS, geophysical surveys, and GIS. This has enabled the acquisition of a detailed understanding of the morphometry, structure, and formation factors of karst features under the arid climate conditions of Mangystau.

The development of karst in the studied region is driven by complex interactions among geological-structural, lithological, hydrogeological, and climatic factors, with the morphology of the terrain playing a key role in the localization and development direction of karstogenesis. Tectonic dissection and fracturing of carbonate rocks facilitate the infiltration of atmospheric precipitation and underground circulation, thereby activating dissolution processes. Favorable structural and geological conditions in the region support the development of modern karst processes even under arid climate conditions.

The results obtained not only clarify the understanding of the karst morphology of the Saura valley but also open up prospects for further research of similar natural formations in the region.

Research conducted using an integrated approach allows not only to characterize karst terrains in detail, but also to develop measures to reduce anthropogenic impact. Intensive tourism and active infrastructure development can accelerate karst processes and increase the likelihood of emergencies. Created orthophotomaps and digital terrain models allow the identification of potentially dangerous areas enables timely implementation of preventive measures. The introduction of an early warning system, regular monitoring, and adaptive management helps to reduce risks to the population and the natural environment, while preserving the recreational potential of the studied territory.

The presented methodology can be recommended for assessing slope stability, geomorphological hazards, and predicting karst processes in similar environmental conditions.

Abbreviations

UAV	Unmanned aerial vehicle
GPR	Ground Penetrating Radar
DEM	Digital elevation model
GNSS	Global Navigation Satellite System

Author Contributions: Conceptualization, A. B. and R. T.; methodology, A. B. and Zh. Sh.; validation, A. B. and R. T.; formal analysis, A. B. and Zh. Sh.; investigation, A. B. and Yu. L.; resources, Zh. Sh.; writing–original draft preparation, A. B., Yu. L. and Zh. Sh.; writing–review and editing, A. B., R. T.; visualization, A. B. and Yu. L.; supervision, R. T.; project administration, R. T.; funding acquisition, R. T. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

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FROM CLASSROOM TO MARKETPLACE: EXPLORING THE DRIVERS OF STUDENTS' DIGITAL ENTREPRENEURIAL INTENTIONS IN EGYPTIAN TOURISM AND HOSPITALITY

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Abstract: This study examines how factors affect Egyptian tourism and hospitality students' digital entrepreneurial intention (DEI). The research investigates the extended Theory of Planned Behavior (TPB) with self-efficacy, digital literacy, and the Unified Theory of Acceptance and Use of Technology 3 (UTAUT3) as influential factors. The aim is to identify essential factors that help form potential digital entrepreneurs in the tourism and hospitality sector. The study obtained data from Egyptian final-year undergraduate tourism and hospitality students using an online questionnaire. A total of 422 valid responses were collected and analyzed to examine the relationships between the theoretical constructs and digital entrepreneurial intention. According to the study's findings, the extended TPB factors positively influence students' intentions to engage in digital entrepreneurship (DE). Digital literacy demonstrates a significant positive effect on students' DEI. The UTAUT3 dimensions also positively influence digital entrepreneurial intentions, with the exception of facilitating conditions. These results contribute to the tourism and hospitality literature by identifying the essential factors that help form a potential digital entrepreneur. The findings provide valuable insights for understanding what drives students toward digital entrepreneurship in this specific sector. Educational institutions in tourism and hospitality can develop focused curricula, initiatives, and training to enhance students' DEI. The research offers practical implications for curriculum development and student preparation. These findings support the development of targeted educational interventions.

Keywords: Digital entrepreneurship, theory of planned behavior, UTAUT3, digital literacy, intention

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INTRODUCTION

The tourism and hospitality industries are showing a growing tendency towards integrating automation technologies, including Artificial Intelligence (AI) and service technologies (Ali et al., 2022), to mechanize business operations, enhance effectiveness and productivity, increase customer satisfaction, and reduce costs (Chang & Lin, 2022; Helal, 2023; Helal et al., 2024; Horváth et al., 2024; Santiago et al., 2024). For example, restaurants include a range of self-service technologies such as menu ordering kiosks, in-store iPads, tabletop touch screens, and other digital interfaces (Park et al., 2021).

These modern technologies have increased the need for DE in the tourism and hospitality sectors, a specific type of entrepreneurship that involves creating and following entrepreneurial opportunities using technical operating systems and specialized information communication tools (Sahut et al., 2019). DE involves transforming business entities, including startups and existing companies, through the innovative application of digital technology (Mir et al., 2022).

Therefore, there is a need to develop the digital skills of future human capital (students) so that they can find job opportunities, grow the industry, and face challenges (e.g., COVID-19) (Sedegah et al., 2024). Additionally, the quickly changing digital world needs better knowledge of what and how new technologies, such as ChatGPT, augmented reality, virtual reality, chatbots, and blockchain (Helal et al., 2024; Santiago et al., 2024), may be incorporated into students' curricula, leading to entrepreneurial projects. However, recent tourism and hospitality research focuses mainly on existing entrepreneurs or professionals, leaving out students representing the future workforce and prospective innovators (Ali et al.,

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2022; Battisti et al., 2022). Thus, there is a need for further exploration of factors that affect students' DEI in the tourism and hospitality industry. TPB is a well-established theory to explain the behavior intention of a person (Ajzen, 2020).

The behavior intention is affected by three variables: attitude, subjective norms, and perceived behavioral control (Sedegah et al., 2024). Attitude is an indication of the behavior (Vamvaka et al., 2020), subjective norms are an indication of social pressures (Al-Jubari et al., 2021), and perceived behavioral control is whether the behavior is easy or difficult or not (Sedegah et al., 2024). However, to the best of the author's knowledge, TPB usage in DE has been accorded less attention in tourism and hospitality research. Beyond TPB dimensions, Wang & Zhang (2015) suggest the inclusion of self-efficacy within the TPB model as a theory construct antecedent. This inclusion enhances understanding of how individuals' perceptions of their abilities affect their attitudes, subjective norms, and perceived behavior control (Neneh, 2020).

Self-efficacy promotes opportunity recognition, goal setting, emotional response, effort allocation, and survival of challenges (Wibowo et al., 2024). Moreover, as Neumeyer et al. (2021) assert, digital entrepreneurs should be highly literate to exploit new opportunities, augment their competitive edge, and counter digital challenges.

Martínez-Bravo et al. (2022) described digital literacy as the ability to access, manage, integrate, create, and present digital information effectively and efficiently in various contexts and for various purposes with digital tools and systems. Digital literacy involves possessing technical capabilities and being aware of how to gain access to and engage in the digital world, critically evaluating digital information, and using technology in an ethical and responsible manner (Reddy et al., 2022). Hence, the present research assumes digital literacy to be an essential component that enhances students' DEI and enables them to use digital resources. For example, a digitally literate individual is capable of using social media networks to communicate effective marketing messages (Reddy et al., 2022). In addition, Venkatesh et al. (2012) contributed that adopting technology helps gain the competencies that enable its use in daily life and workplaces.

Technology adoption models have expanded extensively since they began to develop based on technology use and acceptability environments (Venkatesh et al., 2012). This current research investigates the impact of UTAUT3 on students' DEI. According to Ali et al. (2022), UTAUT3 provides a greater understanding of technology adoption and utilization, mainly when variables other than effort expectations and performance are essential. UTAUT3 can be used as a robust foundation in explaining why tourism and hospitality students embrace digital technology and participate in DE.

This research, therefore, aims to identify how psychological influences (i.e., extended TPB with self-efficacy), technological competence (i.e., digital literacy), and the technology acceptance model (i.e., UTAUT3) influence students in Egypt's tourism and hospitality sectors to participate in DE.

LITERATURE REVIEW

Digital entrepreneurship intentions

As per Zhao et al. (2023), DE is a phenomenon that has transformed conventional business practices and created new prospects for expansion and innovation. DEI reflects the enthusiasm and commitment of individuals to initiating new ventures using internet platforms and digital technology (like social media, cell phone applications, websites, and AI-based technology) (Alkhalaileh et al., 2023; Mir et al., 2022). For different reasons, it is necessary to investigate the determinants of students' participation intentions in DE (Wibowo et al., 2024). The determination of potential digital entrepreneurs enables business and academic organizations to provide an environment conducive to access to sources of funding and resources (Mir et al., 2022; Rashwan et al., 2024). Moreover, the identification of the digital skills gap among students enables the development of tailored educational programs and training activities (Ulfert-Blank & Schmidt, 2022).

Conceptual development

Extended theory of planned behavior and digital entrepreneurship intentions

Attitudes. Attitudes refer to personal judgments and evaluations of the anticipated outcomes of engaging in a particular action (Ajzen, 2020). According to Wu et al. (2020), students are more likely to have positive attitudes if they believe they have the skills and capabilities to succeed as entrepreneurs and see DE as a feasible and fulfilling career choice. Emotional elements (e.g., enthusiasm and excitement) greatly influence students' perceptions of entrepreneurship (Svenningsson et al., 2021). However, Mir et al. (2022) mentioned that students who want to participate in DE face financial limitations, regulatory impediments, and market instability. According to Sharma et al. (2023), students overcome these hurdles with the support of positive attitudes, which reduce risk perception and increase enthusiasm for undertaking entrepreneurial projects. Based on the previous discussion, we formulate the following hypothesis:

H1: Attitudes positively influence tourism and hospitality students' DEI.

Subjective norms. According to Ajzen (2020), subjective norms refer to an individual's judgment on whether or not others in their social surroundings approve of a particular behavior. However, specific personal characteristics can lessen the influence of subjective norms. Allawi & Alyouzbaky (2024) stated that students with a strong inclination for independence may prioritize their objectives over social influences. However, a robust entrepreneurial spirit among students enhances a shared identity, rendering DE an appealing career choice (Alkhalaileh et al., 2023). Sharma et al. (2023) affirmed that perceiving colleagues or distinguished persons succeed via digital firms may deliver a substantial informative impact and a sense of social affirmation. Based on the previous discussion, we formulate the following hypothesis:

H2: Subjective norms positively influence tourism and hospitality students' DEI.

Perceived behavioral control. Perceived behavioral control refers to individuals' self-assessment of their talents, resources, and access to necessary criteria for engaging in activities that correspond with their interests and passions (Ajzen, 2020). Miralles et al. (2015) stated that perceived behavioral control impacts the relationship between

entrepreneurial knowledge and intention. The TPB suggests that individuals are more likely to accomplish their objectives and accurately forecast their future entrepreneurial behaviors when they have greater behavioral control (Vamvaka et al., 2020). Reddy et al. (2022) stated that students are more likely to participate in digital projects when they have the requisite knowledge and tools. Based on the previous discussion, we formulate the following hypothesis:

H3: Perceived behavioral control positively influences tourism and hospitality students' DEI.

Self-efficacy. Self-efficacy is a concept that assesses an individual's belief in succeeding in a specific situation (Ulfert-Blank & Schmidt, 2022). Self-efficacy beliefs can affect individual selection of tasks, level of effort, and perseverance in finishing them, particularly when faced with obstacles. Research has demonstrated that self-efficacy is critical in developing an individual's motivation, achievement, and behavior (Wibowo et al., 2024). Wu et al. (2020) asserted that self-efficacy significantly predicts undergraduate students' intentions to pursue entrepreneurship activities. Self-efficacy clarified why students with similar attitudes and social factors might demonstrate divergent behaviors (Shang et al., 2023). Students exhibiting elevated self-efficacy in their digital entrepreneurial competencies are more likely to engage in startup ventures than their peers (Neneh, 2020). Based on the previous discussion, we formulate the following hypothesis:

H4: Self-efficacy positively influences tourism and hospitality students' DEI.

Digital literacy and digital entrepreneurship intentions

Digital literacy is the skills and capabilities required to communicate and work using digital tools (Martínez-Bravo et al., 2022). These skills and capabilities include the ability to efficiently search and collect information from a variety of online sources as well as to evaluate the accuracy and applicability of that information critically (Neumeyer et al., 2021). Anthonysamy et al. (2020) asserted that promoting digital literacy gives students the necessary digital skills to engage effectively and successfully in their personal, academic, and workplaces (Šaffová et al., 2024). Shin & Kang (2021) stated that digital competencies are essential for businesses to adeptly navigate market fluctuations and engage effectively with their target audience. Likewise, Neumeyer et al. (2021) highlighted the value of digital literacy in integrating digital technology, making it easier to access resources like e-learning platforms, crowdfunding tactics, and virtual communication opportunities. Based on the previous discussion, we formulate the following hypothesis:

H5: Digital literacy positively influences tourism and hospitality students' DEI.

UTAUT3 and digital entrepreneurship intentions

Performance expectancy. Performance expectancy is the perception that using a particular technology will improve task accomplishment (Farooq et al., 2017). Performance expectancy highlights businesses' advantages when using technological instruments and systems (Pinto et al., 2022). According to Battisti et al. (2022), entrepreneurs use digital tools when they expect improved work productivity and outcomes. Similarly, Reddy et al. (2022) stated that digital technologies increase sales by expanding the customer base, enabling online transactions, and accelerating the creation of marketing and customer relationship management revenue. Also, Singh et al. (2024) mentioned that businesses can lower operational costs using data analytics, digital transformation, and automation. Based on the previous discussion, we formulate the following hypothesis:

H6: Performance expectancy positively influences students' DEI.

Effort expectancy. Effort expectancy reflects an individual's perception of the effortlessness and convenience of technology adoption (Farooq et al., 2017). People utilize technology to boost productivity when they find it easy to use and understand (Helal, 2023). Similarly (Alkhalaileh et al., 2023) asserted that entrepreneurs are more likely to embrace digital solutions perceived as user-friendly and seamlessly integrated into their existing workflows. In addition, according to Allawi & Alyouzbaky (2024), digital simplicity refers to how easily businesses can incorporate digital tools and platforms into their work practices. Likewise, Singh et al. (2024) mentioned that entrepreneurs are more motivated to integrate digital tools into their businesses when these technologies are less sophisticated and need less effort. Based on the previous discussion, we formulate the following hypothesis:

H7: Effort Expectancy positively influences tourism and hospitality students' DEI.

Social influence. Social influence is the degree of pressure exerted on individuals by their social surroundings to accept or reject a particular technology (Ali et al., 2022). Social influence highlights the impact of social networks and interpersonal ties on technological behaviors (Pinto et al., 2022). Individuals are expected to accept and use technology if they know their peers, superiors, or community members do (Allawi & Alyouzbaky, 2024; Helal, 2023). Moreover, according to Gunasinghe et al. (2020), witnessing colleagues using digital tools motivates individuals to use them as they know their advantages and disadvantages. Thus, network effects enhance social impact by increasing the value of extensively utilized digital technology, promoting further adoption. Based on the previous discussion, we formulate the following hypothesis:

H8: Social influence positively influences tourism and hospitality students' DEI.

Facilitating conditions. The facilitating conditions refer to an individual's perception of resources and support that can facilitate technology adoption and use (Pinto et al., 2022). Facilitating conditions, including technology infrastructure, training opportunities, and enabling regulations or standards (Farooq et al., 2017). According to Luong & Lee, 2021, educational institutions provide training centers catering to the various technical skills students need to compete in the labor market. Yeganegi et al. (2021) asserted that individuals engage with new technologies when they possess the necessary resources, including reliable hardware, enough software, and technical support. Thus, we argue that entrepreneurs accept technology when they recognize adequate support structures, including technical assistance, training programs, and funding resources. Based on the previous discussion, we formulate the following hypothesis:

H9: Facilitating conditions positively influences tourism and hospitality students' DEI.

Hedonic motivation. Hedonic motivation is the manner by which individuals recognize technology as a source of amusement, enjoyment, and joy (Ali et al., 2022). Individuals who take pleasure in technological utilization through pleasant

interfaces, interactive features, or gamification factors tend to embrace and sustain the tools in the long term (Helal et al., 2024). According to Yeganegi et al. (2021), individuals who perceive technological change as energizing and stimulating will be willing to embrace this technology. Hedonic's impact on the adoption of technology can drive consumer interest and interaction with the company because entrepreneurs are more willing to embrace digital behavior when they are able to realize high hedonic benefits from digital technology (Mir et al., 2022). Price value. Price worth is an individual's judgment of the net value of a technology compared to its costs (Farooq et al., 2017). Thus, we formulate the following hypothesis:

H10: Hedonic positively influences tourism and hospitality students' DEI.

Price value. The judgment includes explicit cost (i.e., purchase cost, subscription rates, and maintenance charges) and implicit cost (i.e., time to learn and any technical problems) (Gunasinghe et al., 2020). Entrepreneurs adopt digital transformation if the probable advantage, including increased revenue, lowering operating expenses, and increased customer satisfaction, are more than the expenditures, states Singh et al. (2024). A positive cost-benefit ratio makes entrepreneurs invest in technology that provides immense value (Sahut et al., 2019). Thus, those entrepreneurs who are aware of the importance of pricing and benefits from digital technologies are likely to accept and implement such technologies than others who do not possess such awareness. Habit. Habit is a word used to explain behavior that becomes routine via past experience, and it indicates to what extent individuals do a specific task without thought or effort (Gunasinghe et al., 2020). Based on the previous discussion, we formulate the following hypothesis:

H11: Price value positively influences tourism and hospitality students' DEI.

Habit. Habit is habituated behavior that can profoundly influence individuals' receptivity to using new technology (Pinto et al., 2022). Habits also require less cognitive effort once they are well developed, hence enabling individuals to keep employing traditional tools and techniques (Farooq et al., 2017). As posited by Lissitsa (2024), students with advanced digital use habits cultivated through extensive experience and guidance are likely to sustain the use of digital technology within their working settings. Similarly, students with more persuasive and consistent routines are likely to embrace digital working styles (Svenningsson et al., 2021). Based on the previous discussion, we formulate the following hypothesis:

H12: Habit positively influences tourism and hospitality students' DEI.

Personal innovativeness. According to Ali et al. (2022), personal innovativeness is a personal trait that reflects the individual's willingness to accept and use new digital tools quickly. Gunasinghe et al. (2020) defined personal innovativeness as the comfort and proactivity with which individuals use the latest technologies to explore and experience recent digital tools and systems. Innovativeness individuals often view technology not only as a tool for goal attainment but as an opportunity for personal development, knowledge acquisition, and the enhancement of various aspects of their lives (e.g., education and jobs) (Pinto et al., 2022). According to Luong & Lee (2021), students are expected to demonstrate increased enthusiasm when they have more openness toward technological innovation. Likewise, Wibowo et al. (2024) affirmed that students who always investigate modern technologies will likely be more receptive to adopting digital tools. Based on the previous discussion, we formulate the following hypothesis:

H13: Personal innovativeness positively influences tourism and hospitality students' DEI.

Collectively, this study illustrates the main hypotheses in Figure 1.

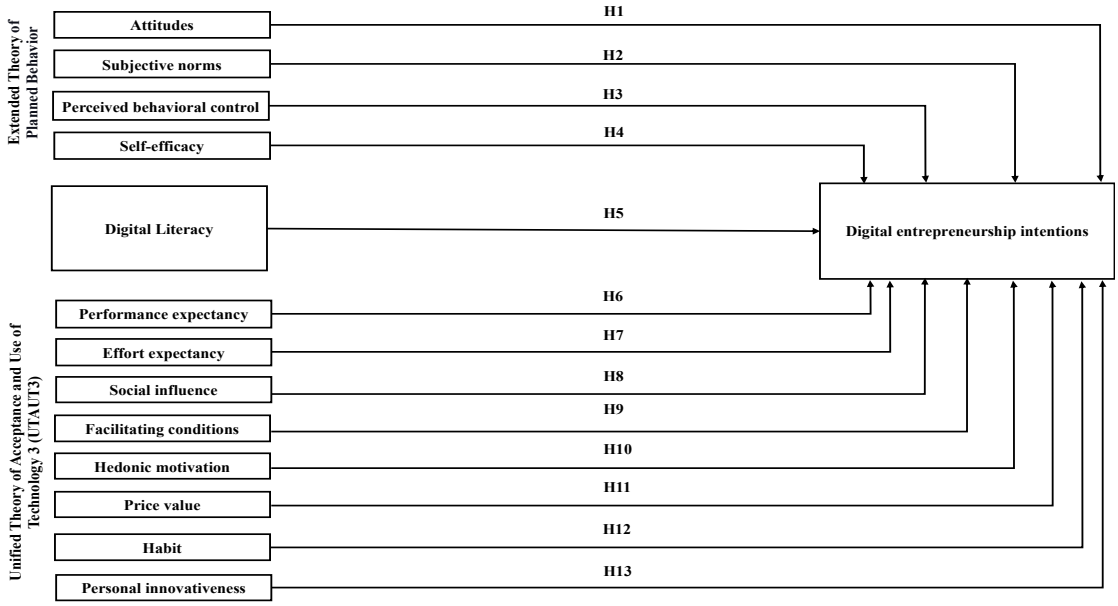


Figure 1. The conceptual model

MATERIALS AND METHODS

Constructs measures

This research utilized previous reliable and valid measurement scales to evaluate the factors affecting tourism and hospitality students' DEI. First, the study used the measurement scales of extended TPB by Schwarzer & Jerusalem (1995),

Wang & Zhang (2015), and Gao et al. (2017), including the four factors (i.e., attitudes, subjective norms, perceived behavioral control, and self-efficacy). Second, the study used the Reddy et al. (2022) scale to measure digital literacy to assess students' proficiency in accessing, assessing, and employing digital technologies. Third, the study used the UTAUT3 framework that Farooq et al. (2017) developed to evaluate the factors that can encourage technology adoption and utilization among students. Finally, the study employed the scale that Singh et al. (2024) developed to assess students' DEI, measuring their motivation and preparedness to participate in digital entrepreneurial initiatives.

The study context and data collection

The study was conducted among final-year students at Egypt's tourism and hospitality higher education from April to August 2024. Final-year students were chosen because they had extensive knowledge and skills from their academic pursuits (Sedegah et al., 2024). They are more receptive to new chances and entrepreneurial initiatives because they consider their career prospects actively. The participants were selected using a convenience sampling method from educational institutions offering bachelor's degrees in tourism and hospitality. The questionnaire was distributed in Arabic to guarantee that participants comprehended the questions fully and could furnish appropriate replies. Two proficient translators with at least five years of experience specializing in English translated the questionnaire to ensure its precision and appropriateness for the target society. The study collected the data through an online questionnaire. The initial part of the questionnaire gathered demographic data (e.g., gender and age). In the second part, a 5-point Likert scale was employed to evaluate 45 research items, with responses ranging from 1 ("strongly disagree") to 5 ("strongly agree") (appendix A).

First, a pilot study involving 50 participants was conducted to measure the reliability of study factors. The results demonstrate that all constructs exhibited good internal reliability (Cronbach's alpha values ranged from 0.74 to 0.89). Therefore, the pilot study verified the reliability of the questionnaire items and established a solid basis for the second analysis phase. The second phase of the questionnaire collected 422 valid responses for further analysis.

Data analysis

The current study performed the requisite analysis through the utilization of two software, i.e., SPSS and AMOS. Missing Completely at Random test revealed the absence of missing information, and neither skewness nor kurtosis existed (Kline, 2015). Further, the study evaluated Composite Reliability (CR) and Cronbach's alpha to gauge the internal reliability of each latent variable construct (Fornell & Larcker, 1981). Further, the study evaluated Average Variance Extracted (AVE) to verify the convergent and discriminant validity of the constructs, with an AVE of 0.50 considered adequate for measuring validity (Hair et al., 2017). Confirmatory factor analysis was used to verify that multi-item scales are mapping onto the assumed underlying variables (Hair et al., 2020).

After this rigorous validation procedure was completed, hypotheses were tested using standardized path coefficients (ß) for quantifying the strength and direction of correlations between different factors (Hair et al., 2020).

RESULTS

Sample characteristics

Table 1 illustrates the demographic characteristics of the study's participants. Most of the 422 respondents were men (70.1%, n=296), with women accounting for 29.9% (n=126). A predominant 62.6% response was in the 18-21 age group, while 36.3% belonged to the 22-30 age group. 1.2% of responders were aged more than 30 years. Business engagement was significant among respondents, with 65.2% (n=275) participating in entrepreneurial initiatives, while 20.3% (n=86) possessing startup experience. Significantly, just 4.7% (n=20) had operated their enterprises, whereas 9.8% (n=41) indicated a lack of prior entrepreneurial experience. The findings show that, among the participants, the need for independence was a primary motivator for pursuing DE, cited by 48.6% (n=205). Financial achievement was another notable motive, recognized by 33.2% (n=140). In comparison, motives associated with innovation and social impact were less significant, with 11.8% (n=50) and 6.4% (n=27), respectively, recognizing these as primary motivators. Moreover, the participants predominantly possessed academic qualifications in hospitality (55.7%, n=235) and tourism (44.3%, n=187).

Table 1. Sample profile (Source: Created by authors)

Characteristics	Descriptions	Statistics	(%)
Gender	Male	296	70.1
	Female	126	29.9
Age	18-21	264	62.6
	22-30	153	36.2
	More than 30	5	1.2
Have you ever engaged in any tourism/hospitality entrepreneurship activities?	Yes, I have run my own business	20	4.7
	Yes, I have worked in a startup	86	20.3
	Yes, I have participated in projects (e.g., internships, competitions)	275	65.2
	No, I have no prior experience	41	9.8
What motivates you to consider digital entrepreneurship?	Desire for independence	205	48.6
	Financial success	140	33.2
	Opportunity to innovate	50	11.8
	Social impact	27	6.4
What is your department?	Hospitality	235	55.7
	Tourism	187	44.3

Measurements and model fit

Table 2 shows the results of standardized loading, AVE, CR, and Cronbach's alpha (a). First, this study found that all constructs have acceptable standardized loading values, exceeding the acceptable threshold of 0.70 (Hair et al., 2017). Second, all constructs had AVE values beyond the 0.50 threshold, affirming their precision in capturing the variance of their indicators and substantiating their convergent validity (Hair et al., 2020).

Table 2. Analysis of measurement model (Source: Created by authors) (Note: All factor loadings were significant at ≤ .001; CR = Composite Reliability (≥ 0.70); Cronbach alpha (≥ 0.70); AVE = Average Variance Extracted (≥ 0.50).)

Constructs	Standardized loading (t value)	AVE	CR	Cronbach alpha
Attitude		0.56	0.79	0.73
ATT1	0.75			
ATT2	0.79			
ATT3	0.72			
Subjective norm		0.57	0.80	0.74
SN1	0.85			
SN2	0.70			
SN3	0.72			
Perceived behavior control		0.63	0.84	0.73
PBC1	0.83			
PBC2	0.74			
PBC3	0.82			
Self-efficacy		0.59	0.81	0.80
SE1	0.84			
SE2	0.70			
SE3	0.77			
Digital literacy		0.58	0.89	0.84
DL1	0.82			
DL2	0.75			
DL3	0.72			
DL4	0.77			
DL5	0.74			
DL6	0.80			
Performance expectancy		0.74	0.89	0.88
PE1	0.85			
PE2	0.89			
PE3	0.85			
Effort expectancy		0.62	0.83	0.83
EE1	0.70			
EE2	0.83			
EE3	0.83			
Social influence		0.59	0.81	0.77
SI1	0.73			
SI2	0.80			
SI3	0.78			
Facilitating conditions		0.56	0.83	0.79
FC1	0.80			
FC2	0.79			
FC3	0.71			
FC4	0.70			
Hedonic motivations		0.68	0.86	0.87
HM1	0.79			
HM2	0.85			
HM3	0.84			
Price value		0.61	0.76	0.76
PV1	0.78			
PV2	0.79			
Habit		0.60	0.75	0.75
HB1	0.76			
HB2	0.79			
Personal innovativeness		0.64	0.79	0.79
PI1	0.77			
PI2	0.75			
PI3	0.73			
Digital entrepreneurship intention		0.60	0.86	0.82
DEI1	0.78			
DEI2	0.86			
DEI3	0.73			
DEI4	0.74			

Finally, Cronbach's alpha and CR further validate the measuring model's robustness in that all constructs achieved values over 0.70 (Fornell & Larcker, 1981). The measurement model's adequacy was assessed using several fit indicators, as defined by Hair et al. (2020). The comparative chi-square (χ^2/df) was 2.68, and the model fitted well because it is less than the generally accepted level of 3.0. It was achieved when the model was 2293.5 with 854 degrees of freedom ($p < 0.001$), which presents clear-cut evidence against the null hypothesis of lack of fit.

Besides the chi-square statistic, several other fit values were used to measure how well the model fitted overall. There were five scores: 0.90 for the Adjusted Goodness-of-Fit Index, 0.91 for the Normed Fit Index, 0.92 for the Goodness-of-Fit Index, 0.91 for the Comparative Fit Index, and 0.94 for the Tucker-Lewis Index. All these high scores are over the 0.90 threshold, which gives confidence in the stability of the model. The final result was an RMSEA of 0.063, below the reasonable limit of 0.08. These fit values show that the model is stable and can be used for more hypothesis testing.

Further, Fornell & Larcker (1981) stated that the square root of the AVE for each construct should exceed the sum of all the relationships between that construct and all the other constructs to indicate the discriminant validity (Table 3). The correlation values, while indicating some positive relationships, do not meet the threshold for discriminant validity.

Table 3. Discriminant validity (Fornell & Larcker, 1981) (Source: Created by authors) (Note: All correlations are significant at $p < 0.001$.)

Constructs	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Attitude	**0.74**													
2. Subjective norm	0.33	**0.75**												
3. Perceived behavior control	0.33	0.32	**0.79**											
4. Self-efficacy	0.27	0.24	0.29	**0.76**										
5. Digital literacy	0.29	0.26	0.31	0.29	**0.76**									
6. Performance expectancy	0.38	0.31	0.35	0.33	0.33	**0.86**								
7. Effort expectancy	0.28	0.26	0.32	0.27	0.31	0.35	**0.78**							
8. Social influence	0.22	0.23	0.29	0.20	0.29	0.27	0.29	**0.76**						
9. Facilitating conditions	0.19	0.21	0.24	0.33	0.26	0.22	0.25	0.25	**0.74**					
10. Hedonic motivations	0.33	0.31	0.36	0.21	0.34	0.42	0.35	0.30	0.27	**0.82**				
11. Price value	0.33	0.28	0.32	0.31	0.32	0.39	0.32	0.28	0.25	0.44	**0.78**			
12. Habit	0.31	0.29	0.35	0.27	0.37	0.41	0.39	0.32	0.29	0.45	0.42	**0.77**		
13. Personal innovativeness	0.32	0.30	0.35	0.31	0.33	0.40	0.35	0.30	0.28	0.45	0.40	0.45	**0.80**	
14. Digital entrepreneurship intention	0.35	0.30	0.34	0.31	0.30	0.41	0.33	0.26	0.22	0.39	0.36	0.39	0.39	**0.77**

Hypothesis testing

The study examines the factors influencing the DEI of students in tourism and hospitality (Table 4 and Figure 2). Firstly, the study found a positive effect of the extended TPB on students' intentions towards DE. The research indicated that attitude positively influences DEI (H1: $\beta = 0.290$, $p < 0.001$; H2: $\beta = 0.163$, $p < 0.003$; H3: $\beta = 0.151$, $p < 0.003$; H4: $\beta = 0.331$, $p < 0.001$). These outcomes underscore the importance of encouraging an entrepreneurial mindset (e.g., social pressures, enhancing confidence in students' abilities and competencies, and providing needed resources) as a requirement for intention formation. Secondly, the findings demonstrate that digital literacy substantially increases students' intentions for DE (H5: $\beta = 0.659$, $p < 0.001$). This notable impact underscores the necessity of digital competencies in the modern entrepreneurial landscape, where expertise in digital tools and platforms is crucial for success.

Table 4. Path coefficients (Source: Created by authors)
(Note: *Absolute *t*-value > 1.96, p< 0.05; **Absolute *t*-value > 2.58, p< 0.01; ***Absolute *t*-value > 3.29, p< 0.001)

Hypothesis	Path	Standardized Coefficient	t-value	p-value	Conclusion
H1	Attitude □ Digital entrepreneurship intention	0.290	5.43	0.000***	Supported
H2	Subjective norm □ Digital entrepreneurship intention	0.163	3.02	0.003**	Supported
H3	Perceived behavior control □ Digital entrepreneurship intention	0.151	2.98	0.003**	Supported
H4	Self-efficacy □ Digital entrepreneurship intention	0.331	6.88	0.000***	Supported
H5	Digital literacy □ Digital entrepreneurship intention	0.659	15.36	0.000***	Supported
H6	Performance expectancy □ Digital entrepreneurship intention	0.387	9.06	0.000***	Supported
H7	Effort expectancy □ Digital entrepreneurship intention	0.203	4.15	0.000***	Supported
H8	Social influence □ Digital entrepreneurship intention	0.135	2.82	0.005**	Supported
H9	Facilitating conditions □ Digital entrepreneurship intention	-0.051	-1.013	0.311	Rejected
H10	Hedonic motivations □ Digital entrepreneurship intention	0.181	3.17	0.002**	Supported
H11	Price value □ Digital entrepreneurship intention	0.251	4.74	0.000***	Supported
H12	Habit □ Digital entrepreneurship intention	0.609	16.90	0.000***	Supported
H13	Personal innovativeness □ Digital entrepreneurship intention	0.334	5.73	0.000***	Supported

Finally, the study examined the impact of UTAUT3 on tourism and hospitality students' intentions to engage in DE. This study revealed that seven dimensions of the UTAUT3 model positively impacted students' DEI including performance expectancy (H6: $\beta = 0.387$, $p < 0.001$), effort expectancy (H7: $\beta = 0.203$, $p < 0.001$), social influence (H8: $\beta = 0.135$, $p < 0.005$), hedonic motivations (H10: $\beta = 0.181$, $p < 0.002$), price value (H11: $\beta = 0.251$, $p < 0.001$), habit (H112: $\beta = 0.609$, $p < 0.001$), personal innovativeness (H13: $\beta = 0.334$, $p < 0.001$). These findings mean that students are more likely to pursue DE if they believe that using digital technology has more advantages, find digital tasks more manageable, have established

digital entrepreneurial habits, enjoy the entrepreneurial process, value the cost-benefit ratio of DE, and are receptive to new ideas and technologies. However, the study found that facilitating conditions do not positively impact DEI (H9: β = -1.013, $p < 0.311$). The finding indicates that while access to resources is essential, students may not be fully aware of the supportive conditions accessible to them, or they may not regard these factors as pertinent to their entrepreneurial goals.

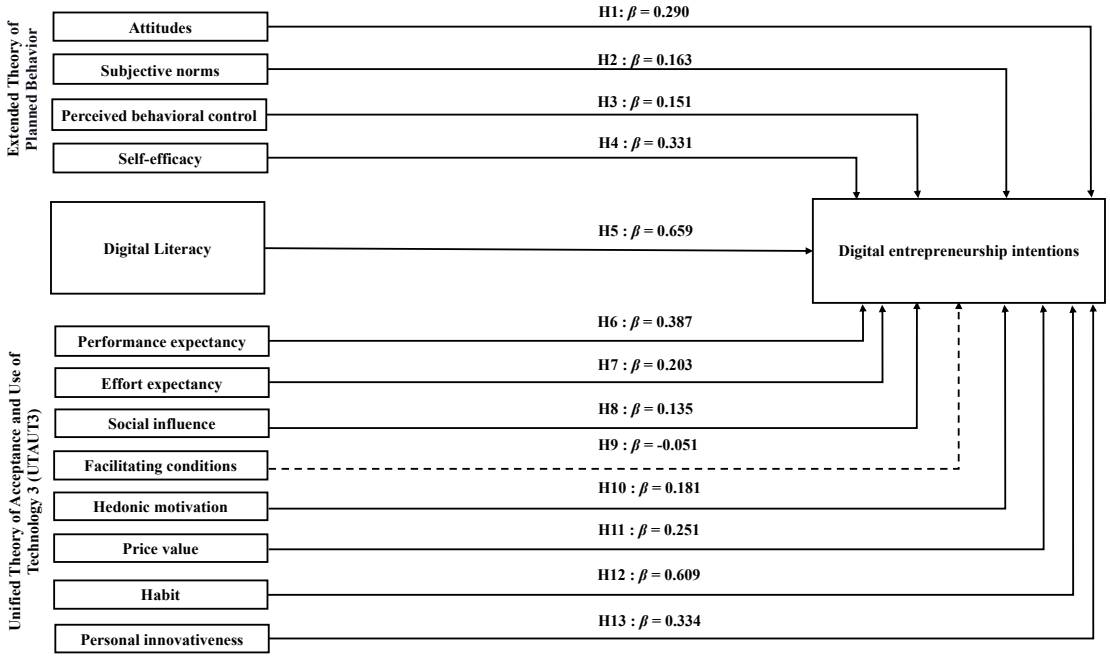


Figure 2. Structured framework (Note: Arrows show significant pathways, whereas dotted arrow indicates a nonsignificant path)

DISCUSSION AND IMPLICATIONS

Discussion

The current research seeks to determine factors influencing students' DEI in tourism and hospitality. The study found that extended TPB significantly explained students' DEI. The findings confirm Ajzen's (2020) TPB that positive attitudes would dominate the impact on behavioral intentions. Academic circles should put a lot of emphasis on cultivating students' entrepreneurial mindset. For example, curriculum showing successful entrepreneurs or a practical experience can raise the attitudes of students and make DE more attractive (Sedegah et al., 2024). Furthermore, the creation of an entrepreneurial culture enables students to achieve their aspirations by exerting a favorable impact on the subjective norms (Al-Jubari et al., 2021). Additionally, students can be motivated to apply DE more effectively by being given practical DE training and mentorship that supports their self-confidence (Sedegah et al., 2024).

Additionally, the study determined that digital literacy had a positive effect on DEI among tourism and hospitality students. This discovery aligns with past studies proving that digital literacy plays an essential role in effective work performance in the subsequent years (Shin & Kang, 2021). This result points out that these institutions need to add higher-level digital skills to their curriculum in order to enable students to engage in the digital economy and benefit from the new entrepreneurial opportunities (Safarov et al., 2024; Reddy et al., 2022). Thus, digitally skilled students are able to cope with the dynamics of the digital business environment, using web-based tools in order to engage in DE projects. The study confirmed the positive influence of social influence on student intention towards pursuing DE.

Furthermore, the research revealed that all dimensions of the UTAUT3 model positively influence the students' DEI, except (i.e., facilitating conditions). A significant relationship existed between students' intentions to participate in DE and performance expectancy. This result implies that students are more inclined to engage in digital entrepreneurial ventures when convinced that digital technologies will result in improved productivity and performance, consistent with the findings of Battisti et al. (2022). Similarly, effort expectancy positively influenced students' DEI, suggesting that students are more ready to employ digital tools when they perceive them as user-friendly. This outcome agrees with the findings of Allawi & Alyouzbaky (2024), which emphasize that more straightforward and user-friendly technologies reduce entry barriers. Thus, educators should prioritize demonstrating the tangible advantages and simplicity of digital tools to motivate a more significant number of students to pursue DE (Svenningsson et al., 2021).

Based on Ali et al. (2022) findings, students are strongly encouraged to venture into DE through peer pressure, mentorship, and societal encouragement. Mentorship programs and peer interactions can significantly impact the entrepreneurial aspirations of students by developing a supportive ecosystem (Banerjee & Ho, 2019). However, the study failed to find any positive association between facilitating conditions and the DEI of the students. This reveals that the students need to learn about the resources they possess in order to participate in DE. Hence, learning institutions should unite and raise awareness about the favorable conditions (Neumeyer et al., 2021). Additionally, the study established that hedonic motivation and price value positively affect the intentions of the students to participate in DE. Students who perceive a favorable cost-benefit ratio and enjoy utilizing digital technology use technologies in their digital initiatives, consistent with findings from

Yeganegi et al. (2021) and Sahut et al. (2019). Additionally, the habit was determined to impact students' DEI significantly. Students who consistently utilize digital technologies are keener to include them in their work (Pinto et al., 2022). Finally, personal innovativeness significantly impacts students' DEI. Thus, schools need to promote creativity, innovativeness, and experimentation for developing students' innovativeness to engage in DE (Alkhalaileh et al., 2023).

Theoretical implications

This study complements the theoretical tourism and hospitality DE literature by examining students' DEI. This study contributes to the perspectives of implementing the TPB in the DE context. Mir et al. (2022) pointed out that technology access, privacy and security concerns, and social media online reviews can affect different perceptions of TPB in the digital context. For example, issues related to data breaches and online privacy might deter students from setting up online businesses (Helal et al., 2024). Student behavior in the online environment has, therefore, evolved, and universities must introduce different support and teaching programs that place emphasis on privacy and security issues. Moreover, integrating self-efficacy with TPB aspects highlights students' confidence in their future entrepreneurial capabilities. Hence, extended TPB enhances the comprehension of how students' behavior integrates with digital aspects to establish entrepreneurial intentions (Shang et al., 2023). Additionally, the study contributes to the literature by illustrating that digital literacy is not only a technical competency but also a critical factor in influencing entrepreneurial intentions and competencies.

For instance, acquiring data analysis skills enables future entrepreneurs to evaluate and capitalize on data insights, promote evidence-based decision-making, and enhance business plans in relation to consumer behavior and market trends (Reddy et al., 2022). This result highlights the imperative of integrating digital literacy skills into entrepreneurship curricula and training programs. Furthermore, the study makes a significant contribution to technology adoption and entrepreneurship research in the tourism and hospitality sectors using UTAUT3. The study illustrates that UTAUT3 factors are essential in understanding potential entrepreneurs' perceptions and utilization of digital assets. UTAUT3 constructs assume more importance in an entrepreneurial context since entrepreneurs depend greatly on technology for innovation, scaling, and competition.

Managerial implications

The conclusions derived from the current study provide some managerial implications to help tourism and hospitality training schools in advancing students' DEI. For example, schools must create curricula that introduce students to the advantages of DE and expose them to practical experiences highlighting the benefits. Thus, students will become professionalized and achieve self-actualization, motivating and encouraging them to follow their entrepreneurial aspirations upon hearing success stories and participating in experiential learning (Sedegah et al., 2024). Further, according to Al-Jubari et al. (2021), entrepreneurship clubs, collaboration platforms for peers, and mentoring initiatives provide social support to students necessary to progress on their entrepreneurial pursuits. In addition, learning programs can ready students for DE by embedding sophisticated digital competencies in the learning curriculum, such as data science analytics, AI software, and social media literacy (Reddy et al., 2022). It is also important for institutions to offer students hands-on DE training to enhance their self-efficacy and behavioral control. Hands-on education, such as entrepreneurship training and internship, would have a dramatic impact on boosting the confidence and faith of students in their entrepreneurial activities (Wu et al., 2020).

In addition, institutions can emphasize the benefits of digital technology, which may reduce perceived barriers to DE. In addition, educational institutions should set up a strong infrastructure for entrepreneurship that encourages students to participate in DE (Banerjee & Ho, 2019). For instance, fostering business aspirations requires support from entrepreneurship incubators. Similarly, educational programs must encourage students to utilize digital technology regularly since the more these tools are incorporated into students' daily lives, the more likely they are to use them for business ventures. Luong & Lee (2021) stated that developing entrepreneurial ambitions requires fostering personal innovativeness by promoting creativity and experimentation. Accordingly, emphasizing benefits and offering required assistance increases students' inclination to participate in DE (Allawi & Alyouzbaky, 2024).

However, findings revealed that while facilitating conditions were expected to impact students' DEI positively, this relationship was not statistically significant. This result indicates that students may need help recognizing available resources (e.g., financial, training, mentorship, technological, and market research). Therefore, institutions and policymakers must enhance awareness and guarantee that students know about accessible resources (Neumeyer et al., 2021).

CONCLUSION

This study investigated the factors influencing digital entrepreneurial intention (DEI) among Egyptian tourism and hospitality students through an integrated theoretical framework combining the extended Theory of Planned Behavior (TPB), digital literacy, and the Unified Theory of Acceptance and Use of Technology 3 (UTAUT3). The research analyzed data from 422 final-year undergraduate students and revealed that the extended TPB framework, digital literacy, and most UTAUT3 dimensions (except facilitating conditions) significantly predict students' DEI. The findings demonstrate that students with positive attitudes toward digital entrepreneurship, strong social support, high self-efficacy, advanced digital competencies, and favorable perceptions of technology benefits are more likely to pursue digital ventures.

These results offer generalizable insights for tourism and hospitality education systems worldwide, suggesting that developing digital entrepreneurial mindsets requires integrating entrepreneurship education with digital literacy training, emphasizing practical experience and mentorship, and ensuring student awareness of available support resources. The theoretical framework can be adapted across different cultural and economic contexts, though the relative importance of factors may vary based on collectivist versus individualist orientations and entrepreneurial ecosystem development.

The study contributes to understanding how behavioral, technological, and skill-based factors combine to influence entrepreneurial intentions in digital contexts, providing a foundation for educational institutions globally to develop targeted curricula and support programs that enhance students' digital entrepreneurial capabilities and prepare them for the evolving digital economy in tourism and hospitality sectors.

Limitations and further research

The study provides several avenues for future investigation due to its limitations. This study focuses on factors affecting tourism and hospitality Egyptian students' DEI. Thus, Comparative studies of tourism and hospitality students from various nations might reveal how cultural, economic, and educational aspects affect their DEI. Further, subsequent studies might examine the influence of other factors, such as government legislation, good governance, industry trends, personality traits, and technical breakthroughs, on students' intentions to pursue DE. Ultimately, qualitative research approaches, such as interviews or focus groups, enhance quantitative findings by delving deeper into students' experiences and motivations.

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CULTURAL HERITAGE PRESERVATION IN RESOURCE-RICH TERRITORIES: CHALLENGES AND SUSTAINABLE DEVELOPMENT PATHWAYS

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Abstract: The present article provides an interdisciplinary assessment of cultural heritage preservation in resource-rich territories, focusing on Kazakhstan's Aktobe Region as an emblematic case of the tensions and synergies between natural resource exploitation and heritage conservation. Despite the fact that Kazakhstan is home to over 25,000 registered cultural heritage sites, the protection of these sites is constrained by industrial pressures, insufficient institutional capacity, limited community engagement, and fragmented regulatory mechanisms. These challenges are particularly pronounced in regions with high concentrations of mining, oil, and gas activities. In such areas, technogenic transformations, landscape degradation, and environmental stressors have a detrimental effect on the integrity of archaeological, architectural, and museological assets. The study employs a systematic qualitative review based on PRISMA 2009/2020 guidelines. A total of 85 peer-reviewed sources published between 2000 and 2025 across heritage studies, geography, sustainability science, and environmental governance have been synthesised. A comparative analysis of international contexts demonstrates that developed countries are increasingly integrating adaptive reuse, heritage impact assessments, climate-risk adaptation, and participatory governance into heritage management systems. In contrast, post-Soviet states, including Kazakhstan, continue to encounter structural impediments such as legislative inconsistency, inadequate funding, and ineffective coordination between heritage authorities and extractive industries. The findings indicate that cultural heritage can function as a strategic catalyst for sustainable territorial development when integrated within governance models that combine legal protection, ESG-aligned corporate responsibility, community-based stewardship, and spatial planning. In the context of territories with abundant natural resources, achieving a balance between economic growth and heritage conservation is not merely a preservation task; rather, it is an essential prerequisite for ensuring long-term socio-ecological resilience and the formation of regional identity.

Keywords: cultural heritage preservation, resource-rich territories, sustainable development, industrial landscape transformation, heritage governance, Aktobe region, adaptive reuse

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INTRODUCTION

In Kazakhstan, cultural heritage encompasses both tangible objects (architectural monuments, historic landscapes) and intangible forms (traditions, cultural practices). More than 25 000 historical and cultural heritage objects are registered in the country, including 265 monuments of republican significance and over 12 000 of local significance (Ministry of Culture & Information of the Republic of Kazakhstan, 2025). Insufficient development of buffer zones, inconsistent enforcement of protection standards, and limited involvement of local communities and specialists complicate the protection of this heritage. Added to this, domestic literature notes a shortage of qualified personnel, bureaucratic procedures, and inadequate funding for restoration projects (Rizakhojayeva, 2021; Abdikarimova et al., 2025). In regions with high natural-resource potential – for example, the western regions of Kazakhstan with significant oil, gas and mineral sectors – additional pressures arise from intensive resource use, industrial load, infrastructure development and tourism flows, which may degrade heritage conditions (Imankulov, 2024; Moldagaliyeva et al., 2024; Issakov et al., 2025).

In distant abroad contexts – such as the USA, Western Europe, China and Japan – cultural heritage preservation faces its own distinctive challenges even within well-resourced systems. In the USA and Western Europe, despite strong institutional capacity, issues of adaptive reuse of heritage buildings, conflicts between infrastructure expansion and heritage

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conservation, mass tourism pressure, climate change impacts, and ageing heritage stock are prominent (Min, 2025; Zhang, 2024; Kostakis, 2024; Tost, 2021; Kostakis & Lolos, 2024).

In East Asia, for instance in China, rapid urbanisation, industrialisation, heavy tourism flows and environmental impacts are placing significant strain on the historic fabric of cities and cultural landscapes; for example, studies of the "Forbidden City" highlight the combined threats of environment change, pollution and redevelopment on heritage (Zhang, 2024; Li, 2025; Saifi, 2025; Van Tricht et al., 2025; Mekonnen et al., 2022; Chen, 2023)

In the near abroad – countries such as Belarus, Russia, Kyrgyzstan and Uzbekistan – we observe a mixture of post-Soviet legacies and globally common heritage concerns. In Russia and Belarus, research points to legislative and institutional weaknesses: heritage legislation is not always systematically integrated, monitoring and public engagement mechanisms remain weak, and heritage is often under-financed (Martynenko & Trofimova, 2019). In Central Asian neighbours (Kyrgyzstan, Uzbekistan), challenges include lack of resources, weak integration of heritage into sustainable territorial development, limited assessment of natural-resource and cultural-heritage potential, and the risk of heritage compromise due to resource extraction or heavy land-use transformation (Imankulov, 2024; Nazarov, 2020; Oktyabrskaya et al., 2024; Hølleland, 2017). In all these countries of the near abroad, the central issues revolve around how to balance economic development – especially in resource-oriented territories – with preservation of cultural and natural heritage. Across these geographical contexts, common themes emerge – institutional capacity, funding, community engagement, monitoring, environmental stressors – but each context has its own local variations and priorities.

In the contemporary world, the topic of cultural heritage preservation is of growing importance for multiple reasons.
First, globalization, rapid urbanisation, industrialisation and infrastructure development impose intense pressure on historical fabrics, landscapes and cultural practices – leading to loss of authenticity, destruction or alteration of cultural spaces (Seila, 2025; Rodrigues, 2025; Andrade et al., 2024; Lucia & Pashkevich, 2023). Second, cultural heritage is increasingly recognised as a resource for sustainable development: it supports identity, social cohesion, tourism attractiveness, economic growth and resilient territorial development (Rhodes, 2024; Wang et al., 2025; Fouseki, 2022; Soeswoyo, 2025).

Third, territories that are rich in natural resources face a double-pressure scenario: on one hand they host abundant heritage and landscapes; on the other, they experience intense resource use (mining, extraction, infrastructure) which may negatively impact both cultural and natural heritage. Forestry, mining, oil and gas, heavy tourism and development can degrade landscapes, displace communities, erode cultural practices and undermine heritage integrity. Moreover, climate change and environmental stressors amplify threats – increasing frequency of extreme events, shifting landscapes, rising pollution levels – all of which demand that cultural heritage be integrated within sustainability agendas (Harfst, 2025; Somoza-Medina, 2021; Chiodi et al., 2025). Additionally, international initiatives such as programmes by UNESCO emphasise the linkages between culture, nature and sustainable development, making heritage preservation central in research, policy and practice globally (Min, 2025). Given the strategic value of heritage for territorial development, especially in regions with high natural-resource potential, the theme is not only academically timely but also practically urgent (Guo, 2024; Vandelli et al., 2024; Vadrucci, 2025; Geçikli, 2024; Aldybayev et al., 2021).

METHODOLOGY

This review was conducted using a systematic, qualitative methodology to synthesize interdisciplinary scientific knowledge on the relationship between abundant natural resources, sustainable development, and the role of cultural heritage conservation. The methodology was based on the general principles of transparency and replicability, developed in accordance with the PRISMA guidelines (2009/2020) and adapted for conceptual sociological and geographical reviews. Literature selection and analysis were conducted in four stages: identification, screening, eligibility, and inclusion (Figure 1).

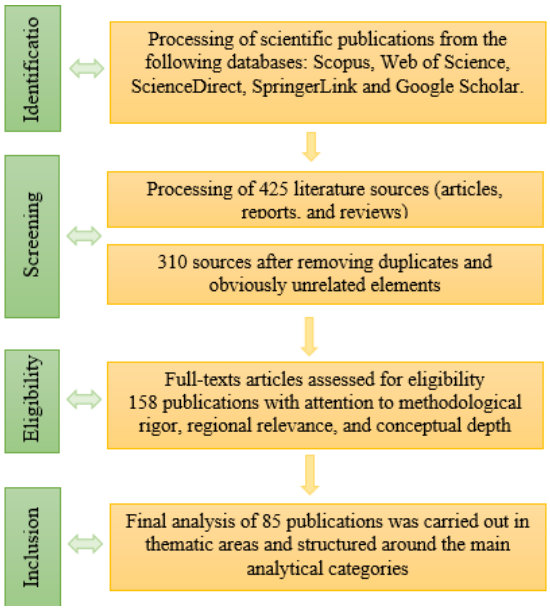


Figure 1. PRISMA 4-phase flow diagram of the literature selection process (Source: own construction)

Identification: A targeted search strategy was developed to identify peer-reviewed journal articles, conceptual papers, and systematic reviews published between 2000 and 2025. The review focused on papers examining cultural heritage, sustainable development, and natural resource potential. The following databases were used: Scopus, Web of Science, ScienceDirect, SpringerLink, and Google Scholar. Search terms included keywords such as technogenesis, sustainable development, recreation, industrial zones, steppe ecosystems, biodiversity, and green infrastructure. The initial search yielded 425 articles, reports, and reviews, of which 310 were retained after removing duplicates and obviously unrelated items.

Selection: Records were screened based on titles and abstracts to assess relevance. Inclusion criteria: (a) publications in English; (b) published in peer-reviewed journals or academic collections; (c) a substantive examination of the interactions between anthropogenic impacts and natural ecosystems; (d) an examination of recreational or protected areas in a post-industrial or technogenic context; and (e) a contribution to conceptual, theoretical, or applied ecological and spatial approaches. Exclusion criteria included publications narrowly focused on technical engineering solutions, case studies without a broader theoretical approach, and non-peer-reviewed "gray" literature. At this stage, 158 publications were selected for full-text assessment. Selection requirements: The full texts of 173 publications were reviewed based on methodological rigor, regional relevance, and conceptual depth. Each article was evaluated based on whether it addressed: (1) cultural heritage preservation; (2) sustainable regional development; and (3) natural resource potential. Particular attention was paid to articles presenting comparative case studies from different countries, in particular Kazakhstan, Germany, China, South Korea, the United States, and others. As a result, 85 works were selected, including systematic reviews, theoretical articles, and case studies relevant to policy and planning.

Inclusion and analysis: The final corpus of 85 articles was analysed thematically and structured around the main analytical categories defined in the "Literature Review" section: cultural heritage preservation, natural resource-based and restoration strategies, and sustainable development. Data were obtained taking into account geographical focus, methodological approach (where applicable), and conceptual contributions. The selection covers a range of disciplinary areas: geography, cultural studies, ecology, environmental science, and regional development, providing an interdisciplinary synthesis.

Most of the included works were published in high-impact journals such as GeoJournal of Tourism and Geosites, Sustainability, Ecologies, and Environment and Planning, demonstrating the academic quality and relevance of the sources. Several studies were funded by the government or linked to environmental organisations, reflecting both academic and applied significance. Where necessary, visual data such as satellite imagery, geospatial modelling and environmental indicators were taken into account, although the main focus of this review is on the conceptual and policy aspects.

The entire selection process was documented and conducted by a team of seven researchers with expertise in landscape planning, cultural heritage, urban geography, and environmental policy. Consistency among reviewers was ensured through double-checking inclusion criteria and joint synthesis of themes.

The result is a robust, comprehensive and globally contextualised analysis of the relationship between resource potential and cultural heritage in the context of sustainable territorial development.

LITERATURE REVIEW

In the distant abroad, research on heritage conservation is well-established in Europe, North America and Asia. For example, in Europe and the USA scholars have explored adaptive reuse of heritage buildings and the integration of heritage into urban planning and sustainable development. Koch (2024) emphasises that major contemporary threats to heritage include climate change, tourism pressure and governance deficiencies.

In a recent bibliometric review, Min (2025) analyses how the field of cultural heritage management has evolved from site-based conservation toward systemic urban policy integration, community participation and socio-ecological approaches. In East Asia, Zhang (2024) presents a systematic review of cultural route heritage in China, offering insights into heritage management in resource-intensive contexts and globalised tourism flows.

In the near abroad, researchers in the post-Soviet space have addressed the institutional, legal and community aspects of heritage conservation. For instance, Martynenko & Trofimova (2019) analyse legislative frameworks in Russia and Belarus and identify systemic weaknesses in regulation, oversight and economic integration of heritage. Volkova et al. (2025) examine heritage preservation amid rapid urbanisation and tourist flows in Russia's Krasnodar Territory, highlighting the interplay between heritage, ecological systems and sustainable development. Central Asia more broadly has begun to feature in the literature: Imankulov (2024) looks at restoration and reconstruction of architectural heritage in Kazakhstan and Central Asia, stressing threats from globalization, urbanisation and environmental change.

In Kazakhstan specifically, several recent studies provide relevant empirical and theoretical contributions. Kadyrbekova et al. (2023) evaluate how Kazakhstan's rich cultural heritage can be strategically used to stimulate domestic tourism and national pride, offering a systematic methodology and policy recommendations. Aldybayev (2021) discusses current problems of cultural policy and heritage preservation in Kazakhstan tied to the Silk Road legacy, noting shortages of specialists, funding and effective integration. Abdikarimova et al. (2025) examine the role of ethnic tourism in preserving Kazakhstan's cultural heritage and local traditions, discussing both benefits and risks such as commercialisation and authenticity loss. Together, these bodies of work – in distant, near and national contexts – establish a foundation from which the present review builds; yet there remains a gap in explicitly addressing the intersection of cultural heritage preservation in territories with high natural-resource potential, which is the focus of this article.

The Aktobe Region in western Kazakhstan presents a remarkable case of a territory combining significant natural resource wealth and the attendant development pressures associated with resource exploitation. The region boasts

abundant mineral and hydrocarbon potential: it plays a leading role in Kazakhstan's reserves of chromium, nickel, titanium and phosphates, while also hosting significant oil and gas deposits. For example, the region is cited as comprising the full periodic-table of useful minerals in Kazakhstan, with reportedly more than half the national nickel reserves, over one-third of phosphates, and the bulk of chromium ore (SPK-Aktobe, n.d.).

Exploration and mining of chromite deposits around the town of Khromtau are well-documented: the Kempeirsai deposit in Karagaly district is estimated to hold over 300 million tons of Cr_2O_3-bearing rock. These metal-rich deposits support a cluster of processing and beneficiation plants, notably the chrome ore-processing complex in Khromtau and the metallurgical works near the city of Aktobe. In parallel, the region's hydrocarbon sector remains active, with oil and gas extraction contributing to regional GDP and attracting associated infrastructure development and logistics.

This combination of metal mining, ore processing, hydrocarbon production, and industrial infrastructure frames the Aktobe Region as a classic "resource-rich territory" (i.e., endowed with substantial natural capital) and raises several implications for both economic development and cultural heritage management. On the one hand, resource extraction brings investment, employment, infrastructure (roads, rail, power), and economic diversification possibilities beyond mere raw export. On the other, it also generates a high level of environmental and socio-spatial transformation: tailings and processing waste, changed landforms, increased transport routes, heavy industrial emissions, and alteration of natural and historical landscapes. Research on mining impacts in the Aktobe Region indicates that chromium-ore extraction in the Khromtau area has led to significant environmental burdens – landscape change, soil degradation, groundwater contamination – which in turn may affect heritage landscapes and archaeological sites situated in or adjacent to mining concessions (Berdenov et al., 2025; Beketova, 2019; SPK-Aktobe, 2023).

The dual character of the territory – abundant natural resources and significant cultural/historical assets – places the region at a crossroads of sustainable development. The challenge lies in reconciling efficient resource utilisation (and its economic benefits) with the conservation of cultural heritage, which itself constitutes a form of territorial capital. In the literature on resource-rich regions, scholars emphasise that such territories are exposed to the so-called "resource curse" or dependency risk, but that effective governance mechanisms can convert natural resource wealth into broader sustainable development outcomes (Kostakis & Lolos, 2024; Min et al., 2025). In the case of Aktobe, the interplay between resource extraction, industrial infrastructure, and heritage conservation presents a fertile field for investigation: how to integrate the management of cultural heritage into a region undergoing rapid resource-led transformation? The current review aims to situate the Aktobe Region within this conceptual framing and explore how the literature on heritage preservation in resource-intensive contexts can draw lessons for this territory.

The Aktobe Region hosts a diverse array of cultural heritage monuments and sites that reflect its deep historical roots, ethnocultural significance and evolving identity. These heritage assets range from ancient archaeological settlements, architectural monuments, museological institutions, to Soviet-era memorial complexes (Berdenov et al., 2025). For example, the region contains the ancient settlement of Balasagun (though more commonly referenced in Kyrgyzstan, but related legacy settlement patterns exist locally) and other early medieval fortifications, which illustrate regional links to the historic Silk Road and nomadic cultures. In the urban centre of Aktobe, key monuments include the mausoleum of Abulkhair Khan, a memorial complex commemorating Kazakh unity and statehood, and the Republican-level "Alley of Heroes" memorial dedicated to the Great Patriotic War, featuring multiple stelae and sculptural works (Jelen, 2022; Koch, 2024; Nastou, 2024; Zhang et al., 2024). Museums play a critical role in the region's heritage ecosystem: the Regional Museum of History and Local Lore in Aktobe holds artifacts from Syntashta culture and Scythian/Sarmatian burial mounds. Furthermore, the region reports approximately 75 cult-objects (temples, mosques, memorials), including 27 of national significance and 48 of local significance (SPK-Aktobe, 2023).

These sites carry multiple layers of value: historical-archaeological value (ancient settlements, burial mounds), architectural and artistic value (mausolea, memorial sculpture, places of worship), social and educational value (museums, memorial complexes), and touristic and regional-branding value (heritage sites as destination assets). Their spatial distribution is noteworthy: many lie either in the city of Aktobe or its immediate surroundings, while others are located in more remote districts adjacent to mining or processing industrial zones. This spatial proximity to resource extraction zones creates tensions but also offers opportunities around heritage and industrial tourism composites.

From a heritage management perspective, the Aktobe Region thus combines urban and rural heritage assets, national and local monuments, and a territorial spread that intersects with resource-intensive land use. This raises questions about buffer zones, monument monitoring, industrial encroachment, stakeholder capacities (local communities, mining companies, heritage agencies) and funding regimes. For heritage to function as a lever of sustainable territorial development in Aktobe – not just as a passive legacy but as an active asset-these issues must be addressed.

Resource-rich territories face distinct dynamics when it comes to cultural heritage preservation. The presence of high natural-resource endowments leads to intensified extraction, industrial infrastructure, transport connectivity (roads, rails, pipelines), and sometimes large population influx or transient workforces. This development footprint often overlaps with heritage landscapes, archaeological sites, and traditional ways of life. In the distant abroad (for example Western Europe, the USA, Japan, China), scholars have documented how mining, heavy industry and urban sprawl intersect with heritage conservation. For instance, adaptive reuse of industrial heritage in Western Europe has become a key strategy: old factories and mining sites are repurposed into museums, cultural venues and tourism destinations (Koch, 2024). In the USA, the National Historic Preservation Act and related frameworks mediate the conflict between infrastructure development and heritage preservation; yet mass tourism, climate change, and urban expansion remain persistent threats

(Yiamjanya et al., 2024; Dmitriyev, 2022; Nikolić et al., 2024). In East Asia, the phenomenon of rapid urbanization and infrastructural build-out has placed enormous stress on cultural heritage corridors – e.g., in China the upgrading of Silk Road heritage sites is challenged by the demands of industrial corridors and high-volume tourism flows (Zhang, 2024).

In Kyrgyzstan and Uzbekistan, mining and large-scale infrastructure (e.g., hydropower, open-pit mining) have intersected with ancient settlement zones and Silk Road heritage sites; often heritage protection is secondary to economic development. Across global contexts, several regulatory and stakeholder-based models for heritage-resource territory interaction have emerged. First, state regulation: in many countries cultural heritage is legally protected via dedicated laws, administrative structures (ministries of culture, heritage agencies), and listing systems. These laws typically include duties for heritage impact assessments (HIAs) before industrial projects, buffer zone requirements, monitoring regimes, and penalties for damage. For example, in China the "Principles for the Conservation of Heritage Sites in China" outlines a methodological framework for heritage site conservation. Second, international organisations: the UNESCO World Heritage Convention (1972) sets global standards, promotes heritage as part of sustainable development, and provides technical assistance and funding for heritage in vulnerable or resource-intensive zones (Hølleland, 2017).

Third, corporate and private-sector initiatives: mining and oil-gas companies increasingly integrate heritage management into their ESG (environmental, social, governance) policies – commissioning archaeological surveys, financing site stabilization, partnering with local museums or communities, and participating in heritage tourism projects.

Fourth, local/community initiatives: increasingly recognised as vital to heritage resilience, community-driven approaches empower local stakeholders, enhance cultural continuity, and can mediate between resource development and heritage protection (Banda, 2024; Abeywickrama, 2024; Hernández-Escampa, 2024; Hussein et al., 2025).

In resource-rich territories, the regulatory challenge is to ensure that heritage conservation is not marginalised during rapid extraction and infrastructure build-out. Buffer zone delineations, cumulative impact assessments, adaptive reuse strategies (for industrial heritage), integration of heritage into regional economic diversification (heritage tourism, cultural industries) and stakeholder partnership models are key. The literature (Seila, 2025; Koch, 2024) identifies 29 factors undermining effective heritage management, including legislative weakness, limited funding, stakeholder exclusion, environmental hazards, and industry dominance.

For example, in Western Europe many former mining sites (coal, metal) have been converted into industrial-heritage parks, museums and cycle-tourism routes, thus aligning resource legacy with heritage value. In contrast, in many post-Soviet contexts the absence of coherent heritage-industry governance means that industrial expansion often overrides heritage protection. Hence, the Aktobe Region's feature as a territory with significant resource extraction and processing (chromium, nickel, oil & gas) needs to adopt regulatory practices that incorporate heritage impact evaluation, industrial-heritage synergy (e.g., mining heritage as tourism asset), community participation and public-private partnerships.

In sum, cross-national experience shows that for territories with high natural-resource potential, preserving cultural heritage demands multilayered regulation: legal frameworks, international standards, corporate accountability, community engagement, and integration into sustainable development pathways. The Aktobe Region can draw lessons from distant and near abroad contexts to develop a heritage-resource interface that supports both economic development and cultural resilience.

In Kazakhstan, the legal and institutional framework for cultural heritage preservation is anchored in the Law of the Republic of Kazakhstan "On Cultural Heritage" (Law of the Republic of Kazakhstan, 2020) which defines objects of cultural heritage, procedures for registration, buffer zones, modes of state protection, and liability for violations. Under this law, cultural heritage includes tangible monuments of material culture, sites, structures, and landscapes, as well as intangible cultural heritage components. Additional regulatory mechanisms include the Regulation on the Implementation of State Protection of Monuments of History and Culture, which sets out the operational procedures for monuments' listing, monitoring and restoration. Regional executive bodies (akims), local heritage management units, and the Ministry of Culture and Information are responsible for the implementation of heritage policy.

In practice, for a region such as Aktobe, registration of monuments, delineation of protective zones, state-budgeted restoration funding, and public-private cooperation frameworks operate in concert with mining and industrial sectors. For example, the regional investment portal indicates that Aktobe Region lists 75 cult-objects, of which 27 are national-level and 48 local-level (SPK-Aktobe, 2023). However, several authors have pointed to implementation gaps: insufficient funding, limited capacity in local heritage units, and weak integration between industrial development planning and heritage protection frameworks (Abdikarimova, 2025). Moreover, buffer zones around mining or industrial areas may not always be appropriately defined or monitored, causing risk to adjacent heritage assets. The Kazakhstan regulatory model is gradually evolving towards integrated territorial planning – combining heritage conservation, industrial zones, tourism development and community participation – but still requires stronger mechanisms for heritage-industry interface, monitoring of heritage condition, and alignment with sustainability agendas.

Preserving cultural heritage is increasingly recognised not only as a cultural mission but as a strategic component of sustainable territorial development – especially in regions facing resource-intensive economies. Heritage assets can contribute to the so-called triple bottom line of sustainability: social (identity, community participation), economic (tourism, creative industries, heritage branding) and environmental (conservation of landscapes, cultural-natural interlinkages). Empirical evidence supports the positive relationship between heritage and regional economic growth: Kostakis & Lolos find that in Greece regions with higher cultural heritage endowment exhibited stronger growth over 2000-2019 (Kostakis, 2024). This suggests that heritage functioning as regional asset can diversify economic base away from resource dependency. In Western Europe, industrial heritage diversification (e.g., former coal mines re-imagined as

museums and visitor centres) is well documented, transforming resource-exhaustion zones into cultural-tourism clusters and thereby reinforcing resilience. This task assumes particular importance in the Aktobe region.

The region is abundant in mineral resources and home to significant mining and processing enterprises. Concurrently, it possesses a rich cultural and historical heritage that has not yet been adequately incorporated into regional development initiatives. In this context, the preservation of cultural heritage can become a connecting element between the resource economy, territorial identity and sustainable development paths (Volkova et al., 2025; Jelen, 2022).

Archaeological discoveries from the Hunnic-Sarmatian period in the Aktobe region substantiate this hypothesis. In the Kobda district, the Derbisali burial ground, dating from the 2nd to 4th centuries AD, was discovered. It contained a military sabre, wooden and faience vessels, silver jewellery and household items. Given the presence of approximately 400 burial mounds dating back to the Hunnic-Sarmatian period within the region, these sites possess significant potential as archaeological monuments. These sites have the potential to serve as the foundation for the development of archaeological tourism, museum exhibitions, educational routes, and the integration of the territory into its brand identity. Consequently, archaeological heritage transcends its role as a mere monument, becoming an asset with the potential to generate social and economic value (Beketova et al., 2019).

A further salient aspect pertains to the region's industrial heritage, which is frequently disregarded yet harbours considerable potential for sustainable development. There are several such sites in the Aktobe region:

1. The Algin Chemical Plant, a manufacturing facility in the chemical industry, is currently either operating at a reduced capacity or partially operational. Its infrastructure, buildings and production lines may be of historical interest as evidence of the Soviet/post-Soviet industrial era and the technological modernisation of the region (Berdenov et al., 2025).
2. The Mamyta Coal Mine, a coal mine and coal enterprise, was historically an important part of the industrial complex of the Aktobe region. The abandoned or partially operational mine exhibits features indicative of industrial heritage, including kopras, tunnels, conveyors, and miners' residential settlements.
3. The Kromtau district is renowned for its nickel, chromium and other metal deposits, which are extracted from the region's quarries. The most notable of these deposits are Nikeltau Quarry and Badamshi Quarry, which are located in the district. These deposits are further processed in the vicinity of the villages, where extraction and preliminary processing facilities are situated. The district also features enrichment factories, which are integral to the mining and processing of these materials. The Nikeltau district (Nikeltau village) is notable for the region's resource history. It is proposed that these industrial territorial systems (comprising quarries, settlements and infrastructure) be reinterpreted as industrial cultural heritage (Berdenov et al., 2016; Berdenov et al., 2024; Dmitriyev et al., 2022).

The importance of this phenomenon in the context of sustainable development is a subject that merits further examination. It is evident that industrial heritage has the potential to serve as a foundation for a novel phase of territorial transformation, characterised by a transition from extraction to reuse, a shift in focus from raw materials to tourism and cultural-industrial entrepreneurship. For instance, the transformation of a former factory into a museum, an exhibition space, or a multifunctional centre is a prime example. The transformation of a mining village into an industrial park has been achieved by the introduction of visitor attractions, creative studios and collectives. Quarries, characterised by their open walls and reservoirs, serve as mirrors of the landscape, as well as locations for photography and recreational activities.

RESULTS

The preservation of cultural heritage has evolved from a narrow focus on the protection of monuments to a comprehensive system of value management that links culture, economy, and community development. In contemporary scholarship, cultural heritage preservation is defined as the coordinated set of legal, managerial, and social actions that safeguard both tangible and intangible assets while enabling adaptive use and transmission to future generations (Min et al., 2025).

Developed countries have institutionalised this approach through multi-level governance frameworks and integration with sustainability agendas. In the United States and Western Europe, robust legislative frameworks, including the National Historic Preservation Act (U.S., 1966) and the European Heritage Strategy for the 21st Century, facilitate the establishment of heritage inventories, the enforcement of protection measures, and the allocation of financial resources for restoration initiatives. Adaptive reuse has become pivotal to these policies, facilitating the transformation of redundant industrial or historic buildings into museums, innovation hubs, or creative spaces (Saifi, 2025; Özgeriş et al., 2024). Empirical analyses of adaptive-reuse projects across crisis-affected industrial zones demonstrate measurable gains in local employment, tourism, and environmental performance (Hernández-Escampa, 2024; Hussein et al., 2025).

European Union initiatives such as Horizon 2020 and Creative Europe have further institutionalised "heritage-led regeneration" (Kostakis & Lolos, 2024), promoting transdisciplinary research, digital documentation, and participatory governance. These programmes establish a correlation between cultural value and socio-economic renewal, thereby positioning heritage as both a planning parameter and an investment priority (Tost et al., 2021). In East Asia, particularly in nations such as China and Japan, heritage policy is characterised by a commitment to achieving a harmonious balance between the principles of conservation and those of modernisation. As demonstrated by Zhang et al. (2024), a study of the Silk Road reveals a harmonious balance between large-scale infrastructural expansion and site zoning, along with the implementation of heritage impact assessments (HIAs) in accordance with the Principles for the Conservation of Heritage Sites in China. In the Japanese context, this approach is further enhanced by the incorporation of resilience measures, including earthquake-proof retrofitting and climate adaptation, which underscores the integration of risk governance into heritage management (Nastou et al., 2024; Shen et al., 2024; Van Tricht, 2025; Dobričić, 2024; Aktürk, 2021).

Conversely, within the post-Soviet and Central Asian contexts, the regulatory framework remains less developed. A comparative analysis of Russia and Belarus reveals fragmented legal frameworks and weak enforcement (Martynenko & Trofimova, 2019), while studies from Kazakhstan and Kyrgyzstan point to financing gaps and limited community participation (Imankulov, 2024). Nevertheless, the emergence of new partnerships between state agencies and extractive industries signifies an increasing recognition of the potential for corporate social responsibility and heritage stewardship to coexist (Rhodes II, 2024; Tiainen, 2014; Mahmood, 2017). The experience of developed countries demonstrates that cultural heritage preservation is most effective when embedded in an integrated governance model combining legal protection, adaptive reuse, technological monitoring, and community engagement. This transforms heritage from a static artefact into a dynamic component of sustainable territorial management.

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THE IMPACT OF HUMAN CAPITAL ON ORGANIZATIONAL PERFORMANCE (CASE STUDY) JORDANIAN FIVE-STAR HOTELS

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Abstract: The current study aimed to identify the impact of human capital in organizational performance in Jordanian five-star hotels. The descriptive analytical approach was used, and a questionnaire was applied consisting of three parts: the first is the demographic information of the study sample, the second is the human resources management scale consisting of (20) paragraphs, and the third is the organizational performance scale consisting of (15) paragraphs. Its validity and reliability were confirmed. The study population consisted of (6189) employees in five-star hotels in Amman, the sample consisted of (362) employees in five-star hotels in Amman were selecting by stratified sampling due to hotel variable by get back percent (94.3 %) whenevre (384) questionnaires was collecting by E-Link, and delay (22) by percent (5.7 %). After collecting the data and conducting the appropriate statistical processing, the study concluded that there is a statistically significant at level ($\alpha \leq 0.05$) effect of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance with its dimensions (Internal process, Customer satisfaction, learning and development) in Jordanian five-star hotels. Training had the highest effect, then experience, then skill, and finally knowledge. The study proposed a set of recommendations, most notably the need for five-star hotel management to focus on training their human resources and involve them in developing training programs. The need to prioritize organizational performance in five-star hotels, given its significant importance in achieving positive results across hotel services as a whole, and continuously assess the level of human resources to ensure the best customer service at all times.

Keywords: Human capital, organizational performance, Jordanian five-star hotels, five-star hotel managements

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INTRODUCTION

Tourism is an influential economic sector in countries, providing significant economic flows, creating job opportunities, and encouraging growth at the regional and international levels. The tourism sector is also one of the most important sectors that contributes to the growth and positive economic changes in hotels, due to the increase in tourist numbers.Which prompts it to create new job opportunities to strengthen its human capital, which helps improve its organizational performance by employing competent, experienced, and knowledgeable workers in the hotel sector, thus achieving greater profitability and increasing its market value (Hernández, 2019).

Studies and theories have paid significant attention to the development and study of human capital, which began with the emergence of economic and business studies. The first theory to explain human capital dates back to Mincer (1958), followed by the work of Schultz and Becker, who developed this theory; the focus in this theory was on the components of human capital, which are experience, skill, training, and knowledge (Titei, 2020). Organizations make great efforts to complete the internal operations procedures necessary for their success and achievement of their goals. They also continuously strive to improve their performance through strategies and human resources with expertise, knowledge, and skills, in addition to their periodic analysis of their organizational structures to achieve high-quality organizational performance, which enables them to compete strongly in the labor market (Musheke & Phiri, 2021).

The hospitality sector is one of the sectors that relies most heavily on humanitarian services and customer satisfaction. It also requires employees with a positive approach and diverse behaviors and attitudes (Dirani et al., 2020). Considering that the hotel and hospitality sector is an integral part of any country's tourism sector, it is a source of income for countries and improves their economic situation (Bashir, 2020). Despite the dominance of technology in the current era over various sectors, especially the hotel sector, human cadres are indispensable due to their training, knowledge, experience and skills, which are components of human capital in the sectors (Hamadamin & Atan, 2019).

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With the growing importance of service sectors such as tourism and hospitality, which constitute a fundamental part of countries' economies, developing human competencies in these sectors has become a top priority to achieve outstanding organizational performance that meets customer expectations. This is clearly evident in the vital role employees play in providing high-quality services (Tran & Ntim, 2020). From this standpoint, the role of human capital in the hospitality and hotel sector is one of the most important topics that has occupied the managers and heads of these sectors, given the high-quality services they provide that distinguish these sectors (Tang, 2020). The study Elghozail & El Idrissi (2023) recommended that future research should focus on exploring the relationship between human capital and organizational performance in four-star hotels, as it can help the hotel quickly adapt to changes in the environment, anticipate future trends, and encourage employee innovation and a learning culture. A study Kamel & Hassanin (2022) conducted in Egypt also recommended that attention should be paid to employee training, compensation, and rewards, as they have a positive impact on organizational performance. Recent studies, such as Bayle & Clausen (2024) and Salih et al. (2024), indicate that investing in human capital has a direct positive impact on organizational outcomes, as improving employees' skills and developing their knowledge leads to enhanced innovation and increased productivity, which supports the efficient and effective achievement of strategic objectives. In addition, focusing on human resource development contributes to achieving higher levels of organizational commitment, as employees become more capable of facing challenges and achieving tangible accomplishments. Investing in human capital is not limited to improving individual performance, but rather extends its impact to include the entire organizational structure, and for an organization to flourish and improve the quality of its production, it must focus on organizational performance, as this achieves customer satisfaction and enhances employee commitment.

Daniel (2018) adds that the company's design of training workshops that help employees meet their needs in the labor market and carry out their tasks effectively makes them more capable of providing distinguished and high-quality performance, which leads to the development and improvement of its organizational performance, as the more the company trains employees, the more they acquire skills, experiences and knowledge, which are all components of human capital. In addition, the more employees are motivated and trained in all aspects that contribute to achieving the company's goals, the more motivated and diligent they will be, which will make it easier for the company to achieve those goals, succeed, and gain a competitive advantage in the job market. Many scholars and researchers have emphasized the impact of human capital and its dimensions, which include knowledge, skills, experience, and training, on organizational performance, such as: Chen et al., 2020; Gupta et al., 2020; Singh et al., 2021, who indicated that the dimensions and characteristics of human capital have an impact on organizational performance across sectors in general, and the hotel and hospitality sector in particular.

Soelton et al. (2021) defines organizational performance as the cumulative average of employee performance in the company. The relationship between achieving the company's goals and the performance of its employees is a direct relationship. The higher the quality of performance employees provide, the more they help the company achieve its goals and achieve better organizational performance. Gutterman (2023) adds a definition to the concept of organizational performance as a combination of productivity and performance, where a company's productivity is measured by the volume and percentage of work completed by the company's employees during a specific period of time.

Many studies, such as Suryanto et al. (2018), have confirmed that organizational performance and the pursuit of improving it are of great importance for managing companies and establishing their infrastructure, while Ali & Haseeb (2019) added to the importance of organizational performance and working to enhance it.

The importance of organizational performance is highlighted as a phenomenon that significantly impacts an organization's infrastructure, impacting its market value, service quality, and productivity (Daniel et al., 2023). Gede & Huluka (2024) emphasizes the role of organizational performance in driving an organization to achieve its goals, as well as contributing to raising the quality of its productivity and making it more effective.

Study problem

The hotel sector is increasingly important in supporting the Jordanian national economy and enhancing the Kingdom's position as an attractive tourist destination regionally and internationally. However, this sector faces challenges related to the quality of organizational performance, which is the cornerstone of achieving competitive excellence and attracting tourists. This challenge is directly linked to the weakness of human capital, a key component of any organization striving to achieve sustainability and innovation. Through the researcher's work within the work environment of five-star hotels in the capital, Amman, he observed a clear deficiency in the level of employee qualifications and training that aligns with market demands and customer needs. This shortcoming is not limited to a lack of the necessary technical and cognitive skills, but also extends to the absence of effective institutional policies aimed at enhancing human capital as a strategic means of achieving outstanding organizational performance.

Based on these observations, the problem of the study is the need to study the impact of human capital on organizational performance in Jordanian five-star hotels, with the aim of analyzing the factors influencing this relationship and providing practical solutions that contribute to raising employee efficiency and improving institutional performance.

Study Questions

This study seeks to understand the impact of human capital, with its dimensions (knowledge, skills, experience, and training), on organizational performance, with its dimensions (internal processes, customer satisfaction, learning and growth), in Jordanian five-star hotels. This study aims to answer the following three questions:

Main Question 1: What is the level of human capital in its dimensions (knowledge, skills, experience, and training) in Jordanian five-star hotels?

Main Question 2: What is the level of organizational performance in its dimensions (internal processes, customer satisfaction, learning and growth) in Jordanian five-star hotels?

Main Question 3: Is there an impact of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal operations, customer satisfaction, learning and growth) in Jordanian five-star hotels?

Study Objectives. The current study aims to:

- Identify the study sample's level of awareness of human capital in Jordanian five-star hotels in terms of (knowledge, skills, experience, and training).
- Identify the study sample's level of awareness of organizational performance in Jordanian five-star hotels in terms of (internal operations, customer satisfaction, learning and growth).
- Exploring the impact of human capital on organizational performance in Jordanian five-star hotels.

Important of the Study. The importance of this study is divided into two main aspects:

First: Theoretical Significance

The theoretical importance of the study lies in the theoretical framework it presents regarding the concepts of human capital and its importance in making hotel organizations more efficient and effective, in addition to clarifying the role of employees in improving their ability to solve problems, make sound decisions, and assume responsibilities.

The study also contributes to the theoretical framework of organizational performance concepts and their relationship to human capital. It is expected that this study will enrich academic debate by providing references and recent research that enhance the scientific understanding of the variables studied, thus contributing to the enrichment of the Arab library with vital topics related to the hotel sector. Previous studies indicate a gap in the ability of Jordanian hotel sector employees to meet customer expectations and achieve high levels of organizational performance. For example, a study Al Fahmawee & Jawabreh (2022) conducted in Jordan, confirmed that workers in the hotel sector, especially five-star hotels, lack the required basic competencies, such as practical skills, specialized experience, and in-depth knowledge in the hospitality field, which leads to poor service levels and overall poor performance. A study by Albán & Brazales (2021) recommended focusing on human capital by focusing on graduates of hotel colleges. A study by Mahmoud et al. (2021), conducted in Jordan, also aimed to explore the relationship between human resource management practices (skills, knowledge, and social and personal characteristics) in the hospitality sector and service innovation (creativity embodied in the ability to perform work in order to generate economic value), it recommended the need to provide a suitable internal environment for innovation and creativity in providing hotel services.

Second: Practical Importance

The practical importance of the study lies in providing applied insights into the impact of human capital on organizational performance in Jordanian five-star hotels. The study's findings will help hotel management understand the importance of training and qualifying employees and enhancing their competencies, which will contribute to improving organizational performance and enhancing operational efficiency. The study also highlights the importance of training courses and workshops in improving employee performance, which enhances hotels' competitive advantage, attracts talented employees, and creates a positive work environment that strengthens their ability to attract tourists and retain outstanding human resources. In addition, the study provides practical recommendations for hotel managers regarding employee development and training priorities, which contributes to enhancing human capital and improving organizational performance. These recommendations are based on the study's findings, providing new opportunities for development and innovation in hotel services and contributing to the sustainable improvement of the hotel sector's outcomes in Jordan.

Main Hypothesis (H01): There is no significant effect at the level of significance ($\alpha \leq 0.05$) of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal processes, customer satisfaction, and learning and growth) in Jordanian five-star hotels.

Study model: The study consists of two variables: the independent variable, which will be represented by human capital, while the dependent variable will be represented by organizational performance in five-star hotels in the capital Amman Governorate, and this will be explained in Figure (1)*:

Table 1. References of study variables and dimensions

Variables	Dimensions	References
Human capital	Knowledge	(Sobhi, 2016);(Mahmoud et al., 2021)
	Skill	(Sobhi, 2016); (Alnoor, 2020)
	Experience	(Sobhi, 2016); (Alnoor, 2020)
	Training	(Suwaiti, 2016); (Kamel & Hassanin, 2022) ;(Alnoor, 2020)
Organizational Performance	Internal Operations	(Al-Sayyad & the Sunbani, 2024)
	Customer Satisfaction	
	Learning and Growth	

Terms and Procedurally Definitions

Human capital: The extent to which employees possess knowledge, skills, experience, competencies, and creativity, and their ability to utilize them within an organization, impacting its flexibility, performance, service quality, and profitability

(Masyhuri et al., 2024). Procedurally, it is defined as the sum of knowledge, experience and skills possessed by individuals working in five-star hotels in Amman, which enable them to achieve the organization's goals. Human capital in this study is represented by the fields of (knowledge, skill, experience and training) and was measured by questionnaire items from 1-20.

Knowledge: The set of knowledge and experiences through which an individual can make decisions that demonstrate their uniqueness. It is the essence of creativity and innovation (Al-Sharbini, 2021). Procedurally, it is defined as the information and knowledge an individual possesses that relate to their work performance in five-star hotels in Amman. It was measured using questionnaire items from 1 to 5.

Skill: It is a set of personal and social qualities and tendencies that everyone tends to possess to varying degrees and that are necessary for daily life as much as they are necessary for work. In the field of business, they are technical and professional skills, and they affect decision-making, dealing with problems, recognizing opportunities and managing changes (Ibrahim et al., 2017).

Procedurally, it is defined as the extent to which an employee possesses professional and personal qualities that enable him to master the work he performs in five-star hotels in Amman, and it was measured by questionnaire items from 6 to 10.

Experience: is the skills and knowledge acquired through long practice and supported by observation. This experience may result from previous jobs or training, and varies from one person to another according to their readiness and ability to care about the subject of practice (Al-Habib & Abdel Salam, 2012). Procedurally, it is defined as: the skills and knowledge that an individual has acquired through his work in five-star hotels in Amman or through his performance of an activity that affects his reactions, feelings and emotions, and it was measured by questionnaire items 11-15.

Training: is the process of educating individuals by imparting theoretical and practical knowledge to them, so that they possess all the necessary skills related to a specific functional or educational field (Basbous, 2015). Sobhi (2016) defines it as a planned and ongoing process designed to provide employees with the skills and knowledge that improve employee performance and increase the effectiveness of the organization.

Procedurally, it is defined as the deliberate, planned and organized process that is implemented to provide individuals with specialized skills and knowledge in five-star hotels in Amman, with the aim of improving their performance and attitudes to raise their level and efficiency to carry out specific tasks, and it was measured by questionnaire items 16-20.

Organizational performance: A set of integrated activities undertaken by an organization to achieve its organizational goals, which are highlighted by the development, growth, and improvement of its infrastructure (Brier & Al-Hajj Jaber, 2024). Organizational performance refers to the achievements of the organization at the management, operational, and internal processes levels (Bai, 2024). It is defined procedurally as all organizational and administrative procedures related to work performance in five-star hotels in Amman, including inputs and operations, and was measured by questionnaire items 21-35.

Internal operations: These are all the internal operations, activities, and events that distinguish the organization from other business organizations, and through which the desires of customers and owners are met (Ben Yarabh, 2018). Procedurally, it refers to the internal procedures and directives required for work in five-star hotels in Amman Governorate. These procedures are implemented by trained human resources and lead to the effective achievement of the organization's objectives. It was measured using questionnaire items 21-25.

Customer satisfaction: The activities and procedures undertaken by an organization to satisfy customers' desires and needs and achieve their satisfaction (Al-Khafaji & Yaghi, 2015).

Procedurally, it is defined as the degree of congruence between what the customer wants or expects and the actual service provided in five-star hotels in Amman Governorate. It was measured using questionnaire items 26-30.

Learning and growth: The organization's acquisition of knowledge and experience that enhances its competitiveness, transforms new proposals into practice, and acquires positive values, leading to improved individual and collective behavior (Hamza, 2012).Procedurally, it is defined as cognitive development and intentional learning through the performance of required tasks in five-star hotels in Amman Governorate, and was measured using questionnaire items 31-35.

Study Limits: Spatial Limits: The study was limited to five-star hotels in the Amman Governorate.

Temporal Limits: The study was limited to the 2024-2025 academic year.

Human Limits: The study was limited to employees and administrators at five-star hotels in the Amman Governorate.

Subject Limits: This study will be limited to human resource management in its dimensions (knowledge, ability, skill, and experience) and organizational performance in its dimensions (internal processes, customer satisfaction, learning and growth) within five-star hotels in Amman. Therefore, the results of this study cannot be generalized outside its subject boundaries.

METHODOLOGY AND PROCEDURES

Study Method

The current study relied on the descriptive-analytical approach, which focuses on describing the phenomena or topics under study, then analyzing them thoroughly to understand or explain the events or processes occurring, and studying the relationship between independent and dependent variables to extract the strength of their role in relation to each other.

Study population and sample

The study population consisted of all employees in five-star hotels in Amman, numbering (23) hotels, with (6,189) male and female employees (according to statistics from the Jordanian Hotel Association, 2024). As for the study sample, (384) questionnaires were collected via an electronic link, (22) of which were deleted, leaving the sample consisting of (362) employees in five-star hotels in Amman Governorate. According to the Krejcie & Morgan (1970) table for selecting samples, a proportional stratified random sample was selected from each hotel in the study population, Table (2) shows this.

Table 2. Frequencies and percentages of the study sample according to the variables of gender, experience, academic qualification, job title and training courses

Variable	Category	Frequencies	Percentages
Gender	Male	195	53.9
	Female	167	46.1
	Total	362	100.0
Experience	Less than 5 years	104	28.7
	From 5 to less than 10 years	170	47.0
	10 years and older	88	24.3
	Total	362	100.0
Academic qualification	Diploma or below	17	4.7
	Bachelor's	216	59.7
	Graduate studies	129	35.6
	Total	362	100.0
Job title	Director	67	18.51
	Deputy or Assistant Director	24	6.63
	Department Head	87	24.03
	Supervisor	17	4.70
	Employee	167	46.13
	Total	362	100.0
Training courses	Guest Service in Hospitality and Tourism	109	30.11
	Human Resource Management in the Hospitality and Tourism Industry	91	25.14
	Hotel Marketing Strategies	84	23.20
	No Training Courses	78	21.55
	Total	362	100.0

Data collection sources: Collecting information and data is considered one of the most important steps in scientific research. Therefore, its sources, accuracy, and quality must be verified, as they are used to answer the study's questions and test its hypotheses. In this study, the following sources were used to collect its data: Primary Sources: The primary study data was collected through the study tool, the "questionnaire," which was developed to measure the study's variables and dimensions, drawing on previous studies. Secondary Sources: The researcher reviewed everything related to the study topic contained in Arab and foreign studies, some electronic sources on the internet, and previous related studies.

Study tool: The current study relied on a questionnaire as a study tool, which includes three main sections: demographic variables: gender, experience, academic qualification, job title, and training courses. Independent variable: human capital, which includes (20) paragraphs distributed over four dimensions: (knowledge, skill, experience, and training), with (5) paragraphs for each dimension. The following studies were used in selecting the paragraphs: (Sobhi, 2016; Alnoor, 2020; Kamel & Hassanin, 2022; Mahmoud, et al., 2021). Dependent variable: Organizational performance, which includes (15) paragraphs distributed across three dimensions: (internal operations, customer satisfaction, and learning and growth), with (5) paragraphs for each dimension. The study of (Al-Sayyad & Al-Sanbani, 2024) was used in preparing the paragraphs.

Note that a five-point Likert scale was used to answer the paragraphs, i.e., scores were assigned from (5-1) according to the degree of agreement with all questionnaire paragraphs (very high agreement - very low agreement).

Instrument validity: The questionnaire's ability to accurately measure the objectives it seeks to achieve has been verified, or the questionnaire's paragraphs have been verified to be able to measure and infer the dimensions they are supposed to measure through validity procedures, which include two types: face validity: The researchers presented the research tool, the questionnaire, in its initial form to a group of academic arbitrators with experience and specialization in the field of management and hotels, and asked them to express their opinion on developing some paragraphs of the questionnaire, in terms of the extent to which the paragraphs were appropriate to the subject of the current study and the degree of their validity in revealing the information required to enrich the study. Whether in terms of the relevance of the paragraphs to the axes under which they fall, their opinions were taken into account and some phrases were modified according to what they saw as appropriate, so that the tool became composed of (5) paragraphs for each dimension of the two scales, and of high reliability for measuring the objectives of the study and producing it in its final form.

Constructive validity: The extent to which the objectives that the questionnaire seeks to achieve were achieved was measured by applying it to a survey sample consisting of (25) employees in five-star hotels in Amman, and extracting the correlation coefficients between the paragraphs and the field to which they belong in the two scales: Human capital includes: (knowledge, ability, skill, and experience), and organizational performance includes the areas of (internal operations, customer satisfaction, and learning and growth). The tables below illustrate this. It appears from Table (3) that the correlation coefficients between the items of the fields and the total score for each field ranged between (0.581-0.875), and all of them are statistically significant at the significance level ($\alpha \leq 0.01$), which are high and acceptable correlation coefficients for the purposes of applying the study tool. It appears from Table (4) that the correlation coefficients between the paragraphs of the fields and the total score for each field ranged between (0.643-0.880), and all of them are statistically significant at the significance level ($\alpha \leq 0.01$), and they are acceptable correlation coefficients for the purposes of applying the study tool.

Table 3. Correlation coefficient values between each paragraph of the human capital scale and the total score of the field (n=25) ** Correlation coefficients at the significance level ($\alpha \leq 0.01$)

No	Training	Experience	Skill	Knowledge
1	.764**	.638**	.643**	.645**
2	.875**	.743**	.758**	.603**
3	.838**	.543**	.785**	.737**
4	.736**	.787**	.714**	.763**
5	.837**	.581**	.724**	.712**

Table 4. Correlation coefficient values between each item of the organizational performance scale and the total score for the field (n=25) ** Correlation coefficients at the significance level ($\alpha \leq 0.01$)

No	Learning and Growth	Customer Satisfaction	Internal Operations
1	.920**	.782**	.812**
2	.869**	.873**	.854**
3	.880**	.886**	.764**
4	.861**	.845**	.757**
5	.758**	.643**	.661**

Internal consistency: Consistency was measured by Cronbach's Alpha coefficient, and the study tool is judged to be stable, such that a score of more than (0.70) is adopted for acceptable consistency according to what was stated in (Sekran, 2010), and Table (5) shows that. Table (5) shows the results of Cronbach's Alpha coefficients to reveal the stability coefficients of the study tool's axes, which ranged between (0.93-0.94). The Cronbach's Alpha coefficient for the tool as a whole reached (0.96), which is a high and acceptable consistency coefficient for the application of the purposes of this study.

Table 5. Cronbach Alpha' coefficients for the study axes and the tool as a whole

No	Variable	Cronbach Alpha'	Item Number
1	Human Capital	0.93	20
2	Organizational Performance	0.94	15
	Total	0.96	47

Statistical methods used in data analysis:

The researchers relied on the statistical analysis program (SPSS) to analyze the data, using descriptive statistics: frequencies, percentages, arithmetic means, standard deviations, and Cronbach's alpha coefficients to ensure the reliability or stability of the study tool. And to verify the extent of its internal consistency. The Variance Inflation Factor (VIF) test and the Tolerance test were also applied to confirm the independence of the independent variables from each other and the absence of the problem of autocorrelation for the purposes of applying multiple regression analysis, and the Klomgorov-Simirnov normal distribution test. And extracting the correlation coefficients matrix between the independent and dependent study variables to determine the strength of the correlation between them, and the extent of the relationship between the dimensions of human capital and the dimensions of organizational performance in Jordanian five-star hotels. Multiple regression analysis was applied to reveal the impact of human capital in its four dimensions on each dimension of organizational performance in Jordanian five-star hotels, and it was applied to test each of the study's hypotheses.

Presentation and Discussion of Study Results

The following presents and discusses the results based on the study questions and hypotheses.

The first main question: What is the level of human capital in its dimensions (knowledge, skills, experience, and training) in Jordanian five-star hotels? To answer this question, the means and standard deviations of the human capital scale domains, and the total score of the scale, were extracted, as shown in the following table. Table (6) shows the arithmetic means and standard deviations of the human capital scale in Jordanian five-star hotels, where the field of "experience" came with the highest mean (4.27) and a standard deviation of (0.47), the score was very high. Then came the field of knowledge with mean (4.24) and a standard deviation (0.54), by a very high score. Then came the field of skill with mean (4.21) and a standard deviation (0.51). Finally, the field of "training" came with the lowest mean (4.02) and a standard deviation of (0.58), by high score. The total score for the human capital scale in Jordanian five-star hotels came with mean (4.185) and a standard deviation of (0.43), by high score.

The second main question: What is the level of organizational performance across its dimensions (internal operations, customer satisfaction, learning and growth) in Jordanian five-star hotels? To answer this question, the arithmetic means and standard deviations for the organizational performance scale domains, as well as the overall score for the scale, were extracted, as shown in the following table. Table (7) shows the arithmetic means and standard deviations of the organizational performance scale in Jordanian five-star hotels, where the field of "learning and growth" came with the highest arithmetic mean (4.15) and a standard deviation of (0.62) and a high degree, then came the field of internal operations with an arithmetic mean (4.12) and a standard deviation (0.61) with a high degree. While the field of "customer satisfaction" had the lowest mean (4.03) and a standard deviation of (0.59), with high score. The overall score for organizational performance in Jordanian five-star hotels had mean of (4.10) and a standard deviation of (0.54), with high.

The third main question: Is there an impact of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal operations, customer satisfaction, learning and growth) in Jordanian five-star hotels?

Table 6. Means and standard deviations of the human capital scale fields in Jordanian five-star hotels, and the total score of the scale (n=362)

No	Axis	Mean	Stan.dev	Degree
1	Knowledge	4.24	0.54	Very high
2	Skill	4.21	0.51	Very high
3	Experience	4.27	0.47	Very high
4	Training	4.02	0.58	Very high
Total human capital scale		4.185	0.43	Very high

Table 7. means and standard deviations of the organizational performance scale domains in Jordanian five-star hotels, and the total score of the scale (n=362)

No		Axis	Mean	Stan.dev	Degree	Rnak
1		Internal Operations	4.12	0.61	Very high	2
2		Customer Satisfaction	4.03	0.59	Very high	3
3		Learning and Growth	4.15	0.62	Very high	1
Total organizational performance score			4.10	0.54	Very high	

RESULTS RELATED TO TESTING THE STUDY'S HYPOTHESES

This section presents the results of testing the study's hypothesis. Multiple linear regression analysis was applied to test the main hypothesis. However, before beginning the regression analysis, it is necessary to ensure that the data are homogeneous in their variances, and to check the normal distribution of the data using the Klomgorov-Simirnov test. Homogeneity of variance and normal distribution test: To confirm the independence of the independent variables from each other and the absence of the problem of autocorrelation, the variance inflation factor (VIF) test and the tolerance test were conducted, which are used in many studies. It is necessary for the variance inflation values to be less than (10), and the tolerance values to be greater than (0.05). The results of the homogeneity of variance for the independent variable, human capital, with its dimensions (knowledge, skill, experience, and training), were confirmed by applying the Tolerance test and the Variance Inflationary Factor (VIF) test. Table (8) shows this. Table (8) above shows that the value of the variance inflation factor (VIF) for all independent variables is less than 10 and the values of tolerance are more than (0.05). This indicates the homogeneity of variance in the dimensions of the human capital scale (knowledge, skill, experience, and training), and thus the validity of the data, which means the possibility of applying regression analysis and trusting the results. It is noted from the above that the data are suitable for multiple linear regression analysis, as it was shown that there are no problems of self-correlation between the independent variables, and thus the possibility of continuing to test the hypotheses, and knowing the impact of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal operations, customer satisfaction, and learning and growth) in Jordanian five-star hotels. Table (9) shows that all (Z) values are not statistically significant at the significance level of 0.05, indicating that the data are subject to normal distribution.

Table 8. Values of the tolerance test and the variance inflation factor (VIF)

Indepenfent variable	Tolerance	VIF
Knowledge	.539	1.856
Skill	.467	2.140
Experience	.457	2.189
Training	.512	1.952

Table 9. Results of the normal distribution of the study variables' data (Klomgorov-Simirnov test)

Variables		Negative	Positive	Z value	Sig.
The human capital	Knowledge	-0.265	0.367	1.436	0.084
	Skill	-0.147	0.122	1.593	0.066
	Experience	-0.095	0.085	0.675	0.542
	Training	-0.225	0.205	0.962	0.377
The organizational performance	Internal Operations	-0.078	0.082	0.442	0.721
	Customer Satisfaction	-0.202	0.194	0.875	0.443
	Learning and Growth	-0.201	0.197	0.592	0.626

Table 10. Results of Pearson's correlation coefficient between the dimensions of human capital and the dimensions of organizational performance in Jordanian five-star hotels (n=362)

Variables	Learning and Growth		Customer Satisfaction		Internal Operations		The organizational performance	
	Corre.	Sig.	Corre.	Sig.	Corre.	Sig.	Corre.	Sig.
Knowledge	.552**	.000	.466**	.000	.432**	.000	.542**	.000
Skill	.616**	.000	.470**	.000	.473**	.000	.583**	.000
Experience	.607**	.000	.582**	.000	.586**	.000	.662**	.000
Training	.566**	.000	.605**	.000	.597**	.000	.659**	.000
The human capital	.705**	.000	.642**	.000	.630**	.000	.738**	.000

Correlation coefficient matrix between variables: The Pearson correlation coefficient was extracted between the independent and dependent variables of the study to determine the strength of the relationship between them. The table

below illustrates the relationship between the dimensions of human capital and the dimensions of organizational performance in Jordanian five-star hotels. Table (10) shows that there is a positive and statistically significant relationship between the total score of human capital and the total score of organizational performance and between all dimensions in each of them, as the total Pearson correlation coefficient between the total score of human capital and the total score of organizational performance reached (0.738), with a statistical significance of (0.000). This indicates that the higher the level of human capital, the higher the level of organizational performance in Jordanian five-star hotels.

The main hypothesis (H01): There is no effect of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal processes, customer satisfaction, and learning and growth) in Jordanian five-star hotels? To test this hypothesis and answer the third question, multiple regression analysis was applied, and the following table illustrates this. It is clear from Table (11) that there is a statistically significant effect of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in Jordanian five-star hotels, as the value of F reached (114.059) with a statistical significance of (0.000), and the value of the correlation coefficient R reached (0.749), which is a high and statistically significant correlation coefficient, between the independent variables, which are the dimensions of human capital, with the dependent variable "organizational performance". This indicates a strong relationship between the dimensions of human capital and organizational performance.

Table 11. Results of the multiple linear regression analysis to reveal the impact of human capital dimensions on organizational performance in Jordanian five-star hotels (*Dependent variable: organizational performance)

Infepenfent Variables	t .	Sig.	βeta	R	R^2	F قيمة	Sig	D-W	Hypothesis result
Knowledge	2.777	.006	.133	.749	.561	114.059	.000	1.931	Regected
Skill	2.907	.004	.149						
Experience	5.585	.000	.290						
Training	6.509	.000	.319						

The R^2 value was (0.561), which represents the percentage of explanation for the differences in the dependent variable "organizational performance" resulting from changes in the dimensions of human capital (knowledge, skill, experience, training). The table shows that the value of (βeta) in each dimension of human capital that affected organizational performance was as follows: It was found that the training dimension had the greatest effect among the dimensions of human capital on the dependent variable (organizational performance). The effect reached a value of βeta coefficient (0.319), which means that raising one unit of training increases the level of organizational performance by (31.9%), and the value of t strengthens this effect, as it reached (6.509) with a statistical significance of (0.000). It comes in second place after experience, as the value of βeta coefficient reached (0.290), which means that raising one unit of experience increases the level of organizational performance by (29%). This effect is reinforced by the t-value, which reached 5.585, with a statistical significance of 0.000. It ranked third after skill, with a beta coefficient value of 0.149, representing an impact of 14.4%. It ranked fourth after knowledge, with a beta coefficient value of 0.133, representing an impact of 13.3%

Based on what is stated in Table (11), the main hypothesis is rejected, which states: There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in its dimensions (internal operations, customer satisfaction, and learning and growth) in Jordanian five-star hotels. The alternative hypothesis is accepted, which states: "There is a statistically significant effect at the significance level ($\alpha \leq 0.05$) of human capital in its dimensions (knowledge, skill, experience, and training) on organizational performance in Jordanian five-star hotels." This indicates that training has the greatest impact on organizational performance, as Al-Samawi (2014) indicates that training is of great importance in the field of providing individuals with new skills, experiences and knowledge that contribute to raising their efficiency and effectiveness. It is also necessary to obtain information and data that individuals lack, suitable trends for work and appropriate skills, and training provides appropriate behavioral patterns.

In addition to the habits necessary to increase performance efficiency. Daniel (2018) adds that the company's design of training workshops that help employees meet their needs in the job market and carry out their tasks effectively makes them more capable of delivering outstanding, high-quality performance. Which leads to the development and improvement of its organizational performance. One of the most prominent types of training is behavioral training, which aims to modify and change behaviors or alter employees' perspectives and attitudes toward performance. Then came the field of expertise in influencing organizational performance, as it is easily indicated Najm (2017) that human resources management participates in finding and creating expertise within the organizations in which it works through training, development, and flexible feeding of performance evaluation and selection systems, etc.

By attracting distinguished skills and competencies to work within the organization, it can be said that human resources management supports the presence of a distinguished intellectual capital of experts and innovators to work within the organization. Human resources management also contributes to building the organization's culture, which in turn contributes to the transfer of expertise and the flow of knowledge to employees. Finally, the areas of skill and knowledge came, Donate & Pablo (2015) indicated that human resource management practices affect the knowledge, abilities and skills of employees, which is known as knowledge acquisition in knowledge management processes. Also, effective communication between employees leads to the interpretation and generation of information, which is known as the generation of knowledge and skill. In addition, knowledge-based human resource management practices refer to those processes that are designed to enhance the acquisition, generation, sharing, and application of knowledge to achieve skill.

Recommendations

Based on the findings, the study recommends the following:

- Five-star hotel managements should develop training programs to train their human resources, and involve them in developing plans and procedures for implementing these programs to keep pace with developments in the global hospitality industry.
- Providing adequate incentives for highly skilled and experienced employees to perform their work in Jordanian hotels.
- Working to attract employees with the appropriate knowledge, training, and experience from hotel management.
- The need to prioritize organizational performance in five-star hotels, given its significant importance in achieving positive results across hotel services as a whole.
- Continuously assessing the level of human resources to ensure the best customer service at all times.

Suggestions for future studies:

- Conduct a study to assess the level of training needs of employees in five-star hotels in Jordan.
- Conduct a study by five-star hotel management to examine customer satisfaction levels, their needs, and everything related to hospitality services, and follow up on customer complaints.
- Conducting a study by Jordanian hotel managements on waste levels and improving investment rates of available resources and energies.
- Conducting studies on the role of mediating variables in the relationship between human capital and organizational performance, such as employee satisfaction, incentives, change management, information technology, and modern technologies.

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PREDICTORS OF DIGITAL MATURITY FOR ACCOMMODATION SMALL-AND MICRO ENTERPRISES: A SYSTEMATIC REVIEW

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Abstract: Organisations wanting to stay competitive through digital transformation must demonstrate high digital maturity levels according to current market conditions. South African small and micro enterprises (SMEs) have the potential to make a significant contribution to the local economy; however, they face specific digital transformation challenges and opportunities that distinguish them from other businesses. The small accommodation sector faces challenges such as limited financial resources, which impact digital access, inadequate infrastructure, insufficiently skilled workers, and must navigate complicated regulatory frameworks. Digitalisation can transform SMEs by enabling market expansion, operational efficiency, customer satisfaction, and business stability, thereby becoming more sustainable and contributing to a competitive advantage, while also supporting local employment and economic growth. The research combines existing studies to determine which factors influence digital maturity levels in South African small and micro accommodation businesses. The researcher conducted a systematic database search across Scopus, Web of Science, EBSCOhost, Google Scholar, and Sabinet for peer-reviewed articles published between January 2013 and May 2024. The PRISMA guidelines were used to evaluate studies after screening and extraction. The research included fourteen studies that met the established criteria. The findings revealed that SMEs achieve digital maturity through multiple interconnected elements, which include personal skills, organisational characteristics, and environmental and systemic factors. Digital maturity depends on the owner/manager's digital literacy, access to ICT infrastructure, organisational culture, financial capacity, external support networks, and regulatory environment. The development of digital maturity in South African accommodation SMEs requires programs that enhance digital competencies, build infrastructure, and create supportive regulatory frameworks. Financial backing, skill development, and information dissemination will enable stakeholders to harness digital transformation for enhanced sector competitiveness and inclusive economic expansion in South African tourism.

Keywords: digital maturity, Small-scale accommodation enterprises, digital transformation, technology adoption, hospitality SMEs

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INTRODUCTION

Digital transformation is a fundamental business requirement that enables organisations to achieve market competitiveness and operational resilience (Buhalis & Leung, 2018; Westerman et al., 2014). Digital maturity is a fundamental business growth factor for tourism and hospitality companies because it determines their ability to use digital technologies for strategic and operational success (Mero et al., 2020; Li et al., 2021). The accommodation industry depends on digital platforms for distribution and marketing, guest communication, and operational efficiency, which makes digital maturity essential for market survival and business success (George et al., 2020; Ghosh et al., 2022). The accommodation sector of South Africa functions as a fundamental tourism industry segment which drives economic expansion and generates employment opportunities (Rogerson & Rogerson, 2021; SAT, 2021).

The accommodation sector consists of numerous small and micro enterprises which operate as guesthouses, bed-and-breakfasts, and boutique lodges to expand tourism participation, boost local economies, and promote inclusive economic growth (Rogerson, 2019; Lebambo & Shambare, 2021). The digital transformation of these SMEs faces unique barriers because they lack financial resources, have inadequate infrastructure, and insufficiently skilled workers, and must navigate complicated regulatory frameworks (Nyirenda & Pelser, 2020; Ndayizigamiye & Dube, 2020).

The COVID-19 pandemic created an immediate need for digital transformation in the accommodation industry because it forced all businesses to adopt digital solutions for marketing, guest engagement, and booking management (Mabaso et al., 2023; Kahiya & Mhlanga, 2022). The digital transformation presents an opportunity for some SMEs to enhance their digital capabilities. However, numerous businesses face challenges because of restricted resources and digital access problems that affect rural and township areas (Sibanda & Rambe, 2021; OECD, 2021).

The literature shows that digitalisation transforms SMEs by enabling market expansion, operational efficiency, customer satisfaction, and business stability (Martin et al., 2019; Li et al., 2021; OECD, 2021). The journey to digital maturity requires complex approaches because it depends on multiple internal and external elements. Research across

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international borders shows that digital transformation success depends on four key elements: leadership, digital literacy, organisational culture, financial readiness, and ecosystem support (Buhalis & Leung, 2018; Ghosh et al., 2022). The research field in South Africa has started to study these matters; however, there is no complete analysis of digital maturity predictors for accommodation SMEs. The identification of these predictors serves multiple essential purposes. Identifying these factors enables government agencies, development organisations, and industry bodies to create specific intervention strategies that help close digital gaps while fostering sustainable development. Identifying strategic digital investment and capacity-building priorities allows SMEs to be accommodated through this knowledge.

The research adds to academic knowledge about digital transformation in developing markets by providing findings that could help other African and Global South countries (George et al., 2020). The systematic review aims to address this knowledge gap through a comprehensive evaluation of research evidence, which determines digital maturity predictors for South African accommodation SMEs. The research seeks to achieve two main objectives, which include (1) identifying and sorting the internal and external elements that support or hinder digital maturity in this setting and (2) developing practical recommendations for policy implementation, future research, and practice applications. The review aims to help South African accommodation SMEs achieve digital transformation by revealing their transformation paths and obstacles to digital economy benefits. Studies worldwide support these results because digital maturity depends on technology access and human resources, organisational culture, and supportive business environments (Martin et al., 2019; OECD, 2021). The specific socio-economic situation of South Africa, with its vast social gaps and limited infrastructure, requires a detailed analysis of digital maturity factors affecting accommodation SMEs.

LITERATURE REVIEW

Digital transformation and SMEs in the accommodation sector

The digital transformation of small and micro-enterprises (SMEs) operating in the accommodation sector has become a significant research focus in emerging economies because these economies face ongoing digital access disparities (Buhalis & Leung, 2018; George et al., 2020). The accommodation industry of South Africa consists mainly of small and micro enterprises, which include guesthouses, bed-and-breakfasts, lodges, and boutique hotels (Rogerson & Rogerson, 2021).

Tourism-driven local economic development depends heavily on these businesses, but they encounter specific challenges and development routes to achieve digital maturity (Nyirenda & Pelser, 2020). Organisations achieve digital maturity through their ability to integrate digital technologies into fundamental business operations, decision systems, and customer relations (Westerman et al., 2014; Ghosh et al., 2022). Research worldwide shows that digital maturity helps small and medium enterprises (SMEs) to operate more efficiently while reaching broader markets and delivering better customer experiences (Mero et al., 2020; Li et al., 2021). Research about African and South African accommodation businesses shows that technological adoption follows non-linear patterns because it depends on multiple socioeconomic factors, organisational elements, and environmental conditions (Sibanda & Rambe, 2021).

South African research shows that some accommodation SMEs expand their operations using online booking systems, digital marketing tools, and property management software. However, numerous businesses maintain manual operations or use only partial digital solutions (Rogerson, 2019; South African Tourism, 2021). The research conducted by Davids & Jokonya (2019) demonstrated that Western Cape SMEs exhibit diverse digital adoption levels because urban businesses outperform rural businesses. The study by Lebambo & Shambare (2021) shows that local conditions determine digital adoption because infrastructure problems, cost barriers, and differences in digital competence levels generate substantial inequalities.

The COVID-19 pandemic has become a digital transformation accelerator because it forced numerous SMEs to speed up their digital evolution through changes in consumer conduct and operational limitations (Kahiya & Mhlanga, 2022). The literature shows that digital integration faces ongoing challenges because of restricted funding opportunities, insufficient training programs, and unclear regulatory frameworks (Ndayizigamiye & Dube, 2020).

Research worldwide supports these findings by showing that digital maturity depends on technological and human resources, organisational culture, and supportive business environments (Martin et al., 2019; OECD, 2021). The specific socio-economic conditions of South Africa demand a detailed investigation into what drives digital maturity among accommodation SMEs throughout the country.

The role and impact of small-scale accommodation enterprises in South Africa

Economic and social contributions

Most South African tourism accommodation businesses operate as small-scale enterprises (SSAEs), including guesthouses and bed and breakfasts (B&Bs), self-catering cottages, boutique lodges, and homestays. The Tourism Grading Council of South Africa (TGCSA, 2022) and South African Tourism (2023) report that small-scale accommodation businesses account for more than 80% of the country's 60,000 registered accommodation facilities. Most companies operate in non-urban areas, small towns, and rural locations. SSAEs serve as essential job generators in the economy.

The World Travel & Tourism Council (WTTC, 2023) reports that tourism in South Africa created 1.1 million direct employment opportunities in 2022, while SSAEs generated between 40-50% of accommodation sector jobs according to SEDA (2022) and UNWTO (2022). The labour-intensive nature of SSAEs and their local presence make them essential for fighting unemployment while creating entry-level positions for women and young people. The ownership structure of SSAEs demonstrates national transformation and empowerment because more than half of these businesses are operated by women, and one-third are managed by young people (NDT, 2023). The economic influence of SSAEs reaches beyond their ability to create employment opportunities. These businesses create economic growth locally by

purchasing products and services from nearby suppliers, including food producers, laundry services, artisans, and tour operators. The World Bank (2021) demonstrates that every rand earned by SSAEs creates 72 cents of additional economic activity through their local supply chain networks, which increases their overall economic impact.

Social, cultural, and developmental impacts

SSAEs create social inclusion and community development through three main mechanisms. Most SSAEs operate as family-run or community-based businesses that preserve cultural heritage by delivering genuine local experiences and showcasing indigenous traditions and regional history (Rogerson & Rogerson, 2021). The development of rural and Township areas benefits from SSAEs because they expand tourism beyond major cities and resorts, which leads to economic diversification and reduced regional disparities (UNWTO, 2022). These businesses are essential tools for entrepreneurship and empowerment because they provide entry points for local business owners to join the formal economy while fostering self-reliance and innovation (SEDA, 2022). SSAEs create positive social cohesion through their ability to host local events and facilitate visitor-host interactions and business partnerships, which unite communities with tourists.

Contribution to tourism growth and resilience

The diverse range of accommodation options in South Africa depends on small-scale accommodation enterprises to maintain its position as an accessible tourist destination. These businesses maintain quick response capabilities to market changes through their adaptability, which helped them thrive during domestic travel growth during COVID-19 and the rise of experiential and slow tourism (SA Tourism, 2023). The remote locations of these businesses make them essential for building tourism-based recovery and resilience in underdeveloped areas.

Challenges unique to small-scale accommodation enterprises

The numerous advantages of SSAEs face multiple obstacles that restrict their ability to grow and become more resilient while adopting digital transformation. The main impediment to SSAEs stems from their restricted financial capabilities. Most SSAEs function with minimal profit margins while facing extreme sensitivity to market fluctuations and unexpected disturbances. Traditional lenders avoid investing in digital technology and marketing initiatives for small, informal, and rural businesses because they consider these operations risky, which blocks access to finance (World Bank, 2021). The financial restrictions become more severe because owner-operators handle multiple responsibilities, preventing them from dedicating time or resources to strategic planning or staff development.

The industry faces a significant problem because many operators within the sector lack digital competence and human resource expertise. The digital skills and online marketing abilities of SSAE owners and their staff members remain insufficient to implement new technology systems and handle digital guest relations and online business promotion (SEDA, 2022). The fast evolution of technology and restricted affordable training options prevent numerous SSAEs from implementing essential digital tools, including online booking systems, property management systems, and digital marketing platforms, vital for contemporary market success. The existing infrastructure problems worsen these difficulties because rural and township areas experience unreliable broadband connections and regular power blackouts that disrupt business operations. Statistics South Africa (2022) shows that rural SSAEs achieve less than 50% internet reliability, yet urban areas maintain more than 90% reliable internet access. The digital requirements of modern travellers create market barriers because they need immediate online services and communication channels.

The registration process for SSAEs remains complicated because they must follow strict compliance rules while dealing with insufficient government agency support. Their informal and semi-formal operations prevent them from accessing official support programs, mainstream distribution channels, and financial assistance. The restricted market access stems from minimal marketing funds and dependence on third-party platforms, which impose high fees that reduce direct customer connections. The inability to handle online reputation management negatively impacts booking numbers because online reviews have become essential for businesses. SSAEs face exceptional risk from outside events, including pandemics, economic downturns, and climate-related disasters. The COVID-19 pandemic exposed the weak state of SSAEs because numerous businesses needed to shut down or reduce their operations due to travel restrictions and significant market demand reductions. The recovery period has proven challenging for SSAEs because they need to implement new health measures and adapt to changing consumer tastes while dealing with digital booking platforms that continue to gain market share. Small-scale accommodation enterprises in South Africa play a vital role in economic expansion, social integration, and tourism variety. Yet, they encounter multiple obstacles which endanger their ability to innovate and survive. The complete realisation of SSAEs as tourism development drivers for inclusive and resilient growth depends on joint initiatives to enhance digital skills training, financial access, infrastructure development, and support network availability.

Digital maturity and transformation frameworks

Assessing digital maturity among South African small-scale accommodation enterprises (SSAEs) requires multiple theoretical perspectives. Analysing digital transformation predictors and barriers in the sector depends on combining digital transformation theories, technology adoption models, organisational behaviour, and small business management principles. The ability of organisations to use digital technology for business model improvement, operational efficiency, and customer engagement and adaptability defines digital maturity (Westerman et al., 2011; Kane et al., 2015). The digital maturity model from Westerman et al. (2011) divides organisations into four stages, starting from digital beginners who lack integration, to fashionistas who have many digital initiatives but no integration, and

conservatives who are risk-averse, and digital masters who achieve full integration, innovation, and agility. The position of SSAEs on this spectrum depends on various internal and external elements. Digital transformation involves more than technology implementation because it requires organisations to transform their complete structure, operational systems, and cultural framework (Bharadwaj et al., 2013; Hess et al., 2016). The hospitality industry requires businesses to unite online booking systems with automated property management, social media marketing, and customer analytics platforms. Digital transformation requires organisations to develop "digitally mature" cultures and mindsets because it involves technological implementation and human behavioural changes (Buhalis & Leung, 2018).

Technology acceptance model (TAM)

According to Davis (1989), the Technology Acceptance Model (TAM) shows that users will adopt new technologies based on their perceived usefulness and ease of use. The adoption rates of digital tools in SSAEs increase when owners and staff members see their value and find them easy to implement (Mariani & Borghi, 2019). The model demonstrates why owner-managers' digital literacy and positive attitudes are crucial in adopting.

Diffusion of innovations theory

The Diffusion of Innovations theory, as proposed by Rogers (2003), explains how innovations spread between organisations and within them at a macro level. The theory's five factors of relative advantage, compatibility, complexity, trialability, and observability explain why digital tool adoption rates differ between urban and rural SSAEs and different market segments (Rogerson, 2019).

Unified theory of acceptance and use of technology (UTAUT)

The UTAUT model (Venkatesh et al., 2003) extends TAM by adding social influence factors and facilitating conditions, including peer and customer expectations and infrastructure support. Small tourism businesses in the industry face digital adoption influences from their industry networks, customer market forces, and local business support systems.

Organisational culture and change management

The success of digital transformation depends heavily on organisational culture, according to Schein (2010) and Leso et al. (2023). Organisations that value learning, innovation, and adaptability will be more willing to test digital technology implementations. The change management theory of Kotter (1995) demonstrates that organisations must establish a clear vision and leadership while maintaining open communication with stakeholders to implement lasting transformation successfully. The values and attitudes of SSAE owners who actively manage daily operations determine how open their organisations will be to change.

Resource-based view (RBV) and dynamic capabilities

The Resource-Based View (Barney, 1991) states that organisations gain sustainable competitive advantage by possessing distinctive valuable resources, including physical assets and knowledge-based elements. Digital literacy, innovative culture, and customer relationships are essential for SSAEs to succeed. According to Teece et al. (1997), organisations must develop dynamic capabilities to detect digital opportunities and threats and convert them into business advantages.

SME and entrepreneurship theory

Sme theory (storey, 1994) explains how small businesses encounter unique obstacles because they operate with limited resources and informal structures and face greater exposure to environmental challenges. The digital divide affecting small and medium enterprises (SMEs) is most severe in developing countries like South Africa because of limited infrastructure, financial resources, and weak institutional support (Deloitte, 2021).6. Tourism and Hospitality Context.

The tourism and hospitality industry faces special challenges because of its intangible nature, perishable products, and its focus on delivering exceptional customer experiences, making digital maturity adoption more significant (Buhalis & Leung, 2018). The tourism sector needs digital transformation because guests now expect immediate service and customised communication through online platforms following the pandemic (World Bank, 2021; UNWTO, 2022).

Digital ecosystem and external environment

The digital ecosystem, which includes government policies, industry standards, and public-private partnerships, is a fundamental factor enabling or hindering digital maturity development (OECD, 2021; SA Tourism, 2023). Organisations that join industry associations, digital accelerators, and training programs gain better access to knowledge, resources, and social capital (Google Africa, 2023).

Theoretical insights on digital maturity in small-scale accommodation enterprises

The systematic review bases its theoretical framework on the understanding that digital maturity within small-scale accommodation enterprises (SSAEs) consists of multiple interconnected elements. The research demonstrates that digital transformation of the South African tourism sector requires multiple theoretical approaches because each framework provides insufficient understanding of its distinct challenges and prospects. Understanding digital maturity requires more than technology acquisition and infrastructure availability. The availability of reliable internet, capital, and modern devices does not automatically lead to success in the digital transformation.

The Technology Acceptance Model (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) demonstrate that human elements, particularly owner-manager and staff perceptions and confidence and openness toward digital tools, play a vital role in digital transformation success. According to Schein (2010) and Kotter (1995), the individual readiness of staff members interacts with organisational culture because organisations need to create spaces that encourage learning, experimentation, and adaptability for lasting change.

RESEARCH METHODOLOGY

The systematic review uses established best practices for literature synthesis described by Tranfield et al. (2003) and the PRISMA guidelines (Moher et al., 2009; PRISMA, 2020). The research design aims to gather all relevant scholarly and grey literature about SSAE digital maturity predictors in South Africa to deliver strong, actionable results for researchers, policymakers, and practitioners. The study design started with the understanding that digital maturity is a complex concept that unites knowledge from tourism management, information systems, small business development, and economic policy fields. The interdisciplinary nature of the subject led to the selection of systematic review methodology because it provides both complete and unbiased results beyond the capabilities of narrative or selective reviews (Booth et al., 2016). The review investigates which factors from scholarly and industry literature determine digital maturity in South African small-scale accommodation enterprises.

The researcher developed a search plan to find all relevant studies while preventing any form of bias. The researcher conducted systematic database searches for academic and thesis content through Scopus, Web of Science, EBSCOhost, ScienceDirect, JSTOR, and ProQuest. The search included official reports from South African Tourism and NDT, SEDA and WTTC, and international organisations such as the World Bank, Deloitte, UNWTO, and OECD. The research focused on essential hospitality and tourism and SME-related academic publications. The combination of Boolean operators with specific keywords, including "digital maturity", "digital transformation", "small-scale accommodation", and "South Africa", produced relevant studies while minimising unimportant results. The review analysed publications from 2010 onward but included essential earlier works to establish theoretical foundations.

The research applied specific criteria for study selection to achieve both transparency and objectivity in the process. The research included studies examining digital maturity, transformation, and technology adoption within South African small-scale accommodations and hospitality businesses. The review included research from Sub-Saharan Africa when the findings directly applied to the study. The review included academic peer-reviewed articles and high-quality grey literature sources that used English as their publication language.

The study excluded research that concentrated on big hotel corporations and tourism industries outside hospitality and digital maturity assessments that did not serve as the primary focus. The research excluded opinion pieces, newsletters, and non-systematic reviews because they failed to meet the required methodological standards.

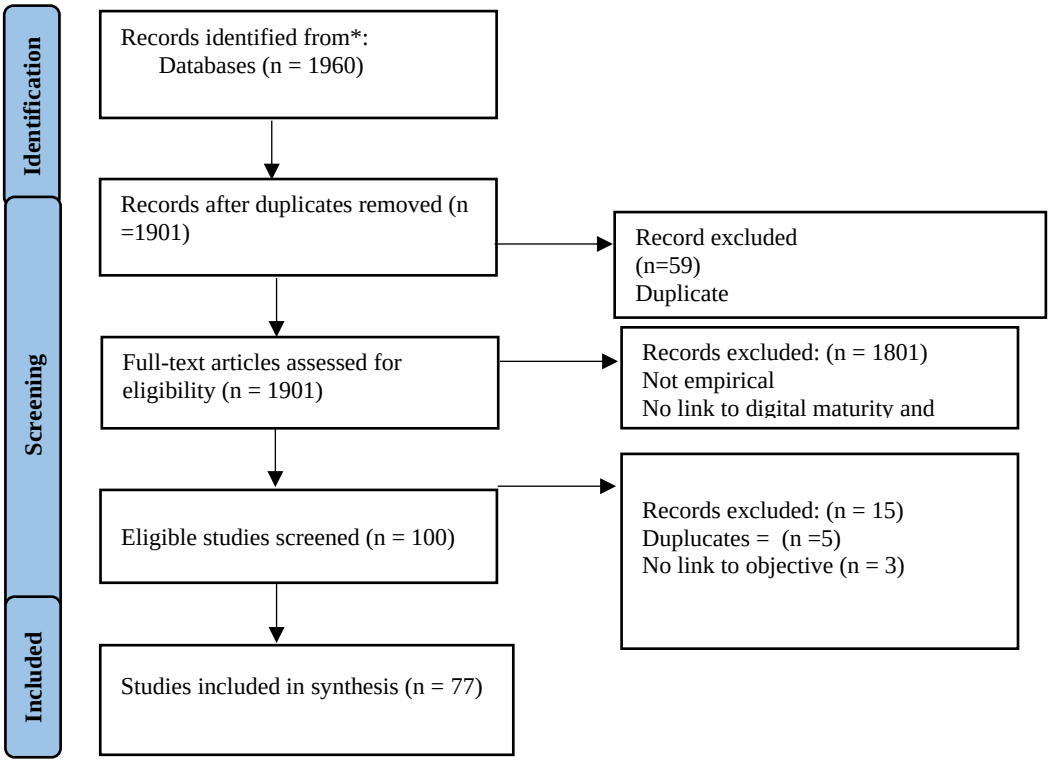


Figure 1. PRISMA framework flow chart (Moher et al., 2009)

The PRISMA (Figure 1) flow guided the study selection process, which started with record identification and de-duplication, followed by title and abstract screening for relevance, and ended with full-text evaluation against inclusion

criteria. The research team used multiple reviewers in a staged process to decrease selection bias while enhancing the reliability of the review. A standardised data extraction form was created to collect study information, including citation data, research context, methodology, participant demographics, and discovered factors, challenges, and primary research outcomes. The systematic method enabled researchers to evaluate evidence from different study types with other characteristics. The thematic synthesis process used inductive coding to find repeated patterns, which resulted in the organisation of predictors into conceptual groups, including human capital and financial resources, infrastructure and market pressures, and organisational culture. The thematic synthesis method allowed researchers to understand the data deeply while creating a connection between South African research outcomes and established digital maturity frameworks from Westerman et al. (2011) and Bharadwaj et al. (2013).

The methodology required a thorough evaluation of study quality for all included research papers. The research team applied the CASP (Critical Appraisal Skills Programme) checklist for qualitative studies and the JBI (Joanna Briggs Institute) checklist for quantitative research to evaluate empirical studies. The AACODS checklist assessed grey literature by verifying the source's authority, accuracy, coverage, objectivity, date, and significance.

The quality appraisal process enhances the reliability of the final synthesis by showing both the positive aspects and weaknesses of the evidence base. The research design includes recognition of its built-in constraints. The research analysis depends on English-language materials, which might have excluded important Afrikaans and indigenous language resources. The fast-paced development of digital technologies leads to the possibility that some research results will lose their validity because new digital tools and practices will appear in the sector.

The research team searched extensively but failed to discover all relevant grey literature and unpublished studies. The review process followed ethical standards by correctly referencing all sources while avoiding human participant involvement and sensitive data exposure. The systematic review methodology used in this study provides both high research reliability and evidence-based recommendations for South African small-scale accommodation enterprises to develop their digital transformation strategies.

RESULTS

Predictors of digital maturity in South African accommodation SMEs

The synthesis of the reviewed literature reveals a multi-dimensional framework of predictors that collectively shape digital maturity among South African accommodation SMEs (Table 1).

These predictors operate at the individual, organisational, and systemic levels.

Table 1. Predictors of digital maturity for SSAEs

Predictors	Description
1. Owner/Manager Digital Literacy & Attitude	Skills, confidence, and openness to digital transformation among leadership
2. Financial Resources & Access to Funding	Ability to invest in digital solutions, access to grants/loans, and perceived ROI
3. Digital Infrastructure & Connectivity	Availability and reliability of the internet and digital tools, especially in rural areas
4. Market & Customer Pressures	Demand from tech-savvy travellers, competition, and expectations for online access
5. External Support & Network Participation	Engagement with industry associations, mentorship, training, and government / private programs
6. Organisational Culture & Change Management	Willingness to innovate, learn, and manage change within the enterprise
7. Enterprise Characteristics (Type, Location)	Influence of urban/rural setting, market segment, and size on digital adoption

Owner/manager digital literacy and attitudes

The literature shows that the owner or manager's digital literacy and willingness to adopt new technology are fundamental to digital transformation success. Research shows that SMEs operated by owners who demonstrate digital literacy and innovation-mindedness tend to adopt sophisticated digital solutions (Davids & Jokonya, 2019; Nyirenda & Pelser, 2020). Research by Sibanda & Rambe (2021) in Limpopo province established that owner dedication to digital training and their willingness to learn new digital skills directly affected digital platform usage. The research confirms international findings about human capital's importance in digital transformation by identifying owner resistance to change and generational differences as major obstacles (Martin et al., 2019; OECD, 2021).

Access to ICT infrastructure

The quality and accessibility of information and communication technology (ICT) infrastructure are essential elements enabling digital maturity development. Rogerson & Rogerson (2021) explain that urban SMEs experience stable internet connectivity and competitive digital service options, yet rural and peri-urban businesses struggle with ongoing connectivity problems. The absence of proper infrastructure prevents businesses from adopting digital solutions and stops them from joining digital platforms such as online travel agencies (OTAs) and e-payment systems (Lebambo & Shambare, 2021; Ndayizigamiye & Dube, 2020).

Financial capacity and access to capital

SMEs need financial resources to purchase technology investments, employee training, and digital marketing initiatives (Ghosh et al., 2022). The initial expenses for property management systems, website maintenance, and OTA subscriptions create significant barriers for small businesses to enter the market. Research conducted by George et al.

(2020) and South African Tourism (2021) shows that companies with better access to funding and government support programs achieve higher digital capabilities and pandemic resilience (Mabaso et al., 2023).

Organisational culture and innovation orientation

The literature shows that organisations which promote learning and experimentation and embrace change as a value demonstrate digital maturity (Sibanda & Rambe, 2021; Buhalis & Leung, 2018). Businesses that support employee skill development and promote digital thinking among staff members achieve better results in technology adoption. Lebambo & Shambare (2021) discovered that SMEs that actively trained staff and interacted with customers through digital tools managed to sustain their operations during emergencies.

External support networks and ecosystem engagement

Research studies confirm that external networks, including government agencies, private sector partners, and industry associations, play a vital role in digital transformation (South African Tourism, 2021). Digital readiness programs, mentorship, and peer learning platforms enable organisations to share knowledge while accessing shared resources. The Tourism Incentive Programme and digital skills workshops provided by provincial tourism boards have proven successful in driving digital adoption, according to Rogerson (2019) and South African Tourism (2021).

Regulatory and policy environment

The development of digital maturity depends on a supportive regulatory framework that includes specific e-commerce laws, data protection standards, and business-friendly policies (Rogerson, 2019). The current bureaucratic system and insufficient targeted incentives are barriers to progress. Research indicates that businesses need simplified registration procedures and enhanced digital infrastructure funding opportunities and regulatory standards that match the operational capabilities of small and medium enterprises (Davids & Jokonya, 2019; OECD, 2021).

Market pressure and customer expectations

The growth of international online travel agencies, shifting consumer behaviour, and digital-first traveller trends have forced small and medium enterprises to implement digital transformation (Buhalis & Leung, 2018). The need for online booking, contactless payments, and real-time communication from customers has driven digital transformation among businesses that serve international customers (Li et al., 2021).

DISCUSSION

The systematic review results demonstrate that South African accommodation SMEs achieve digital maturity through multiple interconnected elements, which include personal skills, organisational characteristics, and environmental and systemic factors. The research confirms that owner/manager digital literacy is the essential factor that aligns with worldwide studies showing leadership vision and digital competency drive technological adoption and digital transformation sustainability (Buhalis & Leung, 2018; Ghosh et al., 2022). The digital divide in South Africa becomes more pronounced because rural and township SMEs face unreliable internet access and unaffordable technology devices, according to Lebambo & Shambare (2021) and Rogerson & Rogerson (2021). According to existing research, financial resources are vital in digital investment. Small and micro enterprises face capital restrictions preventing them from buying digital platforms, joining online marketplaces, and maintaining their current systems (Mofokeng & Chinomona, 2019). The current government programs and industry support systems have limited reach and effectiveness because numerous small businesses lack knowledge about available programs and fail to qualify for them (South African Tourism, 2021).

The speed and extent of digital transformation depend on how organisations approach change through their cultural values and their willingness to innovate. Small and micro enterprises that maintain a learning-oriented culture, experimental mindset, and employee development programs achieve better utilisation of digital tools for service development and customer relations (Sibanda & Rambe, 2021). The combination of risk avoidance behaviour and digital unfamiliarity among leaders creates obstacles for business development. According to Kahiya & Mhlanga (2022), the pandemic forced all SMEs to adopt digital solutions for survival, but their long-term digital adoption success remains uncertain.

The literature repeatedly demonstrates that successful digital transformation depends on supportive ecosystems, which include industry associations, mentorship programs, and government agencies. These organisations deliver technical education and funding while creating knowledge exchange spaces, enabling SMEs to overcome their capacity limitations (Ndayizigamiye & Dube, 2020). The regulatory framework hinders SME digital adoption because it contains complex rules, insufficient digital infrastructure funding, and policy incentives that do not support digital transformation (Rogerson, 2019; OECD, 2021). The review further demonstrates that digital maturity requires individualised approaches because each organisation faces unique circumstances during its transformation process. Developing effective interventions and policy responses requires researchers to study how internal readiness interacts with external enablers and barriers.

Recommendations

South African accommodation small and micro enterprises (SMEs) need a complete strategy to enhance their digital maturity because it requires solutions for technological obstacles and human, financial, and systemic problems.

The government needs to establish digital infrastructure expansion programs focusing on underserved areas of South Africa because these regions lack reliable internet access for their numerous SMEs. The digital economy participation of

SMEs becomes possible through public-private partnerships, which receive targeted public funding to eliminate existing infrastructure barriers. The government needs to create financial support programs through grants, concessional loans, and tax incentives targeting digital investments for small and micro accommodation businesses. The support system must include easy-to-use application procedures and active outreach programs to help eligible SMEs obtain available resources, especially those with restricted administrative abilities.

The establishment of strong capacity-building initiatives stands as a vital requirement. The combination of technology providers and educational institutions with local chambers of commerce and industry bodies should create accessible digital literacy training programs for accommodation SME owners, their staff members, and managers. The training programs must consider different digital experience levels, language backgrounds, and operational characteristics of accommodation SMEs. The sector will benefit from peer-to-peer learning networks, mentorship programs, and demonstration projects that promote best practices and encourage innovation and ongoing improvement.

The regulatory framework needs assessment for potential modifications to establish better conditions for the digital transformation of small businesses. The government needs to simplify regulatory requirements and minimise administrative hurdles while ensuring all digital rules match the needs of small businesses.

The current situation demands immediate efforts to spread knowledge about available resources, digital tools, and market opportunities to SMEs. Successful implementation of digital adoption requires coordinated communication efforts and advisory services to inform SMEs about existing support programs, digital tools, and market opportunities. Lastly, South African accommodation SMEs need government support, industry collaboration and active participation from SMEs to achieve digital maturity. The combination of infrastructure development with financial backing, skill development, regulatory improvements and information dissemination will enable stakeholders to harness digital transformation for enhanced sector competitiveness and inclusive economic expansion in South African tourism.

Suggestions for future research

The current research provides essential knowledge about digital maturity predictors for SSAEs, yet multiple areas need additional investigation. Research needs to follow SSAEs through their digital transformation journey. This will help scientists understand how businesses change technology usage patterns and how digital adoption affects performance and community growth. Research opportunities exist through comparative studies, which can explore different variables. Research should investigate how digital maturity factors and results differ between urban and rural SSAEs and between different provinces and market segments. Research into geographic, demographic, and economic factors will help develop policy solutions addressing digital adoption challenges. Current public and private support programs must be assessed with high precision. Research on Google Africa Tourism Accelerator, Airbnb Africa Academy, and Tourism Transformation Fund programs will show which digital maturity and business performance improvement strategies work best and which need modification or expansion. The study needs to investigate how different demographic characteristics, including gender, age, educational background, and business registration status, affect digital technology adoption. Research into these dynamics will enable the creation of targeted training programs which meet the specific requirements of disadvantaged groups operating in the sector.

Research into what travellers think about digital presence and service quality of SSAEs presents a promising research opportunity. Research about tourist reactions to digital presence and service quality of SSAEs will generate practical knowledge for developing marketing plans and technology acquisition strategies. The growing online presence of SSAEs has created new security risks which require immediate research on digital trust and cybersecurity protection methods for resource-limited settings. Research should investigate how common cybersecurity threats affect SSAE owners and their digital trust levels, and identify effective risk management strategies for limited resource settings.

Research should focus on technological leapfrogging because SSAEs can use affordable mobile-based digital solutions to overcome infrastructure limitations. Research must evaluate how these digital strategies help promote digital inclusion and market competitiveness for businesses operating in areas with limited connectivity and marginalised communities. South African SSAEs need practical solutions and continuous research and development to achieve digital maturity in the tourism industry. The combination of specific research studies and well-informed policy development enables stakeholders to support SSAEs in their digital transformation, enhancing their benefits for communities and the entire national tourism sector.

CONCLUSION

The research examines digital maturity predictors for South African small-scale accommodation businesses through a comprehensive analysis of theoretical and empirical evidence. The study shows that digital maturity in this industry depends on more than technology infrastructure because it results from owner-manager digital literacy and attitudes, organisational culture, financial and human resource availability, market forces, and network strength.

The combination of internal and external elements produces an environment that presents both possibilities and obstacles for digital transformation, especially for businesses in rural areas with limited resources. The research results demonstrate that digital maturity improvement initiatives must address all aspects of the problem while considering specific local conditions. The success of digital maturity enhancement requires more than technology access because it needs digital skill development, innovation culture transformation, financial support, and network development.

The development of South African small-scale accommodation enterprises requires policymakers and industry stakeholders to create extensive training programs and support systems, as well as targeted infrastructure funding for

businesses in marginalised and rural areas. Implementing successful case studies and peer mentorship programs should help build confidence while showing concrete advantages to stakeholders.

The digital transformation of small-scale accommodation enterprises is a fundamental solution to enhance South African tourism through increased business resilience, market competitiveness, and economic inclusion. The sustainable growth of local economies and communities depends on stakeholders who address human and systemic factors of digital maturity to empower SSAEs for digital marketplace success.

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THE TRANSFORMATIVE ROLE OF PLACE ATTACHMENT IN CONVERTING SUSTAINABILITY PERCEPTIONS INTO ACTIVE TOURIST ADVOCACY

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Abstract: While a significant body of literature exists on sustainable tourism, little is known about the psychological mechanisms by which perceptions of sustainability are translated into advocacy behaviors. The affective and identity-based pathways that connect sustainability to proactive advocacy have been poorly theorized, as the majority of the literature has predicted advocacy from direct cognition rather than affective mediators. Further, advocacy has been under-researched as a dependent variable compared to revisit intention, even though it is higher up the loyalty hierarchy and represents more valuable behavioral outcomes for destination marketing and management. The current study aims to address these critical gaps by examining the mediating role of place attachment in the sustainability-advocacy relationship within community-based tourism contexts. It developed and empirically tested the comprehensive hypothesis that place attachment was the core psychological mechanism that transformed perceptions of sustainable development into advocacy behaviors through both emotional and functional pathways. Thus, the study employed a quantitative cross-sectional survey design with 377 tourists in the Egyptian community-based tourism sector, using structural equation modeling to test the hypothesized relationships among perceived sustainability dimensions, place attachment components, and advocacy intentions. Results demonstrated that perceived sustainability is significantly associated with place attachment, which fully mediates its effect on advocacy intention for economic and cultural sustainability dimensions, while partially mediating environmental sustainability effects. These findings extend theoretical understanding by demonstrating that economic and cultural sustainability require complete psychological transformation through place attachment before influencing advocacy, whereas environmental sustainability operates through both affective bonding and direct normative pathways.

Keywords: sustainable tourism, advocacy behaviors, place attachment, perceived sustainability, psychological mechanisms, community-based tourism

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INTRODUCTION

The current tourism landscape is undergoing a shift, with sustainability moving from a secondary consideration to a primary determinant of destination success, particularly in community-based contexts where visitor experience and community wellbeing intersect profoundly (Moscardo et al., 2013). This evolution reflects broader societal shifts towards conscious consumption and ethical travel, creating a new psychological dynamic between tourists and destinations that goes beyond typical measures of satisfaction. In developing economies like Egypt, community-based tourism is not only an economic activity but also a complex socio-ecological system in which perceptions of sustainability may evoke strong emotional ties that facilitate higher levels of advocacy than loyalty measures.

While existing research has identified a correlation between sustainability and intent to revisit the destination (Mohaidin et al., 2017), the psychological process of transforming sustainability perception into passionate advocacy is largely uncharted territory in research to date, particularly in Asian culture where community values and collectivist

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identities might lead to different experience triggers than destinations based in other cultural experience. The convergence of sustainability assessment in cognition, emotional place bonding, and behavioral advocacy marks an emergent frontier toward understanding contemporary tourism relations in community contexts.

As tourists increasingly seek meaning and ethical alignment with destination values, they embrace active advocacy in communities as part of identity expression and value alignment (Sukma et al., 2025). This is especially pertinent in community-based tourism contexts, where authenticity and 'localness' impact visitor perceptions. The multidimensional conception of sustainability - framed as economic viability, cultural preservation, and environmental stewardship - initiates a complex tapestry of emotional indicators for visitors that will involve emotional bonds that may be more profound than was previously acknowledged in the tourism literature (Lee et al., 2015; Luong, 2023a), particularly when there is a grant of community welfare and cultural survival related to tourism. Although considerable academic interest has been directed toward sustainable tourism, significant theoretical gaps remain in our understanding of how psychological perceptions of sustainability encourage sustainable advocacy behavior (Scott, 2011). First, and perhaps most obviously, emotional and identity-based pathways connecting sustainability to proactive advocacy behaviors have not been well theorized, as the existing literature generally focuses on the direct cognitive connection rather than another significant mediating factor: affect. Second, advocacy has received limited attention from researchers, particularly compared to revisit intentions in tourism. Advocacy is a more effective way of expressing loyalty and offers greater economic value to organizations, since advocacy extends beyond personal behavior and influences others' travel intentions and behaviors (de Leaniz et al., 2024). Third, the formation of place attachment, a key to community-based behaviors such as advocacy, remains understudied culturally and contextually. Empirical studies have not been conducted in collectivist societies, specifically in Egypt, limiting the applicability of Western-developed theories to Southeast Asian perspectives, where community dependence and the valuing of relationships may significantly shape tourist engagement experiences.

This research addresses these gaps by proposing and testing a holistic theoretical model that positions place attachment as the primary psychological mechanism through which perceptions of sustainability translate into advocacy behaviors in Egyptian community-based tourism. By assessing the emotional and functional connections tourists make with sustainable destinations, this work further contributes to knowledge surrounding the psychological processes sustainability initiatives may elicit (Liu et al., 2021; Tang et al., 2025). Moreover, by examining advocacy rather than behavior as simple as saying, re-visitation, the current work captures a more meaningful behavioral range of loyalty regarding both organic promotion and defense to a destination. This research also provides cultural context for sustainable tourism in developing Asian economies, alongside valuable managerial recommendations for community-based tourism providers seeking to improve both their sustainability practices and their emotional connection with customers (Garbelli et al., 2017). Ultimately, the purpose of the current study is to answer the following questions to address this research gap:

1. How do distinct dimensions of perceived sustainability (economic, cultural, environmental) differentially influence the development of emotional and functional place attachment among tourists in Egyptianscommunity-based tourism settings?
2. To what extent does place attachment serve as the psychological mechanism that translates sustainability perceptions into active advocacy behaviors?
3. How do emotional (place identity) and functional (place dependence) dimensions of place attachment comparatively predict various forms of advocacy in sustainable tourism contexts?

LITERATURE REVIEW

1. The Multidimensional Nature of Perceived Sustainability in Community-Based Tourism

Sustainable tourism has shifted over the years from a purely environmental protection approach to a comprehensive framework that encompasses economic viability, cultural authenticity, and environmental care, creating thoughtful consideration of tourism as a complex systemic phenomenon (Pulido-Fernández et al., 2014). Prior studies demonstrate that tourists' perceptions of sustainability can shape their evaluations of destinations and ensuing behavioral intentions. Across a variety of contexts, research confirms that sustainability practices improve the attractiveness and competitiveness of destinations (Phakdee-Auksorn et al., 2025). In particular, sustainability in community-based tourism is especially salient because it directly influences local livelihoods and the preservation of cultural integrity; thus, tourist perceptions carry noteworthy weight for a destination's viability. For example, research has shown that a community engaged in sustainable tourism development creates real experiences that resonate with more ethically conscious travelers (Sukma et al., 2025), while the economic, social, and environmental sustainability aspects subsequently shape the tourist experience. The economic aspect emphasizes that tourism generates jobs and fair wages for local communities; the cultural aspect preserves culture and integrity; and the environmental aspect is oriented toward caring for the ecosystem and minimizing the ecological footprint in destination locations (Choosuk et al., 2024; Judge et al., 2020).

Economic sustainability goes beyond generating profits; it also involves cooperative arrangements that enable local communities to secure a share of the value generated by tourism. Research has identified that economic sustainability in community-based contexts is about creating backward linkages, whereby income derived from tourism can be reinvested to support local industry sectors, including, but not limited to, agriculture and handicraft production, thereby creating multiplier effects throughout the local economy (Maldonado-López et al., 2024). In addition, research in developing contexts has shown that small-scale, locally owned tourism businesses are more likely to generate local economic benefits than large, foreign-owned developments. However, they may face challenges accessing markets and capital. Tourists' perception of financial sustainability, therefore, can range from a basic notion of value for money to an ethical assessment

of whether their stipend is genuinely accruing value to local communities. This notion aligns with the broader phenomenon of conscious consumption in tourism, where travelers are seeking more evidence that their economic spending directly contributes to the development of a local community rather than a foreign corporation (Wut et al., 2024).

The cultural and environmental aspects of sustainability create particularly robust and often emotional attachments in community-based tourism contexts. Cultural sustainability includes protecting intangible heritage, traditional knowledge systems, and authentic cultural representations from the homogenizing influences of globalization (Azhar et al., 2022; Ilieș et al., 2022). Scholarship in indigenous tourism contexts has exemplified that cultural sustainability is about effectively negotiating the visibility of cultural presentations while respecting cultural integrity, with successfully moving tourism models permitting communities a degree of say in how their cultures are understood and experienced. Environmental sustainability extends beyond more traditional conservation contexts in community-based tourism and includes traditional ecological knowledge and community-based resource management systems that have supported functioning ecosystems for generations (Strobl et al., 2015). Correspondingly, research indicates that when tourists see actual communities stewarding environmental resources, this enhances the meaningfulness, experience quality, and potential enjoyment of conservation work (Lv et al., 2023). The overlap of cultural and environmental sustainability creates powerful narratives of resilience and adaptations that, when factors permit, can have great influence on tourist perceptions and experiences.

2. The Psychological Architecture of Place Attachment in Tourism

Place attachment refers to the intricate emotional connections and psychological ties that individuals have to specific physical places, consisting of two different but complementary aspects: place identity (the emotional and symbolic importance of place for the self) (Cordova-Buiza et al., 2024) and place dependence (the functional value of a place for a particular activity or experience). The conceptual foundation of place attachment was established through research in environmental psychology and human geography that identified place attachment in relation to recreation and tourism (Kaplanidou et al., 2012). In tourism contexts, place attachment has been shown to predict loyalty behaviors distinct from satisfaction, as emotionally attached tourists feel a sense of ownership and protective connectedness to a destination (Singh et al., 2025). Research has indicated that place attachment mediates visitors' experiences and loyalty (Lee & Xue, 2020), and studies have shown that place identity is a strong predictor of environmentally responsible behavior among tourists (Luong, 2023b). More recently, research conducted in Asian contexts has identified culturally influenced forms of attachment, including collectivist values, that shape emotionally driven attachment to place through community influences and relational experiences (Huang & Lin, 2023). Creating place identity is a complex set of psychological processes in which a destination is integrated into one's self-concept and identity story.

Scholars posit that the development of place identity is akin to that of social identity. In both cases, people gain self-esteem and a sense of differentiation from special places associated with personal identity. In tourism, the process of place identity development is often more rapid, as attitudes about identity are shaped by transformative experiences that break down previous worldviews or dramatically expand the self in moments of self-discovery (Chauhan, 2025). Some studies have found that the existential authenticity—being one's true self when traveling—of a tourist experience is a very significant factor in the development of place identity (Emadlou et al., 2025). This is particularly true when a destination provides a range of experiences that resonate with travelers' intrinsic values, hopes, and aspirations. The narrative aspect of place identity suggests that tourism experiences are often reframed as personal stories and spatially integrated into their life stories, creating emotional bonds to the destination that last well beyond the duration of the visit.

Place dependence constitutes the functional dimension of attachment, signifying the extent to which a destination fulfills specific activity needs and provides distinctiveness unavailable at alternative locations. The concept derives from a dependency theory standard in media studies, which posits that individuals develop a greater attachment to places that serve and fulfill essential goals, especially when those goals are difficult to achieve elsewhere. Studies in adventure tourism contexts have established that place dependence typically develops in destinations that offer an optimal balance of challenge and skill, stimulating flow experiences that are both immensely satisfying and difficult to replicate elsewhere (Liu & Huang, 2019). Community-based tourism is another context in which place dependence typically arises from the interaction of a unique, coordinated bundle of activities, social interactions, and the environment, generating an experience distinctive in nature (Chi & Han, 2021). Place dependence has functional characteristics, meaning it often develops more quickly than place identity, but is also often more susceptible to disruption when the destination changes or when other competitive options emerge that fulfill the same goals. Therefore, the study hypothesizes that:

H1: Perceived sustainability positively influences place attachment in community-based tourism settings, with cultural sustainability demonstrating the strongest effect, followed by environmental and economic sustainability dimensions.

3. The Psychological Transformation from Sustainability Perceptions to Advocacy Behaviors

Advocacy is the most active and influential form of destination loyalty because it involves personal revisitation, promoting the destination positively, affirming others' experiences, and defending the destination when criticized (Su et al., 2016). While the theoretical link between sustainability and advocacy remains underexplored, existing research generally examines intermediary variables, such as satisfaction and destination image processes, that are closer to the actual emotional change that leads to the active promotion stage (Nguyen & Duong, 2024). While previous studies have established that perceived value acts as a mediator in the relationship between destination image and behavioral intention (Kong & Chang, 2023), others have found a direct relationship between sustainability and word of mouth recommendations

in specific destinations (Laachach & Alhemimah, 2024). The suggested role of place attachment as a potential mediating factor in these relationships provides an essential theoretical contribution, as emotional connections may help explain why some sustainable destinations elicit greater advocacy than others with similar sustainability credentials (Yamashita et al., 2024). Many studies find that place attachment predicts pro-environmental behavioral intentions (Li & Wu, 2019), while others have found that place identity can mediate relationships between festival experience and loyalty (Hazel Xu et al., 2022).

The psychological shift from sustainability awareness to advocacy behavior involves nuanced cognitive and affective processes that transcend rational decision-making paradigms. Cognitive consistency theories contend that when tourists develop strong place attachments toward a sustainable destination, they experience a psychological impetus to align with their affective bonds and sustainability values, and thus choose advocacy to relieve the cognitive dissonance they experience (Yilmaz et al., 2021). The literature supports this perspective: tourists who perceived consonance between their environmental values and the destination's sustainability practices experienced heightened satisfaction, which motivated them to share their experiences with others (Fuchs, 2025). Social identity processes may also come into play, in which advocacy allows tourists to signal membership in valued social groups (e.g., ethical travelers, enthusiasts of local culture) while reinforcing their own identity narratives (Salinero et al., 2022). This performative aspect of advocacy behavior, particularly in the age of social media, allows tourists to share sustainability-focused travel experiences with larger audiences and use them in the projection of identity.

In the context of community-based tourism, the emotional aspects of advocacy behavior are powerful because of relationships that go beyond the typical host-guest dynamics that transpire through travel. Studies have shown that transformative experiences in a community context can lead to feelings of moral obligation and reciprocity, which drive advocacy as a form of giving back for these experiences (Park et al., 2022). Also, the form of consumption philanthropy establishes that transacting tourists who feel that their travel is supporting community wellbeing may go as far as advocacy as a form of ethical consumption (Denley et al., 2020). The emotional effects of advocacy are further compounded when tourists feel that a community or environment they have developed an emotional attachment to faces external threats, leading to protective behaviors around communities and environments that may include advocating for the destination in response to criticisms or sharing the destination with others to ensure its economic sustainability (Wenxin, 2025). The most significant protective capacity lies in situations where advocacy arises from a genuine concern for the community or environment, rather than being driven by self-interest (Figure 1). Therefore, the study hypothesizes that:

H2: Place attachment (identity and dependence) mediates the relationship between perceived sustainability and advocacy behaviors.

H3: Place dependence has a stronger direct effect on advocacy intentions than place identity.

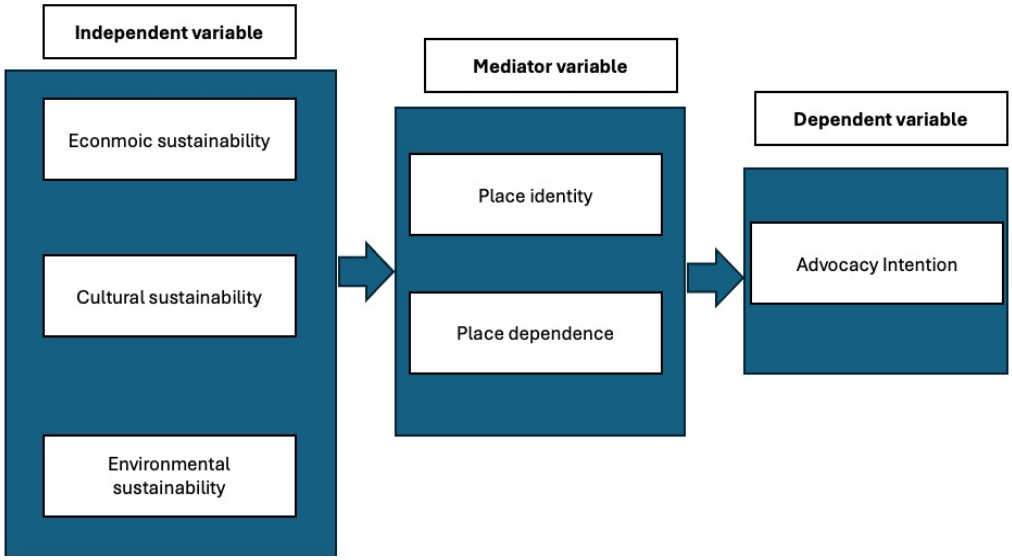


Figure 1. The Conceptual Framework

MATERIALS AND METHODS

1. Data Collection Procedures and Techniques

This study utilized a cross-sectional survey design to gather data from tourists who had participated in community-based tourism in Egypt. Data collection was conducted from March to June 2023 and targeted tourists who stayed for a minimum of three days in chosen community-based tourism locations in the Red sea. The survey instrument was developed through a thorough scale adaptation, contextual adaptation, and translation process. The items in English were translated into parallel back-translation method with reconciliation to provide for conceptual equivalence, linguistic accuracy, and cultural relevance. The homestay hosts and local tourism coordinators created a network for data collection. They received extensive training as research facilitators and administered the survey during times of high engagement with tourists—usually during an evening cultural activity or morning departure preparation.

2. Selection Criteria for Participants

The research utilized stratified purposive sampling to access participants who would be able to contribute significant meanings to the research phenomena and was also aimed at securing a diversity of sample across key demographic variables. Invited participants were required to be adult tourists (i.e. 18 years or older) who had completed a stay of no less than three consecutive nights in one of the research identified community based tourism sites and took part in two or more the community-based activities offered during their stay. This requirement established that participants had sufficient immersive engagement with the community-based tourism features of the destination to be able to recall enough detail and provide a sufficient response to the interview questions. The sampling strategy contained tourists who were both Canadian and from other countries, and quotas were developed to ensure gender, age, and travel motivations were present in the sample of tourists. Tourists were recruited from several different outlets including a homestay network (e.g., host family connections), community tourism cooperatives, and local guide associations.

Hosts and coordinators introduced the study via an invitation to tourists as they were departing and participants were invited to participate voluntarily. This multi-approach sampling recruitment method relied on a pre-existing trust relationship to recruit participants willingly while balancing potential selection bias with access points.

3. Sample Size and Sampling Method

Out of the 500 questionnaires given out, there were 377 valid responses, resulting in a 75.4% response rate, after removing any incomplete, inconsistent or improperly answered questionnaires. The sample size clearly exceeds the minimum for structural equation modelling (SEM), which recommends at least 10-20 observations for each estimated parameter, or for the sample to be greater than or equal to 200 total.

The descriptive statistics for the sample were representative of strategic diversity across gender (51.2% male, 48.8% female), age (12.5% under 20 years, 22.3% age 20-25 years, 27.6% age 26-30 years, 21.2% age 31-35 years, 16.4% over 35 years), and education level (24.1% high school, 44.6% bachelor/engineer, 31.3% master/PhD). Including a mixture of both domestic (68.4%) and international tourists (31.6%) added to the representativeness of the sample; however, the non-probability sampling method limits generalizability, which is a limitation to the study.

4. Measurement Instrument and Scale Development

The survey tool included existing multi-item scales that were adapted from the literature, with contextual adaptations, at the constructs level. All items for the scales utilized a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Perceived sustainability was measured as a second-order reflective-formative construct comprised of three dimensions: an economic sustainability dimension composed of four items, which included modifications adapted to the community context, a cultural sustainability dimension which included four items that incorporated cultural specificity, and an environmental sustainability dimension which included four items and considered ecological specificity. Place attachment was conceptualized as a second-order reflective construct comprised of two dimensions: place identity consisting of four items and a place dependence dimension with four items, at this dimension emotional depth modified within each item. Advocacy intention was measured as a first-order reflective construct that included five items with added items constructed to incorporate the defensive and proactive aspects of advocacy, privy to context and tourism (Table 1).

Table 1. Complete Measurement Scales and Item Specifications

Construct	Dimension	Item Code	Item Wording	Source Adaptation
Perceived Sustainability	Economic Sustainability	ECO1	"Local families receive fair economic benefits from tourism activities"	Modified from Iniesta-Bonillo et al. (2016)
		ECO2	"Tourism spending circulates within the local community rather than leaking out"	
		ECO3	"The destination provides stable employment opportunities for local residents"	
		ECO4	"Local businesses and artisans can sustain themselves through tourism"	
	Cultural Sustainability	CUL1	"Traditional cultural practices are authentically preserved and not commercialized for tourists"	
		CUL2	"Local heritage sites and historical places are well-maintained and respected"	Modified from Iniesta-Bonillo et al. (2016)
		CUL3	"Cultural festivals and traditions continue to be practiced with genuine community participation"	
		CUL4	"Younger generations are actively involved in learning and continuing cultural traditions"	
	Environ-mental Sustainability	ENV1	"Natural landscapes and ecosystems are protected from tourism-related degradation"	Modified from Iniesta-Bonillo et al. (2016)
		ENV2	"Waste management systems effectively minimize environmental pollution"	
		ENV3	"Water resources are conserved and protected from overuse or contamination"	
		ENV4	"The destination maintains biodiversity and protects native flora and fauna"	
Place Attachment	Place Identity	PID1	"This destination feels like it is part of who I am as a person"	Modified from Williams & Vaske (2003)
		PID2	"I feel a strong emotional connection to this place and its people"	
		PID3	"This destination symbolizes important personal values that I hold"	
		PID4	"I identify strongly with the atmosphere and spirit of this place"	
	Place Dependence	PD1	"This destination offers exactly the type of experiences I look for when traveling"	Modified from Jorgensen & Stedman (2006)
		PD2	"No other place I've visited compares to what I experience here"	
		PD3	"The activities available here are more important to me than those in other destinations"	
		PD4	"I get more satisfaction from visiting this destination than any other similar place"	

Advocacy Intention		ADV1	"I will actively recommend this destination to friends and family"	Modified from Akgunduz& Sanli (2017).
		ADV2	"I will share positive stories and photos about this destination on social media"	
		ADV3	"I will encourage others to visit this destination when they plan their travels"	
		ADV4	"I would defend this destination if I heard someone criticizing it unfairly"	
		ADV5	"I would choose to return here rather than try a new destination with similar offerings"	

RESULTS

1. Data Validity and Reliability Measures

The measurement model was rigorously evaluated using confirmatory factor analysis (CFA) in relation to reliability, convergent validity, and discriminant validity, with standardized factor loadings for all items exceeding the desired level of .6 (ranging from .68 to .84), demonstrating adequate item reliability. Composite reliability (CR) fell within the range of .83 to .91, well above the .7 cutoff, and Cronbach's alpha values ranged from .81 to .89 indicating adequate internal consistency. The average variance extracted (AVE) values ranged from .55 to .67, exceeding the .5 cutoff and establishing convergent validity. Discriminant validity was assessed according to the Fornell-Larcker criterion by confirming that the square root of AVE scores were larger than constructs correlations with other constructs, and the heterotrait-monotrait ratio (HTMT) was assessed and found to be below .85. The measurement model demonstrated a good fit of the data (χ^2/df = 2.18, CFI = .94, TLI = .93, IFI = .94, RMSEA = .056) and met criteria for good model fit (Table 2).

Table 2. Reliability and Validity Assessment

Construct	CR	AVE	Cronbach's α	1	2	3
1. Perceived Sustainability	0.91	0.67	0.89	**0.82**		
2. Place Attachment	0.88	0.63	0.86	0.59	**0.79**	
3. Advocacy Intention	0.83	0.55	0.81	0.52	0.68	**0.74**

2. Demographic Results with Descriptive Statistics

A total of 377 tourists participated in the study, with gender being evenly distributed (51.2% male and 48.8% female). The ages indicated that the sample consisted primarily of middle-aged people, with the largest group aged 26-30 years (27.6%). There were also categories for respondents ages 31-35 (21.2%), 20-25 (22.3%), over 35 (16.4%), and under 20 years (12.5%). Education levels were also relatively high overall; 44.6% held a bachelor's/engineer degree, 31.3% a master/PhD, and 24.1% a high school education. In terms of ownership, the sample consisted of domestic tourists (68.4%) plus international tourists (31.6%). The primary motivators for traveling were cultural-based immersion (42.3%), appreciation of nature (35.7%), and interactions with the community (22.0%).

Following this process, descriptive statistics were calculated for the main constructs. When calculating descriptive statistics, exploratory descriptive statistics would indicate that all variables exceeded the scale midpoint, with cultural sustainability receiving the highest mean score (M = 4.18, SD = 0.66) and economic sustainability receiving the lowest mean score (M = 3.91, SD = 0.71). As well, for Aim 2, both place attachment (M = 4.02, SD = 0.64) and advocacy intention (M = 4.08, SD = 0.68) were also coded positively to build further positive intention (Table 3).

Table 3. Descriptive Statistics and Correlations (**p < 0.01)

Variable	Mean	SD	1	2	3	4	5	6
1. Economic Sustainability	3.91	0.71	1					
2. Cultural Sustainability	4.18	0.66	.46**	1				
3. Environmental Sustainability	4.05	0.73	.41**	.57**	1			
4. Place Identity	3.98	0.69	.38**	.52**	.49**	1		
5. Place Dependence	4.06	0.70	.44**	.43**	.47**	.56**	1	
6. Advocacy Intention	4.08	0.68	.40**	.48**	.51**	.61**	.67**	1

3. Structural Model and Hypothesis Testing

The structural model demonstrated a good fit with the data (χ^2/df = 2.24, CFI = 0.93, TLI = 0.92, IFI = 0.93, RMSEA = 0.057). Hypothesis 1 suggested that perceived sustainability positively influences place attachment, which was strongly supported by the results ($\beta = 0.59$, $p < 0.001$). Looking closely at sustainability dimension specific effects, our analysis found that cultural sustainability had the strongest effect on place attachment ($\beta = 0.51$, $p < 0.001$), followed by environmental sustainability ($\beta = 0.38$, $p < 0.001$), and economic sustainability ($\beta = 0.31$, $p < 0.01$), thus supporting the dimensional hierarchy proposed by H1. Hypothesis 2 suggested that place attachment positively influences advocacy intention, which was again strongly supported ($\beta = 0.74$, $p < 0.001$). Following the similar pattern for the place attachment dimensions, our analysis found that place dependence ($\beta = 0.55$, $p < 0.001$) had a stronger effect on advocacy than place identity ($\beta = 0.49$, $p < 0.001$), thus supporting the differential effect proposed by H2.

4. Structural Model Analysis with Disaggregated Sustainability Dimensions

Analyzing direct relationships between individual sustainability dimensions within the mediation and outcome variables produces a more refined picture than the aggregated model does. The disaggregated structural model demonstrated acceptable

fit to the data (χ^2/df = 2.31, CFI = 0.92, TLI = 0.91, IFI = 0.92, RMSEA = 0.059), which enabled a fine-tuned analysis of the unique way each sustainability dimension contributed to formation of place attachment and advocacy behaviors (Table 4).

Table 4. Disaggregated Structural Model Results

Relationship	Standardized β	SE	t-value	p-value	Result
Direct Effects on Place Identity					
Economic Sustainability → Place Identity	0.28	0.06	4.67	<0.001	Significant
Cultural Sustainability → Place Identity	0.45	0.05	9.00	<0.001	Significant
Environmental Sustainability → Place Identity	0.32	0.05	6.40	<0.001	Significant
Direct Effects on Place Dependence					
Economic Sustainability → Place Dependence	0.35	0.06	5.83	<0.001	Significant
Cultural Sustainability → Place Dependence	0.29	0.05	5.80	<0.001	Significant
Environmental Sustainability → Place Dependence	0.38	0.05	7.60	<0.001	Significant
Direct Effects on Advocacy Intention					
Economic Sustainability → Advocacy Intention	0.09	0.05	1.80	0.072	Not Significant
Cultural Sustainability → Advocacy Intention	0.11	0.06	1.83	0.067	Not Significant
Environmental Sustainability → Advocacy Intention	0.14	0.06	2.33	0.020	Significant
Mediator to Outcome					
Place Identity → Advocacy Intention	0.42	0.07	6.00	<0.001	Significant
Place Dependence → Advocacy Intention	0.51	0.06	8.50	<0.001	Significant

5. Differential Effects on Place Attachment Dimensions

The analysis shows different patterns of how each dimension of sustainability is influencing the two aspects of place attachment. Cultural sustainability has the strongest effect on place identity (β = 0.45), suggesting that cultural dimensions, such as authentic traditions, heritage preservation and community cultural practices, are the most significant forces underlying emotional bonding and identity attachment to destinations. This results supports theoretical frameworks that stress the fundamentally human need for cultural meaning and symbolic attachment, especially in tourism settings where cultural experiences are often the center of attraction. Environmental sustainability has the strongest effect on place dependence (β = 0.38), indicating environmental quality, conservation practices and protection of natural resources are paramount to establish functional bonds whereby tourists believe the destination is uniquely suitable for collecting the experiences they desire. This result suggests environmental attributes create the "stage" in which enjoyable experiences transpired, whereby fulfilling experiences relied upon environmental attributes and ultimately would be needed for functional attachment. Economic sustainability has moderate, yet substantial effects on both place identity (β = 0.28) and place dependence (β = 0.35), indicating appearances of economic fairness and local distribution of benefits contributes to both emotional and functional attachment, albeit through different psychological mechanisms.

6. Mediation Analysis with Disaggregated Sustainability Dimensions

The mediation analysis reveals complex indirect pathways through which sustainability dimensions influence advocacy intentions:

Table 5. Disaggregated Mediation Analysis

Indirect Pathway	Standardized β	95% CI Lower	95% CI Upper	p-value	Mediation Type
Economic → Place Identity → Advocacy	0.118	0.065	0.171	<0.001	Full Mediation
Economic → Place Dependence → Advocacy	0.179	0.112	0.246	<0.001	Full Mediation
Cultural → Place Identity → Advocacy	0.189	0.126	0.252	<0.001	Full Mediation
Cultural → Place Dependence → Advocacy	0.148	0.089	0.207	<0.001	Full Mediation
Environmental → Place Identity → Advocacy	0.134	0.081	0.187	<0.001	Partial Mediation
Environmental → Place Dependence → Advocacy	0.194	0.129	0.259	<0.001	Partial Mediation

The data collection and analysis indicate that place attachment fully mediates the relations for economic and cultural sustainability and partially mediates the relation for environmental sustainability, yielding the indicated relationship pattern. That is, economic and cultural sustainability place bonding perceptions truly require total psychological transformation, through emotional and functional bonding, before affecting advocacy behavior. Meanwhile, environmental sustainability resulted in a small, but significant, direct effect on advocacy after accounting for place attachment; therefore, environmental sustainability may elicit advocacy in further cognitive or normative paths beyond place bonding (Table 5).

DISCUSSION

The results of this study indicate an intricate psychological framework through which the various sustainability dimensions operate through different pathways to influence advocacy behaviors in community-based tourism settings. Through this disaggregated analysis, it was demonstrated that cultural, environmental, and economic sustainability dimensions follow different psychological pathways to stimulate place attachment and ultimately advocacy intentions. Beyond other sustainability dimensions, the particularly strong association of cultural sustainability with place identity reflects the role of cultural elements as the dominant catalyst for emotional bonding and for translating sustainable values

into personal identity connections (Laskarin Azic et al., 2023). This finding offers the perspective that cultural preservation and authentic cultural experiences afford tourists the substantive connections needed to embed destinations in their self-concept and identity scripts in community-based tourism contexts.

The significant link between environmental sustainability and place dependence (β = 0.38) indicates that environmental quality and preservation lay the foundation for functional bonding, in which tourists view destinations as uniquely capable of fulfilling their desires for experience (Lee & Jan, 2017). Economic sustainability, on the other hand, demonstrates equivalent impacts on place identity (β = 0.28) and place dependence (β = 0.35), indicating that perceptions of economic fairness affect attachment (whether emotional or functional) but likely through different psychological mechanisms (Cai et al., 2021). The finding that, of the two, place dependence has a more significant impact on advocacy intent (β = 0.51) than does place identity (β = 0.42) indicates that functional satisfaction is the main basis of attachment for advocacy behavior, possibly because functional experiences are easier to communicate to others than identity attachment (Han & Hyun, 2017).

The mediation analysis provides a revealing theoretical insight: Place attachment completely mediates the relationships for economic and cultural sustainability, while place attachment partially mediates the relationship for environmental sustainability. This pattern suggests that environmental sustainability may trigger advocacy through additional cognitive or normative pathways beyond place attachment, potentially invoking ethical obligation or environmental values (Sajid et al., 2024). In contrast, perceptions of economic and cultural sustainability require modifications in psychological perspective and are almost fully operationalized via emotional and functional place attachment to influence advocacy behavior.

The analysis of total effects offers additional representations of this complexity as cultural sustainability, with the strongest total effect on advocacy (β = 0.348) followed very closely by environmental sustainability (β = 0.338), and economic sustainability had a smaller total but still strong effect (β = 0.297).

1. Theoretical Contributions

This study provides several important theoretical contributions by explaining the psychological pathways through which sustainability dimensions affect advocacy behaviors. First, the disaggregated analysis shows that sustainability dimensions operate through distinct psychological processes rather than through a single mechanism (Baghirov et al., 2023). For instance, cultural sustainability primarily promotes emotional- and identity-based ties, whereas environmental sustainability provides functional ties and additional direct effects, and economic sustainability promotes emotional and functional bonding. This multidimensional processing framework challenges the aggregate approaches employed in much of sustainable tourism research. It adds greater theoretical clarity in understanding how the sustainability dimensions link with different psychological systems.

The finding that economic and cultural sustainability fully mediated, whereas environmental sustainability only partially mediated, constitutes an essential theoretical development in considering how psychological processes transform sustainability perceptions into behaviors. This pattern suggests that environmental sustainability may be driven by both emotional bonding and other cognitive or normative processes (Kala & Chaubey, 2023), but economic and cultural sustainability may require only a complete transformation through place attachment.

This study extends the affective transformation model by identifying boundary conditions that make cognitive and normative pathways relevant, especially for environmental sustainability, because moral obligations and ethical concerns can both be direct drivers of advocacy behaviors alongside emotional bonding.

The different influences on place identity and place dependence provide theoretical value towards understanding how various dimensions of sustainability influence the construction of place meaning. Cultural sustainability's greater influence on place identity adds theoretical significance to meaning-making and symbolic connection in sustainable tourism, as cultural sustainability elements provide the narrative content for place identities (Lee & Xue, 2020). Environmental sustainabiility's greater influence on place dependence adds to the theoretical significance of functional experience quality as the basis for bonding to a destination (Tan & Lin, 2020). This distinction contributes to place attachment theory by clarifying how different attributes of destinations can contribute to the emotional versus functional aspects of the relationship with place, thus providing a more sophisticated theoretical explanation for tourism psychology.

2. Managerial Implications

The disaggregated findings provide very specific, practical implications for community-based tourism operators and destination managers. The robust cultural sustainability-place identity pathway indicates that cultural attributes should be positioned as the emotional core of destination marketing and experience design (Ozer et al., 2025). This would involve not only showcasing culture, but ensuring opportunities for meaningful cultural participation so that tourists can directly experience living traditions. Managers should curate cultural experiences that foster personal transformation and meaningful identity expression, such as workshops with local artisans, cultural ceremonies that require participation, and authentic interactions that allow tourists to build genuine connections with community members (Safarov et al., 2024).

The strong environmental sustainability-place dependence relationship suggests that management practices for environmental sustainability should be framed not merely as conservation, but as crucial to maintaining the unique experience-based qualities for which destinations are treasured experiences to be shared (Jiang et al., 2025). Managers should demonstrate how specific environmental practices help protect the activities and settings that interest tourists, such as how waste management systems help preserve scenic beauty, or how meaningful consideration of conservation efforts has led to biodiversity outcomes that enhance wildlife viewing experiences. Finally, the partial mediation of environmental

sustainability suggests that messaging can also appeal more directly to environmental values and responsibilities in the motivation to advocate, especially among environmentally conscious segments of tourists (Torabi et al., 2025).

The findings on economic sustainability indicate that transparency on local economic benefits should be woven throughout the tourist experience rather than conveyed as non-integrated information. When tourists are aware of how their spending benefits the communities and environments they have come to appreciate, it will reinforce functional and emotional attachments (Minh et al., 2025). Managers should develop clear visual stories about economic distribution, such as infographics that show tourism dollars circulating in the community, or stories about specific businesses and families benefiting from visitors. Destination managers should also develop differentiated strategies for place identity rather than place dependence. Place identity is developed by creating emotional peaks rooted in meaningful cultural interactions and personal connections. In contrast, place dependence development must be underpinned by consistent delivery of high-quality experiences that deliver functional service expectations (Liu et al., 2015).

Accordingly, training initiatives for community members should, therefore, emphasize both cultural authenticity and service quality, since achieving emotional and functional satisfaction is necessary to cultivate advocates for the destination.

CONCLUSION

This research makes significant theoretical and practical contributions to sustainable tourism scholarship by unveiling the intricate psychological architecture through which sustainability perceptions transform into advocacy behaviors in community-based tourism contexts. By positioning place attachment as the central mediating mechanism and disaggregating sustainability into its constituent dimensions—economic, cultural, and environmental—this study demonstrates that the path from sustainability awareness to passionate destination advocacy is neither direct nor uniform, but rather operates through distinct emotional and functional pathways that vary by sustainability dimension.

The finding that cultural sustainability primarily drives emotional identity bonds while environmental sustainability fosters functional dependence attachments reveals a nuanced psychological landscape that has profound implications for both theory development and practical destination management. Importantly, the research challenges simplified assumptions in sustainable tourism literature by demonstrating that economic and cultural sustainability require complete affective transformation through place bonding before influencing advocacy, whereas environmental sustainability maintains dual pathways through both emotional attachment and direct normative appeals. For community-based tourism destinations in developing economies like Egypt, where sustainability is not merely an operational practice but a matter of cultural survival and community wellbeing, these insights provide actionable guidance for cultivating genuine tourist advocates who will organically promote, defend, and return to destinations. The robust mediation effects and high variance explained in advocacy intentions underscore that emotional and functional bonds are not peripheral considerations but rather the very essence of transforming sustainability efforts into sustained destination success.

As the global tourism industry continues its inexorable shift toward sustainable and ethical travel, understanding these psychological mechanisms becomes essential for destinations seeking not just visitor satisfaction but the creation of passionate advocates who will champion sustainable communities in an increasingly conscious travel marketplace.

The study limitations

This research has a number of limitations worthy to note when reviewing the findings as well as some recommendations for future exploration. First, cross-sectional data, while a valuable approach to understanding relationships between variables, limits definitive causal statements about the variables. Future studies could explore causal, and temporal, relationships using different research models including longitudinal designs or experimental studies. Second, the emphasis on community-based tourism in Northern Egypt, while presenting rich contextual understanding, limits comparisons to other tourism contexts and cultural settings. Replications of studies in varied destination types (e.g., urban tourism; coastal resorts) or cultural contexts (e.g., Western individualistic societies) would enhance the external validity and boundary conditions of the study.

Future studies should aim to capitalize on the dynamic interplay between place identity and place dependence across stages of the tourist experience and relationship with a destination. Data collections over time could allow for examination of growth or change in these dimensions after multiple visits, and potential changes in relative value for the relationship. Additionally, studies investigating neurological and physiological correlates of place attachment may add increased understanding of the embodied nature and bond to a destination, potentially using methods, such as EEG or fMRI, or biometric measures, that complement self-reports.

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EXPLORING MICRO- AND SECTORAL-LEVEL COLLABORATION WITHIN A TRANSFRONTIER CONSERVATION NETWORK IN SOUTHERN AFRICA

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Abstract: Collaborations and partnerships are widely recognised as essential for effective tourism operations, destination efficiency and resilience, and the effective implementation of SDGs, through coordinated action among government, private sector, and community stakeholders. However, despite their importance, research shows that power imbalances, weak policies, and marginalisation, especially in wildlife destinations, often limit the effectiveness of these partnerships. This study draws attention to Transfrontier Conservation Areas (TFCAs), as multi-country agreements to address pressing environmental and socioeconomic concerns. Focusing on the latter, this study explores the micro and sectoral level stakeholder collaborations and partnerships existing in and between the three prominent wildlife destinations in the Kavango Zambezi Transfrontier Conservation Area, being Kasane (Botswana), Livingstone (Zambia), and Hwange (Zimbabwe), to reveal how these partnerships are able to filter to higher governance levels to achieve shared objectives. Interviews were conducted with relevant stakeholders including businesses, non-governmental organisations, and governing authorities. This data was supplemented by focus groups with community representatives in the three study areas. Sectoral collaborative networks were found to be geared towards improving destination efficiency and visitor experiences, with concerns related to service quality and regulations staggering the formation and continuance of some of these relationships. Micro-level (community) partnerships differed in the three study sites owing to the traditional leadership structure, level of agency, and power held by communities as their position in the tourism network. Overall, this exploratory study provides some insights into the nature of formal and informal relationships amongst tourism stakeholders in the Transfrontier Conservation Area and provides practical and policy-related recommendations, including the training and upskilling of local tourism businesses and community organisations to ensure their deliberate inclusion in TFCA networks, as well as supporting the re-emphasising of the importance of harmonising policies and strategies, along with localised implementation. The study further provides directions for future research to interrogate the role of these partnerships in implementing sustainability and resilience outcomes in the region.

Keywords: networks, collaboration, partnerships, wildlife tourism, Transfrontier conservation areas, stakeholders

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INTRODUCTION

Collaborations and partnerships have been heralded as key for sustainable tourism development and destination resilience (Zada et al., 2025; Novelli, 2023). Certainly, from an operational point of view, collaboration enables the seamless coordination of actors in the destination's value chain to provide memorable experiences (Zach & Racherla, 2011), while many scholars underscore the leveraging of collaborative networks and multi-level partnerships for the attainment of socioeconomic and environmental goals (see Movono & Hughes, 2022; Dolezal & Novelli, 2022; Ferrer-Rocca et al., 2022). These scholars specifically reference SDG 17, underlining the role of partnerships between private, public, and community stakeholders for the implementation of SDGs (Zada et al., 2025; Mugarura et al., 2025; Ferrer-Rocca et al., 2022; Papp-Vary et al., 2025). Largely, existing research on tourism partnerships, particularly within the scope of tourism destination governance, has found government to be a centralised stakeholder influencing the efficiency, longevity, and even establishment of these collaborative structures (Scheyvens & Cheer, 2022; Lekgau et al., 2025; Graci, 2020). Other studies, in wildlife destination contexts, have found community dynamics, more especially the works of community-based organisations (CBOs), as struggling to ensure community involvement and benefit from the tourism sector, owing to the existing systemic marginalisation and power imbalances embedded within the tourism networks in wildlife destinations (Priatmoko et al., 2025; Lenao, 2017; Mkono et al., 2023).

In their study, Litheko (2022) stresses the need for government to have a concrete policy and practical strategy for private-public partnerships in ecotourism sites in South Africa, thereby highlighting the need for a more concerted and integrated focus on tourism partnerships and collaborations in wildlife destinations.

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Evidently, tourism partnerships and collaborations are an important field of study in examining how to leverage resources, capabilities, and structures to achieve desired goals, representing an emerging field (see Mugarura et al., 2025; Ruggieri et al., 2022; Papp-Vary et al., 2025; Ferrer-Roca et al., 2022; Lekgau et al., 2024a, 2024b, 2025). This study seeks to draw attention to Transfrontier Conservation Areas (TFCAs), which are protected areas spanning over two or more countries grounded on an agreement between those countries (Mpofu et al., 2023; Bourgeois et al., 2023).

By their very essence, these TFCAs are built on a foundation of multi-scalar collaboration and partnership across several countries for the broader aims of nature conservation, socioeconomic development, and regional peace (Kohler & Bollig, 2025). Wildlife tourism is a major function of TFCAs, owing to the potential of the sector to assist in attaining these broad goals. Dolezal & Novelli (2022) and Berdenov et al. (2025), amongst others, emphasise the capacity of tourism to create and strengthen existing partnerships, empower communities, and provide inclusive spaces where these partnerships could be leveraged for broader societal and sustainability goals. Similarly, while the establishment of TFCAs is reliant on government and other political actors, the operations of these protected areas are dependent on the nature of local engagement (Stoldt et al., 2020; Usman et al., 2025). This background presents a novel opportunity to understand the role of micro and sectoral collaborative networks and partnerships and how these can fit into the broader collaborative network of TFCAs to more effectively attain their goals and support resilience-building efforts.

Existing research often focuses on institutional frameworks and arrangements in TFCA systems (Mpofu et al., 2025; Lekgau & Tichaawa, 2019; Bhatasara et al., 2013; Andersson et al., 2013; Ferrer-Roca et al., 2022), or the extent of community involvement and the role of CBNRM programmes (Zanamwe et al., 2018; Lekgau & Tichaawa, 2021; Garine-Wichatitsky et al., 2013). This exploratory study seeks to elucidate the existing partnerships and collaborations among stakeholders at both sectoral and micro levels, serving as a foundation for a more in-depth examination of these networks within complex TFCA systems and how such partnerships can be leveraged to advance TFCA objectives, particularly in relation to socioeconomic upliftment and community inclusion, areas in which progress has been widely critiqued (see, for example, Chiutsi & Saarinen, 2017; Zanamwe et al., 2018; Bourgeois et al., 2023).

LITERATURE REVIEW

Transfrontier Conservation Areas (TFCAs) in Southern Africa emerged from the recognition that environmental challenges transcend national boundaries and therefore require international cooperation (Bhatasara et al., 2013; Büscher, 2013; Kupika et al., 2025). Often referred to as "peace parks," TFCAs have been promoted as global instruments for conservation and regional integration, receiving substantial support from the international conservation community (Büscher, 2013). The concept gained prominence in the early 1990s, founded on the premise that biodiversity protection and ecological processes should not be constrained by political borders (Bhatasara et al., 2013; Chiutsi & Saarinen, 2017; Ramutsindela, 2007). This thinking led to the establishment of cross-border protected areas through regional cooperation (Zanamwe et al., 2018). TFCAs have since attracted extensive attention from scholars, policymakers, and practitioners, largely because they are positioned as mechanisms for biodiversity conservation, regional peacebuilding, and socio-economic development (Büscher, 2013; Chiutsi & Saarinen, 2017; Bourgeois et al., 2023). Büscher (2013) further associates their establishment with efforts to redress colonial-era border divisions, while Garine-Wichatitsky et al. (2013) emphasise their significant tourism potential. Southern Africa is the leading region for TFCA development, hosting 14 such initiatives, including the Kgalagadi, Great Limpopo, Ais-Ais/Richtersveld, Limpopo–Shashe, Lubombo, Maloti–Drakensberg, Malawi–Zambia, and the expansive Kavango–Zambezi TFCA (Steyn & Spencer, 2011; ZimParks, 2025).

The emergence of TFCAs as exemplary conservation models coincided with the broader democratic transitions occurring across the Southern African region—most notably Namibia's independence in 1990 and South Africa's in 1994 (Bhatasara et al., 2013; Kupika et al., 2025). Steyn & Spencer (2011) attribute the proliferation of these conservation landscapes to Dr. Anton Rupert, then president of the World Wide Fund for Nature (WWF), who championed the notion of linking conservation and regional peace. His early dialogue with Mozambique's President Joaquim Chissano in 1990 laid the groundwork for formal cross-border conservation initiatives. However, Ramutsindela (2007) cautions against viewing TFCAs as entirely novel constructs, arguing instead that their establishment was preceded by a range of regional conservation activities and cooperative arrangements in managing shared natural resources. Hence, the roots of transfrontier conservation in Southern Africa can be traced to pre-existing traditions of cross-border resource governance and environmental stewardship (Ramutsindela, 2007; Kupika, 2025). TFCAs are inherently multi-stakeholder endeavours involving national governments, local communities, international donors—such as SIDA, GIZ, USAID, and the World Bank—and prominent non-governmental organisations including WWF and Conservation International (Bhatasara et al., 2013; Lekgau & Tichaawa, 2025). Although they are promoted as collaborative ventures, concerns persist regarding the marginalisation of local communities in governance and decision-making processes (Chiutsi & Saarinen, 2017; Zanamwe et al., 2018; Bourgeois et al., 2023). Their transboundary and political nature introduces considerable governance complexity, requiring power to be shared among states, NGOs, multinational companies, and local actors (Bhatasara et al., 2013;). This complexity not only complicates coordination but also risks alienating communities residing adjacent to protected areas, thereby reflecting the broader socio-political dynamics that shape conservation in postcolonial contexts (Ramutsindela, 2007; Kupika et al., 2025). Indeed, Hughes (2005) questioned whether TFCAs represent genuine conservation efforts or rather new forms of supranational governance disguised as ecological cooperation.

A further critique relates to the distribution of benefits. While TFCAs are envisioned to generate both conservation gains and socio-economic upliftment, evidence suggests that progress on poverty alleviation has been limited. Chiutsi & Saarinen (2017) note that despite the spatial expansion of TFCAs, poverty remains prevalent, and in some cases has

intensified, among communities bordering these protected areas. Such findings were seen in a few other studies in TFCAs and host communities (see Lekgau & Tichaawa, 2019; Mpofu et al., 2025; Bourgeois et al., 2023).

This disparity underscores the persistent gap between anticipated and realised development outcomes. Ultimately, TFCAs encapsulate a mix of ecological, political, and economic goals. Their governance is shaped not only by conservation imperatives but also by international donor priorities, state interests, and localised power relations.

These interdependencies and tensions raise critical questions about whether TFCAs genuinely foster local empowerment and inclusion, or whether they inadvertently reproduce existing inequalities under the guise of transboundary environmental cooperation. While there is wide agreement on the importance of local institutions being empowered to be involved in transboundary conservation management, it is a major gap in TFCA practice.

As such, this study approaches this research field by drawing focus to TFCA sectoral networks and the positioning and collaborations of various sectors in these networks to provide insight into how they can be leveraged to attain developmental goals. The KAZA TFCA is the largest TFCA globally, covering an area of 520,000 km², comprising five countries: Angola, Botswana, Namibia, Zambia, and Zimbabwe (Verschueren et al., 2024; Usman et al., 2025).

The TFCA was first initiated in 2006, with the governments of the five countries signing a memorandum of understanding (MoU) to work together in formally establishing the TFCA (Stoldt et al., 2020). In 2011, a TFCA treaty was signed, with the overarching purpose being to 'establish a world-class Transfrontier conservation area and tourism destination' (Köhler & Bollig, 2025). The KAZA TFCA holds 103 wildlife management areas, 85 forest reserves, 20 national parks, and 11 sanctuaries, housing a human population of over 3 million sharing land with a diverse wildlife population (Verschueren et al., 2024). This transboundary protected area houses several iconic protected areas, including the UNESCO World Heritage sites Victoria Falls and Okavango Delta, as well as Chobe National Park, Bwabwata National Park, Hwange National Park, and Kafue National Park. This study considered three prominent wildlife attractions that have spurred the development of wildlife tourism in the surrounding communities: Chobe National Park in Botswana, Victoria Falls in Zambia, and Hwange National Park in Zimbabwe.

DATA AND METHODOLOGY

This research adopted an exploratory research design owing to its intention to provide some preliminary insights into collaborative networks and partnerships amongst tourism stakeholders in the KAZA TFCA. Researchers such as Halie (2023) affirm the value of exploratory research in cases where the phenomenon has not been fully understood, and lay the groundwork for future investigation. Certainly, while there have been studies done on tourism in the KAZA TFCA, many of these studies used a single country analysis, with the present study stressing the need for multiple country analysis to understand the formal and informal connections between tourism stakeholders, which could have significant implications for how to leverage such networks to attain sustainability goals.

A qualitative approach was taken, comprising interviews to identify the existing business networks amongst tourism businesses, tourism and conservation authorities, and community organisations. Most formal tourism establishments related to accommodations and tour operators, whereas informal tourism enterprises largely comprise food and beverage establishments, tour operators, and craft vendors (Tichaawa & Lekgau, 2024). Both Botswana & Zimbabwe have CBNRM programmes that have resulted in community organisations such as community trusts and CAMPFIRE programmes, respectively, which represent the community agency within the wildlife conservation and tourism structures within protected area networks and ensure community livelihood outcomes. As such, interviews were held with representatives of such organisations to understand their role in the TFCA system and their relationships with broader stakeholders.

The fieldwork was conducted in two phases, comprising ten days each. The first phase involved travel to Kasane and Livingstone to conduct the interviews with the stakeholders. The interviews were conducted mostly in English, and in a few cases, in the local languages of Setswana for Botswana participants, and Bemba for Zambian participants. The second phase constituted the collection of data in Zimbabwe, which took eight days. Unlike the Botswana and Zambia study sites where there were clusters of businesses in the two towns, Hwange was slightly more dispersed, especially the accommodations. Similarly, English was the primary language used to conduct the interviews, with the option of Shona and Ndebele available for the participants who preferred a local language. The fieldwork occurred in June to July 2024, and a total of 58 interviews were conducted with tourism and conservation stakeholders in the three study sites (Table 1).

Table 1. Participant profiles

Study sites	Key stakeholder	Participant codes
Kasane (Chobe National Park)	Tourism governing authority representatives	P1
	Tourism businesses (informal and formal)	P2 - P13
	Community representatives	P14 – P20
	Community trusts representatives	P21 – P23
	Conservation agency representatives	P24 – P25
Livingstone (Victoria Falls)	Tourism businesses (informal and formal)	P26 - P35
	Community representatives	P36 – P39
	Conservation agency representatives	P40 - P41
	Conservation governing authority representatives	P42 – P43
Hwange (Hwange National Park)	Tourism businesses (informal and formal)	P44– P49
	Community representatives	P50 – P54
	Community CAMPFIRE representatives	P55 – P57
	Tourism governing authority representatives	P58

The questions explored the types of relationships participants had with other stakeholders in the region, the purpose of these relationships, and how they fit into their individual organisational behaviours or outcomes. The interview duration varied from 30 minutes to 2 hours. The ethical considerations were acknowledged, with the study having received ethical clearance from the researchers' institution. Further, the participants were informed of the purpose of the study, assured of their confidentiality and anonymity, and that they voluntarily participated in the research.

The interviews were recorded, with the researchers having received prior permission, and fieldwork notes were kept consistently. The interviews were transcribed verbatim. Using Atlas.ti, thematic analysis was used, which involved the line-by-line coding of the data, with the researchers grouping the codes related to partnerships and collaboration into three themes based on the three networks considered: tourism, conservation, and community.

The participant codes are followed by a BW for the Botswana participants, ZM for Zambian participants, and ZW for participants from Zimbabwe. The following section of the paper presents and discusses these key themes.

RESULTS

Tourism sectoral network

A key type of partnership among tourism stakeholders in this study site is concerned with expanding business opportunities. Largely, many participants viewed collaboration in relation to formal and informal partnerships related to supply chain opportunities, such as business overflows where clients are directed to nearby accommodations in cases of full capacity, as well as complementing business activities, such as attractions, activities, and accommodations, as partly discussed in a previous study (see Tichaawa & Lekgau, 2024).

So at least, the restaurant sent us a menu and they will do deliveries at no charge because they've got a motorbike. So trying to see maybe Debonairs can do that as well. And there's another bar and restaurant. So if we can have the menus in the apartments, it can be easier for the guests with this loadshedding. Because some guests will just call a taxi to go all the way to town to buy food and then come back again. So they can save that time when they deliver [P25ZM].

In this regard, firm size was notably mentioned, with several participants indicating that these opportunities largely centred on bigger establishments and their support of SMMEs.

This is how I do it. I have been got bigger players in the industry, that my suppliers were some of them, they don't have the service that I do. And I do personalised tour services. So whenever they have good clientele in their organization I know I will be operating. As much as they are fully booked, I will also be operating. There are a lot of activities for bigger organisations, so I'll get that piece of cake as well [P15BW].

Interestingly, some participants mentioned partnerships among local entrepreneurs to be geared towards the lack of resources. Indeed, small local entrepreneurs struggle with obtaining the necessary resources, such as financial resources to purchase vehicles for transport and game viewing or boats, and therefore some entrepreneurs work together to supplement their resources. This was aptly explained by one participant, stating:

So you then realise that with tourism, you cannot work on your own. But directly and indirectly we do work as partnerships. You realise that our small-scale agents maybe they partner on their own. Maybe, for instance, I have got a vehicle and maybe an agent has got customers, so they come to us and hire the car and use it; hence, they benefit and we benefit. So partnerships are there [P17BW].

In addition to the partnerships that enhance the visitor experience in the destinations, another major form of collaboration mentioned in the interviews with accommodation facilities is through their international networks, facilitated through their attendance at trade shows or their relationships with international agencies that assist in co-marketing activities. Some responses in this regard include:

But it's different with us. This company has got a very big footprint, because as we speak, we've got agents based in Germany. We've got agents based in the UK [United Kingdom]; we've got agents based in Slovakia, and you know, we've got agents based in SA [South Africa] and here, I'm here as well as a regional sales manager looking at the regional market [P3BW].

Furthermore, a few participants in Botswana and Zambia pointed out some partnerships within their operations to be geared towards marketing the destination. In Zambia, this was mostly related to working with other tourism establishments to improve visitor experiences for garnering positive reviews from the existing tourists to their own networks. In Botswana and Zimbabwe, partnerships that had destination marketing outcomes were amongst community trusts and (hunting) safari companies which can market the country within their hunting networks. See, for example, responses below:

Well, there is that connection with them. But in terms of like an official partnership, then no, there is no partnership. We would be referring people there. It's also part of marketing the destination, the country [P18ZM].

Well, to begin with opportunities, there are widespread, or rather networking, opportunities with other stakeholders within the region or the safari industry. It's different from the hospitality industry per se, although hospitality is part and parcel of the safari operations industry. Rather, when we talk about the opportunities, we refer to the networking opportunities and interactions that can boost businesses in relation to clientele and an expanded market. We have what you call subsidiaries within the market. So these are the opportunities that we have within wildlife tourism in our area [P40ZW].

We have safari operators. Safaris are the ones dealing with marketing, selling, and all that. What they do is give what they have agreed upon with the community, and they bring it to the community for a living. That is how we do it. This benefits us because the money we are getting is exceptional, more than 3 million to 5 million per quote [P5BW].

In addition to working collaboratively to improve guest experience within the destination, some of the participants mentioned the importance of maintaining consistency amongst tourism establishments, particularly in the era of social media shaping visitor expectations and experiences. On this matter, one participant from Botswana had the following to say:

More bookings are trying to get it more known through social media, or as tour operators, turning to reach out and spread the word of the launch. And then, of course, we've got to keep our standards because word of mouth is a big, big, big thing in the industry. And then, of course, social media can be a very good thing, but we're very bad at downfall. So your standards have got to be kept up constantly, and you've got to be honest. One bad negativity can go on social media and spread like wildfire. That's the downfall for me with social media. It's going to make or break you [P10BW].

Another notable form of collaboration amongst tourism organisations was amongst tourism authorities and registered tourism businesses. Largely, some of the responses from tourism authorities in Zimbabwe and Botswana were geared towards community organisations, such as trusts and CAMPFIRE, as mandated by CBNRM policy.

I'd say we do have, we do have, which is BTO [Botswana Tourism Organisation], which is one organisation that is more into the development of tourism in Botswana because there are some areas that are never promoted. But with that organisation, they are the ones that spearhead that. So, as stakeholders, we also will have involvement. Yeah, which is not direct involvement, but through BTO [P15BW].

The final major form of business collaboration is the industry associations found in Botswana and Zambia. In Botswana, some of the participants mentioned the tour guide association, which represents the tour operators in the town as well. Further, participants also highlighted the town WhatsApp group amongst businesses (both tourism and non-tourism) to share important information as well as assist in the coordination of the destination. In Zambia, this association arose from the need to have a strong collective voice and comprises local vendors selling arts and crafts to tourists. Notably, very few participants alluded to there being a tour operator association. It is important to note that there were a few participants in both study sites who mentioned that they were not part of these networks, with some reasons ranging from lack of awareness to lack of perceived value.

Notably, some participants, though mentioning relationships with tour operators in neighbouring countries, mostly centred on the key attractions, being Victoria Falls and Chobe National Park, underlined the importance of formalising and extending partnerships within the broader region to maximise the potential of the KAZA TFCA. See quote below:

You know, they need to link us with other business committees in this KAZA region. You know, that's one of the reasons it was established, but we don't see it happening with them [P3BW].

Protected area management and conservation network

The next major theme emanating from the results relates to existing collaboration and partnerships amongst tourism stakeholders and the protected areas in their home country, as well as the broader KAZA TFCA.

Mixed responses were received in this matter, where some participants confirmed some collaboration with conservation NGOs in their locale, as shown by a participant in Zimbabwe:

So we have a good relationship with one Conservation Centre, where we send our guests to learn about how to conserve. We also help each other with the anti-poaching unit, because we've got our own anti-poaching unit that patrols our area, and then we coordinate that with the anti-poaching unit for the Conservation Centre. They do come onto our property to look for some of the wild animals, because they are endangered, and look after them. And yes, it's quite a lot that we do with businesses around [P38ZW].

Certainly, there was a general understanding of the importance of cooperation between tourism businesses, communities, and conservation NGOs and authorities due to the recognised importance of wildlife as key livelihood resources leveraged. This cooperation involved communities and businesses assisting in curbing poaching or anti-environmental behaviours through anti-poaching units, reporting incidents to the relevant authorities, and assisting in conservation efforts, with one representative from Botswana stating, '*Normally on fighting veld fires, to avoid that. Drilling boreholes so that the wild animals can find where they can drink water'* [P4BW].

However, in Zambia, two participants representing conservation NGOs revealed underlying concerns regarding the relationships between tourism establishments and black-owned and managed NGOs, suggesting that these interactions may be influenced by racial undertones, as seen in the following quote:

I think relationships are one of them. It's one of its kind. So if you check around, you'll see. It's one of its kind because it's run by black people. So it's difficult to have relationships with most white organisations because they don't want us. We cannot relate very well with them, or they cannot relate very well with us, because they see us as underdogs. [P19ZM]

Furthermore, some participants in Zambia, representing tourism businesses, mentioned that although invited to assist in conservation work, they have not yet done so, representing a gap in their corporate social responsibility work. Similarly, some participants in Zambia, when mentioning the nature of collaboration in wildlife tourism and conservation in their town related to the TFCA, underscored that these relationships were based on already existing relationships. This makes it difficult for emerging entrepreneurs and local organisations to tap into these relationships.

The whole system was corrupt. This time for you to make is who you know, the kind of connection that you have—that's what helped. The papers don't even mean anything [P23ZM].

In terms of the broader TFCA, the participants involved in conservation activities underlined the need for closer working relationships with TFCA management in the countries. For instance, a conservation NGO in Botswana stated,

'*Our relationship should get closer. I think my first month here, we invited, yeah, Kaza management over to our facility, to inform them of what it is that we are doing*' [P2BW]. In the same line, a conservation NGO in Zambia alluded to some efforts being taken to integrate national and local conservation stakeholders in the TFCA engagements but called for the need to be more inclusionary in how this is done, noting:

So those are just like agreements that KAZA made. So it's all that programme and just a cross-pollination of knowledge between Zimbabwe and Zambia, and that's why we see workshops being done in Zambia, workshops being done in Maun. Yes. Yes. Like they had a very big workshop somewhere here in Lusaka, but we were asked to pay a [large] amount to join [P20ZM].

Generally, the sentiments in Zimbabwe were more positive, with participants noting the positive relationships and partnerships with the TFCA management, particularly their support for tourism and community livelihoods. Some representatives of CAMPFIRE stated:

I think it's a very good relationship, whereby both parties [communities and the TFCA] are benefiting from the transparency of the relationship. It is a positive one, whereby both parties are benefiting and exchanging their products. The tourism [sector] benefits by getting employees and customers as well. And the community gains a market where they can distribute their products, as previously mentioned, the food, the souvenirs, the art. [P30ZW].

Besides, some of the projects that the park tourism and conservation department and the TFCA have taken to empower the community include apprenticeships offered for career courses like hunting and animal tracking [P30ZW].

It is important to note that these views above were held by conservation NGOs and are not reflective of the broader collaborative works between the TFCA and the local tourism sector and communities.

Community-related networks

Finally, the last theme of this study considers the local networks amongst the communities. In exploring this theme, local institutional structures were considered. In all study sites, participants identified the traditional leaders, along with their involvement in the wildlife tourism network, as they are an important node connecting the community together. In Botswana, this relates to the kgotla, which as a community leadership structure is leveraged by conservation and tourism authorities as one of the primary means of accessing the broader community, spreading information, and, in some cases, making decisions on the developments in their locale. Similarly, traditional leadership in Zimbabwe comprises a system of chiefs, headmen, and village heads, though their role is complex, owing to the fact that while their authority is formally recognised by the Constitution, it is often constrained and politicised. Additionally, this Hwange community is also represented by the CAMPFIRE programme in wildlife conservation and tourism affairs. While some participants mention the Mukuni Chief in Zambia, who resides and leads in the Mukuni Village near Victoria Falls, he doesn't represent or lead the broader Livingstone community, which has no similar figure. Similarly, while there is no established CNBRM programme in Zambia, the policy outcomes relate to raising awareness of conservation matters, appropriate behaviours, and educational training sessions. Largely, many participants in both Botswana and Zambia assert the importance of these institutions in ensuring community roles in the wildlife tourism and conservation network. For instance:

"*Then, the increased the revenue sharing and benefits; the government or conservation authorities in the private sector are now seeing the need to, uh, equally benefit in the tourism industry. So there's a need for equitable benefit sharing. Instead of fighting, they can actually come together and have something tangible coming out of their engagement, which also works best for the community. Because if you have the government, the local communities, and the private sectors fighting, it won't end well. But if they come together, it means better empowerment, better improvement of the sector, and expansion of the community based on ecotourism demand for authentic ecotourism experiences*." [P27ZM]

Similarly, some tourism business representatives in Zambia alluded to connections with Mukuni village, mostly in terms of working with this smaller community for tours, as well as engaging members of this community as entertainers, as seen in the other two study sites. However, a notable number of participants lamented the lack of community involvement, collaboration, or networks with the broader tourism networks, citing acts of corporate social responsibility as being insufficient. See the quote below:

"*I'm sure you've been in these hotels and lodges, and they have lied to you that they are involved with the community, which is not true. I can confirm that with numbers. I have a lot of reports; we write a lot of reports because funders require you to report on progress. So, from the hospitality aspect, there's no closer movement within the community. They will lie to you that they provide social corporate responsibility. They will lie to you that they do this, but nothing like that. So that's why you see we have a distorted community*. P19ZM

Furthermore, some of the participants in Botswana and Zimbabwe highlight the existence of community cooperatives that absorb local community members and enable their participation in the wildlife tourism economy. These cooperatives have been said to be supported, to a certain extent, by some surrounding businesses and conservation NGOs in the case of Botswana, and the CAMPFIRE project in Zimbabwe. See the responses below:

We have seen cooperatives opening through small projects we have, like the weaving of baskets by the women. We have what you call this, the curio. What you call them, they act, they add sculptures, the sculptures which are being made by the men in the form of animals. You have different wild animals being made from wood. P34ZW

We have a huge relationship with the community. So if you drive in at the entrance, there are Chobe women, the basket ladies. They are part of the community, our community outreach project. So women in Chobe get to use that facility to weave baskets, and they sell them for their own profit. We only offer them a place to stay. We don't get anything from them. They sell their baskets and keep their revenues. P2BW

DISCUSSION

This study sought to unpack the micro and sectoral linkages in three destinations within a TFCA network. Overall, the variation in the networks differed according to the prominence of wildlife tourism and conservation, local institutions, and governance structures. For the most part, stakeholder collaborations were geared towards destination efficiency, improving visitor experiences, and destination marketing, a motivator frequently confirmed in literature (Ruggieri et al., 2022; Presenza & Cipollina, 2010; Ferrer-Roca et al., 2022). In this regard, 'co-petition' and 'cooperation' are seen among stakeholders in all study settings, geared towards tourist service and experience delivery.

Notably, in tourism business networks, many of these networks existed between accommodation, tour operators, transportation services, and, to a lesser extent, food and beverage businesses, which has been framed as supporting local enterprises and, therefore, supporting local communities. The linkages to these SMMEs are quite important, considering their inability to work with international partners as bigger organisations are able to, as well as their ability to obtain spillover effects (for accommodations) and increasingly market (to other travel service providers).

Beyond addressing visitor experience, the partnerships among these local stakeholders were, in some parts, geared towards supplementing resource constraints, which is especially important in these settings as funding and access to funding for small enterprise growth and development are notable challenges (Trupp et al., 2024). In strengthening these networks to enhance destination experience, the issue of service quality is crucial and one that requires attention, particularly considering that one of the goals of the KAZA TFCA is to become a world-class tourist destination (KAZA TFCA, 2020), and in doing so, necessitates involvement from all tourism stakeholders in which such networks can be leveraged to encourage buy-in and support for such initiatives. Also, the results do show distinct differences between the study settings, which can be explained by the nature of tourism development as well as conservation. For instance, Kasane had more visible and stronger networks among stakeholders owing to the dominance of wildlife tourism in this small town, whereas these networks were more geared towards conservation. In Zimbabwe and Zambia, there was a lot of apprehension over the existence and authenticity of these networks owing to the manner in which tourism is structured (Tichaawa & Lekgau, 2024). Despite this, there are some outliers in these networks, particularly those directed to planning and development, which could call into question the manner of inclusivity and transparency.

Accordingly, as grounded by the established TFCA, there is an opportunity to open up these networks across the destinations, which could potentially assist in ensuring consistent involvement and inclusion of local stakeholders.

Partnerships with non-state stakeholders are essential for the implementation of plans and policies (Mugarura et al., 2025; Movono & Hughes, 2022; Papp-Vary et al., 2025). In this study context, these policies and plans are developed for individual states as well as to support the TFCA system. For instance, while tourism operates within each individual country, there is a greater movement to open up and connect each country's tourism industries, which is underpinned by the KAZA uni-visa approach. The plans and strategies for wildlife conservation take a broader systems approach, where there are many more efforts to link these wilderness spaces together to support wildlife movements and their population growth (Köhler & Bollig, 2025). Therefore, partnerships and collaboration among local stakeholders become crucial considering that these destinations and businesses are operating in wildlife management areas where there is no demarcation between societies and wildlife, and therefore issues such as compliance with conservation rules, adopting conservation behaviour, and supporting such initiatives arise. As such, the importance of local institutions and governance was especially evident when considering micro, or community networks, which ensured (to a certain extent) the representation, involvement, and support of local community interests in wildlife conservation and tourism, as these institutions are able to spread consistent messaging and information to the community as they would have a broader reach.

This study also has implications for resilience building in the different TFCA areas. While the impact of environmental (and non-environmental) crises may differ between study sites, these partnerships and collaborations across these networks can be instrumental in effective adaptive measures across the TFCA sites to ensure broad-scale resilience. Collaboration is instrumental to resilience building, owing to its role in disseminating pertinent information, resource mobilisation of adaptive measures, and garnering collective efforts to adapt, innovate, and ensure that all stakeholders, especially those often on the periphery of tourism planning and development, are included (Trupp et al., 2024; Priatmoko et al., 2025; Mugarura et al., 2025). Accordingly, strengthening and harnessing these networks is arguably crucial for the local implementation of broad TFCA directives.

CONCLUSION

This study examined the nature and functioning of micro and sectoral collaborative networks within selected destinations forming part of a Transfrontier Conservation Area (TFCA) system. The findings demonstrate that while collaboration remains central to sustainable tourism development and destination resilience, its manifestation varies significantly depending on the local context, institutional frameworks, and its implementation.

This study highlights the existing partnerships and collaborations at the tourism and conservation sectoral level as well as the micro community level, and found that strengthening such sectoral and micro-level partnerships can create a multiplier effect that aligns local interests with the broader objectives of transboundary conservation and sustainable tourism. From a policy perspective, the findings emphasise the need for harmonised strategies that link national tourism and conservation frameworks with local-level implementation mechanisms.

Practically, supporting the capacity development of local tourism enterprises and community institutions is equally vital to ensure their meaningful participation in the broader TFCA partnership network. Ultimately, this study contributes to the growing body of work on tourism partnerships (Ferrer-Roca et al., 2022; Scheyvens & Cheer, 2022;

Ruggieri et al., 2022; Stoddart et al., 2020) and transboundary governance by revealing the nuanced ways in which micro and sectoral collaborations can support or constrain sustainable development and resilience within TFCAs. This study was qualitative in nature and meant to provide a foundation for future research; therefore, one limitation is that the views were obtained by a selective group of stakeholders. To obtain more comprehensive views on collaboration and partnerships, a quantitative approach involving more stakeholders is required. Furthermore, future research could explore the longitudinal evolution of these networks, their resilience to shocks, and the mechanisms through which local partnerships can more effectively align with regional conservation and development goals.

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SUSTAINABLE SITING OF WIND FARMS IN KAZAKHSTAN: A CASE STUDY OF THE KARAGANDA REGION

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Abstract: This study aims to evaluate the environmental and spatial suitability of the planned Giperborey 50 MW wind power plant near Osakarovka in the Karaganda Region of Kazakhstan and to determine whether the site meets technical, ecological and socio-economic requirements for development. The appraisal combined site observations; analysis of climatic records from the nearest Kazhydromet station to characterise wind resource and seasonal extremes; field noise measurements with a class-1 sound level meter and sound-propagation modelling in WindPro; avifaunal monitoring during the autumn migration period and a first-stage Scottish Natural Heritage collision-risk calculation with seasonal adjustment; vegetation and soil transects; line-of-sight and photographic documentation of visual exposure; and an assessment of land use, access routes and proximity to the electrical grid. Instruments were field-calibrated before and after measurements, and visual checks used representative viewpoints at standard observer height. Avian surveys covered peak dawn and dusk periods within defined migration windows. Results indicate favourable wind conditions, with an annual mean speed above approximately 4.7 m/s and limited calm periods; gently undulating steppe on predominantly low-value grazing land; and the absence of critical habitats within the project footprint. Modelled operational noise remains ≤ 55 dB at the nearest residential receptors, and the 40 dB contour does not extend beyond the project boundary. Compliance held under downwind and neutral stability assumptions applied in the model. Migration counts recorded low use of the rotor-swept zone by high-risk species, and predicted collision totals fall below commonly applied screening thresholds. Visual checks show limited exposure of nearby settlements, and access logistics are feasible via existing roads with minor upgrades. Public interviews indicated neutral-to-positive attitudes associated with expectations of local employment and infrastructure improvement. Overall, under the assessed conditions, the site satisfies the study criteria for environmentally compatible development.

Keywords: wind power plant, environmental impact assessment, spatial planning, renewable energy, Kazakhstan

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INTRODUCTION

The development of wind energy is a key element in advancing sustainable energy systems. Optimal siting of wind power plants (WPPs) requires an integrated approach that accounts for geographic, environmental, economic, and technical variables. Numerous international studies have applied multi-criteria decision-making (MCDM) techniques, including the Analytical Hierarchy Process (AHP), the Best-Worst Method (BWM), and Geographic Information Systems (GIS) to improve siting efficiency and reduce environmental impacts. For example, a GIS-based MCDM model that considered wind speed, infrastructure proximity, and environmental constraints was developed (Moradi et al., 2020); the BWM method in Turkey, incorporating environmental and social criteria, was applied (Tercan, 2021), while weighted overlay models in Sri Lanka identified suitable barren lands and open forests (Kahatapitiya et al., 2023).

The role of land ownership and layout constraints in wind farm design was also explored (Wang et al., 2017).

Beyond spatial optimization, land use and socio-economic effects are critical: denser turbine configurations can improve energy output but may intensify environmental concerns (Christie & Bradley, 2012); property values may increase or decrease with proximity and landscape setting (Mai & Choi, 2025); stakeholder acceptance tends to rise when communities are involved and fairly compensated (Parkins et al., 2022). Ecological effects must likewise be considered, including species-specific changes in bird populations associated with land-use modification (Fernández-Bellon et al., 2018; World Health Organization, 2018). The visual impact of wind farms, particularly near tourism zones or rural settlements, can affect public perception; viewshed analysis has been proposed to mitigate negative effects (Nopp-Mayr et al., 2021). Socio-environmental risks of inequitable land acquisition have also been discussed (Traldi, 2021).

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Life-cycle assessment (LCA) has become essential in evaluating the full environmental footprint of WPPs: energy use and emissions across project phases have been assessed (Schleisner, 2000), and trade-offs between cost optimization and land-use constraints underscored (Christie & Bradley, 2012).

More recent studies confirm the relevance of wake modelling and biodiversity risk assessment in comprehensive planning; for instance, land suitability has been evaluated using slope, road proximity, and turbulence intensity (Thomas & Ning, 2020). The balance between energy output and noise exposure shows that land-use regulations strongly influence acoustic impacts (Sorkhabi et al., 2016), and siting models that integrate wind variability with grid constraints are pertinent where infrastructure is limited (Cetinay et al., 2017).

Circular-economy practices, including recycling turbine components, can reduce impacts (Doerffer et al., 2021), and comparative LCA work examines offshore versus onshore footprints (Piasecka et al., 2019); national case studies also quantify potential emission reductions from turbine recycling (Verma et al., 2022). Wildlife impacts, especially on migratory birds, remain a pressing issue (May et al., 2021). For Karaganda Region, Ospan et al. (2024) documented soil compaction and vegetation change in Karkaraly State National Nature Park, while Tsoy et al. (2024) found widespread exceedances of petroleum hydrocarbons in urban soils of Karaganda and Temirtau. Air-quality burdens around the Temirtau steel plant were quantified in a recent assessment (CREA & SteelWatch, 2024). At basin scale, heavy-metal risks in the Nura River have been characterised (Turdiyeva & Lee, 2023), and regional landscape sensitivity has been mapped for planning and zoning (Sagatbayev et al., 2025). The aim of this study is to provide a site-specific environmental and spatial appraisal of the planned Giperborey 50 MW wind power plant in the Karaganda Region of Kazakhstan, determining the site's compliance with technical, ecological, and socio-economic criteria for sustainable development; unlike many siting studies, this appraisal does not employ GIS-based MCDM, relying instead on field baselines, WindPro® noise modelling, and a Scottish Natural Heritage collision-risk calculation.

Recent work on onshore wind-farm appraisal has shifted from purely technical screening to integrated evaluations that combine spatial feasibility, biodiversity risk, acoustics, visual exposure, soils, and community context; updated bird collision-risk guidance requires using current, species-level avoidance rates and including all observed flight activity in estimates, thereby standardising inputs across EIAs (NatureScot, 2025a; NatureScot, 2025b), while multi-farm validation shows that modelled collision maps align with measured carcass data when post-construction searches are used to calibrate predictions (Morant et al., 2024). For noise, recent experiments report consistent annoyance responses and task-level cognitive effects under exposure to recorded turbine sound, which supports conservative residential thresholds and reliance on measured inputs in appraisal (García-Guerrero et al., 2025; Rosciszewska et al., 2025).

The visual dimension has likewise advanced: fleet-scale mapping of population exposure provides replicable methods to frame site-level line-of-sight checks and photographic simulations (Gleason et al., 2025). Alongside these impact strands, geotechnical and soil considerations are being revisited, with 2025 syntheses highlighting how foundation behaviour and construction disturbance depend on local stratigraphy and multi-hazard loading issues relevant to steppe settings with collapsible or loess soils (da Silva Medeiros et al., 2025; Fan et al., 2025).

Social acceptance remains context-dependent, influenced by perceived fairness and local cost-benefit balances, and can interact with proximity and landscape character (Parkins et al., 2022; Mai & Choi, 2025).

Taken together, these studies align with our approach a site-specific appraisal that quantifies bird flight activity and applies an SNH-based collision calculation, uses measured inputs for noise modelling, documents visibility with line-of-sight photography, and considers soils, access, and community feedback while indicating limits relevant to the Karaganda steppe that justify our emphasis on field baselines and post-construction monitoring.

MATERIALS AND METHODS

The Giperborey 50 MW wind power plant (WPP) is planned in the northern part of the Karaganda Region, Kazakhstan, near the rural settlement of Osakarovka. This region represents a typical dry steppe zone of Central Asia, marked by a combination of flat and slightly undulating terrain with low population density and minimal agricultural use. The study area lies within State Reserve land that has traditionally been used for low-intensity livestock grazing. Satellite imagery and local interviews confirm this land use pattern since at least 1985.

Geologically, the site is part of the northern slope of the Saryarka Ridge and is dominated by weathered Proterozoic and Paleozoic sandstone formations. The area exhibits a shallow hillocky relief with elevations ranging from 502 m to 573 m. Seasonal waterlogging is observed in some depressions, but no permanent water bodies exist within the immediate project boundaries. The seismic activity in the area is low, and no active surface faults have been identified despite the presence of one on geological maps.

The climate is sharply continental, with large seasonal fluctuations. Winter temperatures often fall below -20°C, while summer temperatures can exceed +35°C. Wind conditions are favorable for power generation: average wind speeds exceed 4.5 m/s annually, with frequent episodes above 8 m/s. According to the National Climatic Cadastre (2023), Osakarovka exhibits the highest mean wind speed in the Karaganda Region. The planned WPP site covers 13.5 ha under a long-term lease. The layout includes eight wind turbines with 110 m hub height and 155 m rotor diameter, spaced at a minimum of 400 m to mitigate wake losses. Additional land is allocated for internal gravel roads (9 km), a substation, and an extension of the KEGOC high-voltage infrastructure. A separate 372 ha area was temporarily designated for environmental monitoring and technical feasibility studies. The spatial configuration of the wind power plant components, buffer zones, turbine transport routes, and visual impact observation points is presented in Figure 1.

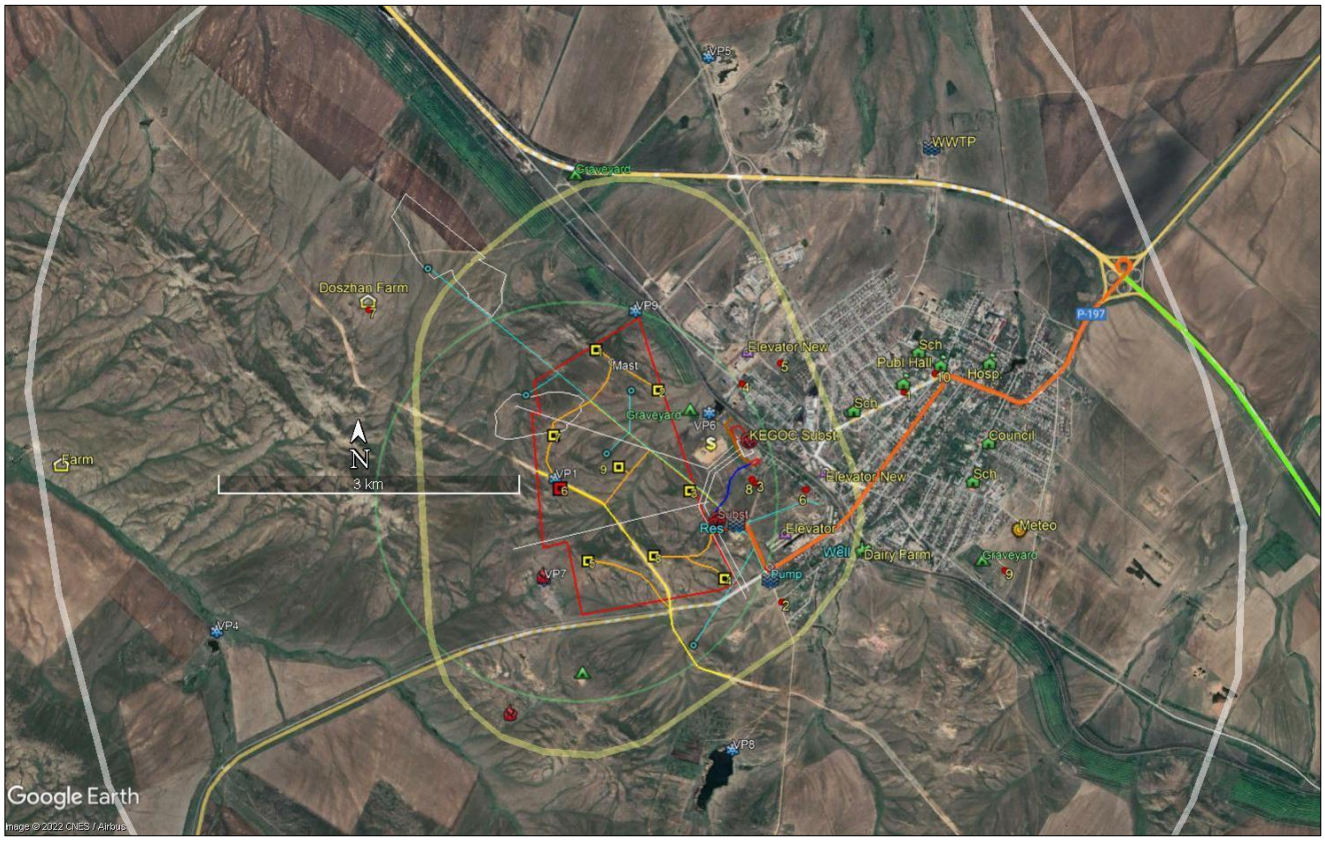


Figure 1. Overview map showing the survey area 5 km around the allocated for the WPP land (white circle), wildlife observation points: the main VP1 (with green circle as 2km the maximum extent of species recognition) and ancillary VP-4-9, 1.5km zone in which blades flickering impact is possible (yellow circle), WPP parts transportation route (green for double lane and orange for single lane) and visual impact assessment points (red dots) Base map source: Google Maps, 2025. Annotations and layout by the authors.

Environmental impact assessment was conducted following national legislation (Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, 2021) and the environmental and social guidelines of the European Bank for Reconstruction and Development (European Bank for Reconstruction and Development, 2014). The project qualifies as a Category A development due to its potential regional influence.

Climatic data were obtained from the nearest Kazhydromet meteorological station, located 3 km east of the site. This data informed the evaluation of wind speed distribution, seasonal trends, and extreme weather conditions such as icing or dust storms. Air quality was assessed qualitatively; no major stationary pollution sources exist within the vicinity, apart from domestic coal-burning during winter. Comparative emission levels are shown in Figure 2.

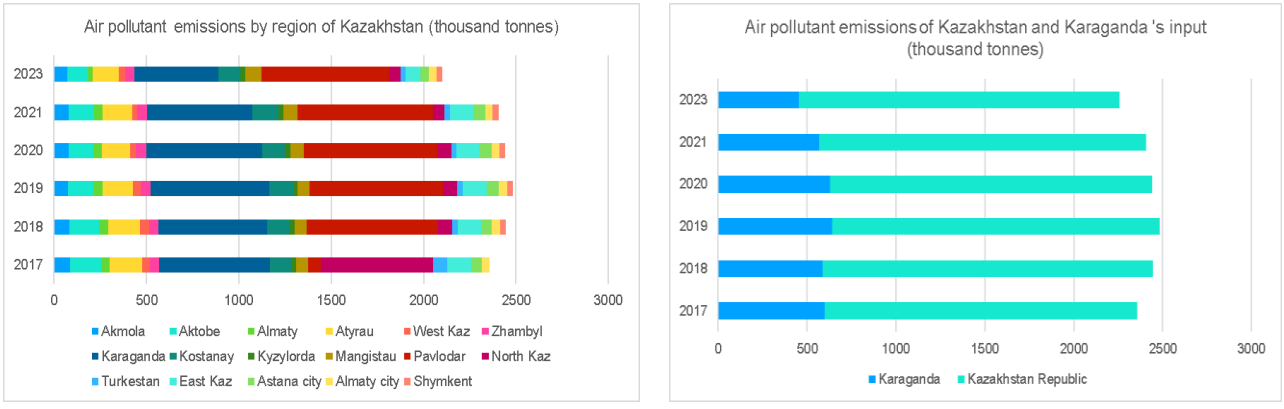


Figure 2. Air pollutant emissions of Kazakhstan and Karaganda (thousand tonnes) based on 2017-2023 statistical data (Source: Bureau of National Statistics, 2024)

Noise assessment involved 23 hours of continuous field measurements using a certified class 1 sound meter (Shi-01, Zaschita). Measurements were taken near residential areas adjacent to the access road and substation infrastructure. Readings were evaluated against WHO guidelines and national thresholds, accounting for impulse and continuous noise levels.

Ornithological monitoring was carried out from mid-August to mid-October 2022 to capture autumn migration activity. A combination of fixed-point vantage observations (VP1-VP9) and transect surveys were employed across a 5 km radius.

Sites included ecologically sensitive habitats such as ponds, waste dumps, tree belts, and grain storage areas. A total of five key vantage points were selected based on topography and visibility. Observation sessions focused on birds flying within the risk altitude (20-200 m) and included flight behavior, frequency, direction, and time spent in the risk zone.

Species classified as high-risk for blade collision, such as pigeons, swans, and raptors, were prioritized for impact estimation. The Scottish Natural Heritage **(**SNH) methodology (Scottish Natural Heritage, 2000) was used to calculate theoretical collision risk, based on rotor dimensions, bird flight speed, and occupancy within the swept volume. Due to the absence of species-specific avoidance data, the second stage of SNH calculations was not applied. Seasonal adjustment factors were introduced to estimate annual mortality based on autumn data, accounting for migratory behavior and population presence in different seasons. Wildlife observations also recorded mammal presence through visual and indirect signs (e.g., tracks, droppings). Dominant species included bobak marmot (*Marmota bobak*) and mountain hare (*Lepus timidus*). No bats or roosts were detected, despite site inspections and interviews with local residents.

Vegetation was documented along ecological transects to determine the degree of natural cover and habitat value. The site is characterized by feather grass steppe with Artemisia species, saline-tolerant plants in depressions, and tree lines along infrastructure. Soil profiles were evaluated in situ and classified as chestnut and solonetzic types with low organic matter. There was no evidence of soil erosion, contamination, or invasive plant species. A social baseline assessment was conducted in nearby settlements, including structured interviews with local residents. Feedback was generally favorable, citing employment opportunities and minimal concern regarding visual or noise impacts. Viewshed and turbine transport modeling were also conducted to assess spatial compatibility with surrounding infrastructure and communities.

This multifaceted methodology ensured a robust evaluation of both natural and anthropogenic aspects of the proposed site. Based on the combined analysis, the Osakarovka area demonstrates high suitability for wind energy deployment, with minimal expected environmental disruption and strong alignment with national goals for sustainable energy development.

RESULTS AND DISCUSSION

The environmental and spatial assessment of the Giperborey 50 MW wind power plant in the Karaganda Region revealed favorable conditions for sustainable wind energy deployment. The findings are based on a comprehensive evaluation of climatic parameters, topography, air quality, noise propagation, biodiversity, and socio-economic conditions. The results are interpreted in the context of site suitability for wind energy deployment and its environmental sustainability, with reference to international assessment methodologies and national regulatory standards.

Climatic Conditions and Site Suitability

Climatic parameters represent a fundamental determinant in evaluating the appropriateness of wind power plant (WPP) siting, particularly in terms of wind potential and atmospheric extremes. The selected site for the Giperborey WPP is located in a zone characterized by an arid and sharply continental climate, which presents both opportunities and challenges for wind energy exploitation. Climatic data analysis revealed significant seasonal temperature fluctuations: average January temperatures reached -16°C, with nighttime lows dropping to -22°C, while in July, mean daytime temperatures rose to +18°C and occasionally exceeded +26°C. Nighttime temperatures during summer typically stabilized around +11°C. The absolute temperature range recorded for the area spans from -45°C in winter to +39°C in summer, indicating high climatic amplitude. The observed depth of seasonal soil freezing in the project area reaches 2.05 meters, aligning with national construction norms (Committee for Construction and Housing of the Republic of Kazakhstan, 2017). While this necessitates structural adaptation in the design phase, it does not pose a critical barrier to implementation. Prevailing wind conditions further substantiate the feasibility of wind energy development.

The average annual wind speed in Osakarovka exceeds 4.7 m/s, with predominant southwest and southern wind directions. Wind rose data obtained from the nearest meteorological station confirm the presence of consistent wind flow throughout the year (Figure 3). Calm wind conditions account for only 5% of recorded time, which implies an operationally favorable environment for turbine deployment.

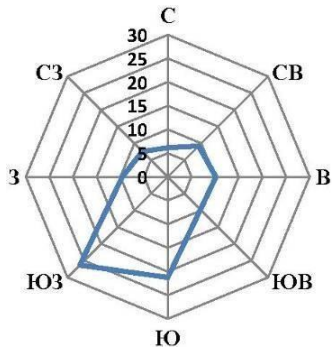


Figure 3. Wind rose at Osakarovka meteo-station. Calm conditions - 5% (Source: Kazhydromet, 2024)

Topography, Drainage, and Transport Access

The topographical configuration of the site is defined by gently sloping hills and shallow depressions characteristic of the Saryarka Ridge's northern foothills. Elevation varies from 573 meters in the western section to 502 meters in the

northeastern portion. Drainage is primarily seasonal, with thaw water accumulating in temporary creeks that discharge into Toksumak Lake, approximately 10 km to the north. The topographic map (scale 1:200,000) clearly delineates the WPP boundaries and natural hydrological features (Figure 4).



Figure 4. 1:200 000 topographical map updated in 1985 with the area allocated for the study area (red line) and the Project components. Relief is drawn in 20 m increments

Access to the site is facilitated by existing regional roads, although the final 700-meter segment requires structural reinforcement to accommodate oversized turbine components. Blade transport modeling highlighted a critical turning radius that necessitates off-road deviation and terrain adaptation (Figure 5).



Figure 5. The blades transporting trailers right-angle turn after Osakarovka (brown line) allows for the blades (white line trajectory) to avoid the powerline poles but will require ground enforcement for driving outside the road (red lines trajectory). (Source: Base map source: Google Maps, 2025. Annotations and layout by the authors)

Air Quality Assessment

Air pollution remains a significant environmental concern across the Karaganda Region, largely attributed to its legacy of mining and heavy industrial operations. According to official environmental statistics, the region contributed over 20% of Kazakhstan's total air pollutant emissions in 2023. This trend is visualized in Figure 2, which illustrates the comparative emissions load across Kazakhstan's regions. However, the immediate WPP site is located at a considerable distance from industrial zones and exhibits favourable air quality parameters. Ambient air monitoring indicated the absence of significant local emission sources aside from domestic heating emissions during winter.

Consequently, no additional mitigation measures are required for the operational phase of the WPP.

Acoustic Modelling and Noise Impact

Noise emissions from wind turbines are an important consideration in determining the acceptability of a wind power plant, particularly in rural areas with dispersed settlements. To quantify potential acoustic impacts, noise propagation

modelling was conducted using WindPro software, a widely adopted tool for environmental sound prediction. The modelling incorporated turbine specifications (hub height 110 m, rotor diameter 155 m), local topography, prevailing wind conditions, and residential receptor locations.

The modelling results indicated that the maximum noise levels in the project vicinity do not exceed 55 dB, which complies with national noise regulations and WHO guidelines for residential zones. Contour mapping of modelled sound levels shows that the 40 dB threshold does not extend beyond the designated project boundaries (Figure 6). These findings suggest that turbine operation will not cause significant acoustic disturbance to nearby residents or wildlife.

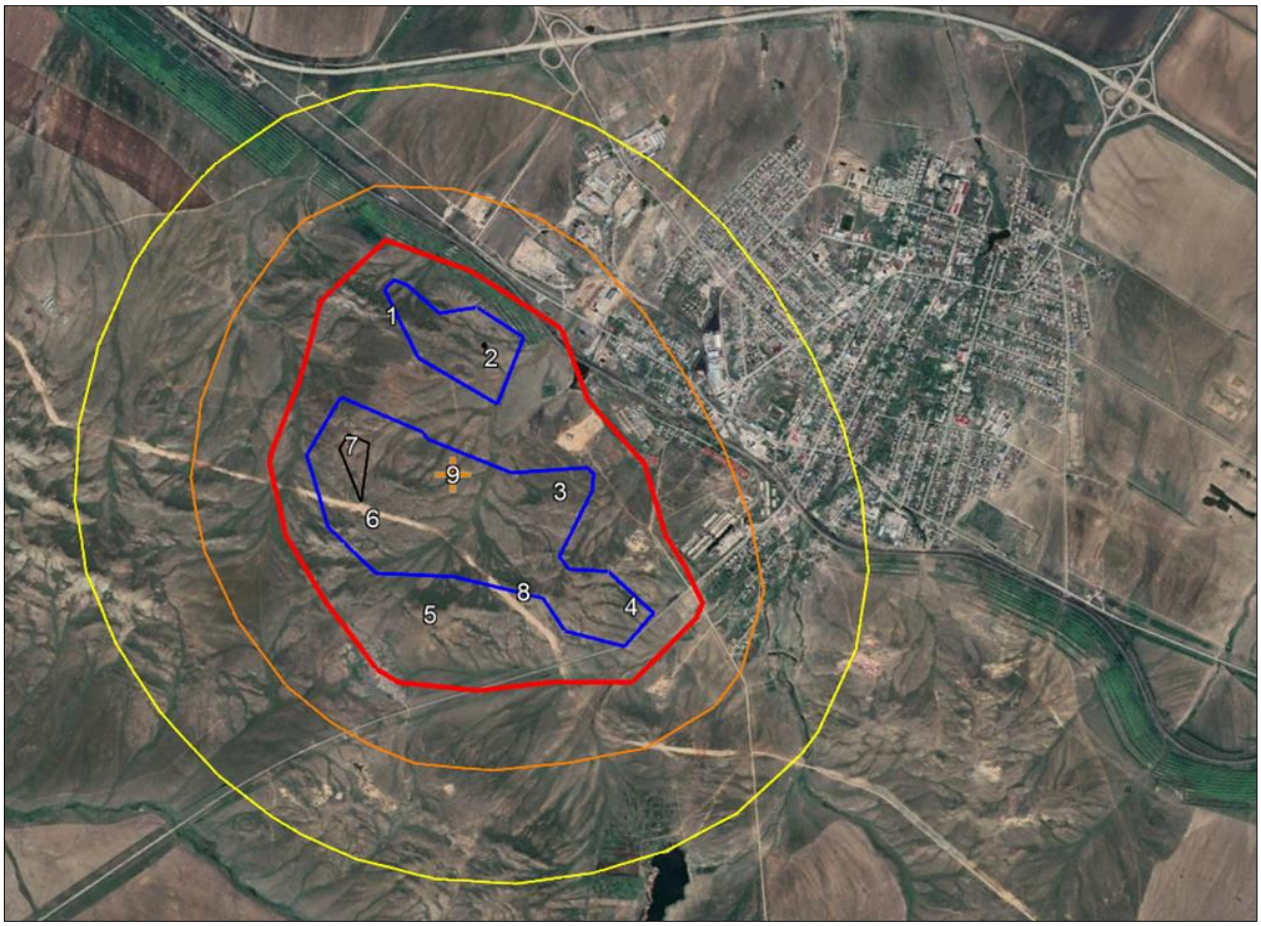


Figure 6. Results of the turbines noise modelling in WindPro showing that 55 dB (black contour), 50 dB (blue contour), 45 dB (red contour) 40 dB (orange contour) 35 dB (yellow contour). Number of turbines (1-9). The nearest houses are at the edge of the red contour. (Source: Base map source: Google Maps, 2025. Annotations and layout by the authors)

Avifauna and Collision Risk Assessment

To evaluate the potential impacts of the WPP on local and migratory bird species, ornithological monitoring was conducted during the autumn migration season (August-October 2022). Observations were carried out from five strategically positioned vantage points within a 5 km radius of the proposed site. The study focused on identifying flight trajectories, altitudes, and behaviors of birds entering the rotor-swept zone (27-183 m).

Target species included large-bodied birds such as swans, pigeons, and raptors, which are more susceptible to blade collisions due to their size and flight patterns. Smaller passerine species were observed but were not prioritized for collision modeling, as they typically fly below or above the risk envelope.

Collision risk was estimated using the **Scottish Natural Heritage (SNH, 2000)** model, which provides a theoretical calculation of avian fatalities assuming no avoidance behavior.

Due to the lack of local data on species-specific avoidance behavior, only the first stage of the SNH methodology was applied. However, the calculated mortality risk remained below internationally accepted thresholds. Seasonal correction factors were also applied, based on comparative data from a similar wind farm 80 km to the north, which recorded an 87% decline in bird abundance during winter months. These adjustments significantly reduce predicted annual collision figures.

Terrestrial Fauna and Habitat Conditions

Mammal presence within the project area was assessed through both direct visual observation and indirect evidence (e.g., tracks, scat). The most frequently recorded species were the bobak marmot (*Marmota bobak*) and mountain hare (*Lepus timidus*). No bat roosts or colonies were detected in nearby structures or natural shelters.

Interviews with local residents confirmed the rare occurrence of bats in the region, likely due to climatic and habitat limitations.Vegetation surveys confirmed the dominance of feather grass steppe with patches of *Artemisia* and salt-tolerant flora in depressions. Habitat conditions were stable, with no observed signs of erosion, invasive species, or overgrazing. This baseline supports the classification of the site as moderately sensitive, with sufficient ecological resilience to accommodate planned WPP infrastructure.

Socio-Economic Context and Community Perception

As part of the integrated environmental assessment, structured interviews were conducted in the nearest settlements, including Puteyschiki and Zhasulan Farm, to evaluate the social acceptability of the wind energy project. The surveyed residents expressed neutral to positive attitudes toward the proposed development. Anticipated benefits included the creation of local jobs during the construction phase and potential improvements to local infrastructure such as roads and electricity reliability. Importantly, no culturally or historically significant sites were identified within the project boundary, based on consultations with the Karaganda Regional Department of Culture and archival resources. Furthermore, viewshed analysis revealed minimal visual intrusion from the turbines, given the topographical buffering and sparse residential dispersion in the region.The alignment of the transport corridor with existing roads, combined with low local traffic volume, indicates that turbine delivery and maintenance operations are unlikely to cause significant disruption.

Synthesis of Environmental Impacts and Site Viability

The multi-criteria assessment demonstrates that the selected site near Osakarovka offers favorable conditions for wind energy development with minimal adverse environmental consequences. Key environmental parameters - including wind availability, topographical compatibility, land stability, and low levels of biodiversity conflict - collectively support the technical and ecological feasibility of the project. No significant long-term risks were identified in relation to air quality, noise, soil degradation, or disruption of wildlife corridors. While some short-term impacts are anticipated during the construction phase (e.g., dust generation, equipment noise), these are temporary and manageable through standard mitigation measures. Moreover, the project's potential to displace fossil fuel-based energy sources aligns with Kazakhstan's national climate strategy and emissions reduction goals.

Cumulatively, the evidence presented supports the classification of the site as highly suitable for wind energy deployment, both in terms of technical viability and environmental sustainability. The Giperborey 50 MW WPP is expected to contribute meaningfully to the region's renewable energy capacity while maintaining ecological integrity and community support.

Our site-specific findings are in line with recent EIAs and impact studies that combine bird-collision estimation with post-construction validation (Morant et al., 2024), measured-input noise appraisal and human-response evidence (García-Guerrero et al., 2025; Rosciszewska et al., 2025), and landscape/visibility framing at population scale (Gleason et al., 2025); geotechnical syntheses further support the need for local soil-foundation checks in steppe settings (da Silva Medeiros & de Lima, 2025; Fan et al., 2025). The findings of this study indicate that the selected site near Osakarovka village in the Karaganda Region presents highly favorable conditions for wind energy development.

The region's stable and strong wind regime, combined with low population density and limited ecological sensitivity, ensures both technical and environmental feasibility. These results are consistent with global site selection studies that emphasize the importance of wind speed, land use compatibility, and minimal biodiversity conflict (Al-Yahyai et al., 2012; Moradi et al., 2020). Noise modelling revealed that turbine operation would remain within accepted thresholds, with no exceedance of 55 dB at any residential receptor. These outcomes align with similar assessments conducted for wind farms in Central Europe, where modern turbine designs and setback distances have significantly mitigated community noise complaints (May et al., 2021). Moreover, the lack of sensitive fauna such as bats or nesting raptors within the project zone further supports its ecological acceptability. From a land-use perspective, the project makes efficient use of marginal land previously subjected to low-intensity grazing.

This contrasts favorably with wind farm projects in more densely settled or agriculturally productive regions, where land conflicts and stakeholder resistance are more common (Traldi, 2021; Christie & Bradley, 2012). The applied methodology, which integrates international modeling tools (e.g., WindPro®, SNH avian risk model) with national environmental legislation, provides a replicable framework for future site assessments in Kazakhstan.

The project also contributes to Kazakhstan's broader commitment to renewable energy expansion and climate mitigation under its national determined contributions (NDCs). Taken together, the results suggest that the Giperborey WPP can serve as a model for sustainable territorial planning in steppe regions, where wind energy potential is high but ecological risks remain moderate.

CONCLUSION

This study provides a comprehensive environmental assessment of the Giperborey 50 MW wind power plant project in the Karaganda Region of Kazakhstan, with a particular focus on the site's climatic, ecological, and spatial characteristics. The findings demonstrate that the selected location near Osakarovka village meets the key criteria for wind energy development: favorable wind conditions, low ecological sensitivity, limited land-use conflicts, and minimal socio-environmental risks. Climatic data confirm the area's suitability in terms of wind speed and temperature stability, while noise and air quality analyses indicate that both construction and operation phases will comply with national and international standards. Wildlife monitoring and avifaunal risk modeling reveal a low probability of significant biodiversity disturbance, particularly when combined with appropriate spatial planning and mitigation strategies.

The integration of international assessment tools such as WindPro® modeling and the SNH collision risk formula into a locally grounded evaluation framework enhances the replicability of the methodology for other steppe regions in Kazakhstan. Moreover, the alignment of the project with Kazakhstan's broader energy transition goals underscores its relevance from a policy and sustainability perspective.

In conclusion, the Giperborey WPP represents a viable and environmentally sound model for wind energy deployment in Central Asia. Its successful implementation can serve as a reference for future renewable energy initiatives that seek to balance technical efficiency with ecological responsibility and territorial planning principles.

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AN INTEGRATED CONCEPTUAL MODEL OF THE IMPACT OF E-HAILING ON DRIVERS' QUALITY-OF-LIFE: INSIGHTS FROM A SYSTEMATIC LITERATURE REVIEW

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Abstract: The past decade has brought with it numerous strenuous calamities on the global economy, among others, these include pandemics, trade wars, geopolitical tensions. This has subsequently impacted some individuals' quality-of-life due to heightened levels of anxiety, job losses, increased poverty and inequality, to mention a few. However, extent literature argues that the growth of sharing economy platforms such as e-hailing services present socioeconomic opportunities that can potentially enhance e-hailing drivers' quality-of-life, subsequently contributing towards several Sustainable Development Goals set by the United Nations. A caveat, however, is that the correlation between e-hailing platforms and their effect on drivers' quality-of-life is an under explored area. This in turn, presents an ambiguous judgement on the role of these platforms towards enhancing e-hailing drivers' welfare. Leveraging the methodological rigor of a systematic literature review, this study interrogates the impact of e-hailing on e-hailing drivers' quality-of-life. Results reveal that although these platforms indeed offer employment opportunities, flexible working conditions, and prospects to supplement one's income, studies have emerged detailing the negative impact posed by e-hailing platforms on drivers' well-being, such as income instability, safety issues, lack of employment benefits, and lengthy working hours. The value of this study lies in its proposition of a multi-dimensional conceptual model that can be utilized to interrogate e-hailing drivers' subjective perception of these platforms on their well-being and quality-of-life. This conceptual study further provides approaches for testing the proposed theoretical framework.

Keywords: e-hailing; ride-sharing; quality-of-life; well-being; systematic review

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INTRODUCTION

Evidence shows that recent events have significantly added pressure on tourism employees, which has subsequently impacted their quality-of-life negatively (Elshaer, 2023). The ongoing global pandemics, economic instability, multilateral trade tensions, among others, play a role in this complex situation affecting societal well-being. These phenomena do not only render those employed in the tourism sector jobless, but also negatively impact on those that are still privileged of continued employment in the sector as they worry about job security and reduced disposable income (Elshaer & Azazz, 2022). Notably, rapid technological advancements have been cited as a great catalyst to improve tourism employee's subjective well-being and quality-of-life (Mackey & Petrucka, 2021). Parallel to these technological developments, sharing economy entities have emerged as essential tools that contributes to local empowerment and offers entrepreneurial opportunities to a broad range of individuals despite spatial and structural limitations (Johnson & Mehta, 2024). In essence, the sharing economy is regarded as a disruptive business model that exploits the utilization of under-utilized assets. Structurally, this model comprises of a firm, or service enabler, which acts as an online intermediary between the suppliers of a good or service (service provider) and customers who demand those underutilized goods and services (Kumar et al., 2018).

That being said, online-mediated e-hailing services (for instance, DiDi and Uber) are some of the sharing economy businesses that have gained popularity and have been applauded for fostering socio-economic inclusion of marginalized individuals (Johnson & Mehta, 2024). E-hailing as a new model utilizes mobile smartphone apps to connect predominately non-professional drivers with passengers who are in demand for transportation service in return for a compensation (Fassbender, 2016). Although e-hailing has been a neglected research area in tourism research, Poó et al. (2018) argue that these platforms, plays a crucial role in urban and the tourism eco-systems, both in economic and mobility terms. From a passenger point of view, e-hailing transportation system has been linked to numerous benefits, among others, this includes improving travelling safety by reducing drunk-driving arrests and accidents caused by driving while under the influence of alcohol (Greenwood & Wattal, 2017), offering convenience, reducing travel anxiety, and time spent waiting for public transport (Fuazee et al., 2024). In some instances, these platforms also offer a user-friendly transportation system at a relatively affordable price (Qureshi & Shamim, 2023). While on the other hand, a host of writers have argued that ride-hailing offers employment opportunities for majority of people and permits

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circulation of cash flow to a wider population (Poó et al., 2018). Due to these factors, a large proportion of individuals across several countries that have adopted this model are increasingly embracing e-hailing services.

Some scholars situate e-hailing within the lenses of sustainable development, while others have argued that these platforms are a great avenue to foster tourism recovery post a crisis (Vega-Gonzalo et al., 2024; Yapp & Yeap, 2020). Literature suggests that there is a great opportunity for fostering inclusive tourism development through this industry considering that its global value is worth USD104.93 billion and predicted to experience 15.7% growth by 2030 (Grand View Research, 2023). A caveat however lies in that most studies uses financial gains earned by drivers as a direct indicator to suggest that the platforms should be leveraged as a sustainable pathway to build resilient tourism systems, foster transformation, and improve individuals' quality-of-life. This assertion disregards that quality-of-life is a multidimensional construct that transcend financial gains. Given the ongoing debate on e-hailing regulations by most governments, a study that applies a systematic methodological approach to provide insight on the role of e-hailing on drivers' quality-of-life is necessary (Shaikh et al., 2024). As a result, the current study offers such insights by leveraging the methodological power offered by a systematic review to capture drivers' perspective on how these technological-mediated platforms impact their subjective well-being and quality-of-life. The value of this research stems from its contribution to the continuous scholarly discourse on the role of gig economy and its impact on tourism employment. The study further expand existing literature on the interrelation between technological developments and their role towards supporting sustainable tourism transformation. The above being said, this paper offers both theoretical contributions, as well as practical applications particularly pertaining to policy recommendations.

LITERATURE REVIEW

Quality-of-life research in tourism and e-hailing context

In the 21st Century, governments across the globe have embarked on a struggle to enhance their citizens' quality-of-life, with an intent to fast-track measures to achieving sustainable development (Kundu et al., 2022). That said, quality-of-life as a study area has attracted research interest across a wide variety of disciplines, including, health, urban planning, social and environmental psychology, design and infrastructure development (Croes et al., 2018; Woo et al., 2016; Grum & Kobal-Grum, 2020; Perlaviciute & Steg, 2018; Mamirkulova et al., 2025; Allal et al., 2022) among others. However, recently, an upsurge of research interest on this topic has also been witnessed in the tourism scholarly discipline, with a specific focus on studies seeking to uncover the interrelation between tourism-related technological developments and their impact on tourism stakeholders' quality-of-life (Uysal et al., 2020). This is due to the assumption that advances in technologies that are directly linked to tourism have an impact on various stakeholders' quality-of-life (Uysal et al., 2011).

Some studies have suggested that empowering hosts communities through tourism-oriented technologies offers them an opportunity to make a livelihood and gain control over their resources, subsequently improving their well-being and quality-of-life (Ramkissoon, 2023; Su et al., 2022). Conceptualizing the meaning of quality-of-life has been an ongoing debate for scholars since 1960 (Puczkó & Smith, 2011). Andereck & Nyaupane (2011) review of quality-of-life studies reveals that there are more than 100 definitions and models that seek to best describe this concept, therefore, reaching a general consensus on its interpretation is problematic since analysis of what is considered a quality life is subjective (Subramaniam et al., 2013). Nonetheless, its operationalization has been framed within the lenses of "well-being", "welfare", and "happiness", and these terms are often used interchangeably across literature (Puczkó & Smith, 2011).

In an earlier study, Meeberg (1993) stated that a quality-of-life should be viewed based on an individual perspective pertaining their overall satisfaction with their life (Woo et al., 2016), and this entail both emotional responses and cognitive decisions (Xiang et al., 2015). In terms of its measurement, studies have sought to measure quality-of-life from an individual, community and up to nations context (Brown et al., 2013; Brauer & Dymitrow, 2014). According to Woo (2013), quality-of-life can be conceptualized using a uni-dimensional perspective or multidimensional perspective. In his study, Kiuranov (1980) proposed a uni-dimensional approach to measuring quality-of-life, arguing that a single-item survey is sufficient to evaluate respondents' perception of a quality life (Woo, 2013). Nonetheless, this method has been criticized for its inability to produce estimates of internal consistency and its limited utility for comparing smaller groups. Alborz (2017) argues that a uni-dimensional approach is suitable only if the aim of a study is to evaluate whether study's participants perceive their lives better than they were post utilizing a digital tool, this however may not enable a researcher to pinpoint which dimension in life does the recipient requires intervention to improve their quality-of-life. On the other hand, most scholars have advocated for a multi-dimensional approach for measuring subjective perception of quality-of-life (Woo et al., 2016). The multidimensional perspective posits that overall life satisfaction is linked with an individual contentment across various spheres in their life (Rahman et al., 2005; Woo, 2013). Nonetheless, consensus on the main dimensions that need to be evaluated as a measure for a quality life is still problematic.

Various scholars have suggested different domains, for instance Alborz (2017) argued that there should be no restriction to the number of sets of indicators that can be used to evaluate an individual's quality-of-life. That said, the WHOQOL Group (1998) describes a quality life as a person's perception on their current state in life within the context of their social setting and value systems, and this can be influenced by a number of things, such as the person's level of independence, psychological condition, physical health, and social link to the prominent elements of their surroundings. Dolnicar *et al*. (2011) concur that quality-of-life should be viewed within the lenses of an individual physical health, psychological well-being, and social well-being. Academically, studies have applied various theories to test perceived quality-of-life on individuals, communities, up to a national level. Nonetheless, the WHOQOL is considered to be the most reliable theoretical framework that can be adopted to measure quality-of-life (Gholami et al., 2023). Alborz (2017) suggests that the

developmental requirements of the people living in a particular community should be taken into account when defining quality-of-life goals. Hence, the WHOQOL precisely provides domains that can be used to predict and further evaluate if an initiative indeed advances an individual's or community's quality-of-life. From a tourism perspective, despite research evidence indicating that partaking in tourism as a service provider indeed does enhance individuals' quality-of-life and their overall life satisfaction (e.g. Ko & Stewart, 2002; Nunkoo & Ramkissoon, 2011), research on the role of e-hailing platforms towards e-hailing drivers' quality-of-life is still at an infancy stage, yet steady gaining scholarly momentum. Building on the existing literature, this study seek to synthesize current empirical research on the interrelation between e-hailing and drivers' subjective well-being, with a rationale of presenting a unified overview on this topic.

METHODOLOGY

A systematic review was adopted as a methodological approach to synthesize information on influence of e-hailing platforms towards e-hailing drivers' quality-of-life. Narrative literature review as a technique for data synthesis has recently received criticism as a result of its subjective nature, in most instances, researchers making use of this approach draw from their own knowledge and experience of the study under investigation and therefore tend to be biased on what they present in their study (Aromataris & Pearson, 2014). For this reason, systematic reviews are increasingly gaining prominence in tourism research (Prayag et al., 2019). The latter technique is more valuable due to its transparency, and for providing evidence-based synthesis (Mallett et al., 2012). Apart from opting for this strategy for its methodological rigor, a systematic review was chosen for this study since it does not only help the researcher summarise what is found in the literature, but also support conceptual model development (Rojon et al., 2021), which is an objective this study seeks to achieve. To determine suitable articles for analysis, this study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) proposed by Page et al. (2021). The PRISMA diagram is depicted in Figure 1.

A search strategy comprising of the following key terms which were merged though Boolean operators was utilized: e-hailing OR "ride-hailing" OR "Uber" OR "Lyft" OR "Bolt" OR "DiDi" AND "quality-of-life" OR "well-bieng" OR "life satisfaction" OR "living standards" OR "welfare" OR "happiness". In total, four reputable databases were selected as the main database to be included in the search process, namely, Scopus, Web of Science, Google Scholar, and Science Direct. The review covered studies published between 2010 until 2025, the rationale for starting in 2010 is that this is the period which the e-hailing platform emerged. The search generated 1733 publications, following omission process of articles that did not meet the inclusion criteria, 41 articles were included for analysis.

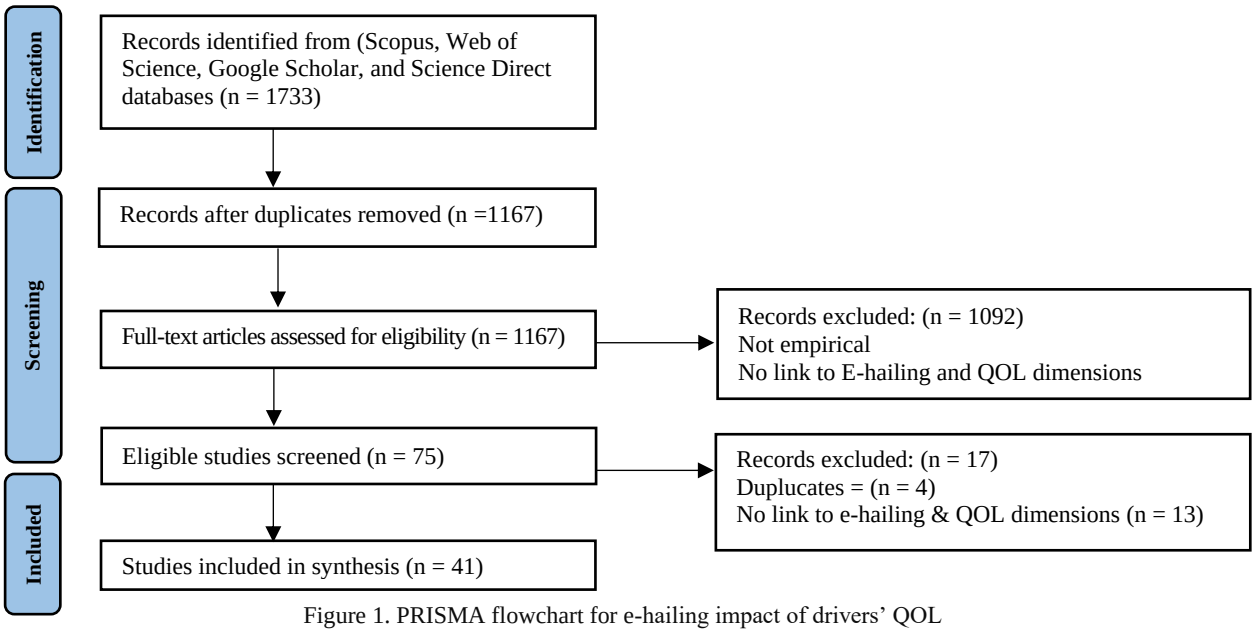


Figure 1. PRISMA flowchart for e-hailing impact of drivers' QOL

SUMMARY OF FINDINGS AND DISCUSSION

Physical and psychological well-being

A leading authority in the study of quality-of-life, Zimmerman (1995), posit that any initiative that seek to enhance an individual's quality-of-life gives them power to decision making processes on matters that impacts their lives. That being the case, proponents of quality-of-life initiatives have advocated for psychological empowerment is an important dimension that individuals or institutions seeking to advance societal well-being need to be cognizant of (Kabeer, 1999; Digan et al., 2019; Abou-Shouk et al., 2021). Chakraborty & Biswal (2021) are off the view that psychological well-being of entrepreneurs should be given higher priority, reason being that this is more likely to enhance their independence which in turn help them overcome socio-economic challenges. For example, entrepreneurs may be empowered economically as a result of the proceeds earned in their enterprise, yet in their family structure, they may be deprived the position to make financial decisions on their earnings. As a consequence, they may feel a sense of powerlessness which leads to a lack of self-worth (Riquelme et al., 2018). Thus, the concept empowerment is just a

myth in cases whereby individuals regard themselves to be empowered while they are not fully empowered, hence Eluwole et al. (2022) advised that the true definition of empowerment is when people have gain control of their lives. Psychological well-being is imparted to recipients when their sense of pride and self-esteem is enhanced due to being valued by others as a result of showcasing their skills and knowledge (Boley & McGehee, 2014). It changes an individual's view about themselves in that they gain a sense of control and drive to improve their circumstances.

In the past, the tourism transportation system has been an oligopolistic market across most developing nations, with fewer enterprises involved in the formal transportation of tourists (Peypoch, 2022), existing literature reveal that e-hailing platforms have opened up the tourism markets allowing even the marginalized populations of the society to enter the tourism transportation system (García-Tejeda, 2024). This therefore enhances e-hailing drivers' sense of pride in that their prospects to partake in a sector that was dominated by fewer corporate business has been broadened due to lowered entry barriers.

These online mediated transportation systems also offer drivers an opportunity to be their own '*boss*', subsequently having greater freedom and autonomy to govern their schedule (Ramizo & Chotib, 2020). Scholarly evidence also suggests that e-hailing services impact on psychological well-being vary from a gendered perspective, for instance, gender roles stereotypically expect women to be caregivers and homemakers, e-hailing platforms however permits women drivers the luxury to split their schedule among employment, leisure time, and family as they desire (Ramizo & Chotib, 2020).

Although literature shows that e-hailing enhances drivers' sense of pride, self-efficacy and self-esteem, a significant amount of literature also highlights drivers' dissatisfaction with these online mediated transport systems. Some drivers have been cited stating that providing rides to passengers has negative impact in their psychological well-being due to the stressful nature of this job for some drivers, the stress arises due to dealing with different strenuous and challenging customers on daily basis (Zulkarnain & Abdullah, 2024). In some instances, impatient customers are dissatisfied due to trips taking much longer than expected due to traffic, resulting in a conflict with the driver (Vega-Gonzalo et al., 2024).

Cheung et al. (2025) revealed that the psychological well-being of drivers is negatively affected as a result of drivers being exposed to risk, stemming from sharing personal information, and fear of being defrauded by customers who are making cash payments. E-hailing reward programs aimed at compensating drivers for accomplishing certain criteria's set by these platforms which often includes high ratings and a certain number of trips completed within a set time frame also compound the psychological pressure endured by drivers, as some drivers state that achieving these requirements to earn the incentive is a daunting despite striving earnestly to attain the reward (Ramizo & Chotib, 2020). Furthermore, the demand for drivers to constantly maintain high-quality ratings and comply with e-hailing platform requirements adds the mental strain on drivers who are worried that their accounts will be deactivated should they be non-compliant or persistently receive low ratings (Idug et al., 2023). Across some economies, such as in South Africa, traditional transportation service providers oppose the implementation of e-hailing service with a fear that this reduces their market share, in turn, e-hailing drivers have experienced violence, psychological abuse, ill treatment, and worst cases having their vehicles torched (McDaid et al., 2023).

The above being said, the psychological state of drivers is more often wary of such ill treatment. Emanating from the existing literature on the impact of e-hailing on the psychological well-being of drivers, this study proposes the following:

Proposition 1: E-hailing platforms has a positive effect on the psychological wellness of e-hailing drivers.

Proposition 2: E-hailing platforms has a negative effect on the psychological wellness of e-hailing drivers.

Social relationships

Researchers, governments, and institutions alike that champion for advancing individual's or society quality-of-life hold a firm belief that achieving this requires building a sense of camaraderie among those that will be recipients of improved quality-of-life stemming due to empowerment initiatives (Maksimović et al., 2019). The rationale for this assertion is that people who have a sense of social cohesion comprehend their struggle better when they work hand-in-hand and therefore alignment of their efforts to achieve the same objective is enhance when they are working in collaboration. Individuals with a positive social well-being are of a view that they are part of a society that can potentially offers a supporting structure across various situations (Zimmerman, 1995). Within the context of e-hailing literature, Zulkarnain & Abdullah (2024) interrogated the role of family and friends in drivers' ability to render e-hailing services, findings reveal that in most instances next-of-kins are vital in offering support and advice in decision making linked to purchasing as well as listing of the vehicle on e-hailing platforms. Worth noting, family members of drivers that opted to provide their service on e-hailing to overcome challenges that they are confronted with in their lives are immensely supportive and believe that drivers will significantly improve their well-being and succeed as a result of e-hailing (Zulkarnain & Abdullah, 2024).

Pratt et al. (2019) disclosed that drivers perceive e-hailing is a pivotal tool for socialization and strengthening interpersonal relationship development. Despite it being a great avenue for networking, some drivers have expressed that at times passengers can display annoying behaviours, such as being drunk, being too loud on the phone, and being rude, thus ruin the socializing element of e-hailing (Pratt et al., 2019). McDaid et al. (2023) echoed the same sentiment that some customers hold firm belief that '*the customer is always right*', and therefore exhibit empowered behaviours that can be degrading, such as taking drugs, acting a racist manner, or having sexual relations in the vehicle. On a different note, while some e-hailing drivers have stated that these platforms strengthen their social cohesion (particularly defending themselves against abusive traditional taxi drivers), some drivers are of the view that digitalization of the transportation service through e-hailing does not fully offer social cohesion as there is less collaborative work and drivers do not collaborate to when they having disputes with a platform service provider, such as disputing increased commission imposed on drivers (Pakusch et al., 2021). Based on the impact of e-hailing of social relations according to existing literature, the following propositions are suggested:

Proposition 3: E-hailing platforms has a positive effect on the social well-being of e-hailing drivers.

Proposition 4: E-hailing platforms has a negative effect on the social well-being of e-hailing drivers.

Economic well-being

Numerous scholars advocate for the idea that economic benefits derived from tourism-linked activities should improve the quality-of-life of citizens (Boley & McGehee, 2014; dos Santos et al., 2024). Maintaining a perspective that views e-hailing as a sub-sector of the tourism industry, this study defines economic well-being as financial gains accrued from rendering e-hailing services to travellers. Ramizo & Chotib (2020) has corroborated that app-based ride services indeed broaden drivers' economic prospects. The manner in which this business model is structured, as long as an individual can demonstrate that they own a vehicle that is in good condition and complete the necessary paperwork, they can be self-employed and earn a living through these platforms (Pollio, 2019). This is particularly advantageous for individuals who have been retrenched or adversely affected by discriminatory corporate policies that marginalize those who are no longer classified as youth. Ride-sharing platforms generally encourage inclusivity and fairness and do not discriminate based on age, gender, and race. That said, notably, the e-hailing sector pioneer Uber has in the past portrayed itself as a great tool for financially empowering those that have been previously marginalized (Pollio, 2019). Ride-sharing is not only beneficial to those without employment, however, even those that are in position of employment have expressed that these platforms aid with supplementing their income (Hamari et al., 2016; Yapp & Yeap, 2020). In select cases, drivers have indicated that these platforms enable them to earn more that salaries gained in their place of employment (Ramizo & Chotib, 2020). The greatest initiative is that drivers do not only need to rely on profits generated for offering ride services, but strategic pricing structures such as offering bonus trips and cash incentives further enhances the economic empowerment offered by these platforms (Mäntymäki et al., 2019). Within the United Kingdom context, drivers enjoy greater economic empowerment similar to those of fulltime employees, as they are eligible to minimum wage, holiday incentive and pension scheme (Rahman et al., 2022). Whilst drivers enjoy greater financial advantages, drivers have raised concerns that in rare cases, some passengers refuse to pay the amount prescribed by the platform provider upon completion of the trip, some request for a trip to be extended while maintain the same price, and in some instances, passengers reserve vehicles and expect the driver to accommodate passengers that are beyond a maximum limit of passengers for that vehicle class, and this may have dire consequences on insurance claims should an accident occur (Ramizo & Chotib, 2020). Pertaining to women drivers, studies have revealed that they earn usually earn less than 7% relative to their male counterparts, nonetheless, various factors have been hypothesised to be a contributing factor to this pay gap, including the fact that female drivers tend to avoid dangerous locations and therefore drive less that males, moreover, male drive faster than females, and lastly, males drive more hours per week which allows them to generate more revenue (Cook et al., 2021). Considering the existing knowledge on the role of e-hailing on drivers' financial well-being, the following propositions are suggested:

Proposition 7: E-hailing platforms has a positive effect on the economic well-being of e-hailing drivers.

Proposition 8: E-hailing platforms has a negative effect on the economic well-being of e-hailing drivers.

Environmental QOL

According to Aghazamani & Hunt (2017), environmental quality-of-life is able to produce enhanced well-being that transcend psychological, social, and economic well-being. Pertinent to the focus of this study, e-hailing services are deemed to be environmentally sustainable service (Yapp & Yeap, 2020). Salim et al. (2020) argue that by virtue of design, ride-sharing platforms contributes towards reducing greenhouse gas emissions (GHGs) as a result of fewer people seeing a need to purchase vehicles. Moreover, demand for long-term parking demand is minimised, consequently presenting an opportunity for spaces to be repurposed for greener practices, particularly in large cities (Salim et al., 2020). Hamari et al. (2016) found that in actual fact, some individuals indeed partake in the sharing economy, including e-hailing services, with a motive to significantly address ecological concerns. However, of recent, studies have emerged that contradicts prevailing notion that ride-hailing services bring about sustainability value, for instance, Clewlow & Mishra (2017) and Naumov & Keith (2023) revealed that these platforms have lured individuals who were not keen to partake in the transportation industry, currently with a sizable number of drivers offering ride-hailing services, this has increased vehicle mileage and traffic congestion. Erhardt et al. (2019) has shown that the introduction of ride-sharing platforms in San Francisco has increased traffic volumes during weekdays by 62% in 2016 in relation to 22% in 2010 before adoption of e-hailing platforms in the city. Emanating from the existing literature, the following postulation is made:

Proposition 7: E-hailing platforms has a positive effect on the environmental quality-of-life of e-hailing drivers.

Proposition 8: E-hailing platforms has a negative effect on the environmental quality-of-life of e-hailing drivers.

Proposed conceptual model grounded based on the literature

Literature shows that there is still limited knowledge pertaining the interrelation between e-hailing and its impact on e-hailing drivers' subjective well-being and quality-of-life, therefore, drawing from the extant literature derived through a systematic review on this topic, a structural model that entwines variables that are essential to use as a measure to assess e-hailing platforms impact on drivers quality-of-life is proposed (Figure 2). The structural model posit that studies that seek to comprehend the utility of e-hailing on drivers subjective well-being and quality-of-life should be cognizant that quality-of-life as a concept is multi-dimensional, instead of focusing solely on the financial dimension of this concept which has been widely used as a proxy measure on quality-of-life discourses (Stiglitz et al., 2010), a rigorous examination of e-hailing empowerment impact on drivers should be undertaken utilizing validated theories or theoretical frameworks. With that said, an evaluation of literature on this topic reveals that e-hailing platforms has an impact on various quality-of-life dimensions that are distinct yet interrelated, this being, psychological, social, economic, and environmental dimensions. This study therefore unifies these dimensions into a single theoretical framework which is

then proposed as a comprehensive tool that can be adopted by researchers that seek to interrogate the empowerment capacity of these platforms on e-hailing drivers' quality-of-life and subjective well-being.

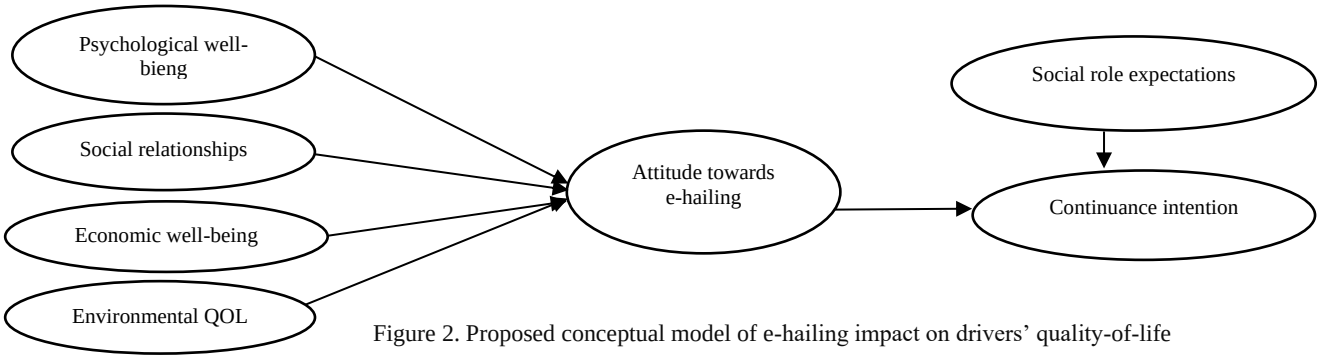


Figure 2. Proposed conceptual model of e-hailing impact on drivers' quality-of-life

On the one hand, some studies have shown that individuals venture into offering e-hailing services with an outlook that this is an avenue to improve their quality-of-life (Gan et al., 2021), and on the other hand, literature has also proven that the implication of an entrepreneurial activity on the overall quality-of-life of an entrepreneur influences their attitude towards that initiative (Caliendo et al., 2020). As a result, the proposed theoretical framework postulates that driver's perception on how e-hailing platforms empower their lives will determine their attitude towards these platforms.

Furthermore, it is imperative to acknowledge that existing literature has extensively emphasized that entrepreneurs are faced with enormous number of challenges that are linked to their family structure and community at large, among others, these may include finding it challenging to balance family role and entrepreneurial demands, and discrimination. Obstacles such as gender discrimination, finding a balance between work and family life, as well as attitude on whether an initiative is empowering has been found to have an influence on continuance intention (De Clercq et al., 2022). As a result, the Social Role Theory is operationalized within the framework as a theoretical lens to assess broader social roles of e-hailing drivers influence on their ability to offer e-hailing service. The framework therefore proposes that driver's perception of challenges arising from driving on these platforms along with their view on the empowerment capacity of e-hailing on their overall subjective well-being will influence their intention to continue rendering e-hailing service.

The proposed theoretical framework has not yet been practically tested, yet suggestions for measurement constructs that can be applied by researchers seeking to test the validity of the suggested variables are provided. Scale items to measure the psychological, social, economic, and environmental impact of e-hailing towards the holistic empowerment of can be adapted from numerous quality-of-life measurement theories or frameworks, such as Quality-of-life Index (QLI) (Ferrans & Powers, 1985), Diener's Subjective Well-Being (SWB) Theory (Diener, 1984), WHOQOL Framework (World Health Organization, 1998), and the Maslow's Hierarchy of Needs. The utility of these theories and frameworks has been validated across a wide range of studies. However, these should be amended to fit the context of e-hailing and its correlation to quality-of-life of drivers. Testing of the Social Role Theory should be upon the researcher's discretion, however guided by the existing literature on social role expectations. Meanwhile, numerous scholars across a wide variety of disciplines have adapted Oliver's (1980) scale items to measure continuous intention, hence this study propose that a similar pattern can be followed to measure drivers' willingness to continue offering e-hailing services taking into consideration its impact on their quality-of-life, yet again, questionnaire items should be modified to suit the context under investigation. To operationalize these distinct theories and frameworks, a Structural Equation Modelling (SEM) can be adopted as a technique that can combine various variables that depict the relationship between e-hailing and its impact on drivers' quality-of-life, social roles that impact their driving experience through these platforms, and their willingness to continue offering ride-sharing services.

According to Nunkoo & Ramkissoon (2011), the strength of SEM rest in its ability to illustrate a sequential flow of how certain dimensions impact each other. Researchers who seek to empirically validate the above proposed model can construct "physical and psychological well-being", "social relationships", "economic well-being", and "environmental QOL" as exogenous predictors. In turn, "drivers' attitude towards e-hailing platforms", as well as the "social role expectations" may be applied as mediators, while "willingness to continue with e-hailing" may be used an endogenous outcome.

CONCLUSION

The systematic review revealed that research on e-hailing has attracted tremendous scholarly attention, nonetheless, there is still a paucity of empirical research grounded on validated theoretical underpinning that has looked at the interconnection between e-hailing platforms and their role on drivers' quality-of-life and subjective well-being.

In addition, in-depth interrogation of the existing literature shows that this research area still suffers from limited cross-country comparative studies and longitudinal evidence to clearly argue the real impact of these platforms on e-hailing drivers across various geographical blocs, or even the global context.

As a result of these limitations, this study recommend that future research on this topic should adopt tested and validated quality-of-life theoretical lenses that considers the multidimensional nature of this concept to improve the conceptual robustness of research on this topic. Research on the correlation between the concepts under discussion may also be strengthened through an integration of quantitative as well as mixed-method methodological approaches as the current literature has largely applied qualitative methods when enquiring about this topic. In conclusion, this study

reveals that e-hailing drivers experience two-sided realities as participants in the digital mediated transportation platforms. Indeed, e-hailing services plays a huge role in reducing barriers to entry into the transportation and tourism sector, and this has contributed to more job opportunities, income generation prospects, enhanced social well-being, and contribution to drivers' environmental quality-of-life. However, drivers have also lamented about the danger they are confronted with on daily bases, financial volatility, and psychosocial strain stemming from engaging in these platforms.

Given that e-hailing represents a segment within the tourism industry, there is a need for tourism scholars to further advance research on this topic in order to shed some light into the ambivalent outcomes currently depicted in the literature. E-hailing policy formulation remains a pressing issue for most governments, therefore, additional inquiry in this subject area will provide policy insights that take into account the safety, economic stability, and any associated quality-of-life measures that are key in enabling a conducive working environment for e-hailing drivers. In pursuit of sustainable tourism recovery and building resilient tourism systems, the well-being and quality-of-life of e-hailing drivers as stakeholders that facilitate tourism mobility should also be central in policy development.

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CULTURAL HERITAGE MAPPING AND SUSTAINABLE TOURISM DEVELOPMENT: A CASE STUDY OF THE OLD TOWN OF TAKUA PA, PHANG NGA PROVINCE, THAILAND

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Abstract: This research aimed to collect data on cultural heritage sites to analyze the spatial distribution of tangible cultural heritage in the old town of Takua Pa, Phang Nga Province, Thailand. The study seeks to establish a foundational database for assessing the spatial potential of these sites and for planning sustainable tourism development in the future. This study used a qualitative research methodology integrated with field surveys and applied geographic information systems (GIS) technology to map cultural heritage sites. The GIS mapping revealed the spatial relationships between heritage sites and their surrounding contexts, as well as their connections to other heritage sites in the area. The research framework used the theories of human settlement, cultural heritage, and sustainable tourism, with in-depth interviews with local key informants to gather comprehensive insights through the Heritage Cycle concept. The results of the study revealed that the old town of Takua Pa has a variety of tangible cultural heritage sites with historical significance, including religious sites, shrines, temples, traditional community architecture, and landscapes shaped by traditional ways of life. These elements have resulted in some cultural heritage sites with high potential to be developed into unique cultural tourism destinations. However, many sites have not been promoted or developed systematically enough, resulting in a lack of connection with existing tourist routes and a lack of potential to effectively accommodate tourists. This study therefore leads to the proposal of appropriate promotion strategies to plan sustainable tourism that covers environmental, social and economic dimensions and to actively involve the community in preserving and promoting local heritage. These efforts are necessary for the old town of Takua Pa to become a valuable and sustainable cultural tourism destination in the long term.

Keywords: cultural heritage mapping, sustainable tourism development, Geographic Information System, the old town, heritage cycle

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INTRODUCTION

At present, Thailand has a variety of cultural heritages, including historical parks, ancient monuments, old cities, and traditional communities, which are considered valuable resources of the area that can be used for education, economic and social development (Suwannachart et al., 2021). Currently, cultural heritages have been used to develop cultural tourism as a form of tourism that is continuously popular, especially in the old city area, which has a variety of cultural heritages, including tangible cultures such as ancient sites, buildings, etc., and intangible cultures such as traditions, lifestyles, and cultures inherited from the community, all of which have the potential to attract both domestic and international tourists to visit the area (UNESCO, 2013). However, the development and promotion of tourism that lacks proper planning and management has caused many tourist attractions in the area to deteriorate and require conservation to maintain them in good condition, including the lack of careful promotion or development, resulting in economic and social impacts and the loss of community identity (Prompayuk & Chairattananon, 2016). The application of Geographic Information System (GIS) technology is an important tool for collecting, analyzing, and presenting spatial data on cultural heritage sites, supporting planning and decision-making in sustainable tourism development (Maguire et al., 2005).

Cultural heritage mapping is not only a process of recording the location and characteristics of heritage sites, but also promotes community participation in the process of preserving and utilizing valuable cultural heritage sites (Siliutina et al., 2024). Therefore, tourism management to support the world's cultural heritage according to UNESCO criteria is an important matter leading to sustainable tourism development planning (De Ascaniis et al., 2018a; 2018b).

In recent years, the study of the old town for conservation has increasingly drawn on settlement theory to analyze urban morphology and the development of old towns. For instance, the studies by Boussaa & Madandola (2024) and Lyu et al. (2023) applied settlement theory and urban morphology analysis in the context of heritage conservation planning. Additionally, the Cultural Heritage Concept and Sustainable Tourism have also been applied in the study, for example, Ornelas et al. (2023) developed an assessment tool based on the Cultural Heritage Concept to evaluate and classify heritage resources for conservation monitoring purposes. Similarly, Alam (2025) utilized this conceptual framework to promote community-based development toward sustainability. This aligns with the work of Zhao et al. (2024), which explored the

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application of sustainable development principles in promoting intangible cultural heritage through cultural tourism. Furthermore, geospatial technologies such as Geographic Information Systems (GIS) and Remote Sensing (RS) have been increasingly adopted in cultural heritage research. Wei et al. (2024), for example, employed RS and GIS to monitor disaster-prone areas affecting heritage sites. Li et al. (2023) used GIS to support local community planning and conservation efforts, while Malaperdas et al. (2023) integrated historical maps with GIS to investigate cultural heritage landscapes. These studies reflect a growing trend in the use of geospatial tools for analyzing, preserving, and managing cultural heritage sites.

The Old Town of Takua Pa, Phang Nga Province is a prominent example of a community with a long history. It is an important community since ancient times located on the Takua Pa River. It was an important port city in the past, making it a trading center on the Malay Peninsula on the Andaman coast. Later, Takua Pa entered a very prosperous era, especially during the tin mining era, which continued since the early Rattanakosin period (A.D. 1782-1851) (Kulachol, 2003). The area surrounding Takua Pa was full of tin ore, causing people to immigrate to engage in mining businesses. In addition, there were many miners in the area, making Takua Pa, especially the large market community (Talad Yai) or the old market, crowded with people, resulting in significant economic expansion.

There was a continuous increase in business operations to accommodate the immigrants who came to work, with many shops, hotels, restaurants, cinemas, and entertainment activities (Ongsakul & Ongsakul, 2014). Eventually, the tin mining in that area was stopped because the mineral in the area was low and the price dropped, causing Takua Pa town to lose its importance, leaving only a small town, especially the big market community (Feldens et al., 2022).

Some moved their business to Yan Yao town, some moved out of the area, causing the town to become quiet and deteriorated over time. Mostly, only the elderly remained in the area. As a result, it was necessary to revive the community to come back to life again by relying on the strong cultural heritage base, especially the Chinese Thai people in the area, both culture and traditions, by integrating spatial data for effective management.

OBJECTIVE

This study aims to examine the spatial distribution of cultural heritage within the old town area of Takua Pa, Phang Nga Province, by employing Settlement Theory, the Cultural Heritage Concept, and the Sustainable Tourism framework as the basis for analysis. The research emphasizes the application of geospatial technologies, particularly Geographic Information Systems (GIS) and Remote Sensing (RS), to survey, collect, and analyze spatial data.

These technologies are also utilized for the development of cultural heritage maps and for identifying key areas suitable for future cultural tourism development, based on the conceptual framework illustrated in Figure 1.

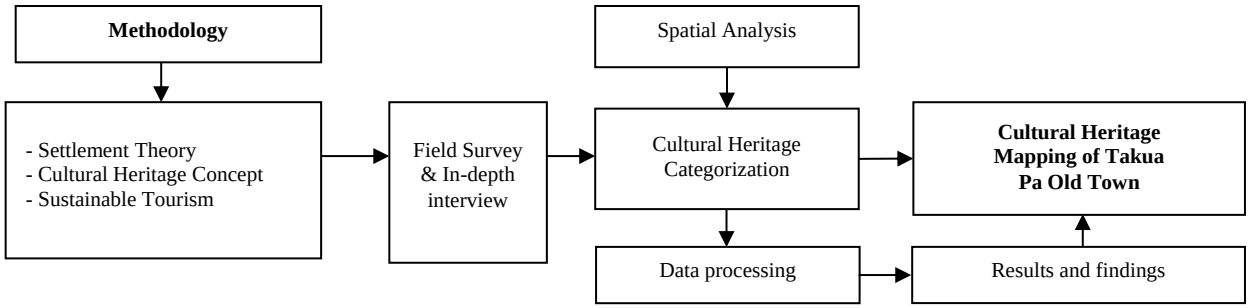


Figure 1. Conceptual Framework (Source: Author, 2025)

RESEARCH METHODOLOGY

This research is a qualitative research that combines field survey processes with spatial analysis through Geographic Information System (GIS) technology to create a cultural heritage map of the Old Town of Takua Pa, Phang Nga Province. The primary objective is to support planning and the sustainable development of community-based tourism.

The data analysis is based on three main concepts: Settlement Theory (Valsson et al., 2013; Bowen & Gleeson, 2019) to understand the traditional settlement patterns of Takua Pa Old Town communities, including road networks, trade routes, and the geographic relationship of the community to resources. Second, the Cultural Heritage Concept (Powers, 2022; Muñoz-Viñas, 2023) is used to classify tangible and intangible cultural heritage, including the values and social meanings attributed to them by the local community. Third, the Sustainable Tourism Concept (World Tourism Organization, 2013; Todd, 2017) to consider the appropriateness of using heritage sites to promote tourism, with considering the impacts in economic, social and environmental dimensions.

1. Population and Samples

In this research, the researcher selected 10 local key informants, including community leaders, elders, tourism entrepreneurs, and local officials with using a purposeful sampling. The selection was based on their extensive experience of residing in or working with the community, as well as their active social roles within the local context for over 20 years. These individuals were purposively chosen based on their direct involvement with the area's cultural heritage. The aim was to gain an in-depth understanding of the meanings ascribed to their own cultural heritage, the ways in which heritage sites are utilized, and perspectives on tourism development in the area.

The selection process and subsequent analysis were guided by the concept of the Heritage Cycle as in Figure 2 (Thurley, 2005), which was employed as a framework for identifying and interpreting cultural heritage sites.

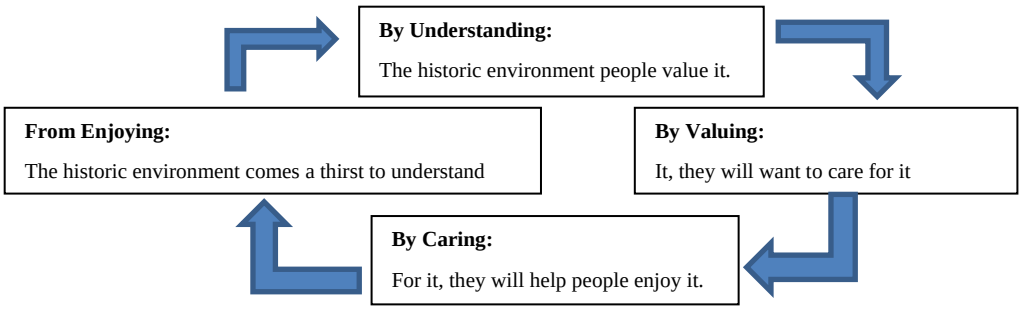


Figure 2. The Heritage Cycle (Source: Adapted by the author from Thurley, 2005)

2. Research Instrument: The researcher employed a combination of tools for data collection, including a Field Survey Record Form, which was used to document the locations and characteristics of cultural heritage sites in the area such as historic buildings, monuments, ritual spaces, and cultural landscapes. Spatial data were collected using a Garmin eTrex 32x GPS device, which recorded geographic coordinates in the WGS 84 reference system (latitude and longitude). These data were verified and supplemented with aerial photographs between 1975-2005 from the Royal Thai Survey Department and the Ministry of Agriculture and Cooperatives and high-resolution satellite image in 2025 from Google Maps to ensure positional accuracy and provide contextual mapping for each site. The form also included fields for location details, field notes, and photographic documentation. In addition, an In-depth Interview Guide was utilized to conduct semi-structured interviews with ten key informants. The questions explored participants' perceptions, meanings, values, and uses of cultural heritage, as well as their perspectives on the future development of sustainable cultural tourism in the area. To ensure content validity, all research instruments, including the survey form and interview guide, were reviewed and revised based on feedback from 3 academic experts in the fields of cultural heritage, geography, and tourism planning. Their suggestions were incorporated to align the instruments with the objectives and scope of the study.

3. Collection of Data: The research began with a documentary review of local records, including regional historical documents, urban planning materials, and reports related to cultural heritage conservation. This was combined with field surveys to verify and document the locations of cultural heritage sites such as old buildings, historic landmarks, religious ritual spaces, and other culturally significant elements with using GIS technology and remote sensing to gather spatial data. Following the fieldwork, a selection of key cultural heritage sites was made based on data from in-depth interviews with 10 local key informants. These informants included community leaders, elders, tourism operators, and local officials, all of whom have direct connections with the cultural heritage of the area. The interviews aimed to explore the meanings, values, and uses of cultural heritage, as well as local perspectives on the development of cultural tourism in the future.

4. Data Analysis: The researcher conducted a spatial analysis using GIS tools to examine the distribution and density of cultural heritage sites, categorize them through heritage classification, and analyze the spatial relationship between transportation routes and the locations of heritage sites. In addition, a visual interpretation of historical aerial photographs was performed to delineate the historical boundaries of the old town and identify patterns of urban expansion over time. This helped to clarify the spatial transformation of Takua Pa and the encroachment of modern development on heritage areas. To assess the concentration of cultural heritage, Kernel Density Estimation (KDE) was applied to identify clusters of high cultural heritage density. This spatial analysis technique enabled the researcher to highlight priority zones for heritage conservation and tourism planning, supporting strategic decisions on the development of cultural tourism infrastructure in areas with significant cultural value. This spatial analysis was complemented by a content analysis of interview data collected from key informants. The data were thematically categorized based on the Heritage Cycle framework (Thurley, 2005) to explore community attitudes, cultural beliefs, and perceptions of heritage, as well as their visions for future development. These combined analyses provided a comprehensive basis for identifying key cultural heritage sites with both spatial and social significance, contributing to the formulation of sustainable cultural tourism development strategies. To further evaluate the significance of each cultural heritage site, the researcher applied a rubric-based assessment framework that incorporated multiple criteria, including historical value, architectural uniqueness, cultural relevance, community attachment, and tourism potential. Based on the total scores obtained from the rubric evaluation, the sites were categorized into three levels of cultural heritage value: high (score > 15), medium (score 11 - 14), and low (score < 11). The sites classified as having high cultural heritage value were selected for further analysis and promotion. These sites were analyzed more deeply for their potential to be integrated into sustainable cultural tourism routes and activities. This approach ensured that the selected heritage sites not only align with community values and identity but also contribute meaningfully to the goals of sustainable tourism development in the area.

RESULTS

The survey of cultural heritage in Takua Pa Old Town revealed that the area once held a distinctive identity shaped by the fusion of Sino-Portuguese architectural styles and the way of life associated with its historical tin mining community.

According to historical records, Takua Pa has been mentioned as an important settlement since the Srivijaya period (circa the 9th to 13th centuries) and later emerged as a significant maritime trading port along the Andaman coast during the Ayutthaya and early Rattanakosin periods. Its strategic location along the Takua Pa River made it a natural conduit for trade between the Indian Ocean and inland Siam. The town's identity was profoundly shaped during the tin mining boom, which began in earnest in the early 19th century, particularly around the reign of King Rama III (1824–1851), and reached its peak during the mid to late 20th century. During this period, Takua Pa became one of Thailand's major tin-producing centers,

attracting waves of migrants, including Chinese Hokkien merchants, mine laborers, and coolies who collectively established a multicultural urban fabric. These diverse communities contributed to the town's commercial vibrancy and architectural richness, especially in the area known as Talat Yai (the "Big Market"), which emerged as the economic and cultural heart of the town. Roads, shophouses, places of worship, and public facilities were constructed to support economic activity and accommodate the growing population. However, by the 1980s, global tin prices began to decline sharply due to market saturation and the emergence of alternative materials. This led to the closure of most tin mines by the early 1990s, triggering economic decline and significant outmigration from the town. As a result, many buildings and neighborhoods were left abandoned or underused, and the once-thriving town gradually fell into a state of quiet deterioration. Today, what remains are the historic buildings, street patterns, and architectural landscapes that serve as tangible evidence of Takua Pa's golden era. These heritage assets now play a central role in shaping the town's identity as a cultural heritage destination and offer strong potential for revitalization through sustainable tourism and cultural conservation. An analysis of historical aerial photographs alongside contemporary satellite imagery indicates that Takua Pa Old Town has experienced spatial urban expansion from its original core centered around the traditional commercial district along Udom Thara Road. The former market area has been gradually transformed into a predominantly residential zone, while still maintaining its historical significance.

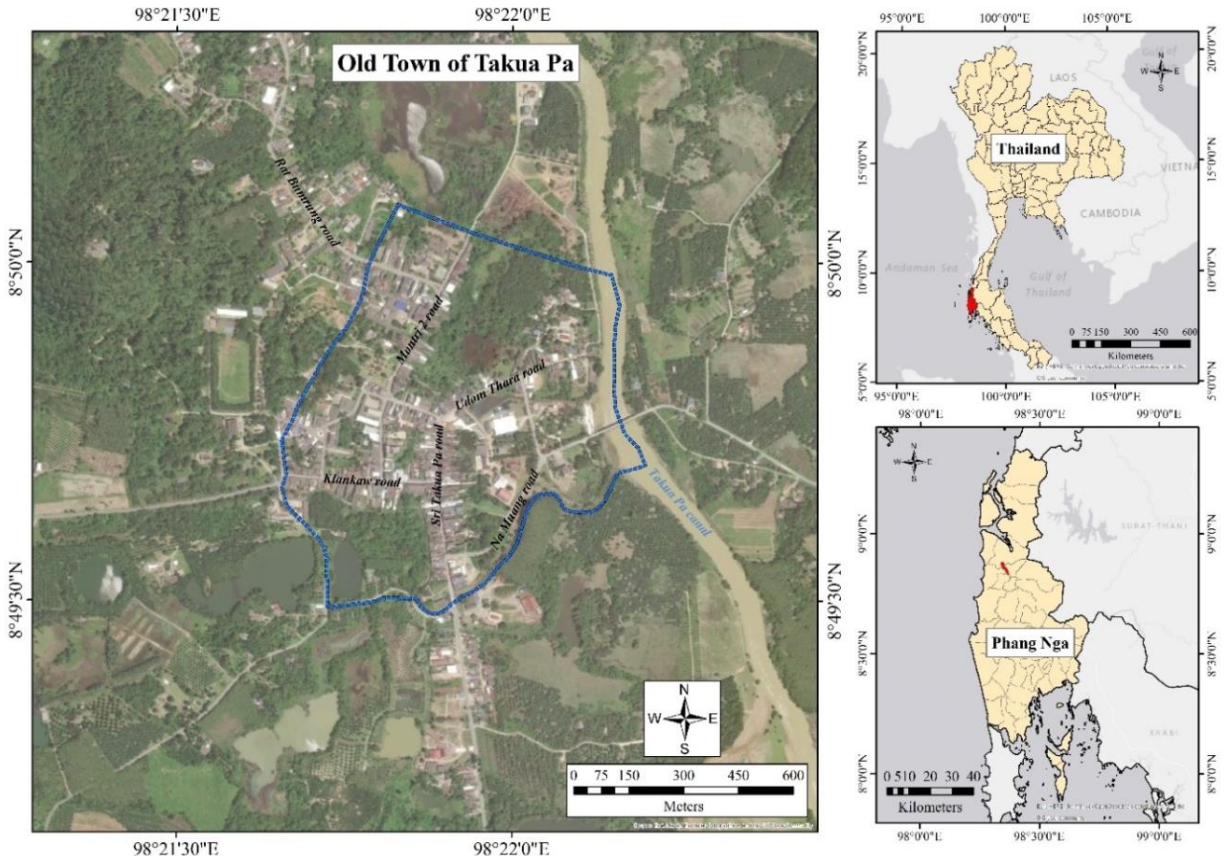


Figure 3. Map of the study area in Takua Pa Old Town, Phang Nga, Thailand
(Source: created by the author, adapted from Esri Basemap Imagery, 2025)



Figure 4. The Big Market of Chinese merchants in the Takua Pa tin mining district, Peninsula Thailand in 1957 (Source: Pendleton, 1959)



Figure 5. Urban Landscape of Takua Pa Old Town in 2025
(Source: photographs from the author's field archive, 2025)

This area preserves critical aspects of local heritage, including architectural styles, traditional culinary practices, vernacular attire, customs, and intangible cultural traditions. Such enduring cultural assets constitute a valuable cultural landscape, presenting significant potential for sustainable development through cultural heritage tourism.

An analysis of historical aerial photographs from the Royal Thai Survey Department (A-B), from the Ministry of Agriculture and Cooperatives (C), and high-resolution satellite image from Google Maps (D) as shown in Figure 6. indicates that Takua Pa Old Town has undergone spatial expansion over time, shifting its urban core from the original commercial district along Udom Thara Road to the more recently developed area along Sri Takua Pa Road.

Following the decline of the tin mining industry, the former market district was gradually transformed into a residential area. Nevertheless, this part of the town continues to retain its identity as a historic urban space. The area preserves both tangible and intangible elements of local heritage, including historical narratives, cultural landscapes, architectural styles, traditional cuisine, vernacular clothing, customs, and local traditions. These preserved features reflect the evolving urban morphology of Takua Pa Old Town and contribute to a rich and layered cultural landscape that holds significant potential for further development into cultural tourism initiatives.



Figure 6. Aerial Photograph and Satellite Image of Takua Pa Old Town Area
(Source: Aerial photographs A-B from the Royal Thai Survey Department (2025), Aerial photographs C from the Ministry of Agriculture and Cooperatives (2025) and high-resolution satellite image D from Google Maps, 2025)

Through the cultural heritage survey, the researcher categorized the identified heritage assets into two principal types: tangible cultural heritage and intangible cultural heritage. The classification is presented as follows in Table 1.

Table 1. Classification of cultural heritage in Takua Pa Old Town (Source: Author, 2025)

Type of Cultural Heritage	**Classification**	**Grouping / Examples**
Tangible Cultural Heritage	Religious Buildings	- Shrines - Temples (e.g., Wat Khuan Tham, Wat Pathumthara, Wat Saenanoocharungsan)
	Cultural Landscapes	- Abandoned tin mines - Takua Pa Canal
	Buildings	- Archaeological sites (e.g., Old Governor's Residence, Old Town Wall) - Historic architecture of residences and important buildings (e.g., Khun In's House, Tao Ming School) - Takua Pa Community Museum
	Monuments	- Steam boiler installation site
Intangible Cultural Heritage	Festivals	- Vegetarian Festival - Buddhist religious holidays
	Local Food and Desserts	- Traditional local dishes - Local desserts
	Traditional Costume	- Local costumes and traditional clothing

The tangible cultural heritage elements have been spatially analyzed and synthesized into a cultural heritage map, as presented in Figure 7. The Kernel Density analysis indicates a spatial clustering of cultural heritage sites, particularly Chinese shrines, along Sri Takua Pa and Udomtara Roads. In contrast, prominent Buddhist heritage sites such as Wat Phra That Khirikhhet and the Phra Borommathat Chedi are located outside the western periphery of the study area. Furthermore, an abandoned tin mine was identified in the southwestern zone of the old town, which has been transformed into an agricultural water reservoir, reflecting adaptive reuse of the mining industry's cultural heritage.

While Wat Phra That Khiri Khet, the Phra Borommathat Chedi on the west side and the former Tao Ming School on the north side of the Takua Pa Old Town community are approximately one kilometer away from the center, future tourism development and promotion will require a transportation system to connect them. Currently, bicycle rentals are

available at the tourist center in the center of the community, which is insufficient for tourist services. Finally, the analysis found that areas in the heart of communities with high concentrations of cultural heritage, particularly shrines, can be used to promote tourism activities during local traditions or festivals to support future tourism.

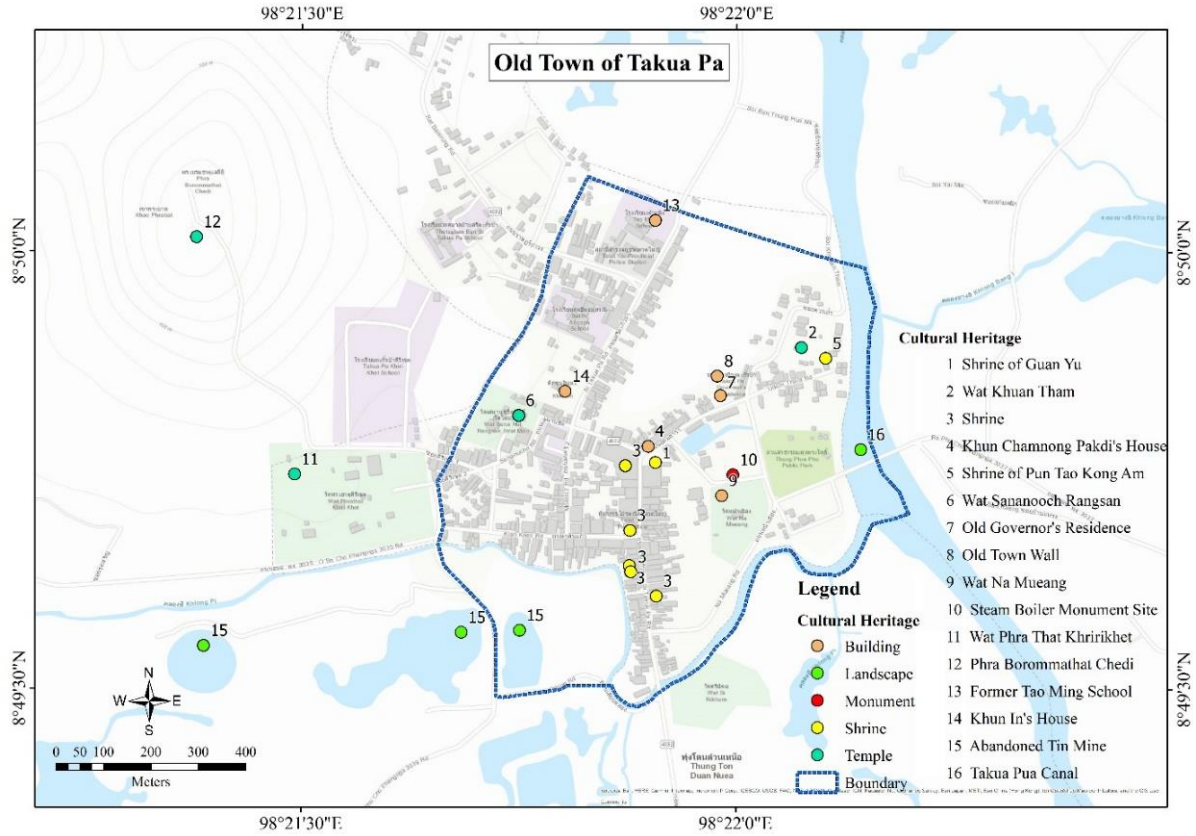


Figure 7. Map of Tangible Cultural Heritage Categorized by Type (Source: Author, 2025)

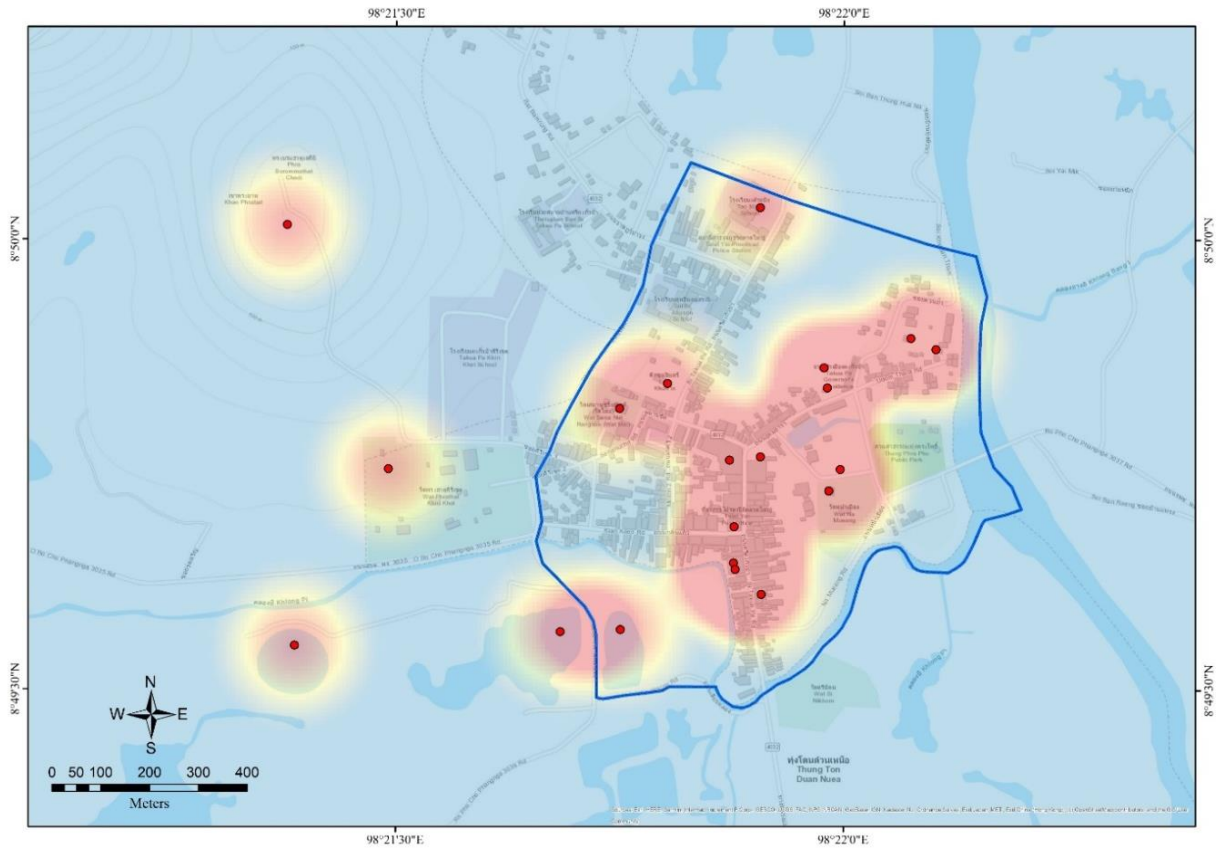


Figure 8. Spatial Distribution Map of Tangible Cultural Heritage (Source: Author, 2025)

The Heritage Cycle framework was employed as a basis for conducting interviews and assigning ratings on a scale from 0 to 5, according to the following criteria as in Table 2.

Based on the interviews conducted using the aforementioned evaluation criteria, it was found that while certain tangible cultural heritage sites demonstrate potential for development as cultural tourism destinations, others show limited prospects for such development. This is primarily due to the lack of clear assessment of meaning or significance, limited public awareness of heritage value, and insufficient efforts to utilize these sites for cultural purposes.

Table 2. Heritage Value Assessment Rubric (0–5 Scale) (Source: Author, 2025)

Score	Expressed Meaning	Perceived Value	Utilization	Perspective on Tourism Development
5	Clearly conveys deep cultural or historical significance; strongly linked to identity or traditions	Widely recognized by both local communities and outsiders as important and meaningful	Actively and regularly used for cultural, religious, or educational purposes	Highly feasible for tourism development; strong potential with clear direction and community support
4	Meaningful but not fully articulated or contextualized	Recognized as important by the community but limited awareness beyond local residents	Occasionally used for community events or cultural practices	Good potential for tourism, but requires additional interpretation, promotion, or infrastructure
3	Has some meaning, but not clearly expressed or understood	Some recognition of value, but mostly among older generations or specific groups	Used irregularly or informally; partially functional	Moderate potential; development possible but needs investment and conceptual clarity
2	Weakly associated with cultural meaning; unclear or fragmented	Minimal recognition; limited to a few individuals or groups	Rarely used or neglected	Low potential; major barriers such as accessibility, interpretation, or management responsibilities
1	Meaning is poorly defined or not communicated	Poorly recognized even within the local community	Abandoned or functionally obsolete	Very low potential; significant obstacles exist; no clear pathway for tourism integration
0	No discernible meaning; disco-nnected from heritage context	No perceived value or relevance to the community	Completely unused or unknown	No potential for tourism development; not feasible under current conditions

These limitations result in a lack of vision and missed opportunities to further develop such sites into cultural tourism assets. Additionally, many sites suffer from the absence of a designated responsible authority and inadequate budgetary support, leading to their physical deterioration and a general lack of readiness for tourism development. Furthermore, most of the sites lack complementary tourism activities necessary to enhance the visitor experience and attract tourists to the area. The evaluation results can be summarized in the following Figure 9.

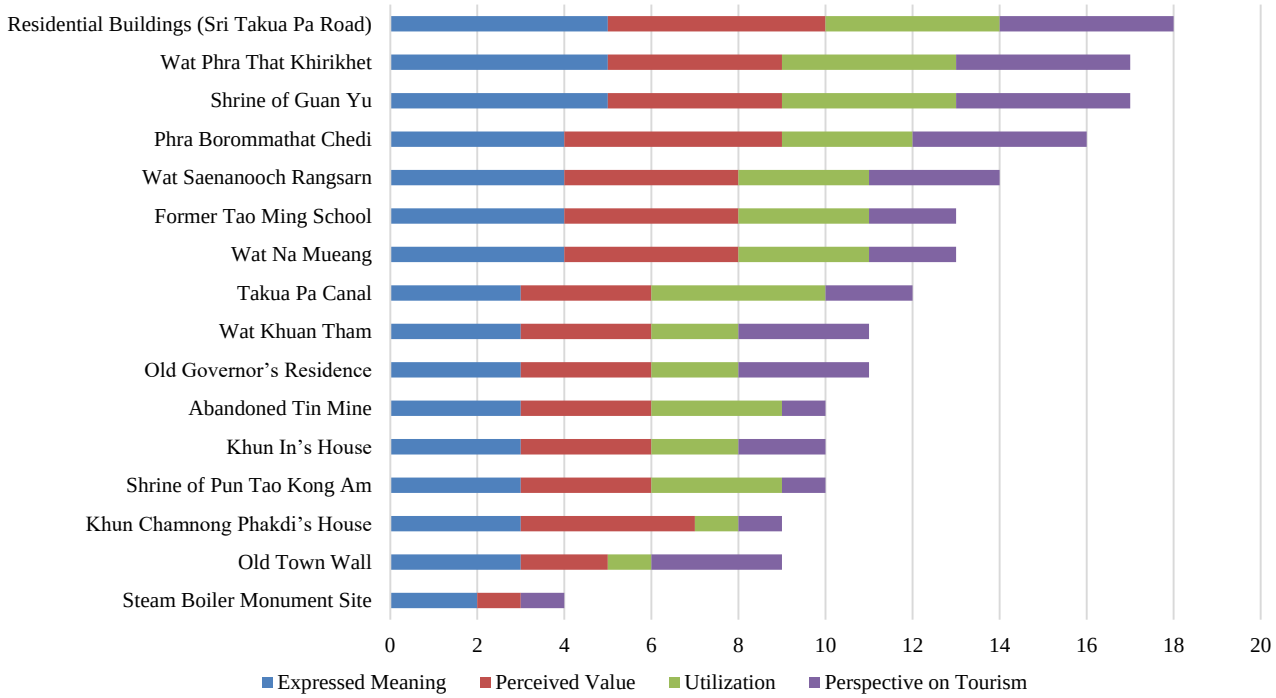


Figure 9. Value Assessment of Tangible Cultural Heritage Sites Based on the Heritage Cycle Framework (Source: Author, 2025)

The assessment results were then categorized into three potential groups based on the total scores. The first group, referred to as the High Potential Group, includes sites scoring 15 –18 points, indicating that they are strong across all evaluation dimensions and are well-positioned for cultural tourism development. This group comprises the Residential Buildings (Si Takua Pa Road) (18 points), Shrine of Guan Yu (17 points), Wat Phra That Khirikhet **(**17 points), and Phra Borommathat Chedi (16 points). These sites exhibit strong cultural expression, high levels of community recognition,

active or latent usage, and clear prospects for integration into cultural tourism circuits. They are therefore suitable for priority investment in terms of interpretation, promotion, and infrastructure development.

The second group, identified as the Moderate Potential Group, consists of sites scoring 11–14 points. These sites are culturally significant but may require restoration, interpretive enhancement, or improved management to become tourism-ready. This group includes Wat Saenanooch Rangsarn (14 points), Wat Na Mueang (13 points), Former Tao Ming School (13 points), Takua Pa Canal (12 points), Old Governor's Residence (11 points), and Wat Khuan Tham (11 points). These locations demonstrate moderate value and partial usage.

They hold potential for development but require targeted interventions, such as enhancing community engagement or assigning clear custodianship and management responsibilities. The final category, the Low Potential Group, includes sites scoring 10 points or less, reflecting limited current significance or community engagement. This group comprises the Shrine of Pun Tao Kong Am (10 points), Khun In's House (10 points), Abandoned Tin Mine (10 points), Old Town Wall (9 points), Khun Chamnong Phakdi's House (9 points), and Steam Boiler Monument Site (4 points).

These heritage elements currently lack active utilization, community acknowledgment, or adequate infrastructure. They therefore require comprehensive reassessment to explore their potential narratives, strengthen community roles, and evaluate the feasibility of future integration into sustainable tourism initiatives.

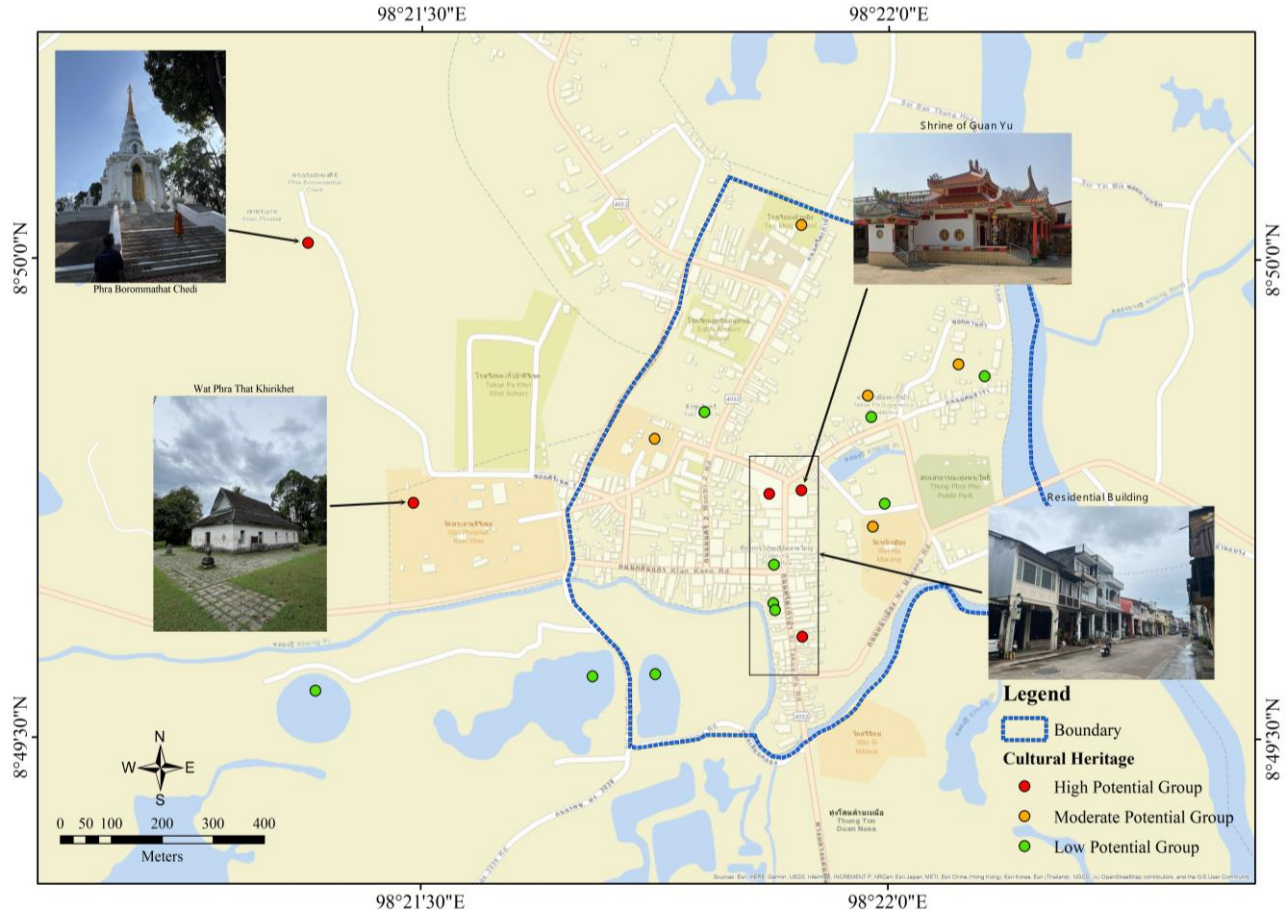


Figure 10. Location of Cultural Heritage Sites Classified by Evaluation Scores Based on the Heritage Cycle Framework (Source: Author, 2025)

DISCUSSION

The findings of this study underscore the diversity of cultural heritage present in the Takua Pa Old Town area, confirming its status as a historically rich and culturally layered urban landscape. This observation aligns with previous research highlighting the cultural heterogeneity of Takua Pa Old Town, as explored in the studies of Boonwanno & Boonprakarn (2017) and Boonwanno et al. (2022), which work documented the convergence of ethnic, religious, and architectural elements that collectively shape the town's distinctive cultural identity. Furthermore, this study reinforces the importance of employing spatial analysis and cultural mapping techniques as a methodological approach to understanding the distribution of cultural heritage resources. The application of GIS-based mapping in this research reflects a growing body of literature that advocates for spatial tools in heritage management. Similar methodological frameworks can be found in the works of Bai et al. (2024), Nova et al. (2023), Malaperdas et al. (2023); Yamashkin et al. (2021), all of whom demonstrate how cultural heritage maps contribute to the visualization, classification, and strategic planning of heritage preservation and utilization.

In addition, the process of selecting high-potential cultural heritage sites for tourism development in this study is consistent with previous research focused on cultural tourism route development. For instance, Laeheem et al. (2023) proposed that the construction of cultural routes must be based on an evaluative understanding of the historical significance, spatial accessibility, and interpretive potential of heritage assets. Similarly, Poomduang & Kheokao (2021)

emphasizes that the potential of heritage sites for tourism development relies on the integration of multiple factors, including their tangible cultural values, community perceptions, accessibility, and capacity for sustainable utilization.

A notable aspect of this study is the application of the Heritage Cycle framework, which adds conceptual depth to the evaluation process. This framework ensures that selected heritage sites are not only significant in terms of historical or aesthetic value but also possess the potential for community engagement and sustainable utilization. This approach is consistent with the findings of Blundo et al. (2018), who emphasize the importance of cyclical heritage management that fosters awareness, understanding, and appreciation leading to active use and conservation. The findings of this study further highlight that once high-potential heritage sites are identified and classified, it is essential to undertake proactive measures to promote long-term sustainability. These measures include investing in conservation infrastructure, enhancing interpretive media, establishing participatory mechanisms for local communities, and encouraging responsible tourism practices. Such strategies align with the recommendations of Mteti et al. (2025) and Song et al. (2024), who argue that heritage tourism must be supported by inclusive planning and sustainable development frameworks.

Finally, this study contributes to the broader discourse on cultural heritage planning by demonstrating that place-based and community-sensitive approaches are fundamental to transforming underutilized heritage assets into meaningful and sustainable tourism destinations. This perspective aligns with the conclusions of Joshi et al. (2021); Chaigasem & Kumboon (2024), who advocate for integrating local identity and participatory governance into heritage planning. Moreover, this research exemplifies the integration of geospatial knowledge with qualitative content analysis, as proposed by Wang et al. (2024). By combining GIS-based spatial analysis with interview-based insights, the study facilitates a comprehensive cultural valuation and participatory planning process. This integration supports both the conservation of cultural heritage and the promotion of cultural tourism in ways that align with local development goals and the preservation of unique regional identity.

CONCLUSION

The research findings reveal that Takua Pa Old Town currently hosts a wide array of cultural heritage resources distributed throughout the area. However, when assessing the potential for development into future cultural tourism destinations, it was found that several heritage sites exhibit relatively low potential. Many of these sites lack oversight from responsible agencies, suffer from physical deterioration, and receive limited support for tourism promotion.

These limitations underscore the need for further development initiatives to prepare such sites for integration into local cultural tourism strategies. At the same time, heritage sites that have already demonstrated high potential still require targeted efforts to enhance their attractiveness to visitors. This includes developing tourism-related activities, improving promotional outreach, and establishing integrated tourism routes that connect them with nearby attractions.

Such strategies will contribute to the promotion of sustainable tourism in the area by ensuring that cultural heritage resources are preserved, activated, and meaningfully linked to the broader tourism landscape.

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LEVERAGING RURAL FESTIVALS FOR SUSTAINABLE COMMUNITY DEVELOPMENT

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Abstract: This study aims to critically examine the potential of rural festivals as instruments for sustainable community development, using the Keiskammahoek Music and Art Festival [KMAF], a rural home-grown festival hosted in the Eastern Cape province of South Africa as a case study. The KMAF serves as a compelling case study for understanding how locally initiated festivals in rural areas can drive social and economic transformation in rural contexts. Through a quantitative research design, questionnaire surveys were administered to Keiskammahoek residents (N=326) who had previously attended the KMAF using a convenience sampling technique. The data was analysed using the Statistical Package for Social Sciences (SPSS) software. Findings demonstrate how rural festivals can be utilized to make a significant contribution to sustainable rural community development especially through leveraging the tourism, marketing and economic opportunities presented by the festival. They reveal that rural festivals such as the KMAF can play a cruicial rôle in advancing sustainable development goals by harnessing tourism, marketing, and economic opportunities generated through the event. These festivals not only attract visitors and stimulate local businesses, but they also foster cultural pride and identity, thereby reinforcing the social fabric of rural communities. However, to achieve this and realize th full potential of such festivals, enhanced collaboration among event stakeholders in rural areas is essential, particularly to strengthen their connections, enabling the events to effectively impact the local communities. The study argues that better collaboration, improved stakeholder management, and eventually, efficient leveraging are suggested for the advancement and socioeconomic growth of South Africa's rural areas. By embedding collaboration and inclusivity in the festival planning and management, rural communities can transform these cultural events into sustainable engines of growth and development. The study suggests that the KMAF exemplifies how rural festivals, when effectively managed, can serve as a catalyst for long-term development, positioning them as valuable tools for the advancement of socioeconomic resilience in rural areas.

Keywords: rural festivals, event leveraging, sustainability, local economic development, rural tourism

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INTRODUCTION

There has been growing recognition for the potential of tourism festivals to play a transformative role in rural economies worldwide (Getz & Page, 2016). Rural festivals are events that are hosted in rural spaces and are generally recognized as viable means of promoting rural revitalization through human connection and cultural exchange (Klien, 2010; Hawkins & Ryan, 2013; Tagore-Erwin, 2018). According to Gibson et al. (2011) as well as Mahon & Hyyrylainen (2019), rural festivals have a greater impact on the local economy because they involve significant investments in tourism-related services like hotels, cafes, and restaurants, as well as in related industries like waste management, building and equipment rental, and legal services. Despite this growing recognition, festivals in rural spaces have been largely neglected in the existing literature, resulting in them remaining underdeveloped and an often-overlooked research topic, particularly in developing economies (Getz, 2010; Getz & Page, 2016).

Furthermore, there is a lack of clear policies to effectively integrate rural festivals into broader sustainable community development initiatives. Whilst there has been a growing body of knowledge at a global level focusing on rural festivalisation, there is a notable lack of research focusing on rural festivals in Africa generally, with the majority of studies (Cawley & Gillmor, 2008; Rossetti & Quinn, 2021; Qu & Zollet, 2023; Qu & Cheer, 2021) concentrating on rural festivals hosted in the Global North. Similarly, for South Africa, there has been a dearth of academic literature on the role of festivals in rural contexts, with much of the existing studies concentrated on the developed urban centers.

The neglect is unanticipated as festivals in rural areas are more likely than festivals in urban areas to maximize their direct benefits for their host communities by utilizing local infrastructure and community resources (Gibson et al., 2012; Peric et al., 2016; 2012). Thus, from the perspective of rural regeneration, the festival's long-term coexistence with the community, the development of creative social networks, and the social enhancement it offers the community must all be taken into account (Qu & Zollet, 2023). In this sense, it is widely acknowledged that rural festivals, often referred to as socially engaged art festivals, are effective ways to encourage rural rejuvenation via interpersonal relationships and cross-cultural interactions (Klien, 2010, Hawkins & Ryan, 2013; Tagore-Erwin, 2018).

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South Africa has become one of the most popular tourist destinations on the African continent, characterized by a unique blend of rural and urban landscapes that offer a wide array of memorable tourist experiences (Nyikana & Tichaawa, 2023; Rogerson & Visser, 2020; Visser, 2023). However, much academic and government focus has been on areas that are already developed, such as Gauteng, Durban and Cape Town, South Africa's major metropoles. In recent times, the South African National Development Plan (NDP) vision for 2030 outlines the government's commitment to refocusing attention from urban areas to developing rural areas (National Planning Commission, 2011).

In this way, the government's goal is to work towards economic activities that lead to sustainable development of the country's rural areas (Mhlabane et al., 2023). In response to the South African government's recent shift in development focus toward rural areas, this study examines the potential of rural tourism festivals as a sustainable development tool. By exploring how these festivals provide real-life experiences, the research aims to inform policy-making and enhance rural development strategies. Therefore, this study explores rural festivals in South Africa as the country's rural communities are deeply rooted in history and rich traditions, with festivals serving as important sites for cultural expression, intergenerational knowledge transmission and having a greater impact in boosting the local economy since they have a large expenditure in tourism-related services as well as in allied industries.

This study aims to critically examine the effective leveraging of rural festivals for sustainable community development using the Keiskammahoek Music and Art Festival [KMAF]. We argue that the festival is positioned to play a crucial role in the regions, and analyzing its leveraging possibilities could assist in terms of recommendations for policy and planning as well as for strategic initiatives for sustainable tourism development through rural festivals.

LITERATURE REVIEW

Event leveraging

The event leveraging concept serves as the foundation for this study. Pan (2023) describes such leveraging as the deliberate application of calculated and smart methods to maximize the positive impacts of event hosting, ensuring optimal use of the opportunities to benefit from the events in question. Mahon & Hyyryläinen (2019), as well as Qu & Zollet (2023), suggest that, if the necessary partnerships are established between the festival organizations, event planners, and non-festival stakeholders to incorporate each event into the festival organizations' marketing mix, rural festival events can be used to boost the level of festival participation in the rural setting.

According to Chalip et al. (2017), it is necessary to address potential obstacles to event leveraging, such as the inability to accommodate new participants, the event's exclusion of local participation, and the disincentives resulting from elite performances that appear to be out of reach for prospective participants. Event portfolio planning and leveraging is challenging because it involves multiple stakeholders with conflicting or different demands, interests, and expectations, which can lead to serious management problems (Ziakas, 2021).

Nonetheless, the tactic of event leveraging is deemed successful by those who are able to take advantage of the opportunity to effectively design related events (Chalip, 2017). A model was therefore proposed by Chalip (2004), which has been widely adopted for effective leveraging of tourism events and festivals, as seen in Figure 1 below.

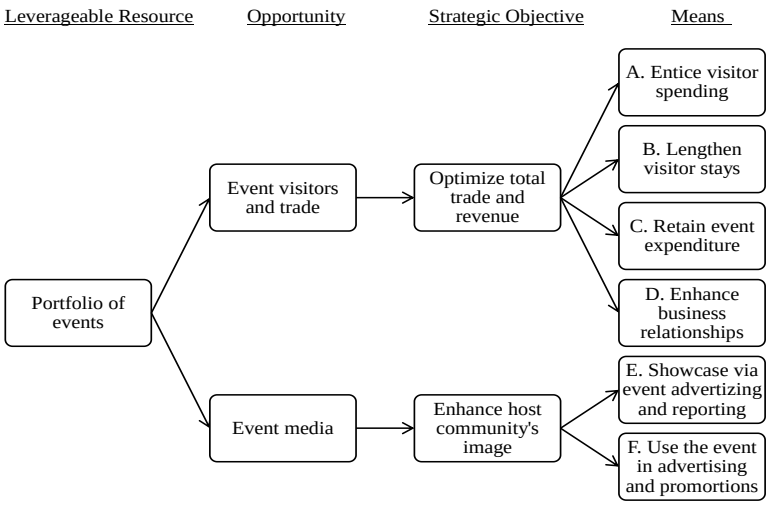


Figure 1. Chalip's (2004) economic model for host community event leverage (Source: Adapted from O'Brien & Chalip, 2007:298)

According to O'Brien & Chalip (2007), the approach depicted in Figure 1 above offers the host town the opportunity to benefit from hosting an event in both the short and long term. As per Chalip (2004), there are four methods to attain intermediate leverage: (A) increasing visitor spending; (B) extending visitor stays; (C) retaining event expenses; and (D) leveraging the event to fortify regional business relationships. Furthermore, there are two complementary ways to use event media to promote an event and the region it is taking place in, as illustrated above: (E) showcasing the region through event reporting and advertising; and (F) utilizing the event in regional promotions and advertising (Chalip, 2004; O'Brien & Chalip, 2007). Therefore, the event leveraging theory is thought to be crucial for providing this study with a solid foundation. The idea of event leveraging is crucial because the current study focuses on a rural festival that

has previously drawn a sizable audience, sponsors, and other stakeholders. This makes it an ideal platform to evaluate the potential of leveraging in the context of the rural festival and sustainable community development. The second theory that forms the basis of this study is stakeholder theory, which is presented in the next section.

Stakeholder theory

This study is also grounded in the stakeholder theory, a theory adopted from the strategic management field. From the business context, the theory emphasizes the fact that an organization tends to be supported and affected by several persons and organizations, as well as by those who are supported and impacted by the organization (Barney & Harrison, 2020). In the same way, it has been a popular theory in tourism and events studies, such that Allen (2008) developed a framework using six major event stakeholder groups, which are the host organization, the host community, coworkers, event sponsors, the media, and participants/spectators. In this way, the argument is that every event contains a variety of stakeholders, each with their own unique viewpoints, concepts, and objectives and they area also impacted by the event in different ways (Van de Wagen & White, 2010). For festival events such as that in this study, the key stakeholders are illustrated in Figure 2 below.

The stakeholder theory is of key importance because this study argues that, to ensure that the event expands and is a success, all the stakeholders that are involved, such as community/residents, event attendees, event owner, and event sponsors, should collaborate effectively. It is through collaborations that the festival can reach optimal leveraging for sustainable community development. But the collaboration is only made possible by ensuring a proper stakeholder analysis, in order to correctly classify the different roles that the different stakeholders play in the festival event.

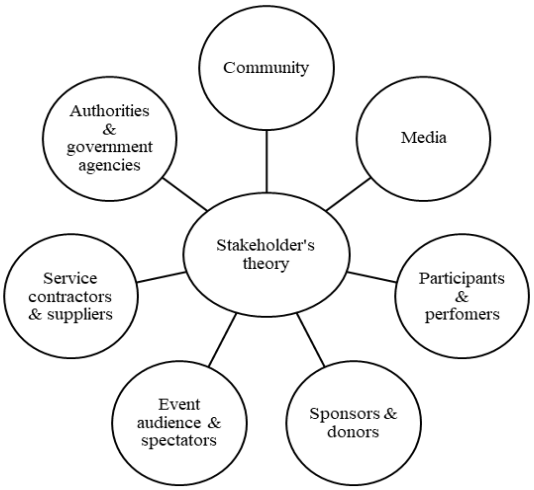


Figure 2. Rural festival event stakeholders (Source: Adapted from Van de Wagen & White, 2010:25)

Stakeholder analysis

According to Reed et al. (2009) as well as Thompson (2012), stakeholder analysis is an analysis that includes identifying stakeholders, identifying differences between them, classifying them, and examining their interactions. A stakeholder analysis is a useful tool for comprehending the behaviour, intentions, relationships, agendas, interests, and resources of important stakeholders and how they have affected or may affect the decision-making process (Węgrzyn & Wojewnik-Filipkowska, 2022). Such a stakeholder analysis was conducted for this study, and it yielded five (5) main stakeholders for the KMAF.

The first stakeholder is the host community/residents, whose responsibility it is to offer ideas and recommendations to help find appropriate methods for handling significant problem areas and managing the events (Chen et al., 2018; Trawoger, 2014).

In addition, visitors/event attendees and participants are also seen as important stakeholders of the KMAF. They have an obligation to act morally during the festival to reduce the negative socioeconomic and environmental impacts of tourism in the area (Lee, 2013). Based on the fact that they have the power to shape the event's positioning, their opinions on the use of rural festival events for the good of the community are crucial. In the context of the current event, many such attendees are from the local region, at times doubling up as both residents and event attendees.

Another important stakeholder is event owners, planners and organizers. It is the responsibility of event organizers to plan, coordinate, and promote events and decide which groups of individuals are directly related to the event (Getz, 2022). They are therefore usually held accountable for the success or failure of the event (Serravalle et al., 2019). The fourth group includes local businesses like restaurants, bars, bed and breakfasts, supermarkets, and local suppliers. Such businesses are regarded as the private sector, which contributes to the success of the event by also sponsoring the event.

According to Derrett (2004), the success of events depends on the private sector, and concludes that businesses provide a variety of support mechanisms, including cash, in-kind sponsorship, influence, and reflections of community attitudes. Lastly, event sponsors are also regarded as stakeholders of the KMAF. Event sponsorship provides support in the form of cash or in-kind contributions, or even both (Cornwell, 2020). Involving the sponsors in the leveraging of events for the destination and other interested parties makes sense since it will allow them to play a crucial part in any endeavor to create a sustainable path for community development (Ziakas, 2023). In order to use rural festival events for the good of the community, it is essential to apply both the event leveraging theory and the stakeholder theory. Firstly, this study argues that the KMAF can only be effectively leveraged if the community is given centre stage during the festival, in line with the notion of event leveraging.

Although it is an entertainment festival, it is held in a rural village context where community development is much needed. Thus, the festival needs to be used with the community's development as the main focus to help it thrive and have a significant influence. In turn, this will build capacity in the local area, which can assist in better hosting future festivals, given that there is a strong appetite for these and they are well-attended. Additionally, the event should make sure that the community provides most of the workforce and the equipment needed, such as tables, chairs, tents, and other festival-related materials.

By doing this, leakages will be avoided, and the majority of the festival's earnings and economic benefits will remain in Keiskammahoek. Secondly, the current study makes the case that all of the stakeholders who were identified and mentioned in the stakeholder analysis should work together to make sure the event grows and is a success. This is in line with the stakeholder theory. Identifying the event's key and secondary stakeholders and precisely defining their responsibilities is a critical concern in doing a stakeholder analysis. In order for the KMAF to be effectively leveraged and to benefit society more than it has in the past, all pertinent stakeholders must be identified, and their roles must be clearly defined. The study argues that, when the stakeholders of the event work together, event leveraging will be achieved.

Festivals as a tool for Local Economic Development

It has been argued in the extant literature that the two primary objectives of arts festivals are to preserve and promote art and culture and to stimulate the domestic or global economy (Pan & Huan, 2013; Stankova & Vassenska, 2015). Events and festivals are special kinds of social contact that enhance human value and set humans apart from other beings (Vitner Markovic et al., 2019). People are ready to go to far-off places to take part in festivals and events because they are seeking meaning in their lives (Berbeka et al., 2012). Frost & Frost (2020) opine that the reputation of an event community, its organizers, or both could potentially act as seed capital for the intentional creation of sociocultural, participative, and economic benefits. In other words, rather than the events themselves, the reputation of the event community is what attracts people to attend, support, participate in, and connect with festivals (O'Brien, 2006). Therefore, festival events should use active event leveraging to provide a marketing offering that can satisfy the needs of various stakeholder groups, which can differentiate and increase the competitiveness of the host destination. This will increase the promotion of the event and the host destination, draw more visitors during and after events, and boost the host destination's visitor economy (Son et al., 2021). It is evident therefore that local economic development can be achieved from festivals, even in a rural setting. This is based on the idea that since most members of the working class move to cities to work, there is relatively little economic activity in rural areas. As a result, these festivals aid in mitigating some of the challenges that may arise in areas with high rates of unemployment, low literacy and inadequate infrastructure, such as Keiskammahoek.

Heritage interpretation has evolved beyond its traditional role as a visitor management tool to become a means of fostering inclusive and resilient tourism development. While national park managers have long used interpretation to enhance visitor experiences and promote responsible behaviour (Worboys et al., 2015; Moscardo, 2017; Moscardo & Hughes, 2023), recent scholarship highlights the need to move beyond Western, nature-centred models that overlook cultural diversity and local knowledge systems. In particular, Western approaches to the creation and validation of knowledge are deeply embedded in academia, which has historically been hostile to Indigenous voices and epistemologies (Smith, 1999; Kovach, 2010; Lambert, 2014; Finegan, 2019). As Kovach (2010) notes, much of what dominant society considers “legitimate knowledge” is produced by a small, homogeneous group operating in formal institutions.
Consequently, interpretive practices shaped by such frameworks frequently assume that interpreters and visitors share similar worldviews, learning styles, and values (Xu et al., 2013), overlooking the diverse cultural contexts of audiences in places such as sub-Saharan Africa. To advance more inclusive and contextually relevant forms of heritage interpretation, it is necessary to engage multiple ways of knowing and to foreground the narratives of local and Indigenous communities.



Figure 3. Topographic map showing major towns and rural areas in the region (Source: Nkunzi, 2023:49)

Integrating storytelling traditions, oral histories, and community voices into interpretive programmes not only strengthens visitors' emotional and ethical connections to place but also empowers host communities to define and communicate their own heritage. In this way, rethinking interpretation through pluralistic and decolonial lenses contributes to more equitable, culturally inclusive, and resilient forms of ecotourism (Clarke, 2014; Finegan, 2019).

METHODS

According to Visser (2015), research methodology refers to the steps a researcher must take in order to find the answer to their research problem. For this study, a quantitative research method was used. Quantitative research is defined as a study that employs mathematics-based approaches, specifically statistics, and numerical data to understand phenomena (Yilmaz, 2013). A structured survey was administered in-person to residents of Keiskammahoek (Figure 3 & 4) who had previously attended the KMAF (n=326). The questionnaires were distributed in a 5-kilometre radius around the town center, where the event was hosted using a convenience sampling method. Convenience sampling is the practice of gathering data from a research population that the researcher can easily contact (Rahi, 2017). Convenience sampling is relevant to practically any research because it essentially means that the researchers use a sample that is easily accessible and available (Golzar et al., 2022).

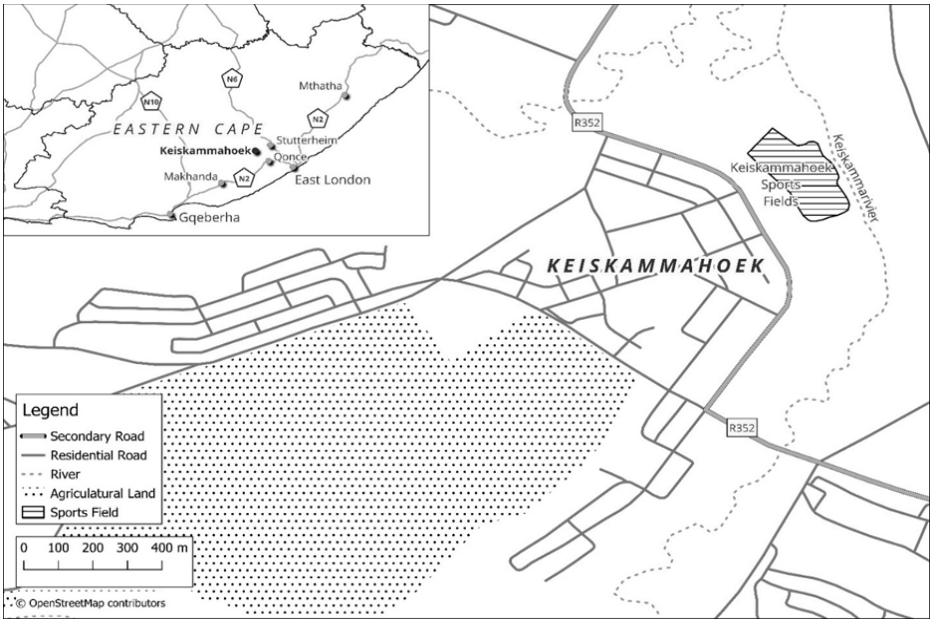


Figure 4. Festival location, Keiskammahoek Sports Field (Source: Nkunzi et al., 2025)

In relevance to this study, and to enhance comprehension of the festival's leveraging potential, the sample was limited to residents who had participated in the event during the previous three years. This made it possible to evaluate some of the socioeconomic factors related to the occurrence. The surveys were captured and analyzed using the IBM Statistical Package for Social Sciences [SPSS] program. Figure 5 below summarizes the research methodology process followed for this study.

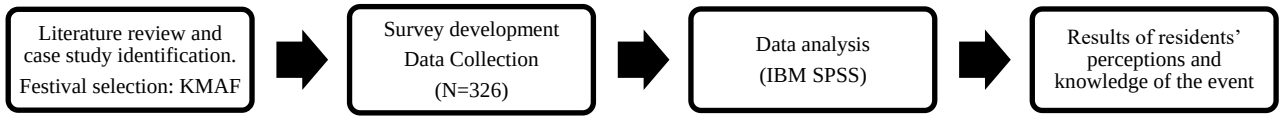


Figure 5. The methodology steps of the study (Source: Authors)

RESULTS AND DISCUSSIONS

Sociodemographic profiles of attendees

The demographic profiles of the respondents are shown in Table 1 below. For the most part, the respondents were relatively youthful in age, with a combined majority of them (86.5%) falling between the ages of 18 and 44 years. There was an equal split between the male (48.3%) and the female (48.3%) genders. Many of the respondents (75.7%) were in some form of employment, whether that be full-time, part-time or self-employed, resulting in varied income brackets per month.

Table 1. Demographic profiles of respondents (Source: Authors)

Characteristics	Category	Percentage of total (n=326)	Characteristics	Category	Percentage of total (n=326)
Age	18–24	17.5	Monthly income (In South African Rands)	No income	16.6
	25–34	35.3		1000–5000	19.3
	35–44	33.7		5001–10 000	14.1
	45–54	12.0		10001–15 000	18.7
	55–64	1.5		15 001–20 000	11.3
				20 001–25 000	5.8

				25 001 Prefer not to say (confidential)	2.8 11.4
Gender	Female Male Prefer not to say	48.3 48.3 3.4	Occupation	Full-time employed Part-time employed Student Self-employed Unemployed	46.8 17.5 13.8 11.4 10.5

Attendees' perceptions and knowledge of the festival

Source of information about the event

The respondents were asked where they found out about the festival, in an attempt to determine the most influential source of information. Table 2 below shows that the majority of the respondents (34%) were informed by family and friends. This is closely followed by those who were informed by electronic media (25.5%), work-related sources (16.3%) and radio and television (12.6%) respectively. These findings show the importance of family and friends as well as social media in marketing and raising awareness about the festival. In this regard, the festival organizers should capitalize on these platforms, especially social media to increase the attendee numbers, and leverage the opportunity to showcase their activities and those around the area. In terms of the frequency of attendance, Table 2 also shows that many of the respondents (44.5%) had been to the festival once before. Whilst there were some who were there for the first time during data collection (27.6%), there were a notable number (25.7%) who had been to the festival between 3 and 4 times. This suggests that the residents support and regularly attend the festival, and would thus have some insights as to the potential of the festival to be leveraged effectively for community development.

Table 2. Source of information about and frequency of attendance at KMAF (n=326, in %) (Source: Authors)

Made aware of the event by	Total (*n*=326, in %)	Frequency of event attendance	Total (*n*=326, in %)
Family/Friends	34.0	This will be my first time	27.6
Electronic media (e.g. social media)	25.5	Once before	44.5
Work-related/professional colleagues	16.3	3–4 times	25.7
Radio/Television	12.6	5–6 times	1.6
Travel agent	7.0	7–8 times	0.3
Print media (e.g. newspapers)	4.6	Over 8 times	0.3

Motivations for attending festival

Table 3 below presents findings in relation to the motivations that drive festival attendance at the KMAF. The respondents were asked to choose only their one most important motivation for attending the festival. The findings show that the most prominent motivations included the opportunity for family togetherness (12%), socializing (11%), the entertainment in the festival (9.2%), the festive atmosphere (8.9%), relaxation opportunities (8.6%) as well as business opportunities (8%).

There were other motivations indicated, but the most prominent ones are important for the linkage between the festival and community development of the rural area it is hosted in. For starters, the opportunity to provide opportunities for bonding with family, socializing and relaxation are important factors for the future of the festival. Nyikana & Tichaawa (2023) have emphasized the need to achieve memorable experiences in events in order to encourage repeat visitation and positive word-of-mouth. Likewise, the business opportunities it offers for residents is a key driver of festival leveraging, as underscored by Makhooane (2017). Any festival that includes opportunities for the locals to be involved, especially in terms of formal and informal businesses plays an important role in the local economy and its development (Nkunzi et al., 2025).

Table 3. Motivation to attend the event (*n*=326, in %) (Source: Authors)

Motivations	Total (*n*=326, in %)	Motivations	Total (*n*=326, in %)
Family togetherness	12.0	Educational purposes	5.8
Meeting people/socialising/networking	11.0	Understanding and learning about the KMAF	5.5
In-festival entertainment	9.2	Quality of the KMAF	5.2
Festive atmosphere	8.9	Promotions and giveaways	3.4
Relaxation/leisure	8.6	The event's location and area	2.8
Business opportunities	8.0	The overall cost	2.8
Build-up activities	7.4	Previous experience	2.8
Appreciation of arts festival	6.1	Weather	0.5

Table 4. Activities participated in, either in the area or near the event venue, either prior to, or after, the event (*n*=326, in %) (Source: Authors)

Activities	Total (*n*=326, in %)	Activities	Total (*n*=326, in %)
Night life	20.8	Entertainment	5.6
Visiting of friends and family	19.9	Culture and heritage	4.1
Shopping	10.5	Health	2.6
Food and beverages	10.2	Adventure	1.8
Sport	9.9	Trading	1.2
Visiting of natural attractions	6.1	Wildlife watching	0.6
Business	6.1	Medical	0.6

Other activities besides festival attendance

Table 4 below presents findings in relation to the activities that respondents participate in, before or after the festival, in the precinct of the festival. This is based on Jani & Mwakyusa's (2021) suggestion that festival organizers should make sure that the events and programs offered are engaging and are capable of increasing the festival's appeal and entertainment value for attendees. Doing this creates memorable experiences and guarantees high levels of overall satisfaction with the event (Nyikana & Tichaawa, 2023). The findings reveal that the most popular activities before or after the festival were nightlife (20.8%) and visiting friends and family (19.9%). Since the festival centers around an evening showcase featuring both local talent and renowned performers, a vibrant nightlife atmosphere was to be expected. Likewise, many attendees reported learning about the event through family and friends, and expressed that their motivation for attending stemmed from a desire for social connection and quality time with loved ones. Consequently, visiting friends and family emerged as a key activity surrounding the festival experience. Beyond the core entertainment and social dimensions of the festival, attendees also demonstrated notable intentions to engage in activities that contribute to local economic development. These included shopping (10.5%), consumption of food and beverages (10.2%), participation in sporting activities (9.9%), visits to nearby natural tourist attractions (6.1%), and business-related engagements (6.1%). Collectively, these behaviors represent significant avenues for economic stimulation and should be considered integral to strategic festival planning. By incorporating these consumption patterns into the broader management framework, organizers can enhance the festival's utility as a catalyst for local economic growth and optimize its impact across multiple sectors.

Future intentions and destination marketing implications

Makhooane (2017) asserts that a person's attitude acts as a conduit between their perceptions and their intended behaviour. For a better understanding of the residents' awareness of utilizing rural festival events for community benefit, it is imperative to analyze their attitudes and opinions of the KMAF in terms of several factors. As a result, this section describes how they viewed and understood the event. This was done through a five-point Likert scale of agreement ranging from Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree as seen in Table 5 below. Firstly, the study set out to find out if going to KMAF has encouraged additional people to visit Keiskammahoek. A vast majority of respondents (88.4%) agreed with the statement that attending KMAF had encouraged attendees to encourage others to visit Keiskammahoek. This finding was in line with prior suggestions from Lu et al. (2020) as well as Peterman et al. (2020) who argue that planning tourism-related events, such as rural festivals, could help communities establish a reputation as popular vacation destinations, which would then attract more tourists to the destination and its environs. The mean score of 4.21 and the standard deviation of 0.922 indicated that most respondents thought favourably of the statement. With regards to an intention to attend the festival again in future, an overwhelming majority of the respondents (84.6%) were definitely keen to do so, with a mean score of 4.12 and a standard deviation of 0.925. This was a similar trend regarding the festival influencing them to participate in other similar activities and festival events in the area (82.5%).

Table 5. Encouragement of attendance at the KMAF (*n*=326, in %) (Source: Authors) (Note: M = Mean; STD = Standard deviation)

Whether attendance at the KMAF had encouraged respondent to	**SD**	**D**	**N**	**A**	**SA**	**M**	**STD**
Motivate other people to visit Keiskammahoek	4.0	1.2	6.4	46.3	42.1	4.21	0.922
Return to the Keiskammahoek to participate in the event again	3.1	3.4	8.9	47.9	36.7	4.12	0.925
Participate in similar events around Keiskammahoek	5.2	4.9	7.4	49.4	33.1	4.00	1.036
Visit other rural areas near Keiskammahoek	6.4	6.7	11.3	47.7	27.9	3.84	1.104
Change/reinforce previous perceptions of Keiskammahoek	11.0	8.3	8.0	35.9	36.8	3.79	1.317
Keiskammahoek has been revealed by KMAF as an area that promotes …							
Friendliness	8.3	2.8	10.7	48.8	29.4	3.88	1.117
Being welcoming	2.8	2.5	7.4	53.3	34.0	4.13	0.863
Neighbouring attractions	3.4	8.9	9.2	44.8	33.7	3.97	1.045
Being safe	24.8	13.8	8.9	31.3	21.2	3.10	1.513
Having a rich heritage	21.5	10.4	12.6	23.9	31.6	3.34	1.536

Notably, the festival appears to have served as a catalyst for broader rural tourism, with a substantial proportion of respondents (75.6%) reporting that their attendance motivated them to explore additional rural areas surrounding the host location. This behavioral shift is further supported by the finding that 72.7% of participants experienced a positive change in their perception of the region following the event. These outcomes suggest a strengthening of the destination's brand image, underscoring the festival's potential to reshape visitor attitudes and stimulate dispersed economic activity—particularly significant given the rural context of the host area. In relation to the destination branding potential associated with the festival, a significant majority of respondents (78.2%) perceived the event as fostering a sense of friendliness within the area. According to Qu et al. (2011), the core functions of a destination brand are identification and distinctiveness, which encompass strategic efforts aimed at shaping perceptions that positively influence tourists' decision-making. The resulting brand image serves as a critical factor in this process, complementing other influential elements such as cognitive evaluations, historical and cultural landmarks, scenic beauty, and natural attractions—all of which may be leveraged in destination marketing strategies (Ferreira et al., 2022). Findings from this study further indicate that most participants viewed the area as welcoming (87.3%) and believed it effectively promoted nearby tourist attractions (78.5%). However, two key dimensions of destination branding emerged as areas of concern. A considerable proportion of respondents did not perceive the area as a safe destination (38.6%) or as one possessing a rich heritage legacy (31.9%). Given the centrality of safety and cultural heritage to effective destination marketing, these aspects warrant targeted attention in future branding initiatives.

DISCUSSION

This study critically analyzed the leveraging possibilities of a rural festival for sustainable community development in South Africa. This is on the basis of rural festivals being identified as presenting unique opportunities to serve as catalysts for community development in the country. They do this through the strategic harnessing of local cultural assets, traditions and social networks for broader community development. Our argument in this study lies in the fact that, when strategically planned and supported by relevant stakeholders, rural festivals can stimulate economic activities through tourism, and create employment opportunities, albeit temporary in nature. Most importantly, they can trigger a vibrant local economy through local entrepreneurial opportunities around crafts, food production and other hospitality-related sectors. In the context of the KMAF, where there are many social ills and challenges, the opportunities for entrepreneurship, and informal trading in particular becomes crucial in the planning and management of the festival going forward. This is linked to the optimization of the leveraging of the event for sustainable community development.

The KMAF draws many visitors to the local rural area and as such serves as an important drawcard for the redistribution of visitor flows away from urban centers. In turn, this can encourage investment in infrastructure and community services that will benefit residents and tourists alike. From the findings, it is clear that the festival is poised to play an instrumental role in showcasing indigenous knowledge systems if properly planned for which in turn will foster cultural pride and strengthen community identity. Key findings from this research show that the festival is well attended by young, employed people. They learn about the festival dates and activities through their friends and family as well as through electronic media sources like social media. They are motivated by the opportunities for family togetherness, socializing, relaxation and the festive atmosphere to attend the festival. In addition to this, they identify the business opportunities, education and broader appreciation of the arts festivals as being important drivers of attendance at the festival. Besides attending the festival, other activities of interest in the area include nightlife, visiting friends and relatives, shopping as well as food and beverages. There was also mention of attending sporting events, natural attractions, entertainment, business opportunities as well as culture and heritage as popular activities before or after the festival, strongly suggesting that the festival leads to broader tourism activities. The findings also point to a strong willingness to constantly return to the festival annually and to further recommend it to others. It also promotes surrounding rural areas as places to visit for tourists. However, there were slight concerns around the safety standards and the lack of rich heritage associated with the area being included in the planning and management of the festival. Based on the above findings and to ensure that the developmental impact of the festival is maximized, the KMAF should be integrated into broader local development plans and strategies which are supported by relevant stakeholder groups. In this way, local stakeholders such as residents, small businesses and other structures should be involved in planning and decision-making about the leveraging of the festival for community development. In this way, equitable access to opportunities can be emphasized, the festival's goals aligned with longer-term community development goals and ideals. An important aspect of this is also building capacity for local residents such that they are able to capitalize on the festival-related opportunities, especially for entrepreneurship.

All these will assist with the effective leveraging of the KMAF such that it becomes more than a celebratory event, but rather a dynamic vehicle for social cohesion, economic resilience and place-based development in rural areas.

CONCLUSIONS AND IMPLICATIONS

This study contributes to the expanding body of knowledge on rural festivals in South Africa, by moving away from conventional event leveraging studies, which have tended to be dominated by sport mega-events and festivalization within the urban setting. Therefore, by using the experiences of a rural festival held in a very impoverished location, the current study adds to the body of knowledge already available about events, festivals, and the leveraging of festivals.

Consequently, the empirical results of this study about the use of rural festival events for sustainable community development should aid in filling a vacuum in the literature on event studies. By grounding the study in the event leveraging and stakeholder theories, the research provides a robust framework for enhanced understanding of the impacts of festivals in rural contexts. The event leveraging theory, in the context of this study points to the need to strategically use the festival to generate long-term benefits for tourism, economic development and destination branding in the immediate event space and the surrounding rural areas. In this way, the festival contributes to increased rural visitor numbers, improved perceptions of the region amongst visitors as well as increased spending and engagement with local economic activities in Keiskammahoek. Collectively, these contribute to effective festival leveraging and sustained local economic growth and development. Similarly, based on the challenges identified, the stakeholder theory in the context of this study highlights the need to identify and align interests of the diverse stakeholders involved in, or are affected by the festival.

This includes the residents, the attendees, local formal and informal businesses as well as the event organisers and sponsors. Collaborative value-creation can yield positive returns in the endeavours to leverage the festival for broader community development, particularly through the integration of the motivations for attendance into event planning and management. These two theoretical lenses point out the festival's role in serving as a cultural experience and a strategic tool for inclusive and sustainable development of this rural area and others similar to it in nature.

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GASTRONOMY, MEMORY AND RESISTANCE: CULTURAL APPROACHES TO THE GENTRIFICATION OF TRADITIONAL PERUVIAN CUISINE

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Abstract: In recent decades, urban transformation processes driven by tourism development, market expansion, and cultural commodification have reshaped traditional food systems, particularly in countries where gastronomy constitutes a central component of national identity, such as Peru. While Peruvian cuisine has achieved notable international recognition, this visibility has simultaneously intensified dynamics of gastronomic gentrification that affect traditional culinary practices, local actors, and the symbolic meanings attached to food. Within this context, traditional gastronomy operates not only as a cultural expression, but also as a space of memory, identity construction, and resistance. The objective of this study is to examine the cultural impact of these transformations by analysing how traditional Peruvian cuisine functions as a field of collective memory and symbolic negotiation in scenarios marked by ethnographic capitalism and cultural displacement. To achieve this objective, the methodology adopted follows a qualitative approach grounded in cultural studies, using a phenomenological design that prioritises the lived experiences and interpretations of culinary actors directly involved in the preservation of ancestral food practices. Data were collected through semi structured interviews with fourteen chefs and gastronomy professionals selected through purposive sampling, and the information was analysed using thematic coding, triangulation, and qualitative analysis software to ensure interpretive rigor. The results indicate that traditional Peruvian cuisine exhibits considerable resilience despite market driven transformations and processes of gastronomic gentrification, as ancestral knowledge continues to be transmitted across generations, although frequently reinterpreted or symbolically negotiated in response to commercialisation, aestheticisation, and changing consumption patterns. At the same time, participants identified risks associated with cultural appropriation and symbolic displacement, particularly when traditional dishes are reformulated for external markets. In conclusion, the findings suggest that the gentrification of traditional cuisine in Peru should not be understood solely as a process of cultural erosion, but rather as a dynamic arena of negotiation and symbolic struggle in which culinary heritage is actively defended, re signified, and sustained, underscoring the importance of developing inclusive cultural, tourism, and heritage policies that recognise both preservation and transformation.

Keywords: Gentrification, ethnographic capitalism, displacement, traditional cuisine, Peru

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INTRODUCTION

In several cities, an urban transformation is evident that, far from benefiting residents, is causing their displacement. Upper- and middle-class sectors with purchasing power are occupying areas traditionally inhabited by the working class, making life in these neighborhoods more expensive and displacing native culinary traditions (Cordova-Buiza et al., 2025; Pérez-Gálvez et al., 2017). This phenomenon affects traditional cuisine, which, when replaced, loses its place and transforms eating habits (Rincón, 2018; Yeom & Mikelbank, 2019). The growth of tourism and state policies has had an impact on the displacement of residents, both internal and external, due to the demand for space and services in certain areas (Alkon et al., 2020; Lees, 2019; Nickayin et al., 2020). In the case of Latin America, gentrification has gained greater prominence in recent times. The arrival of migrants to Latin America is not alien to its history, beginning with the Spanish conquest, and continuing through various migratory movements in specific areas of the territory that influenced the history and current descent of Latin Americans (Joassart & Bosco, 2024).

Peru's migratory history began with the Spanish conquest, which marked the onset of a new sociocultural era. In 1849, the state enacted the "Chinese Law," which began the arrival and hiring of Chinese migrants as "coolies," or contract workers, to work in guano and cotton fields, among others, due to labour shortages (Reyes, 2014; Yuan, 2018).

During this period, the demand for cooks among the upper classes increased. It was in this context that Chinese migrants began to find new employment opportunities, adapting their traditional dishes to local ingredients. At the same time, the Peruvian population incorporated elements of Chinese cuisine based on the food prepared by these cooks.

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At the end of their labour contracts, a large portion of the now-free coolies sought to begin their economic independence by opening small restaurants, and the term "chifa" later emerged, of Cantonese origin, as a considerable number of the migrants belonged to this area (Lu, 2020; Palma, 2022; Vilchez, 2016). Then, Japanese migrants arrived, and with the Nikkei generations growing up in the country, the food of this social group began to gain more traction, combining ingredients as Peruvian as chili peppers with ingredients used in Japanese cuisine, such as raw fish and shellfish (Bonialian, 2015; Takenaka, 2019). Thus, migration did not hinder Peruvian culture but rather adapted to it without losing its natural essence and consequently forming new subcultures that were embraced and adopted by Peruvians (Blouin et al., 2021). Furthermore, the new residents did not attempt to dispossess or displace native residents but instead sought to inject themselves into their midst. Therefore, the question arises: how does cultural resistance to gentrification manifest itself in traditional Peruvian gastronomy and how do capitalism, ethnographic displacement, and traditional cuisine interrelate in the process. Building upon this context, the present study aims to analyze the scope of gentrification in traditional Peruvian gastronomy from a cultural perspective. Specifically, it explores this phenomenon through the analytical categories of ethnographic capitalism, symbolic displacement, and the transformation of traditional cuisine as a expression of cultural identity in 2025.

LITERATURE REVIEW

According to a previous study by Vázquez & Hernández (2020), they demonstrated that neighborhood transformation can be studied through eating habits and their changes, as well as the transformation in the image of traditional businesses. On the other hand, Stock & Schmiz (2019) concluded that entrepreneurs, migrants, and ethnic food merchants play an important role during gentrification by offering "new experiences" to middle- and upper-class residents through their food and culture.

Likewise, Bonotti & Barnhill (2022), Bourlessas et al. (2022) and Lütke & Jäger (2021) highlight that “gastrofication” was not the main factor driving gentrification, although they recognize the relevance of gastronomy once the gentrification process is already underway. Gastronomy plays an important role by contributing to the transformation and revaluation of urban areas, with the aim of attracting new residents and accelerating the displacement of traditional dynamics such as commerce, culinary practices, among others. Also, Claux (2025) pointed out that there is a separation between the characteristics of two areas, one where there is a touristification that protects the national culture, and the other where gastronomic gentrification appears. Likewise, Okumura et al. (2021) deduced that, although the ventures or "carretillas" as well as their gastronomic practices are part of the identity and pride of the Peruvian thanks to the "boom" of Peruvian cuisine, it is through the process of gentrification that these factors are "appropriated" by a superior and "dominant" class.

Finally, the study by Branca & Haller (2021) stated that there is a relationship between the location of the city in the Andes, with the idea of culture, nature and city customs being the drivers of touristification, a term used in this case for different reasons than gentrification. Various theories have been written in scientific literature about gentrification; a term associated with sociologist Ruth Glass since 1964. Gentrification is the displacement of the working class due to the arrival of an upper class. It is also the migration of wealthy homeowners to neighborhoods with lower purchasing power or lower property values, in both rural and urban areas (Cocola, 2023). In the economic sphere, tourism has established itself as the industry that has shown sustained growth rates globally (Cordova-Buiza et al., 2024). In response, various nations have transformed and reconfigured their territories with the goal of positioning themselves as recognized tourist destinations (Zegarra-Alva et al., 2024). Tourism is an activity in which the intervention of entities related to the subject, generally belonging to the state or regional governorates, can be observed. These entities seek ways to exploit the potential of their regions to guarantee income for the benefit of the community (Karagöz, 2023; Sequera & Nofri, 2018).

Migration, whether internal or external, is an important factor in gentrification, and, adding its relationship to tourism, the term "touristification" is born. This phenomenon is defined as the constant conversion of urban areas that may have potential for hosting tourism events or that could attract tourists (Parralejo & Díaz, 2021; Smigiel, 2024). Touristification is also referred to as tourist gentrification, as it constitutes the transformation of an area with lower- to middle-class residents into a private or exclusive sector, basing its "remodeling" on the construction of venues and corporations as tourist attractions (Gotham, 2005). Another factor linked to gentrification in recent years is gastronomy. While significant geographical change due to tourism has already been linked, gentrification also encompasses a cultural and lifestyle transformation of the place where it occurs. For this reason, gastronomy, being an important part of the cultural heritage of countries and specific areas within them, has been included as "Gastronomic Heritage" in United Nations Educational, Scientific and Cultural Organization list of Intangible Cultural Heritage (Romagnoli, 2019).

Based on this observation, there is an existing relationship between gastronomy and gentrification, hence the emergence of the term "gastrofication" or gastronomic gentrification (Anguelovski, 2016). Gastrofication is the conversion of traditional or affordable foods for the resident community of an area into haughty foods for these residents, who are mostly of middle or low socioeconomic levels, due to the “coolturization” of these foods (Sullivan, 2014).

Ethnographic capitalism

To discuss the reasons why gentrification may occur, it is important to consider capitalism as a factor that drives it in some way. First, capitalism can be defined as the ideology or force that drives humankind's desire to transform interrelationships into "transactions" in pursuit of diminishing basic human limitations. Capitalists are driven by how much they can maximize their capital, as the hierarchy among them is shaped by the money they control (Fiore & Plate, 2021).

Cedric Robinson's (2000) theory of Ethnographic Capitalism is the movement in which the existence of levels is observed in terms of existing ethnic groups and the economic gains or benefits that they can acquire, with the "white" groups being more valued and with a greater possibility of creating a greater purchasing power compared to minority groups, who have historically contributed to the aforementioned groups being able to climb socially and economically (Go,

2021; Robinson, 2000). Ethnographic capitalism is also linked to gentrification, as it is a cause of the latter. That is, it is not only the transformation of areas typically from lower to middle class, but also how groups considered superior benefit economically from neighborhoods or areas where ethnic minorities reside, increasing the cost of living there (Rucks, 2022).

Ethnographic displacement

Another theorization of gentrification is Kirkland's, which, like Robinson, mentions the ethnographic factor as an important part of the phenomenon in question. This highlights the lack of research regarding the importance of ethnicities or ancestries when it comes to displacement, including important issues such as the intensity with which different ethnographic groups are affected by the phenomenon or whether they can resist it in different ways. It is also mentioned how the displacement of the first residents in gentrified areas can be an extreme consequence, since there are groups that resist having to leave their homes because they cannot afford to remain there (Csurgó et al., 2025; Kirkland, 2008).

Traditional cuisine

A country's culinary heritage can also serve as a means of promoting the nation and its history to the world, thanks to the recent importance of regional gastronomy. For a country's residents, it represents an economic contribution, boosting local or rural businesses and increasing their production (Barro-Chale et al., 2023; Kruzmetra et al., 2018). Since gastronomy is an important part of the cultures of gentrified communities that needs to be protected, laws and regulations are being developed to ensure the preservation of these food elements. Residents of each country consider gastronomy an important symbol of their identity and nationality, and it also tells the story they have had throughout the years, contributing to the collection of historical relics. The World Trade Organization established Trade-Related Intellectual Property Rights (TRPRs), which, and related to the safeguarding of a country's gastronomic heritage, decreed the right belonging to different parties to officially brand a food product, beverage, or wine related to the geographic areas in which they are offered (Guerra-Fernández et al., 2023). This does not apply to traditional recipes, but rather to products that may have a history in each area but are unique to the merchants (Aouinaït et al., 2020; Gallagher & McKevitt, 2019).

Peru introduced Bill No. 3969, entitled “Law for the Promotion and Development of Peruvian Cuisine.” This bill sought to elevate Peruvian gastronomy as a historical component of the national and cultural identity of Peruvians, including techniques, places of origin, and key actors involved in the preparation of ancestral dishes of cultural value. It also highlighted the role of primary stakeholders such as farmers and traditional markets (Guía, 2019).

MATERIALS AND METHODS

This study adopted a qualitative approach grounded in cultural studies, aiming to interpret how traditional gastronomy functions as a symbolic field of memory and resistance within contexts of gentrification. Given the limited prior research on this phenomenon in Peru, an exploratory and interpretive strategy was employed to capture the lived experiences and culturally embedded meanings of culinary actors engaged in preserving ancestral food practices, which is used to address unknown problems or those with little prior knowledge, with the distinction that it does not involve a definitive search for the resolution of a hypothesis (Muurlink & Thomsen, 2024). A phenomenological design was implemented to explore how individuals engaged in traditional Peruvian cuisine experience, interpret, and resist the transformations brought about by gastronomic gentrification. This design allowed the researchers to prioritise participants’ subjective narratives and uncover the symbolic structures underpinning their culinary practices (Braun & Clarke, 2019).

The participants were selected through purposive, non-probabilistic sampling, prioritising individuals with experiential knowledge of traditional Peruvian cuisine and located in areas undergoing gastronomic transformation. Selection criteria included cultural relevance, professional expertise, and active involvement in preserving ancestral food practices within gentrified urban contexts (Golzar et al., 2022; Mortari, 2015). Interviews were conducted with 14 chefs (Table 1) who met the inclusion criteria, which included being of legal age and having knowledge of techniques and history in the gastronomic field. It should be noted that participants freely agreed to answer the questions in the context of their work activities. Interviews were used to obtain responses and information, as they offer an open and free conversation that allows experts in the field to share personal experiences more naturally (Korstjens & Moser, 2018). To ensure methodological credibility, the interview guide was reviewed by specialists in gastronomy and cultural studies. Rigor was addressed through strategies such as reflexive journaling, thematic triangulation, and member-checking to validate the cultural meanings expressed by participants. These procedures enhanced the trustworthiness and interpretive depth of the study (Hofseth, 2018).

Table 1. Study participants

Pseudonym	Modality	Pseudonym	Modality
E1 (man)	In-person	E8 (man)	Phone call
E2 (man)	In-person	E9 (man)	Phone call
E3 (woman)	In-person	E10 (woman)	In-person
E4 (woman)	In-person	E11 (man)	In-person
E5 (woman)	In-person	E12 (man)	In-person
E6 (woman)	Phone call	E13 (woman)	In-person
E7 (woman)	Phone call	E14 (woman)	In-person

For the selection of specialists to be interviewed, the first consideration was their residency in Peru, in addition to specific selection criteria, which will be detailed below. The first was the type of categorization they should have, relative to the main research topic. Therefore, chefs with extensive experience and knowledge of these topics, as well as professors

from gastronomy and culinary arts institutes and/or universities, were considered. Once the specialists who met the criteria were selected, the interview guide was developed, requesting each group of people to provide their impartial and experienced opinion on the selected topic, and then identifying the most important aspects required for the work. Finally, data coding and triangulation were employed, with strategic use of elements that could contrast the information collected during the research process (Chatzichristos, 2025). The research was conducted using data provided by the interviewees, which corroborated that most of the testimonies support the theory. Following the interviews, the information was transcribed using both the researcher's manual coding and the qualitative analysis software ATLAS.ti 23. Systematic text coding and categorization processes were carried out with internal homogeneity and external heterogeneity. Saturation criteria such as representativeness, density, and frequency were also used (Ahmed, 2024). After applying the criteria, codes were identified and analyzed for their meaning to ensure an accurate interpretation of the findings (Figure 1).

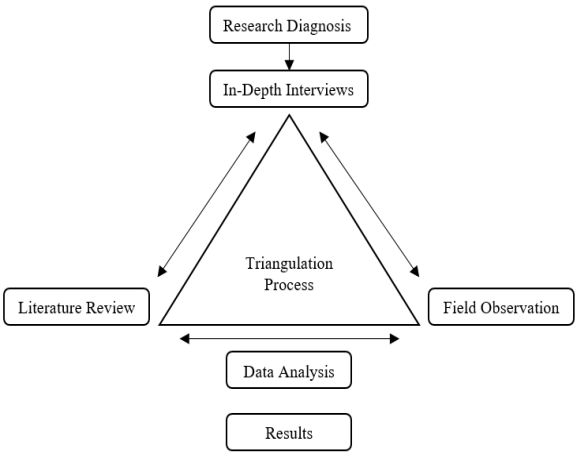


Figure 1. Qualitative analysis process

RESULTS

Ethnographic Capitalism

The interviewees agreed on the existence of social differences in the current Peruvian context, highlighting how these differences in social and economic aspects are most noticeable, both visually in the appearance of the different areas of the capital and interprovincially in comparison with Lima, as well as different characteristics of these. These differences become more palpable when they are shaped by the education given to different socioeconomic groups, as well as the job opportunities that may arise for them, and the image or appearance with which we present ourselves individually to society. These factors contribute to the perpetuation of the cycle of differentiation between social sectors over the years.

Historically, ethnic groups from low-income backgrounds have contributed gastronomically to the national culture through their recipes, which are based on ingredients that, in most cases, were leftovers from wealthier groups or foods that were affordable based on their incomes. Therefore, the working classes, without access to more expensive products, developed creative ways of cooking these ingredients, imbuing them with flavor and meaning. Thus, what began as a dietary necessity transformed into an expression of cultural identity (Table 2).

Table 2. Analysis – triangulation

Analysis - triangulation	Participant	Exemplary Quotes
Over the years, the differentiation between social sectors not only persists, but intensifies.	(E4)	"I feel that there is a noticeable socioeconomic gap across the country, both in terms of the Lima and provincial areas. There is a drastic difference between the economy in those sectors, and we can see that in Lima as well..."
The differences have been crucial in the transformation of this aspect in the country.	(E7)	"…some of the Peruvian dishes today are noted to have a root of resistance, of taking little and transforming it into something that is delicious and edible...and…Peruvian cuisine is very much about that, taking what there is and cooking it in a way that tastes delicious…"
The contributions of diverse ethnic groups were not isolated cultural expressions but rather formative influences in shaping Peru's plural gastronomic identity. The interweaving of Afro-Peruvian, Chinese, Japanese, and Andean culinary legacies has resulted in a cuisine characterized by syncretism, diversity, and historical depth.	(E2)	"…it prevails to this day as the method they learned to cook in their culture, so much so that we have chifas today, which are a mix of Asian food, right? With Peruvian food, and there comes the ethnic part, because it's a mix of cultures."
These recipes and preparation methods became part of Peru's culinary history, continuing through the transmission of this knowledge from generation to generation.	(E10)	"……well, Afro-Peruvian, Chinese, and Japanese influences have also enriched this cuisine, creating unique fusions."

Displacement ethnographic

Through these contributions, both dishes and ingredients native to the country gained national and international recognition. These elements may have been used more frequently in the past, but over the years and with the notable

disappearance of these social groups, their use has diminished. In recent years, various products have reappeared in the country's culinary landscape, becoming common even in cities where they are not native. Therefore, Peru's ethnographic and/or native groups influenced the formation of the country's cuisine and, consequently, its national culture. These groups contributed not only culinary practices and dishes but also transmitted cultural knowledge and belief systems that remain relevant today, bridging historical periods through ongoing practices and collective memory.

Although migration introduced new culinary techniques and ingredients, it did not erase indigenous gastronomic knowledge. Instead, the resilience of native traditions—shaped by historical marginalization and socioeconomic inequality—allowed these practices to coexist and adapt without losing their cultural essence. This nuanced interplay challenges simplistic views of cultural replacement and invites a more dialectical understanding of gastronomic hybridization (Table 3).

Table 3. Analysis – triangulation

Analysis - triangulation	Participant	Exemplary Quotes
This fostered the development of the culinary sector we know today, adding greater variety to the already extensive range of existing foods.	(E8)	"…they helped with the gastronomic transformation of already known dishes and brought to light some lesser-known ones and thus made them known, such as the use of cushuro…"
Native ethnic groups have managed to survive in today's cuisine, although not in their entirety, but by leaving a foundation upon which to work and implement new and diverse knowledge from areas outside the geographic context in which they are located.	(E9)	"…migration is important, of course, but for both the old and new generations, we must be clear that all the techniques, all the practices that are being carried out are the product of our foundations, our bases…"
These groups will maintain their place of origin, as well as their customs and recipes, thanks to the appreciation Peruvians place on everything native and unique to the country.	(E5)	"As human beings, we will always be very attached to our roots, to our culture, to the things we learned in our childhood, so regardless of where we go, we will always try to preserve our culture…"
Processes such as meat drying, underground cooking, utensils, and ingredients will continue to be used, as they can be passed down to new generations to maintain the essence of Peru's unique cuisine.	(E5)	"…to pass on the knowledge of our gastronomy and our culture to the next generations…"

The display of these products also highlights traditional farming methods and sustainable land care. These practices, often ancestral, reflect a respectful relationship between communities and their environment, promoting the conservation of knowledge and natural resources. Given this situation and the growing interest in Peruvian products, sustainable production options have been promoted, ensuring the preservation of the land and minimizing the use of tools or chemicals that could interfere with the long-term sustainable use of the country's soils and natural areas.

Traditional cuisine

Cooking and the mealtime that follows are considered key situations for conversation and bonding between people. At the same time, and considering a closer environment, it promotes better relationships between families by bringing them closer together, creating bonds of unity and linking these situations with pleasant emotions. Therefore, the traditions and emotional value of cuisine are considered an essential part of the perception of Peruvians and their nation.

Part of this sentimental value and the recent boom in Peruvian gastronomy have led every resident of the country to achieve a level of collective pride and satisfaction in the type of cuisine that sustains the culture.

By incorporating ingredients, ecological factors, and history, gastronomy not only embodies pride in the dishes itself, but also in what this country and the people who comprise it have to offer. These modifications to indigenous cuisine have generated negative consequences, such as the loss of traditional knowledge and the substitution of local ingredients, which affects the cultural identity of communities. New contexts and innovative procedures from other regions have caused ancestral tools to be displaced from everyday cooking, used in smaller quantities or only in the areas where they originated, thus losing the opportunity to promote the roots of our nation's gastronomy that make our culture unique (Table 4).

Table 4. Analysis – triangulation

Analysis - triangulation	Participant	Exemplary Quotes
Cooking can also be seen as a method of artistic and personal expression for each cook or chef. Ancient populations and ethnic groups expressed their social and geographical context in many of their dishes, using ingredients or procedures that varied across the different regions of Peru. Today, the country's chefs use cooking as a way to continue this legacy left by indigenous groups, utilizing new trends to update the presentation of various dishes.	(E1)	"…food is often associated with society because it helps us socialize. Food is involved at every social event, and I think that makes you quickly identify with what you see every day, and it also helps you interact with other people."
	(E4)	"…gastronomy…err…is the most important moment for a family. We start with the sentimental side. Gastronomy is where the whole family sits down to share moments, talk about their day…and…to share moments and memories with each other…"
New ingredients were added to the country's native ingredients tray, techniques from other regions, and methods or behaviors performed when eating food were established, causing new customs to join those already culturally and socially established.	(E10)	"…For example, the arrival of the Chinese and Japanese brought new techniques, right? Like the use of soy or ajinomoto, for example. Afro-Peruvians contributed dishes like carapulcra and anticucho. These changes have created a unique fusion that characterizes Peruvian cuisine."
The new approach to the culinary sector has influenced the transformation of traditional dish preparation. With an innovative vision focused on the way these dishes are	(E11).	"…more than anything with the new trends that are emerging, with molecular gastronomy, with...err...organic, so it seems that some recipes are changing…"

presented, the search for new ingredients that some stakeholders may consider higher quality is added. These dishes are presented in smaller quantities and in different ways than those already customary, intersecting with "taypá" food, a common way Peruvians serve their food in larger quantities, seeking to give greater emphasis to the flavor of the food rather than its aesthetics.		
Along with the above, the rise of national cuisine has managed to attract various people interested in Peruvian culture. At the same time, agents with different intentions seek to tarnish the country's prominence in this sector, demonstrating progress toward acquiring and appropriating the characteristics that constitute its gastronomic culture.	(E12).	"…we fight against the appropriation of other cultures because Peru, above all, has always been a victim of...now in these times when it is highly valued worldwide, there are countries that are implying that certain dishes or recipes are theirs and not Peruvian" (E9).

DISCUSSION

Based on the general objective, the results of the presented work show that participants are aware of the phenomenon established in the research. On the one hand, they affirm the existence of social differences in Peru today, which are evident in the differential lifestyles of its residents. These are affected at social and economic levels, and this persists over time. Furthermore, these factors determine the importance of different social groups in the country and the quality of the services they receive. According to Vázquez & Hernández (2020), who propose how the transformation of food forms is an example of the changes that can occur in specific geographic areas, food being an important factor with which the contextual progress of these sectors can be studied. The results obtained demonstrate that as a different migratory movement took position in Peru, the determining geographic areas in this process were transforming both culturally and spatially.

One of the elements that were affected was the cuisine, which was molded based on the incoming gastronomies of those who sought to remain with their residents. Consequently, Stock & Schmiz (2019) present research in which reference is made to how the national residents of the studied area try to adapt, in the same way, to these new customs and traditions inserted by migrant groups who contribute new ways of preparing food, which is reaffirmed by the results obtained.

It is important to highlight that the results coincide with what is stated in Robinson's (2000) theory of ethnographic capitalism, which mentions the gap between ancestral ethnic groups and recent populations, marked by cultural contrasts and socioeconomic inequalities, is a key factor in gentrification processes. These tensions are often reflected in the appropriation of traditional spaces, the displacement of indigenous communities, and the transformation of local practices.

Regarding the ethnographic capitalism subcategory of the scope of gentrification in traditional Peruvian gastronomy, the great socioeconomic differences that exist between ethnic groups and centralized social groups are demonstrated. These differences have been the cause of the country's culinary transformation throughout its history.

These ethnic groups, therefore, have suffered a great deficit in the quality of life and lifestyle, in contrast to the cultural importance they carry in their existence. While Stock & Schmiz (2019) describe the arrival of wealthier social groups as agents of gastronomic transformation, our study challenges the assumption that such transformations are passively accepted by local actors. Instead, the narratives reveal active processes of negotiation, preservation, and reinterpretation of culinary identity. This introduces a cultural resistance perspective absent in their analysis, suggesting that the effects of gentrification are not linear nor uniformly imposed, but are re-signified within local food systems.

With this, the results coincide with the research established by Lütke & Jäger (2021), who in turn mention gastronomy as an important part of gentrification between two distinct socioeconomic sectors.

It is worth mentioning that Robinson's (2000) theory of ethnographic capitalism coincides with the results of this specific objective. The theory presents the participation of capitalism in the gentrification process, which is the socioeconomic difference between upper-class sectors and ethnic groups or enslaved groups of lesser "importance," Who, in turn, were relocated to different geographical regions to be used as labour, often in conditions of exploitation and cultural uprooting.

The results reveal that national ethnic groups have played a fundamental role in shaping Peru's culinary identity. However, participants differed in how they interpreted the influence of migration and gentrification. While many viewed migratory contributions as enriching and complementary to local traditions, others—particularly chefs from regions more directly affected by urban redevelopment—expressed concern about the symbolic displacement of native dishes through commercial reinterpretations. Moreover, some younger chefs embraced fusion as a creative opportunity, whereas older culinary professionals emphasised the loss of ancestral knowledge and the erosion of cultural authenticity. These divergent perspectives highlight that experiences and responses to gastronomic gentrification are not uniform, but shaped by generational identity, regional context, and professional positioning. Such variations enrich the analysis by revealing internal contradictions and the coexistence of both adaptive and resistant discourses within the field of traditional cuisine.

This is why there is a coincidence with the study by Bonotti & Barnhill (2022), which proposes a change in the sociocultural environment of a region, based on the arrival of external groups who seek to implement their lifestyle through this transformation, even if this means interfering with that already established by the natives, who are harmed and sometimes eradicated. This is why the results also mention the insertion of migrant customs and cultures into the already established national one, with which there is a collaboration between these two, forming what is known as variety in national cuisine. On the other hand, Hernández & Vázquez (2023) demonstrated in their work how there can be differences in the gentrification process, which can constitute two different results depending on the approach given to it, one being positive in which the native gastronomic culture is exalted; and the second a negative result, in which the cuisine is completely transformed and loses its national focus. Here, a commonality emerges based on the results obtained, as

migration has had a positive impact on current national cuisine. These movements have succeeded in favoring native cuisine thanks to cooperation between these two groups, both of which have managed to adapt to one another without seeking to interfere based on any presumption of superiority that may exist between them.

According to Kirkland's (2008) gentrification theory shows important coincidences with what is presented in the results. According to Kirkland, the displacement of indigenous ethnic groups from the region can be an extreme consequence of not having mutual adaptation to the lifestyles and daily lives that exist among different social groups, in this specific case being ethnic groups and migratory movements. Likewise, the existence of resistance that can exist in native groups, despite the social, economic and cultural changes that may harm them and determine their stay in the territory.

Finally, in the traditional cuisine subcategory, the results established that the region's native and traditional cuisine plays a significant role in the daily lives of the country's inhabitants, even being an essential part of their recognition as residents of the nation. This characteristic, which gives cuisine a leading role, is due to various causes, one of which is the satisfaction provided by gastronomy as it emerges and stands out among the constant culinary competition around the world. In addition, national factors such as ingredients, products, agents, and geographic locations complement the importance given to the culinary aspect. Despite this correlation between belonging, identity, and cuisine, the agents involved in the culinary process of different dishes are left unprotected and undervalued by government and legislative sectors.

Therefore, the coincidence between the results and those granted in the work of Bourlessas et al. (2022), who concluded that the constant updating and modernization of regional and world cuisine can cause important changes in the customary cuisines in specific areas, since these transformations receive, in a certain way, the support of state sectors in search of "improving" the image that is given to these areas. The results show that ethnic groups, being legislatively unprotected, are at risk of being lost in time, since legislative sectors favor, with this absence, agents outside the area in which the former reside. Along with them, the cultural and culinary contributions inserted in the base of traditional cuisine would be lost.

Likewise, Consiglieri (2019) proposed in his research the existence of appropriation of traditions and elements native or social ethnicities, which are carried out because of the current boom and recognition that it brings to national cuisine. Therefore, the results confirm what was established in the previous research. With the constant growth in attention paid to traditional national cuisine, and the neglect that exists in an important cultural representation of the nation, it is prone to the usurpation of its customs and, consequently, of important parts of the national culture.

CONCLUSIONS

From a theoretical perspective, this research proposes expanding the traditional conceptual framework of gentrification by incorporating categories from cultural studies such as memory, identity, and resistance, from the perspective of ethnographic capitalism and symbolic displacement. This allows us to rethink urban gastronomy, especially traditional cuisine, not only as a cultural practice but also as a space where relations of power and inequality are manifested and negotiated. Thus, the theory is enriched by considering the symbolic and cultural dimension of displacement, providing new tools for analyzing how indigenous communities resist and reaffirm their culinary identity in the face of processes of urban transformation. In practice, the results highlight the risks posed by the folklorization and appropriation of traditional cuisine within gentrification processes, where commercialization can lead to cultural displacement and the loss of the culinary heritage of indigenous communities. This dynamic generates tensions between urban development and the preservation of culinary identities, affecting the intergenerational transmission of traditional knowledge and practices. The findings are especially relevant for tourism managers, urban planners, educators, and gastronomy professionals, who must consider these complexities when interacting with diverse urban contexts, where food culture becomes a field of dispute and symbolic negotiation.

The impact of gentrification on traditional Peruvian cuisine appears to be moderate, as evidenced by the continued presence and agency of ethnic and native groups within the national culinary landscape. Migration, far from erasing local traditions, has been interpreted by participants as a factor that enriches and elevates native cuisine, offering new perspectives that have contributed to the formation of a distinctive and culturally hybrid gastronomy.

Ethnographic capitalism has significantly influenced the historical trajectories of Peruvian cuisine. While indigenous groups established the foundational practices, it was through socioeconomic asymmetries—and their exploitation—that traditional dishes were simultaneously marginalized and revalorized. This paradox underscores how systems of inequality can commodify cultural expressions while rendering their original agents invisible. The displacement and arrival of migratory groups have generated changes and transformations in the traditional character of gastronomy, although these changes should not necessarily be understood as negative. The changes brought about by migration have led to new customs, ingredients, and traditions, which were adapted by Peruvian residents. Furthermore, the constant evolution of the national, regional, and global context has accelerated migration processes and the transformation of traditional cuisine. This is where the importance of traditional cuisine is evident, as it is considered an essential factor in determining the connection between Peru and each of its residents, shaping the emotions and feelings that can be created within each of its inhabitants.

Ethnographic capitalism has influenced the evolution of traditional Peruvian cuisine, intertwining it with socioeconomic differences and migratory flows. These changes should not be viewed negatively, but rather as part of an ongoing cultural transformation. Recognizing these dynamic processes is essential for responsible tourism and cultural heritage policies. Rather than promoting a static or romanticized version of gastronomy, stakeholders should support practices that preserve culinary authenticity without commodifying it, ensuring that traditional actors remain central in narratives of national identity. This will allow for more inclusive and sustainable tourism, aligned with local realities.

One of the main limitations of this study is the sample size. While it allowed for a detailed account of individual experiences, it limits the possibility of generalizing the findings to other contexts. It also limits the time and space for

conducting the interviews. Also, the results are based solely on Peru and may not be applicable to other contexts. For future research, we suggest expanding the sample to include different territories, including community members or participants with public positions. We also suggest incorporating mixed approaches to compare with statistical data and thus broaden the economic, symbolic, and cultural assessment.

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METHODOLOGY OF GEOSITES' TOURIST ASSESSMENT AND GEOTOURISM MAPPING (EXAMPLES OF ŠTIAVNICKÉ VRCHY, SLOVAKIA)

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Abstract: Štiavnické vrchy are a geomorphological region of Slovakia, the landscapes of which attract the attention of tourists. The main goal of the article is to apply a methodology for assessing the tourist attractiveness of geosites according to scientific, aesthetic, cultural-historical, socio-economic, ecological, safety values, based on the works of leading geomorphological scientists in Europe. Geosites with the most pronounced characteristics were selected as an example for each evaluation criterion, which differ significantly from objects that do not have such characteristics and influence the final assessment of the overall tourist attractiveness. The existing methodology has been supplemented with a criterion for the safety of tourists during hikes. Based on the obtained assessments of tourist attractiveness on the corresponding map geosites with high, medium and low tourist attractiveness were identified as the main result of the work and recommendations were given to improve this indicator for sites with low attractiveness through the organization of artificial attractive objects. Such activities include the organization of forest arboretums, various museums, gastronomic and equestrian tourism facilities. It is proposed to take morphometric indicators into account for the tourist assessment of geosites, as they determine the visibility, attractiveness, diversity and passability of the territory, as well as the microclimatic conditions of the area. It was concluded that further tourist development of sites with low tourist attractiveness depends on economically labor-intensive measures to clear and develop tourist trails, which are currently characterized by unsatisfactory conditions. However, the implementation of such actions will be useful in the long term and will ensure sustainable development of the territory. The study concludes that structured evaluation and thematic mapping can guide sustainable geotourism development. These findings can influence geotourism strategies in other regions.

Keywords: geosite assessment, geotourism mapping, Štiavnické vrchy, tourist value, GIS, Slovakia

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INTRODUCTION

A geosite is a specific location on Earth that holds significant geological or geomorphological interest, making it valuable for scientific study, education, or tourism. These sites have a rare and valuable geological, geomorphological, cultural-historical, and natural phenomenon or complication that has outstanding scientific, aesthetic, and cultural-historical value and, while having the appropriate interpretive tools and infrastructure, provides public visiting conditions for visitors (Prosser et al., 2018; UNESCO, 2023a; UNESCO, 2023b; Štrba et al., 2024; Carrión-Mero et al., 2024).

Štiavnické vrchy are a unique volcanic mountain range in the central part of Slovakia, which is rich in beautiful mountain peaks, deciduous forests, fresh lakes, hot springs, and architectural, archaeological, and cultural-historical sites. More than 150 geosites of geological, geomorphological, tectonic, stratigraphic, hydrogeological, petrological, and mineralogical profiles are located in an area of more than 600 km² in the territory of the Štiavnické vrchy. There are no studies on the geotourism assessment of geosites to date, despite their abundance in the Štiavnické vrchy, there is no ranking of these objects according to their attractiveness for tourist visits, and there are no cartographic materials with a geotourism focus. The scientific literature on the topic of geoheritage and geoconservation in the territory of the Banská Štiavnica Geopark contains data on the development and availability of georoutes (Palgutova et al., 2024). It raises issues of geoeducation of tourists by installing information panels on geotourist routes (Palgutova et al., 2023). Among the popular scientific literature on tourism in the study area we would like to highlight the book «Štiavnické vrchy» by Albert Kelemen (Kelemen, 1986) and the book «Štiavnické vrchy – Slovenské stredohorie» by Daniel Kollár (Kollár & Lacika, 2004), which in narrative form acquaint the reader with the natural wealth of the area and offer a variety of tourist routes of varying degrees of difficulty, describing the main attractions and providing scientific information on geological and geomorphological monuments in an accessible journalistic form. Employees of the Dionýz Štúr State Geological Institute published the book «Geotopes of the Banská Štiavnica geopark» in 2023, which contains information on 103 geosites of the Banská Štiavnica region, which extends beyond the Štiavnické vrchy. The geological component of the indicated geosites is well described in this book, however, in all sources of literature, both scientific and journalistic, there is no data on their geotourist assessment, and there are no cartographic materials. Nevertheless, the relevance of geotourism assessment always

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remains high, since this procedure is necessary not only to convey information to tourists about the most striking geosites of the territory but also for effective development and management, as well as for the protection of geological heritage (Suzuki & Takagi, 2018). The growing scientific interest in geoheritage has led to the development of numerous assessment methods.

According to Reynard (Reynard et al., 2007) most of them can be divided into several groups. Early assessment models favored the assessment of scientific values only (Grandgirard, 1999; Coratza & Giusti, 2005; Tessema et al., 2021; Mucivuna et al., 2022; Sutiksno et al., 2024). With the growing interest in geoheritage in scientific circles, socio-cultural attributes were also noticed, so later assessment models extended the assessment to other values in addition to the scientific category. They emphasize the need for protection and point out potential threats (Bruschi & Cendrero, 2005), evaluate socio-economic and geocultural values (Panizza, 2001; Migoń, 2024), management values (Pereira et al., 2007), quantitative (tourist and exploitation values) and qualitative criteria (Pralong, 2005), ecological (Bollati et al., 2015; Cocean & Cocean, 2017), Bussard & Giaccone, 2021) aesthetic (Ha & Yang, 2019; Le et al., 2019; Urbis et al., 2019), historical (Reynard, 2020; Kubalíková & Kirchner, 2016), cultural (Gordon, 2018a; Gordon, 2018b; Reynard & Giusti, 2018; Pijet-Migoń & Migoń, 2022), economic (Pérez-Álvarez et al., 2016) and other categories (Ivanović et al., 2023; Comănescu et al., 2025).

The purpose of this article is to assess the tourist attractiveness of geosites in the territory of the geomorphological region Štiavnické vrchy in Slovakia for such categories as scientific, aesthetic, cultural-historical, ecological, socio-economic, as well as from the point of view of the safety of tourists during hiking or travel. Each type of value will consist of certain evaluation categories, the compilation of which will be made based on the scientific works of leading geomorphologists in Europe. The evaluation category will be assigned a certain score through expert assessment depending on their severity.

As a result, each geosite will receive a total tourist attraction score as the arithmetic average for each category divided by the total number of values. In this article, for the most complete disclosure of the meanings of a particular value, 6 geosites with the most pronounced characteristics will be presented as an example. As a result, it is planned to compile a map of the general tourist assessment of geosites on the territory of Štiavnické vrchy, will allow identifying sites with varying degrees of tourist attractiveness. Such zoning will highlight the problem of a shortage of geological heritage objects in certain areas, which will encourage the search for possible alternatives to increase the overall tourist attractiveness of such territories by organizing artificial attractive objects. Here it should be understood that the creation of artificial attractive objects will not solve the problem of tourists' access to possible geosites, and therefore a further problem in the development of such territories is the arrangement of trails and the development of tourism infrastructure, which requires appropriate efforts on the part of local governments and European Union tourism development organizations. Ultimately, solving the identified problems will contribute to unlocking the tourism potential of geosites and the economic prosperity of the region.

STUDY AREA

The Štiavnické vrchy are a volcanic mountain range in southern central Slovakia, considered one of the most attractive in the country. They are part of the Inner Western Carpathians and the Slovenské stredohorie.



Figure 1. Location of Štiavnické vrchy on the territory of Slovakia (A) and their geomorphological zoning (B) (Source: Zhyrnov, 2024)

The area belongs to Štiavnické vrchy Protected Landscape Area. They are bordered by the Kremnické vrchy in the north, Pliešovce and Krupinská kotlina in the east, Podunajská pahorkatina in the south, and Pohronský Inovec, Vtáčnik and Žiarska kotlina in the west (Kollár & Lacika, 2004). Štiavnické vrchy are divided into ten geomorphological regions: Breznické podolie, Hodrušská hornatina, Kozmálovské vŕšky, Prenčovská kotlina, Sitnianske predhorie, Sitno, Skalka, Slovenská brána, Vyhnianska brázda and Štiavnická brázda (Figure 1) (Mazúr et al., 1986).

The highest part of the Štiavnické vrchy is Sitnianska vrchovina with the highest peak Sitno, (1009 m) which protrudes impressively above the outskirts of the mountain range and from which magnificent distances are visible. It is a conspicuous mountain towering above the surrounding landscape which offers a panoramic view of wide environs. The Sitno mountain is the product of the lava flow. Its top plateau is delimited by rock faces in places 80 m tall. It is a subject of many legends and folk tales. Perhaps the most popular legend is that its entrails shelter the Knights of Sitno (Kollár & Lacika, 2004).

The lower part of the Sitnianska vrchovina Upland is dissected into the system of parallel ridges and valleys oriented in the direction of the meridian. The ridges are long and flat. Isolated elevations protrude from a comparatively large plateau. The tallest of them (the Holík mountain – 784 m) exceeds 700 m above sea level.

The valley is also long and not too branched. Most of them proceed as far as the edge of the mountain range and continue as a parallel valley network of the Ipel'ská pahorkatina hillland. The largest valley created by the Štiavnica brook in the vicinity of Prenčov widens into the small Prenčovská kotlina basin. The massif of Sitno falls abruptly to the Štiavnicka brázda furrow, which is the largest depression in the Štiavnické vrchy. The wide depression stretches into the place where the central crater of the Štiavnica stratovolcano once existed. The depression is linked to softer rocks, which are more prone to erosion than the harder vulcanite. The surface of the Štiavnická brázda furrow is broken into tiny hills which are the heaps of dead, remains of the past intensive mining in wider environs of the town Banská Štiavnica.

A conspicuous dominant of the furrow is the cone-shaped mountain of Kalvária (749 m) which was old-modelled by preparation of the volcanic chimney of an extinct volcano subsequently filled by the hardened basalt lava. A similar basalt form also exists in the locality of Kysihýbel (Kollár & Lacika, 2004).

The most dissected relief is that of the Hodrušská hornatina highland, which occupies the western part of the Štiavnické vrchy. Its forms are varied due to a comparatively large altitude difference between the deep incised valleys and high ridges. The elongated ridge west of Banská Štiavnica is the tallest and most attractive for hikers. Two grassy tops dominate in this ridge: Paradajs (839 m) and Tanád (839 m). They are also visited for the nice panoramic view they offer. The elongated ridge has two parallel side ridges which separate a system of deep valleys. The northernmost of the trio of large valleys in the central part of the Hodrušská hornatina highland is the valley of Teplá with interesting rock forms. The spa village of Sklené Teplice displays some travertine forms linked to the local fairly hot thermal springs. The rocks that exist here on a volcanic substrate also occur in the locality Kamenný Jarok. The best known of them is the Szabóova skala rock which stands as a "sentry" at the entrance to the valley. In the west of the valley of the Teplá River is the ridge with the dominant Zlatý vrch (850 m) also known as Kolberg. On the opposite side of this ridge, the slopes abruptly fall to the deep Vyhnianska dolina valley. Interesting geomorphologic features are concentrated in the environs of the old mining village Vyhne. The Vyhniansky travertine, for instance, is right in the village. It is the travertine hillock standing next to the spring of much mineralized water which oozes here from the not volcanic substrate. On the opposite side of the valley is the Kamenné more (The Stone Sea) consisting of a large number of rhyolite stone blocks. With its area of 13 hectares, it is the largest of its kind in the territory of the volcanic Carpathians (Kollár & Lacika, 2004).

South of the Vyhnianska Dolina valley is the mountain ridge culminating in the Banský vrch (866 m.) also called Kerling. Below it, in the south is the Hodrušská dolina valley, which is dotted by traces of mining activity carried out here in the past. Houses of a couple of mining villages. Dolné Hámre and Banská Hodruša, now joined into one – Hodruša-Hámre, stand along the whole valley. South of the village is a comparatively straight ridge with the tallest mountain of Baňa (760 m) which separates the Hodrušská and Richňavská dolina valleys. The shape of the southern part of the Hodrušská hornatina highland is that of a long ridge with mountains that do not exceed a sea level altitude of 700 m. The south-western end of the Hodrušská hornatina highland is the Slovenská brána gate where the Hron River leaves the Carpathian Mountains behind and enters the Podunajská nížina lowland. The Skalka is another, though lower and less dissected elongated ridge along the eastern edge of the Štiavnické vrchy mountains. In the north, the ridge forms a comparatively narrow mountain barrier between the deep Kozelnícka dolina valley in the west and the Pliešovská kotlina basin in the east. In the central part the erosive Studenská (Kolpašská) kotlina basin with the village of Banský Studenec and a couple of the Studenské jazerá lakes, interrupts the compactness of the Skalka. North-west of lakes towers the tallest mountain of this part of the ridge, the Skalka mountain (882 m) (Kollár & Lacika, 2004).

However, Štiavnické vrchy are rich not only in geological and geomorphological monuments. Here are the cleanest fresh lakes called tajchy. Tajchy are artificial water reservoirs in the Štiavnické vrchy. Most of them were built to provide energy for the silver mines of Banská Štiavnica in the 18th century. At their height, tajchy comprised a sophisticated system of 60 reservoirs, connected by more than 100 km of channels and tunnels. 24 artificial lakes still exist and serve recreational purposes. Because of their historical value, tajchy was proclaimed by UNESCO to be a World Heritage Site on 11 December 1993, together with the city of Banská Štiavnica and technical historical monuments in its surroundings. Among the most touristically attractive and large tajchy (tajchs) we can highlight Jazero Počúvadlo-Počúvadlo lake (Figure 2) Veľká Richňavská nádrž, Kolpašsky tajch in Banský Studenec, Hodrušky dolny tajch in Hodruša-Hámre, Veľký Vindšachtský tajch in Štiavnické Baňe, Rozgrund tajch in Banská Štiavnica, Bakomi tajch in Štiavnické Baňe, Beliansky tajch in Banská Belá. Hot springs and the unique Parenica cave are located in the resort village of Sklené Teplice, which is used for medicinal and recreational purposes (Kelemen, 1986).



Figure 2. Počúvadlo lake (Source: Authors fieldwork, 2024)

Among the attractive archaeological and architectural sites of Štiavnické vrchy it is worth highlighting námestie Svätej trojice, Starý and Nový zámok, Kalvária, hrad Glanzenberg, Žakýlsky hrad, Breznica hrad, kostol svätej Kataríny, hrad Marcus, hrad Sitno, kaštieľ Svätý Anton, Šášovský hrad etc. (Kollár & Lacika, 2004). Thus, the Štiavnické vrchy are a very attractive tourist area (the area is a strong tourist destination according general tourism-geography framing (Ionescu et al., 2017). They have a complex geomorphological and geological structure, and therefore are characterized by significant geodiversity and the presence of many geosites, the tourist assessment of which we will begin in this article.

METHODOLOGY OF THE WORK

The methodological part of the work on the tourist assessment of geosites in the territory of the Štiavnické vrchy consisted of three stages: preparatory, field, and office (Bilgiç et al., 2024; Zorlu et al., 2024; Li, 2025; Pál et al., 2025; Ghermandi, 2022; Wróżyński et al., 2024; Arnon et al., 2023; Li et al., 2024; Vandelli et al., 2024; Kubalíková et al., 2024; Olteanu et al., 2024; Cirillo et al., 2024; Lawrence, 2014). Specialized literature and tourist maps were analyzed in the preparatory stage. Field routes and preliminary overview of geosites during their passage were planned based on guidebooks by Albert Kelemen "Štiavnické vrchy" (Kelemen, 1986) Daniel Kollár, Ján Lacika "The Štiavnické vrchy Mts." (Kollár & Lacika, 2004) and a specialized publication of the Dionýz Štúr State Geological Institute edited by RNDr. Vlastimil Konečný, CSc. Ing. Patrik Pachinger "Geotopes of the Banská Štiavnica geopark: volcanism and structure of the territory" (Konečný & Pachinger, 2023). The tourist map “Štiavnické vrchy”, 8th edition, scale 1:50,000 from VKÚ Harmanec (Mozolová, 2021) was also preliminarily studied. This map was subsequently scanned and used as a basis for digitizing the network of footpaths, cycle routes, roads, railways, hydrographic networks, and tourist infrastructure.

It should be noted that the number of geosites in the books and maps mentioned was smaller than those subsequently described and evaluated by the authors of this article during field research. The Mapy.cz program was also pre-installed on the smartphone, and a tourist map of the Štiavnické vrchy area was downloaded to enable offline operation.

All tourist routes were completed using this computer application. When a specific geosite was described, a location save mark was placed, which later made it possible to transfer all geosites saved in this way to cartographic material in the form of point objects. A paper evaluation journal for each geosite was also created at the preliminary stage, where evaluation scales were indicated for each evaluation category for expert evaluation.

The field stage included the direct passage of the routes described in the above-mentioned literature with the navigation program "Mapy.cz". 153 geosites were marked and described in this way during field research, which was marked with the "Save location" option in the "Mapy.cz" program. Each geosite was assigned a serial number and a corresponding name. Next, a direct expert tourist assessment of geosites was carried out according to 6 assessment categories: scientific, aesthetic, cultural-historical, ecological, socio-economic, and also a safety category. Each category consists of a certain number of evaluation criteria, which, depending on the degree of expression, were assessed with points from 0 to 1, where 0 reflects the complete absence of a certain characteristic, and 1 – the most pronounced characteristic of the criterion. The

final score for each criterion of a particular category was calculated as the arithmetic mean of the sum of all criteria divided by their number. The authors of this article acted as expert evaluators, provided that each assessment was given independently by each author without discussing personal preferences, thus, a certain reduction in the level of subjective attitude in the assessment of a particular geosite was achieved.

The first evaluation category used in the tourist evaluation of geosites was the scientific category. The scientific category plays a key role in the tourist assessment of geosites. Based on the fundamental recreational-and-aesthetical geomorphological research (Coratza & Giusti, 2005; Pralong, 2005; Pereira et al., 2007; Reynard et al., 2007; Rybár, 2010; Kubalíková, 2013) the conclusion can be made that scientific category of relief assessment can be formulated as follows:

1) Paleogeographical value (importance of the geosites for the Earth's history);
2) Representativeness (geosites' exemplarity);
3) Rareness (rarity of the geosite concerning a reference space);
4) Integrity (state of conservation of the geosite);
5) Diversity (number of different partial features and processes within the geosite).

We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This was the Glanzenberg peak in the vicinity of Banská Štiavnica.

The aesthetic category of geosites is the most important stage of tourist assessment. According to the last research (Likhacheva & Timofeev, 2002; Kubalíková, 2013; Štrba, 2015) aesthetical assessment of the geosites as a natural object consists of such criteria:

1) Uniqueness of geosites: a) by the genesis; b) by the form and geographical location;
2) Uniqueness of geosites' surface appearance: a) dissimilarity on anything (fantastic plot); b) similarity to biological and architectural objects;
3) Architectonic and composition of geosites;
4) Visibility: a) outside view; b) visual exposure of the geosites from the object;
5) Exoticism (contrast degree);
6) Expressiveness (expressiveness degree of geosites);
7) Attendant effects: a) sounds – quiet (noise of waterfall, surf, echo…) b) warmth – coolness; c) brightness; d) color; e) illumination (at sunrise, sunset, by the light of the moon…);
8) Compatibility – combination with other elements of a landscape: with flora, fauna, hydrological objects, architectural objects;
9) Photogenicy (the favorite object of painters, and photographers);
10) Emotional perception: a) admiring; b) worship; c) feeling of privacy; d) feeling merge to nature.

We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This is what happened to the Tanád peak in the vicinity of Banská Štiavnica city.

The cultural-historical category depends on an art event or a cultural custom about geosites. Based on the research conducted (Pralong, 2005) cultural-historical significance includes such criteria:

1) Cultural and historical customs (depends on the symbolic relevance and heritage weight of the geosite for a community, this criterion is defined by the cultural and historical customs without taking into account physical vestiges or buildings);
2) Iconographic presentation (all historical pictures of the geosite are counted (painting, drawing, engraving, photography);
3) Historical and archaeological relevance (defined by the presence end relevance of historical, architectural, and (or) archaeological vestiges and buildings on the geosite);
4) Religious and metaphysical relevance (defined by the religious and metaphysical relevance related to the site, this criterion induces popular beliefs);
5) Art and cultural events (art and cultural events concerning the geosite are considered).

We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This became the peak of Kalvária within the city of Banská Štiavnica.

The ecological category includes the following criteria (Andreychuk 2007, Trofimova 2012, Popescu, 2009):

1) Anthropogenic variation of the relief;
2) Anthropogenic garbage;
3) Graphic inscriptions on the surface of the relief form.

This is one of the categories where the criteria were evaluated in reverse order. For example, the complete absence of a characteristic was evaluated at 1 point, while a pronounced value was evaluated at 0 points. We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This is what the Peklo cave in the landscape park of the palace within the village of Svätý Anton became.

The socio-economic category is based on the usable and workable characteristics of geosites (e.g. in a tourist and recreational context). The following criteria (Pralong, 2005) are distinguished here:

1) Accessibility (depends on the distance of the geosite from means of transportation and their relevance, in case of accessibility by cable car or train, the scale must be adapted);
2) Annual number of visitors in the region (the theoretical visitor potential of the geosite is taken into account by the annual number of visitors of the biggest resort in the region, the given score is identical for geosites of the same region);
3) Official level of protection (the official level of protection of the geosite, for this criterion, the economic exploitation is seen as inversely proportional to the limiting characteristic of the protection level);
4) Attraction (the absence of protection may be a tourist and economic disadvantage for geosite exploitation in terms of attraction of visitors from various origins).

We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This is what the Parenica cave in the geothermal springs area within the village of Sklené Teplice has become.

Mountain landscapes are characterized by the streaming of different dangerous natural processes that are the reasons for accidents during excursions or campaigns. We assume that the following criteria are important from the standpoint of safety of stay and tourist activity of a person (Zhyrnov, 2015):

1) Availability of process (the presence of one or more processes that pose a danger to tourists);
2) Process intensity (rapidity and variability of the dynamics of the process for a certain unit of time);
3) Frequency of occurrence (number of repetitions of a process per unit of time);
4) The coverage area of the total area of the geosite (expressed as a percentage);
5) The degree of possible danger to human health and life (from mild symptoms to death).

This is also one of the categories where the criteria were rated in reverse order. The absence of a characteristic was rated at 1 point, while a pronounced value was rated at 0 points. We decided to evaluate this category to reveal its meanings using the example of a geosite with the most pronounced criteria. This is what the Kamenné more object within the village of Vyhne became. Various methodologies were considered for calculating the overall tourism score (Comănescu et al., 2025) but it was finally decided to use the formula proposed by Swiss geomorphologist Jean-Pierre Pralong (Pralong, 2005, p. 194) which is slightly modified by the authors of the article, since it includes ecological and safety values:

$$Vtour = \frac{Vsci + Vaes + Vcult + Veco + Vsec + Vsaf}{6}$$

Where *Vtour* – the general tourist assessment of the geosite; *Vsci* – the value of the geosite's scientific category; *Vaes* – the value of the geosite's aesthetic category; *Vcult* – the value of the geosite's cultural-historic category; *Veco* – the value of the geosite's ecological category; V*sec* – the value of the geosite's socio-economic category*; Vsaf* – assessment of geosite from the point of safety. No specific weighting factors are introduced because there is no objective reason to believe that one value is less important than another when we need to determine the overall tourism value of the geosite (Pralong, 2005).

The office stage of the study involved computer processing of the results: the saved geosite locations using the Mapy.cz application in the form of GPX files were transferred to a cartographic base and transformed into point shapefiles using the Conversion panel in the ArcGIS ArcMap 10.0 geographic information system. The attribute table of the data of the specified shapefile contained the calculated values of the overall tourist assessment of each geosite from each expert assessor. The final value of the tourist assessment of the geosite was recorded as the arithmetic mean of the 3 final assessments obtained by experts during the field stage of the study. The final product of the office stage was 3 maps that can be used by consumers for tourism purposes. The first is a map of the general tourist assessment of geosites of the Štiavnické vrchy territory at a scale of 1:25,000, the second is a map of the density of geosites at a scale of 1:50,000, superimposed on a map of the geomorphological zoning of the Štiavnické Vrchy, and the third is a map of the number of geosites at a scale of 1:50,000 per unit area. A fixed unit area was chosen for the first and third maps, which was ¼ square kilometer.

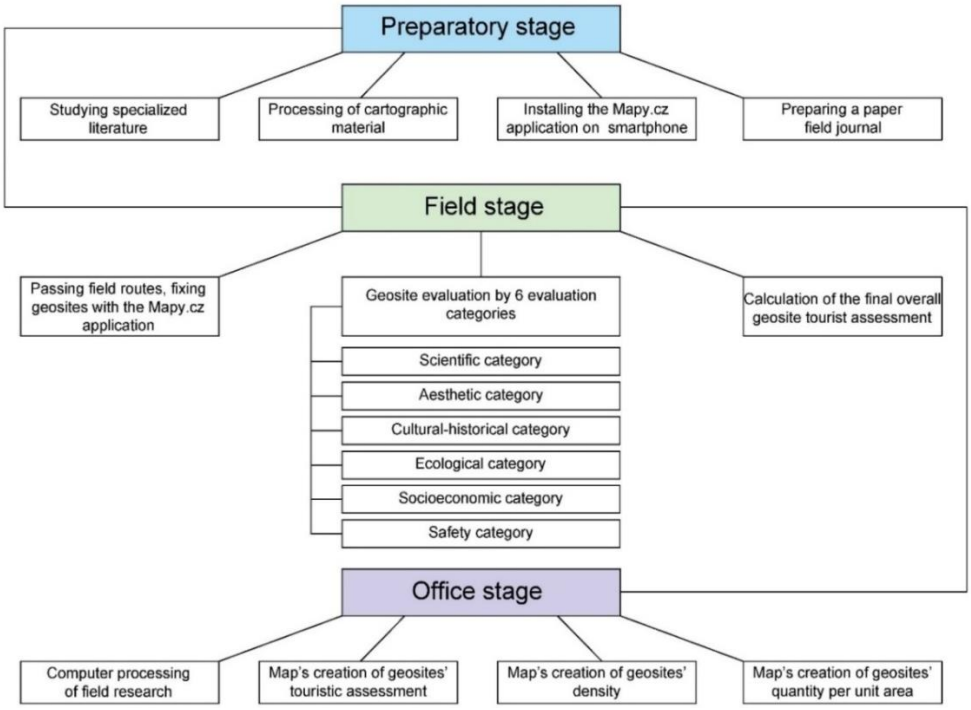


Figure 3. Methodology of current research (Source: Zhyrnov, 2024)

The average value of the tourist assessment of geosites was calculated for each square of the corresponding area in the first case, which fell within the given square, in the second case the number of geosites within the known area was calculated. The Zonal Statistics tool in the Spatial Analyst dashboard of ArcGIS ArcMap 10.0 software was used in both

cases. The final tourist assessment of the geosites of the Štiavnické vrchy area was divided into three categories: for sites with a low attractiveness value, a threshold with values up to 0.50 was recognized, sites of average attractiveness occupied a niche from 0.51 to 0.60, and highly attractive sites were recognized as those that received a rating of 0.61 and higher. It should be noted that the map of tourist assessment of geosites was supplemented with a diagram of the attractiveness values of each geosite, which was created in the Microsoft Excel program, and a table of tourist infrastructure that exists in the key settlements of the Štiavnické vrchy. Information on tourist infrastructure was taken from the tourist map "Štiavnické vrchy", 8th edition from VKÚ Harmanec, and is presented in a short tabular form. Additionally, a geosite density map was compiled using the Kernel density tool of the Spatial Analyst analytical panel, where areas of low, moderate, high, very high, and abundant geosite density were identified (Figure 4).

RESULTS

Let us evaluate some geosites based on the above methodology with certain most pronounced characteristics, which differ significantly from objects that do not have such characteristics and which significantly affect the final tourist assessment of geosites. The first examples of tourist assessment are the geosites "Glanzenberg", "Tanád" and "Kalvária vrch" (Figure 4). (Štrba et al., 2024; Palgutová et al., 2024)



Figure 4. Location (A) and appearance of mountain peaks (B – Glanzenberg; C – Tanád; D – Kalvária) in the area of Banská Štiavnica (Source: Zhyrnov, 2024)

Glanzenberg is a peak in the central part of Štiavnické vrchy, southeast of the Červená studňa saddle. The northern spurs of Banská Štiavnica rise along its steep south-eastern and south-western slopes. This mountain is crossed by rich ore veins Špitáler, Bieber, and Terézia. The gold and silver veins of Špitáler were mined by the Celts as early as the 3rd century BC – 2nd century AD, which represents the oldest open-pit mining in Štiavnické vrchy. The area was settled by miners at the turn of the 12th and 13th centuries, and a castle (Baňa) was built here in the 13th century to protect the town below the summit.

The settlement disappeared in the 17th century. The earthen rampart and fortress wall remain on the top, which was replanted with forest in the 20th century. The importance of fortification is also important according works of (Popescu, 2014). Archaeological research is being carried out here. Archaeological survey work has contributed significantly to understanding the history of the Baňa settlement and the castle on Glanzenberg (12^{th} -16^{th} centuries). The first excavations took place here in 1902 and 1903, and the next from 1931 to 1934. In 1956, Belo Polla of the Archaeological Institute of the Slovak Academy of Science examined the locality for two months. Among other things, he found a precious iron door with stone doorjambs.

Since 1981, the archaeological survey of Glanzenberg has been carried out by Jozef Labuda of the Slovak Mining Museum. He uncovered the remains of the castle, fortifications consisting of stone walls and "circumvallation" (defensive earthworks), residential houses, a water tank, the castle chapel, and various facilities for mining and ore processing-related activities. A panoramic view of the surroundings of Banská Štiavnica opens from the top after removing the forest (www4).

It becomes clear from the above that Glanzenberg Peak has a historical and archaeological past and present, and therefore the scientific characteristics of this peak have a pronounced background (Table 1). The arithmetic average of the scientific category for the Glanzenberg Peak is 0.75, which classifies it as a geosite with a high score for scientific significance.

Table 1. Criteria and scale of scoring used to assess the scientific category, example of the geosite "Glanzenberg" (Likhacheva & Timofeev, 2002, Pralong, 2005; Pereira et al., 2007)

Score / Criteria	0	0.25	0.5	0.75	1.0
Scientific 1: Paleogeographical value	–	low	moderate	High	very high
Scientific 2: Representativeness	–	low	moderate	High	very high
Scientific 3: Rareness	> 7	5 - 7	3 - 4	1 – 2	unique
Scientific 4: Integrity	destroyed	Strongly deteriorated	Moderately deteriorated	Weakly deteriorated	intact
Scientific 5: Diversity	1	2	3	4	≥ 5

Tanád (938.8 m above sea level) is the fourth-highest peak in Štiavnické vrchy. It is located approximately 2 km southwest of the center of Banská Štiavnica in the central part of the mountain range, on the eastern edge of the geomorphological region Hodrušská hornatina. The peak belongs to the protected landscape area «Štiavnické vrchy». From Tanád there are beautiful views of the nearby peaks – Paradajs (939 m), Cukmantel (855 m), Hadová (852 m), Kamenný závoz (768 m), Kanderka (862 m), Sitno (1,009 m), Vtáčnik (800 m) and Anderloch (810 m). Also visible are Pohronský Inovec, Vtáčnik, Malá Fatra, Kremnické vrchy, Nízke Tatry, Poľana, and Javorie in favorable weather conditions, as well as the south-eastward mountains of northern Hungary. The color scheme of the visible landscape is successfully complemented by the blue of mountain peaks, the green of deciduous forests, and the blue and white of the sky (www5).

Tanád is one of the mountain peaks with pronounced aesthetic characteristics and is one of the most visited places by travelers due to the wonderful views that open before the eyes of tourists (Table 2). The arithmetic average of the aesthetic category for the Tanád peak is 0.83, which classifies it as a geosite with a high score for aesthetic value.

Table 2. Criteria and scale of scoring used to assess the aesthetic category on the example of the geosite "Tanád" (Likhacheva & Timofeev, 2002; Kubalíková, 2013; Štrba et al., 2014)

Score / Criteria	0	0.25	0.5	0.75	1.0
Aesthetic 1: Uniqueness of landforms	non-unique	low	moderate	high	very high
Aesthetic 2: Uniqueness of landform surface appearance	non-unique	low severity	moderate severity	high severity	very high severity
Aesthetic 3: Architectonic and composition of landforms	–	low artistic	moderate artistic	highly artistic	ideal
Aesthetic 4: Visibility	–	limited	moderate	wide	exceptional
Aesthetic 5: Exoticism	not exotic	low	moderate	high	unique
Aesthetic 6: Expressiveness	not expressed	mild	moderate	pronounced	grandiose
Aesthetic 7: Attendant effects	–	barely noticeable	light background	tangible	contrasting
Aesthetic 8: Compatibility	incompatible	Slight compatibility	moderate compatibility	good compatibility	perfect compatibility
Aesthetic 9: Photogenicity	–	weak	moderate	good	ideal
Aesthetic 10: Emotional perception	indifference	minor interest	exciting	inspiring	amazing

The conical Kalvária vrch is an expressive dominant feature of the eastern part of Banská Štiavnica. In addition to the beautiful view of the peak itself, it is interesting for the whole complex of Baroque sacred monuments from 1744 to 1751. Kalvária tells the story of Jesus' last journey. It was built as a thoughtful interplay of architecture, sculpture, painting, and craft in unity with the natural environment. The Baroque architectural complex consists of 17 chapels, three churches, the Ecce Homo Chapel, and the Chapel of the Holy Sepulcher. The story of Jesus progresses on the left section of the complex up a natural steep slope to the Upper Church with its motif of the Crucifixion. Seven chapels depicting the seven sorrows of Our Lady line the return path on the right side of the site. Due to the efforts of local activists, Calvary was included in the list of the 100 most endangered monuments in the world at the beginning of 2007.

This was the start of a comprehensive monument restoration, the main phase of which ended in October 2018. At present, the restoration of the artistic elements – frescoes, altars, and sculptural decorations – continues (www1).

The Upper Church, the dominant feature of the Kalvária, was built in 1745. This is the culmination of the Stations of the Cross, dominated by life-sized statues of the crucified Christ and the thieves.

The main stage of the Kalvária's reconstruction was completed in October 2018, and less than a year later the first Holy Mass in decades was celebrated here (www1). From the above, it follows that Kalvária is a special geosite with strong cultural-historical significance (Table 3). The arithmetic average of the cultural-historical category for the Kalvária peak is 0.8, which classifies it as a geosite with a high score for cultural-historical significance.

Table 3. Criteria and scale of scoring used to assess the cultural-historical category on the example of the geosite "Kalvária vrch" (Pralong, 2005)

Score / Criteria	0	0.25	0.5	0.75	1.0
Cultural 1: Cultural and historical customs	without link	weakly linked	moderately linked	strongly linked	initiatory of custom(s)
Cultural 2: Iconographic presentation	never represented	represented 1-5	represented 6-20	represented 21-50	represented >50
Cultural 3: Historical and archaeological relevance	no vestige or building	weak relevance	medium relevance	high relevance	very high relevance
Cultural 4: Religious and metaphysical relevance	no relevance	weak relevance	medium relevance	high relevance	very high relevance
Cultural 5: Art and cultural events	never	–	occasionally	–	at least once a year

Table 4. Criteria and scale of scoring used to assess the ecological category on the example of the geosite "Cave Peklo" (Andreychuk, 2007; Trofimova 2012; Cocean, 2015)

Score / Criteria	0	0.5	1.0
Ecological 1: Anthropogenic changes in relief	high	Moderate	absence
Ecological 2: The presence of anthropogenic waste	high	Moderate	absence
Ecological 3: Application of graphic elements to the landforms' surface	high	Moderate	absence

The artificial cave "Peklo" is located in the park at Kaštieľ Svätý Anton (Figure 5). The cave has experienced significant changes made by man: the entrance to the cave has been refurbished, in the middle of the cave there is anthropogenic garbage and graphic elements on the surface of karst forms. The arithmetic mean value for the ecological category for "Peklo" is 0.5, which distinguishes this geosite from other anthropogenically undisturbed landforms (Table 4).

The most pronounced socio-economic category is characteristic of the cave stream bath Parenica, which is located in the resort village of Sklené Teplice in the north of Štiavnické vrchy (Figure 6).



Figure 5. Location (A) and appearance of artificial cave «Peklo» (B) (Source: Authors fieldwork, 2024)

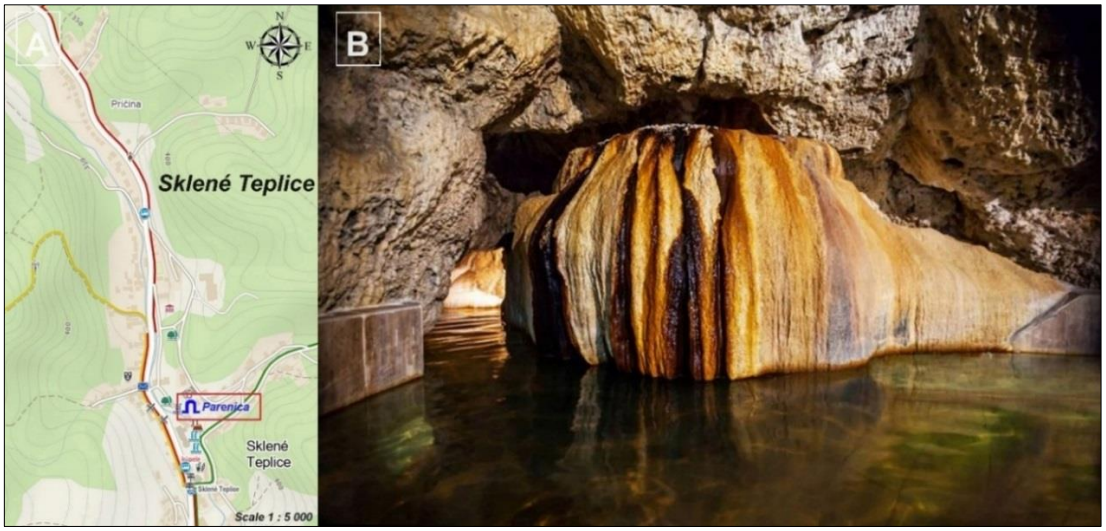


Figure 6. Location (A) and appearance (B) of cave stream bath «Parenica» in the area of Sklené Teplice (Source: Authors fieldwork, 2024)

Parenica is a unique steam bath in a naturally created cave, which is one of the unique SPA phenomena in Europe. The water in the cave comes directly from the thermal spring, it is only slightly cooled to preserve the rare concentration and strength of the mineral composition, and its temperature (42 ° C) is acceptable for the human body. The natural water flowing over the surface of the cave is not only rich in calcium and magnesium but also other rare minerals, which makes staying there especially suitable for tourists with musculoskeletal diseases. This SPA complex is widely known outside Central Europe. Tourists from many countries of Western and Central-Eastern Europe come here for wellness purposes, which makes this geosite both one of the most visited places in Štiavnické vrchy and an attractive tourist and recreational resource. The cave is located in an accessible location – next to the local road 2498 "Hliník nad Hronom – Sklené Teplice – Podhorie", it can be easily reached by personal or municipal transport (Chovanová & Nižňanská, 2010).

Taking into account the above factors, it follows that the Parenica cave is a geosite with relatively pronounced socio-economic characteristics (Table 5). The arithmetic average of the socio-economic category for Parenica cave is 0.5, which classifies it as a geosite with an average (above standard) score for socio-economic importance.

Table 5. Criteria and scale of scoring used to assess the socio-economic category on the example of the geosite "Cave Parenica" (Source: Pralong, 2005)

Criteria \ Score	0	0.25	0.5	0.75	1.0
Socio-economic 1: Accessibility	≥ 1 km of track	< 1 km of track	by a local road	by a road of regional importance	by a road of national importance
Socio-economic 2: Annual number of visitors in the region	< 10 000	10 000 – 100 000	0.1 – 0.5 million	0.5 – 1 million	> 1 million
Socio-economic 3: Official level of protection	complete	limiting	–	not limiting	no protection
Socio-economic 4: Attraction	–	local	regional	national	international

At the foot of the Kamenná mountain, towering above the village of Vyhne, there is a unique creation of nature – the Kamenné more. This site, formed by countless large or smaller rhyolite boulders of a reddish color, is the largest and most important of its kind in Slovakia. This is the largest stone sea in the volcanic part of the Carpathians and one of the oldest protected areas in Slovakia, valuable primarily for its geological features. The sight of this Kamenné more, surrounded by forest, inspires respect and leaves a strong impression. The Kamenné more at Vyhne owes its origin to the process of erosion, as well as an earthquake that caused a massive rock collapse thousands of years ago. The Kamenné more can be reached along the Andrej Kmeť educational trail, the starting point of which is the village of Vyhne (Figure 7) (www2).

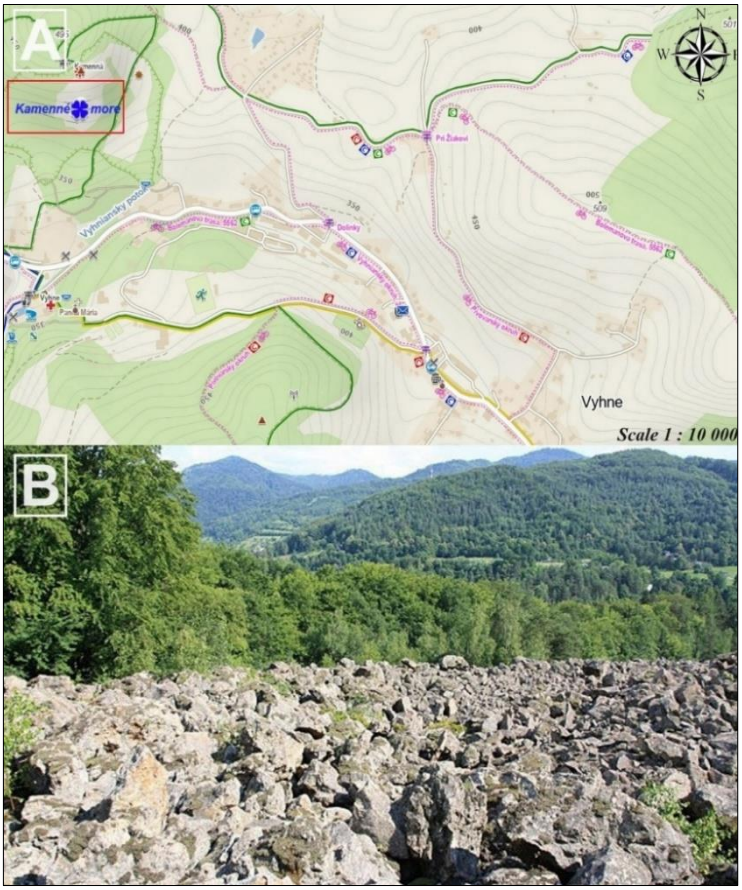


Figure 7. Location (A) and appearance (B) of the stone sea in the area of Vyhne (Source: Zhyrnov, 2024, village Vyhne)

However, this geosite is notable not only for its beauty and unusualness. The Kamenné more is considered a rather dangerous place for tourists to stay for several reasons. Firstly, when making your way along the uneven and sharp boulders of the Kamenné more, you can easily trip and fall on the stones, which will result in injury. Secondly, in the summer heat, the Kamenné more gets quite hot, and staying in such a place can easily cause heat stroke to the body, so it is better to visit this geosite in spring or autumn when this risk is excluded. So, we have at least one circumstance that makes visiting this place relatively dangerous and requires the tourist to be attentive and careful (Table 6). The arithmetic average of the safety category for the Kamenné more is only 0.2, which classifies it as a geosite with a low score for the safety of tourists, therefore this landform is dangerous to visit.

Table 6. Criteria and scale of scoring used to assess the safety category on the example of the geosite "Kamenné more" (Zhyrnov, 2015)

Score / Criteria	0	0.5	1.0
Availability of process	≥ 2	1	absence
Process intensity	high	moderate	absence
Frequency of occurrence per year	≥ 3	1-2	absence
The coverage area of the total area of the landform	≥ 20 %	15-20 %	absence
The degree of possible danger to human health and life	severe	mild to moderate	absence

All 153 geosites were assessed according to the above-described assessment categories within the Štiavnické vrchy geomorphological region. On the corresponding map (Figure 8) we can see the spatial distribution of geosites and their overall tourist assessment. The cartographic basis is represented by a hydrographic network, a network of roads, railways, bicycle routes, and hiking trails. The marked settlements show the existing tourist infrastructure. Some of the most interesting geosites in the Štiavnické vrchy are attached to the map as examples (Al Mohaya & Elassal, 2023).

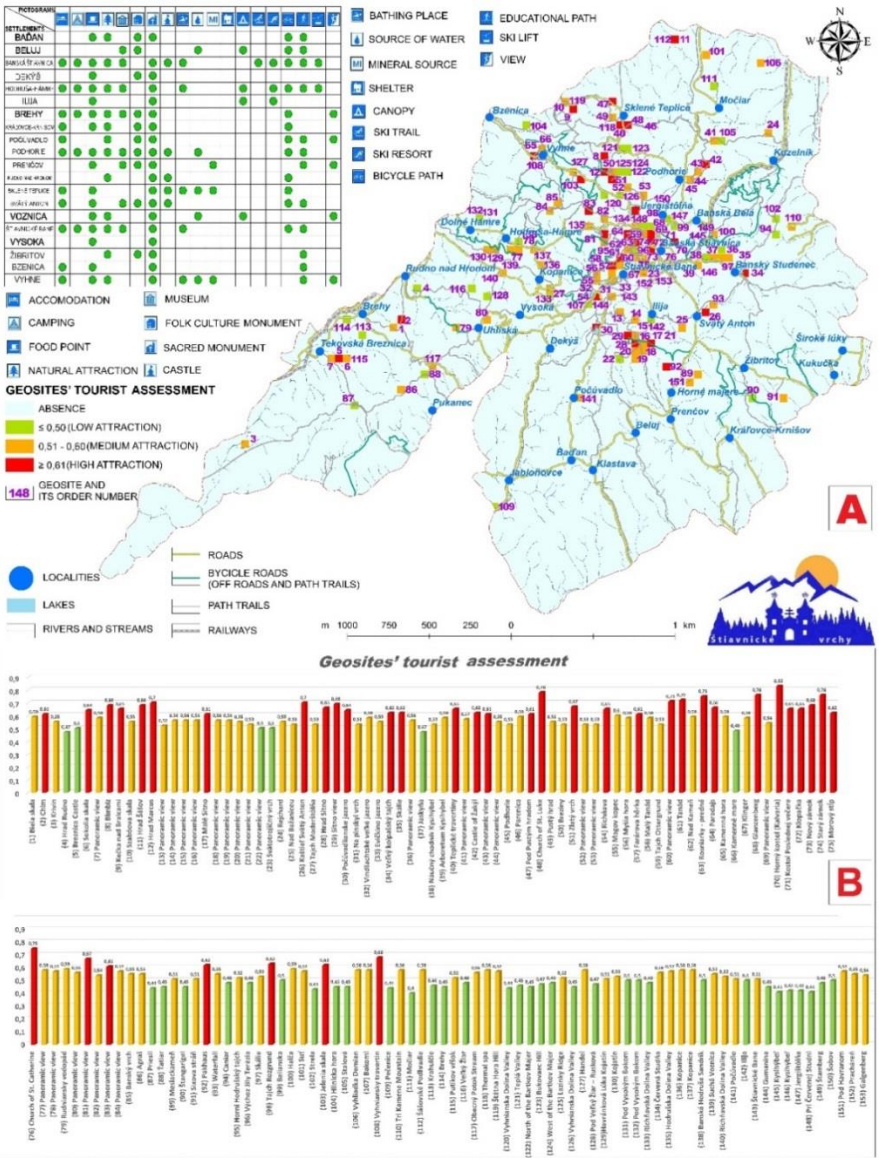


Figure 8 (A-B). Map of tourist assessment of geosites on the territory of Štiavnické vrchy, (A) diagram of geosites' tourist assessment, (B)



Figure 8(C). Photos of geosites according to their location (C) on the map (C) (Source: Zhyrnov, 2024)

The density map of geosites shows that the largest number of them are located within a radius of 20 km from the city of Banská Štiavnica in the central part of the Štiavnické vrchy, mainly within the geomorphological regions of Štiavnická brázda and Hodrušská hornatina. The geomorphological region of Sitno also stands out for its high density of geosites. It should also be noted that the northern, eastern, southern, and southwestern parts of the Štiavnické vrchy do not have any geosites and remain unattractive and difficult to access territories for tourists (Figure 9).

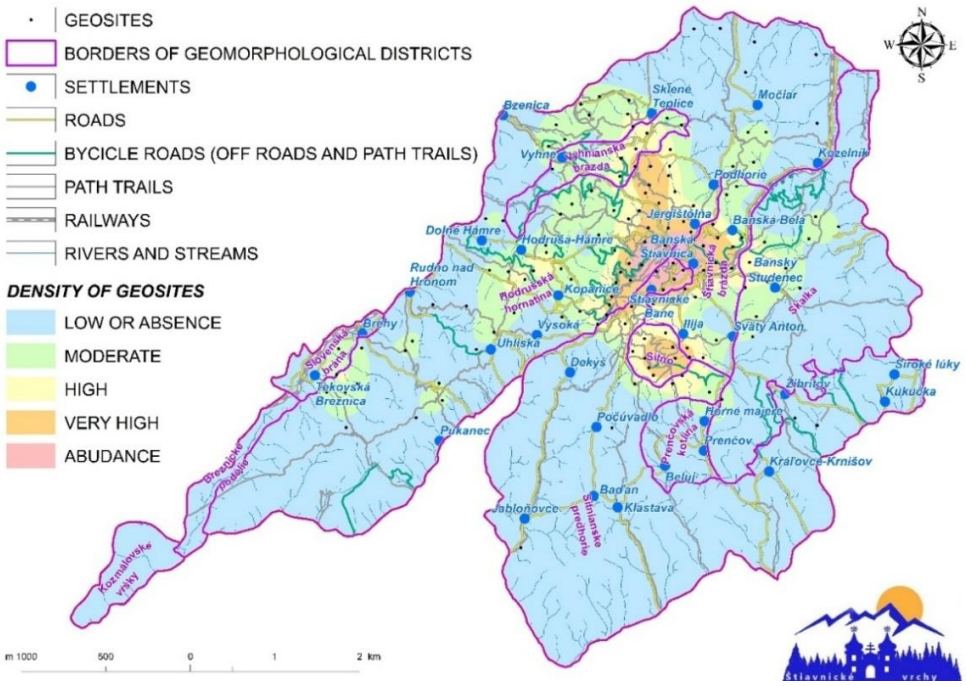


Figure 9. Map of geosites' density on the territory of Štiavnické vrchy (Source: Zhyrnov, 2024)

On the map of the number assessment of geosites within the areas of ¼ square kilometer, one can also see the pattern that the largest number of geosites are located in the vicinity of the city of Banská Štiavnica and the area of the highest peak Sitno of the Štiavnické vrchy (Figure 10) (Diniz & de Araújo, 2022).

DISCUSSION

The tourist assessment of geosites in the current study consisted of six assessment values: scientific, aesthetic, cultural-historical, ecological, socio-economic, and safety. However, this may not be sufficient for a complete and objective tourist assessment. In our opinion, it is worth considering the morphometric value for tourist assessment of geosites, since morphometric indexes define visibility, attraction, variety, and passability of the territory and constitute the microclimatic conditions of locality (Zhyrnov, 2015; Popescu, 2006).

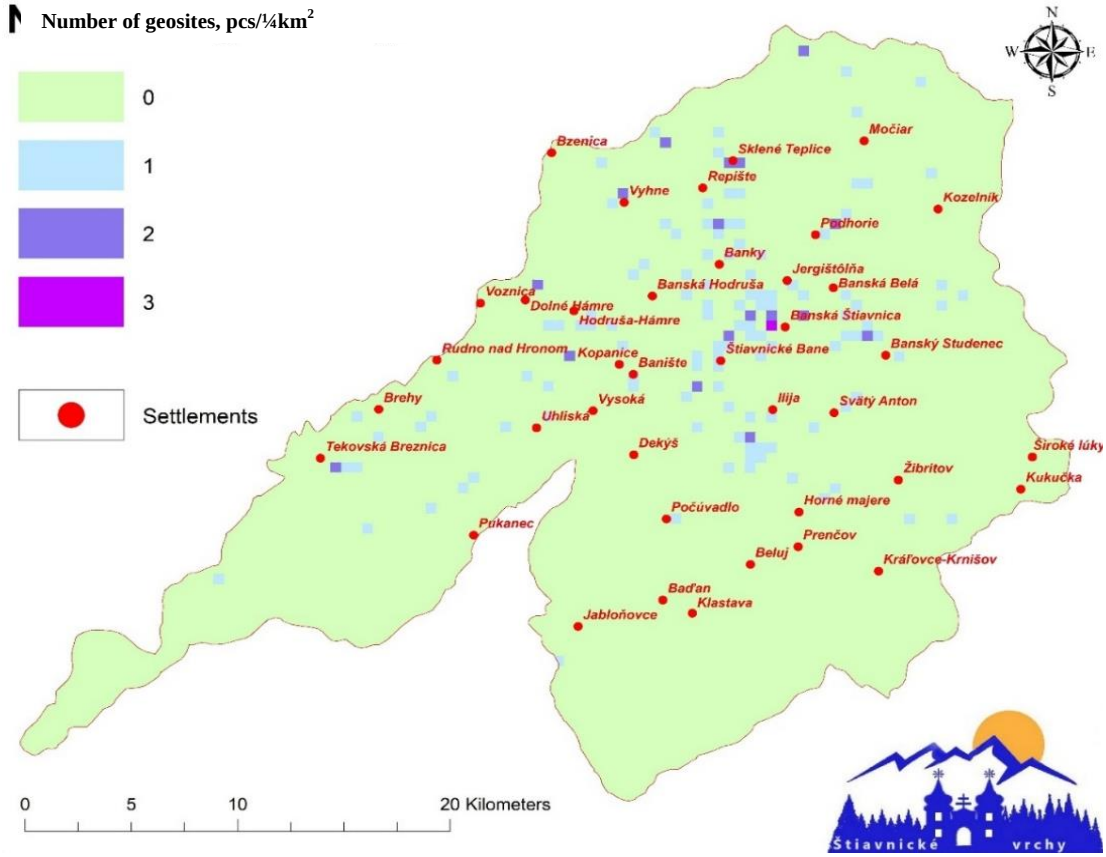


Figure 10. Map of geosites' quantity (pcs/¼km^2) on the territory of Štiavnické vrchy (Source: Zhyrnov, 2024)

According to the views now dominant presentation (Bredikhin, 2004) such morphometrical indexes play a key role in tourist assessment: absolute altitude of the surface, gradient of slopes, slope exposure, vertical and horizontal dissection of relief (Table 7) (Zhang et al., 2024; Oppizzi et al., 2023; Mackenzie, 2024; Olteanu et al., 2024; Cirillo et al., 2024; Carrión-Mero et al., 2025; Petrović et al., 2025).

Table 7. Characteristic of main morphometrical indexes for geosite assessment (Source: Bredikhin, 2004; Zhyrnov, 2015)

Morphometric indexes	Influence on tourist activity
Absolute altitude	Defines visibility and attraction of the territory, the existence of a visible variety of landscapes and high-altitude zones. Informative, emotional and psychological effects are closely connected with visibility.
Horizontal dissection	Defines the variety and passability of the territory and, the transportation possibility for vacationers and service personnel. Defines the creation of the infrastructure connected with tourism.
Vertical dissection	Defines a variety of a landscapes, the review of the panorama, esthetic satisfaction from the relief, degree of passability, and availability of the territory.
Gradient of slope	Defines the prime cost of tourism engineering constructions and the passability of the territory. The quantity of solar energy and illumination of the relief depends on the gradient of the slopes. These facts must be taken into consideration by recreational organisations.
Exposure of slope	Defines frequency of the relief with solar energy. The southern exposition slopes are the most comfortable for tourist activity in temperate climatic zones of the northern hemisphere. Completeness of a range of expositions allows to choose of areas of different functions for tourist activity for uneven-aged people.

Morphometric values of relief determine the complexity category of a tourist route and influence the accessibility of the relief for tourist activities. For example, low accessibility of the relief gives rise to certain forms of tourism (mountaineering, rock climbing), while high accessibility of the relief opens up opportunities for various types of recreational tourism (tourist walks, hiking) (Ovreiu et al., 2018).

It should be noted that morphometric indicators of relief affect not only the visibility, attractiveness, diversity and passability of the territory, but also have important engineering significance and can influence the location of tourist infrastructure, buildings and structures. The engineering and construction assessment of the territory depends on the morphometric indicators of the relief. As a rule, with an increase in morphometric indices, the complexity of construction development of the area increases, which requires special architectural and design solutions, as well as engineering protection of the territory from dangerous geological and geomorphological processes (Gavrilă, 2012).

We propose to realise the zoning of nature systems according to morphometrical criteria, considering the relief as a recreational resource for hiking and trekking (Table 8) (Bredikhin, 2004; Zhyrnov, 2015).

Table 8. Zoning of nature systems according to morphometrical criteria for tourism adaptation (Bredikhin, 2004; Zhyrnov, 2015)

Absolute altitude (m)		The gradient of slopes (°)		Vertical dissection (m)		Horizontal dissection (km)	Score
hiking	trekking	hiking	trekking	hiking	trekking		
>1500	0-500	>45; 12-45	0-3; 3-6	>800	<300	>2.5	0.25
1000-1500	500-1000	6-12	6-12	600-800	300-600	2.5-1.2	0.5
500-1000	1000-1500	3-6	12-45	300-600	600-800	1.2-0.8	0.75
0-500	>1500	0-3	>45	<300	>800	<0.8	1.0

However, it should be noted that the tourist appeal of mountainous areas depends not only on the morphometric indicators of the relief. Morphogenetic types of relief and its morphosculpture play an important role, determining the diversity of external forms and the aesthetics of the relief. Therefore, morphometric analysis of the relief must be carried out in conjunction with related types of geomorphological surveys, since it is a comprehensive approach that will help to adequately divide the territory into zones according to its tourist potential (Oprea-Gancevici & Cheia, 2012).

CONCLUSION

The aim of the article was limited to the tourist assessment of geosites of the Štiavnické vrchy mountain range according to certain assessment values, in order to ultimately create an assessment map of the attractiveness of geosites and propose measures to improve the tourist potential of areas characterized by low attractiveness or absence of geosites. (UNESCO, 2023a; UNESCO, 2023b; Pramuková et al., 2025; Băndoi et al., 2020; Vandelli et al., 2024). As you can see, Štiavnické vrchy has significant tourist diversity. Every tourist can find something that will be interesting or useful for him. However, tourism resources in Štiavnické vrchy are unevenly distributed and there are sites on their territory that today have low tourist attractiveness or even its complete absence. Having assessed the geosites based on the methods of leading geomorphologists, we can draw certain conclusions on how to improve the unattractive areas of the Štiavnické vrchy.

So, the northern, eastern, southern, and south-western directions of Štiavnické vrchy require measures to organize artificial attractive objects to increase the overall tourist attractiveness of such sites. Considering that the main natural wealth of sites with low tourist assessment is forests, a good idea for the designated sites is to create forestry arboretums modeled after Arborétum Kysihýbeľ, which is located on the eastern outskirts of Banská Štiavnica (www3).

In such arboretums, it is possible to grow rare forest species, introduce tree species of different climates, carry out landscape design of the territory, create educational tourist trails, etc. Another possible way to increase tourist attractiveness is to create a variety of museums based on the historical, cultural, and natural conditions of such territories (Kim et al., 2020; Popescu & Ionescu, 2016). Another possible direction is gastronomic tourism, which involves the creation of cafes and restaurants serving Slovak and foreign cuisine, as well as local delicacies (Cunha, 2018).

Forest areas in the southern part of Štiavnicé vrchy alternate with small intermountain valleys, within which horseback riding can be organized (Helgadóttir & Sigurðardóttir, 2008). The southern and southwestern territories of Štiavnické vrchy are represented by rural settlements with a developed agricultural production complex, which is optimal for the creation of a tourism industry sector focused on the use of natural, cultural, historical and other resources of the countryside and its features to create a comprehensive tourism product. Rural tourism in designated areas may include services such as accommodation in cozy private estates, custom-made meals from organic products, learning about the history of the region, mushroom and berry picking trips, and participation in folk rituals (Demkova et al., 2022).

Further development of tourism in these territories is only possible with the clearing, leveling, and arrangement of tourist trails, which are currently in unsatisfactory condition. When implementing such activities, possible areas would be walks in the forest, organized recreation near water bodies and in the forest, skiing and cycling tourism, sporting events (including cross-country, and triathlon), forest and sports orienteering, arrangement of ecological trails, familiarization with natural and historical and cultural heritage in forests (Font & Tribe, 2000) familiarization and observation of representatives of the animal and plant world in natural conditions (Dybsand, 2021). However, such events are economically and labor-intensive and require full support from the state or economic programs for the development of tourism of various funds of the European Union. Nevertheless, in the long term, they are justified, since they will ensure sustainable environmental development and economic prosperity of the region (Băndoi et al., 2020).

One can consider the morphometric assessment category as an addition to the existing methodology for the tourist assessment of geosites. It determines the visibility and attractiveness of the territory, the presence of visible diversity of the landscape, the permeability of the territory, the insolation of the relief, and the construction of tourist infrastructure.

The described methodology allowed for a comprehensive assessment of the tourist attractiveness of geosites from the perspective of scientific, aesthetic, cultural-historical, socio-economic, and environmental values, as well as safety criteria. As a result, 153 geosites in the Štiavnické vrchy mountain range were assessed and a map of the tourist attractiveness of geosites was compiled, highlighting areas with low, medium and high attractiveness.

Measures to increase the tourist potential by creating artificial attractions are proposed for areas of Štiavnické vrchy, which are characterized by the presence of low-attractive geosites or their absence. The tourist assessment of geosites is

not limited to the estimated values given, so the authors of the article are open to scientific discussion on possible assessment categories for attractions, which will ultimately improve the assessment of geotourism zoning.

All interested specialists are invited to participate in this discussion.

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