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THE ROLE OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING TOURISM SERVICES: THE CASE OF DURRËS, ALBANIA

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Abstract: In Albania, the tourism sector has increasingly been using technology to improve the travel experience and service management. In the past, websites and mobile applications served as promotional tools, but recent developments support more sophisticated operations. This study explores the impact of Artificial Intelligence (AI) in tourism services in Durrës, Albania, focusing on how AI-driven technologies improve service management, customer experience, decision making and hotel recommendations. A mixed-methods approach was used, including a literature review, interviews, surveys, implementation, and process improvement. An AI-based hotel recommendation system was developed using Natural Language Processing (NLP) and machine learning to analyze customer reviews. Hotel reviews were collected from Google Reviews, and artificial intelligence techniques were applied to identify and recommend hotels with similar ratings and sentiment profiles, thereby supporting more personalized and data-driven recommendations. Through sentiment analysis, the reviews were classified as either negative or positive. The study finds that AI technologies improve operational efficiency, increase customer engagement, and support strategic marketing efforts. It is recommended that tourism services in Durres adopt AI solutions as they positively impact automated bookings, tour management, and personalized digital interactions, thereby enhancing tourism to a greater extent. The integration of AI-based recommendation systems further demonstrates how data analytics and sentiment analysis can optimize hotel selection processes for tourists. On the other hand, the high cost and staffing required for this poses a challenge for the city. This study provides a unique focus on AI's impact within Albania's tourism sector, with Durrës as a case study. By integrating AI-driven analytics and hotel recommendation algorithms, the research highlights the role of AI in improving service quality, business efficiency, and the overall competitiveness of Albanian tourism. It offers practical insights into how AI can drive sustainable growth and innovation, positioning Albania's tourism industry for a more tech-driven future.

Keywords: Artificial Intelligence, Natural Language Processing (NLP) techniques, tourism, Selenium, Durrës, TF-IDF-based text similarity, cosine similarity

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INTRODUCTION

Albania is a country with a beautiful climate and natural beauty, which makes tourism a major sector in the Albanian economy. Tourism offers a natural and cultural attraction that attracts domestic and international visitors. With the growth of technology and the introduction of Artificial Intelligence everywhere, the question arises whether tourism needs the use of technology? The answer is Yes, it has become indispensable in shaping travel experiences and improving tourism management, everything in tourism is moving towards the digital part. Technology is involved in every phase of the tourist journey, from simple websites and mobile applications to complex systems that personalize visitor interactions.

Over the past few years, the accessibility of digital platforms has transformed the way tourists access, find information, make reservations online without being physically present and interact with destinations. Tour operators offer services more efficiently and tailor tourist packages according to individual preferences, because they have the help of AI-powered applications such as chatbots, recommendation engines and data analytics platforms. Albania in 2024 had the highest number of visitors to the country, thus enabling a considerable potential for economic growth. Certainly, for a better management of tourism, the integration of Artificial Intelligence can improve service quality and operational effectiveness, helping the country compete in a digitally driven tourism landscape. The purpose of this paper is to analyze, study, the impact of information technology on Tourism and what we can offer to improve it better.

The study focuses on Durrës, one of Albania's most popular coastal destinations, to examine the impact of technology on tourism, and draws on face-to-face interviews with 6 major resorts in Durrës. Through interviews and surveys conducted with local businesses including hotels and restaurants, this research investigates whether AI-driven technology has begun to be used, and whether it is contributing positively to the tourism industry. The focus of the study is also to examine the level of technological adoption, the challenges businesses face in using AI, and whether these

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businesses are open to adopting AI tools. Based on the responses we received from the study, and the perspectives of tourism businesses, this paper also provides an implementation of a recommendation system using Artificial Intelligence for tourists based on hotel reviews on Google and classifying them as positive or negative using semantic analysing.

LITERATURE REVIEW

Based on the research of academics and other scientists, in this section we are briefly summarizing the historical development in tourism technology, the benefits of adapting these advances and future trends, and focusing more on artificial intelligence and virtual reality VR. Of course, technology has also been introduced into the tourism sector, reformulating the way of operating and serving tourists.

The way tourists receive recommendations, make online reservations, receive services without being present or without having a traditional travel brochure, we can say that the revolution has been extraordinary.

a) Historical development of technology in tourism

Tourism has become more accessible and convenient since the 19th century with advancements in technology. The development of steam engines and railways revolutionized mobility, allowing more people to move into new destinations (Buhalis & Leung, 2018; Gretzel et al., 2015). The digital age further transformed the industry, as the internet opened up online booking platforms, travel blogs, and social media-based promotion. Websites and apps soon emerged as favorite platforms for providing real-time information about destinations, accommodations, and activities, setting new standards for convenience and ease of access for travel planning (Huang et al., 2017).

b) The role of artificial intelligence and virtual reality

AI and VR have emerged as game changers for the tourism industry, increasing operational efficiency as well as customer experiences. Artificial Intelligence used to be said to be in the future, but now we say we are in the future as it is being used more and more every day in every sector, but especially in the tourism sector. According to (Kieanwatana & Vongvit, 2024) communication and response to a certain service against tourists has been difficult and slow before the creation of AI. With the creation of AI, chatbots were also created which automatically returned responses, enabling direct communication with customers. Recommendation engines made it possible to create and offer tourist packages or services based on user preferences and predictive analytics of user interests. On the other hand (Guttentag, 2010) stated that not only chatbots, or recommendation systems helped in customer service in tourism, but also VR technologies began to be widely used to offer visitors a different reality by seeing the destination virtually before touching it. Through VR, visitors were able to make easier decisions about the selection of the destination (Kannan & Antony, 2024).

c) Advantages of technology in tourism

Giant platforms such as Booking.com and Airbnb have completely simplified the online booking part by offering tourists instant booking without any hassle and an open system to see and comment on the center or service they received. Applications of Artificial Intelligence in tourism have helped a lot to improve various parts of the tourism sector, especially chat bots that give direct answers without the need for human resources. Online advertisement has also risen in specificity so that tourism businesses can access their target population through targeted ads (Xiang & Fesenmaier, 2017; Neuhofer et al., 2015). Data analytics tools help organizations analyze the behavior of customers, predict trends, and optimize service offerings to enhance organizational efficiency and customer satisfaction (Mariani et al., 2018; Gretzel et al., 2015).

d) Future trends in tourism technology

In the coming years, AI, VR, and big data will play an even greater role in the future of tourism. AI solutions such as real-time personalization marketing and dynamic pricing will help companies react to individual customers' needs in real time. VR will provide tourists with pre-experiences of destinations, further influencing booking intentions (Tussyadiah & Wang, 2016; Mariani et al., 2018). Moreover, analysis of big data will become increasingly important in evaluating market trends to allow companies to make decisions through information and aid improved service provision and customer engagement (Slevitch et al., 2020). Analysis and recommendation systems based on AI are also expected to be more advanced. Sentiment analysis techniques will be enhanced by machine learning algorithms, improving how firms interpret and act on customer feedback. Reinforcement learning may also improve recommendation engines to provide real-time and dynamic personalized recommendations to tourists.

e) Challenges and considerations

While AI and other emerging technologies bring numerous advantages, their implementation is challenging. Issues such as data privacy, cybersecurity, and adoption costs are still obstacles, particularly for small and medium-sized enterprises. There is also a debate regarding AI-driven automation and its contribution to job displacement in the tourism sector. The implementation of AI in Albania is also restrained by other issues like infrastructure and technological expertise shortages. The majority of tourism businesses, especially the small and medium-sized ones, are restricted by financial limitations that prevent them from investing in new and advanced technologies like AI and VR.

These must be addressed through strategic digital infrastructure investments, improved training programs, and increased awareness among business owners about the benefits of AI adoption (Neuhofer et al., 2015; Tussyadiah & Wang, 2016, Ivancsóné Horváth et al., 2025).

METHODOLOGY

Understanding the reason why this topic is being addressed is a key element in identifying and carrying out the work. The methodology followed for carrying out this work is: Collection and review of secondary data. Which were provided by a simple internet search, by accessing online libraries, research reports related to the topic and a non-exhaustive list of other secondary sources. From the secondary research, it is intended to understand the results of the academics, sciences they have achieved, the difficulties and conclusions, regarding how technology affects tourism. The study then follows with a primary research/study, on the use of technology in tourism and the positive or negative effects it has on tourism in Albania. Six big resorts in Durres were selected, to conduct direct interviews with them. The goal was to understand how AI-driven technologies affect tourism services in Durres, Albania. Implementing an AI recommendation system based on Google reviews for these sectors enables increased customer satisfaction and operational efficiency. Using the Selenium for web scraping, we have collected all the available user reviews placed on Google. To classify the ratings as positive, negative or neural, we have used AI-based sentiment analysis and natural language processing (NLP) techniques.

Market study in Albania – Tourism and technology

In this study several resorts within the tourism sector were examined, including: restaurants, hotels, resorts and guesthouses as part of their integrated service offering. These businesses represent a broad spectrum of the tourism industry, each focusing on varied ways technology impacts their operations and growth. Table 1 below presents the names and official Google Business links of the selected hospitality establishments that participated in the survey. The primary objective of this survey was to analyze the use of technology in the tourism sector from a business perspective. Participating businesses provided valuable insights into how they utilize technology for management, online promotion, and booking processes. Another aspect highlighted was the role of technology in offering personalized services to clients, which contributes to increasing their tourism experience. The businesses indicated that they use a range of platforms and technological tools to increase efficiency in daily operations. Some of the most commonly mentioned tools included:

a. Inventory Management Applications.
b. Online Booking Software
c. Customer Data Collection and Analysis Systems

In terms of digital marketing, businesses are increasingly oriented toward using platforms such as social media, online advertisements, and search engines to promote their offerings. This approach facilitates real-time interaction with clients and helps build long-lasting relationships with them. One of the main objectives of this study was to identify best practices and challenges encountered in implementing technology in Albania's tourism industry. Businesses reported that one of the greatest benefits of technology is the significant increase in operational efficiency and improved communication with clients. Technology aids in establishing a stronger online presence, thereby increasing the visibility and promotion of local tourist destinations. On the other hand, some businesses also faced challenges when integrating technology into their operations due to some barriers. Among these challenges are the high initial investment costs associated with technology and a lack of qualified staff to manage these technological tools. We did physical interviews with the owners of the Hotels that are shown in Table 1 and also we used Google Forms to collect the results.

Table 1. Tourism businesses in Durrës included in the survey and their Google Business profile links

Name of Resorts	Google My Business link
BRILLIANT HOTEL AND SPA	Brilliant Hotel & Spa
KLAJDI RESORT	Klajdi Resort
FAFA RESORT	Grand Blue Fafa Resort
SUPREME HOTEL	Supreme Hotel
PINEA HOTEL	Pinea Hotel

STUDY RESULTS AND INTERPRETATION

From analyzing the collected responses, it is clear that the majority of surveyed entities are hotels and restaurants that have integrated technology in several aspects of their management, as shown in Figure 1. What type of business do you operate? Do you use technology to manage your business? Do you use technology to manage your business?

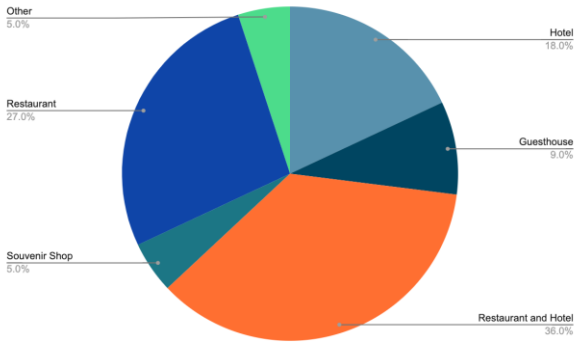

Figure 1. Distribution of business types participating in the tourism technology survey

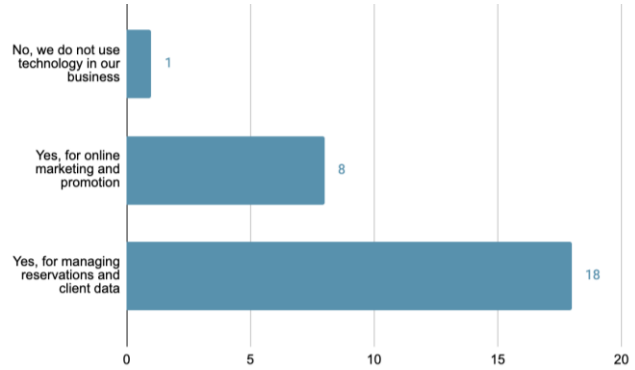

Figure 2. Business responses on the use of technology in tourism management

Figure 2 illustrates that respondents emphasized that they used technology more for managing online reservations and storing data. They emphasized that this has facilitated customer service and improved resource management. Websites are now, let's say, the formal part of every business. What stands out is that 95% of businesses reported having a website. Through the website, they are present online, can be found and offer information to tourists. Websites were stated to be used more for the presentation and promotion of tourism businesses. The use of online reservation management systems is also high, with 89% of businesses using platforms such as Booking.com and Airbnb to receive customer reservations.

These systems have significantly simplified the reservation process and have contributed to an increase in the number of customers. At the end of the survey, 95% of businesses identified technology as a fundamental driver for the development of tourism. They believe that technology not only promotes tourist destinations, but also plays a crucial role in increasing tourists' awareness of local attractions and offerings. In 2024, Artificial Intelligence spread rapidly almost all over the world. So the respondents stated that if they incorporate artificial intelligence into some tourist services, it could significantly increase productivity by automating routine tasks, allowing human resources to focus on more personalized services. On the other hand, the tourist has an easier time getting the service he wants and also through AI he can get suggested packages based on his reviews. The last question was: Give your opinion, what is expected to happen with tourism in the coming years and what are the barriers that AI uses in Albanian tourism?

1. Barriers to the use of technology in Albanian tourism

Based on our survey of tourism businesses in Durres, some of the primary challenges which hinder full application of technology and artificial intelligence in tourism in Albania have been identified. The challenges range from structurally diversified operations that hinder them from having the capacity to utilize and gain from AI-based solutions. These are the most common of them, e.g., a lack of infrastructure for the internet, data security problems, the cost of implementation being too high, and lacking the appropriate expertise in AI. All of them need to be handled so that technology can be utilized to the maximum in enhancing the tourism industry of Albania.

1.1. Lack of internet infrastructure and digital accessibility

To use digital platforms, internet access and its reliability are essential. One of the biggest problems that Albania still faces is the unstable access to the quality of the internet. Especially in coastal areas where internet coverage is low and in more remote areas it almost does not reach at all. Bad internet access causes all sorts of issues for the tourism industry in Durrës, both for businesses and visitors. Nowadays, visitors are very much reliant upon online websites for restaurant and hotel bookings and organizing places. In case of poor internet connectivity, the places are unable to utilize these facilities to their full capacity and, hence, lose opportunities in greeting and hosting guests efficiently. Technologies such as AI-powered chatbots, smart check-in devices, and AR guides must be run on high-quality internet connectivity. Without access to such tools, it is difficult for most Durrës businesses to compete with international tourist trends, tapping into their potential to deliver tourists modern, technologically driven experiences. A second, more serious issue is that of remote working and online management. Most of the hotels and tourist establishments are employing cloud-based management systems to handle reservations, payments, and messages from guests. When there are interruptions in the internet, those systems turn unreliable, leading to inefficiencies in day-to-day activities and spoiling the overall customer experience (Sousa et al., 2024).

2.2. Data security and privacy risks

With increasingly more tourism businesses in Albania going digital, data privacy and cybersecurity have become pressing concerns. Most of the businesses in the sector have poor cybersecurity systems, which leave them open to attacks such as data stealing, financial fraud, and identity theft. The greatest concern is the utilization of poor security systems, where the majority of companies continue to utilize basic password protections and outdated software, which leave them vulnerable to simple cyberattacks. Cyber awareness among hotel and tourism staff is still limited, and they are not at all or inadequately trained in identifying and preventing phishing attempts, malware infections, and other online threats. Using and accessing the internet is not always positive if you are not sufficiently educated about preventive measures. Businesses are still vulnerable to potential security breaches that could compromise customer data and damage their image. We know that taking preventive measures against internet security requires budget and finance. Financial constraints for the digital part in Albania also affect especially small businesses as they place more importance

on daily operating costs than cybersecurity. Without investment, exposed customer data goes unprotected, and the vulnerability for data breaches and loss of money is increased. Even as of 2025 Albania is on the rise in terms of cybersecurity Albania has progressed significantly in the ITU's Global Cyber Security Index, moving up by 22 points compared to the last report and ranked in Tier 2, among the countries that are developing rapidly in the field of cyber security. It is a sign that the Albanian government is seriously working on making digital defenses more robust and addressing growing cyber security threats effectively (National Authority for Cyber Security, 2025).

3.3. High costs of technology adoption

The incorporation of artificial intelligence-driven tools and intelligent tourist solutions poses a significant financial burden to most of Albania's tourism sectors. It is within reach for large hotels to pay for computerized management software, but small and medium enterprises (SMEs) cannot match the pace with the burden of digital change.

The investment is not only the one-time investment but also the ongoing expenses that present a challenge for small businesses to implement technology. The greatest challenge is the significant amount of initial investment required to deploy AI chatbots, automated booking systems, and data analysis software. The technologies, as beneficial as they are for making business processes more efficient and customer experience better, require a tremendous amount of financial resources that many companies cannot put into them. One of the interviewees, the owner of Brilant Hotel, stated that a key challenge is also the lack of access to finance from government funding. The government has no subsidies to support small businesses in implementing AI and the use of information technology in tourism.

Without any external help, most SMEs are not able to delay or forego digital transformation, which limits them from competing with larger, more tech-savvy players. Overcoming such economic barriers entails support from policies, investment at hand, and individualized financing arrangement to facilitate companies of all sizes to avail digital innovations towards continued development of the tourism sector of Albania.

2. Advantages of using AI and technology in tourism

The tourism industry is one of the sectors that has been most affected by technology and its role has become indispensable in the management and performance of technical operations of companies operating in the tourism market. Technology has played an important and very productive role in improving services and customer experience. The use of online platforms for managing reservations, digital marketing, processing and analyzing customer information and facilities in electronic communication with customers has created new and very effective opportunities for improving services and expanding into the global market (Nongkhoo, 2025). Table 2 highlights the key reasons why AI and technologies are beneficial in the tourism industry.

Table 2. Advantage of using AI in Tourism

1	Improving customer service and personalized experience	Artificial intelligence, through virtual assistants and chatbots, helps customers find their most optimal solutions depending on their needs and expectations for the services requested. This is consistent with findings from (Czyz & Javed 2025), who highlight that smart tourism technologies significantly contribute to customer satisfaction and sustainable destination image through personalization and efficient service delivery. Virtual tools provide their most appropriate options and address customer requests to managers, thus providing a convenient and quality experience for customers. The integration of Geographic Information Systems (GIS) in tourism as demonstrated in the case of Ulytau National Park contributes to a more personalized and enriched visitor experience (Amangeldi et al., 2025).
2	Increasing visibility and marketing	Virtual tools, such as websites, social media and other mobile platforms, increased business visibility and market destinations in line with customer expectations.
3	Facilitation of reservations, through process automation	The selection and processing in real time of customer requests for the services required, offers the opportunity for businesses to offer personalized services according to the customer's preferences, making the customer experience within his expectations. (Yang et al, 2024).
4	Personalized customer experiences	The selection and processing in real time of customer requests for the services required, offers the opportunity for businesses to offer personalized services according to the customer's preferences, making the customer experience within his expectations. (Yang et al., 2024).
5	Effective customer relationship management	The use of AI and other technological tools offers the possibility of good customer relationship management, providing them with the required security and reliability. (Huang et al., 2017).
6	Data collection and analysis	Businesses have the convenience of collecting and analyzing data and customer behavior, which serve to improve the quality of service and assist in the decision-making process and long-term business strategies (Abdul-Azeez et al., 2024)
7	Cost reduction	Automating administrative and operational processes through technology reduces the costs of human resources and manual data management.
8	Increased access to global markets	Online platforms and digital promotional tools enable businesses to more easily reach customers from international markets.
9	Real-time communication	Digital platforms offer the possibility of real-time communication with customers, ensuring fast and effective service
10	Security	AI systems detect suspicious behavior and alert security authorities, reducing the risk of crime within the business or tourist destination. For example, (Dziurakh et al., 2024) present an intrusion detection solution specifically designed for smart tourism environments, using anomaly detection to identify and report potentially harmful behavior in real time.

The use of online tools, such as mobile applications, websites, digital marketing platforms, have increased the visibility of businesses and their attendance at the international level. With the use of technology, businesses can now collect and analyze useful information about how their customers behave, allowing them to make well-informed decisions and improve their products depending on market demands. As highlighted by (Nathan et al., 2020), platforms like Airbnb not only

facilitate booking but also contribute to increasing destination visibility and enhancing tourist engagement through digital interaction. Some of the advantages presented in table number 2 were identified through surveys conducted with selected businesses. These businesses described the benefits they experienced from using technology, including improved operational efficiency and management, increased business promotion and access to international markets, enhanced customer communication, and expanded clientele—ultimately leading to increased financial income (Smart Tours Bird Albania).

3. Development of an AI-based hotel recommendation system

Durrës, one of the most popular seaside resorts in Albania, boasts a great selection of hotels to suit all tastes and budgets. With new hotels opening every year, visitors are typically faced with an overwhelming choice. Naturally, as a matter of priority when selecting a hotel, most of the visitors would prefer comfort, cleanliness, location, and quality of service to have a good time. The most effective way of judging the quality of a hotel is by remarks, especially Google reviewers, of former clients on their experience. They are an important component of tourists' decisions since they are honest opinions about the strengths and weaknesses of each hotel. As customer reviews are an important factor in selecting a hotel, our aim is to create an intelligent recommendation system that utilizes Google reviews to classify and rate hotels on the basis of sentiment analysis and star ratings. This way, travelers will have fact-based guidance to make in selecting the most suitable hotel from an actual user perspective, instead of relying on advertisements only or personal assumptions.

Proposed Method / Approach

As the first step towards developing a useful recommendation system, our approach will involve fetching actual current reviews for hotels from Google. We will do this through two likely means which we will utilize:

a. Option 1: Using Google places API: Google Places API allows us to web scrape information about hotels, including name, address, ratings, and reviews. We will retrieve hotel reviews by making API requests, which we will then put in a nicely formatted manner. The API allows us to get data quickly and reliably without any chance of getting blocked.

b. Option 2: Web Scraping with Selenium: In case API limits the amount of reviews scraped, Selenium can be used to automate browsing and scrape reviews directly from Google. Selenium can mimic human activity (scrolling, clicks) to compile all available reviews. This is useful but will most certainly require additional caution for CAPTCHA and anti-scraping protection. The specific Python script used for this purpose is shown in Algorithm 1.

Algorithm 1: Selenium code for crawling the data from reviews of google

```
iimport pandas as pd
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.chrome.service import Service
from selenium.webdriver.support.ui import WebDriverWait
from selenium.webdriver.support import expected_conditions as EC
from webdriver_manager.chrome import ChromeDriverManager
import pandas as pd
import time

hotel_reviews_links = {
  "KLAJDI RESORT Durres":
"https://www.google.com/travel/search?q=KLAJDI%20RESORT%20Durres&ap=ugEHcmV2aWV3cw",
  "FAFA RESORT Durres":
"https://www.google.com/travel/search?q=FAFA%20RESORT%20Durres%22&ap=aAG6AQhvdmVydmlldw",
  "SUPREME HOTEL Durres":
"https://www.google.com/travel/search?q=supreme+hotel+durres&ap=ugEHcmV2aWV3cw",
  "PINEA HOTEL Durres":
"https://www.google.com/search?q=PINEA+HOTEL+Durres%22#lrd=0x134fdf0fa9b7ccb9:0x3943ecc0855608ca,1,,,,",
  "BRILLIANT HOTEL AND SPA Durres":
"https://www.google.com/travel/search?q=BRILLIANT%20HOTEL%20AND%20SPA%20Durres%22&ap=ugEHcmV2
aWV3cw"
}
options = webdriver.ChromeOptions()
options.add_argument("--headless")
options.add_argument("--disable-gpu")
options.add_argument("--window-size=1920x1080")
s)
    if not df_reviews.empty:
  df_reviews.to_excel("Durres_Hotel_Reviews.xlsx", index=False)
  print("File saved to 'Durres_Hotel_Reviews.xlsx'!")
else:
driver.quit()
```

After Selenium we got the excel file that has collected all the reviews we need containing the following key columns *(Review_ID: Unique identifier for each review., User_ID: User who posted the review., name_hotel: Name of the hotel., Hotel_ID: Unique hotel identifier., Review_Text: The actual review content., Rating: Numerical rating given to the hotel.)* These extracted reviews and their key attributes are illustrated in Figure 3.

Review_ID	User_ID	name_hotel	Hotel_ID	Review_Text	Rating
1	101	BRILLIANT HOTEL AND SPA	1001	The hotel is good except for the boring food, even though it is the most expensive hotel I have paid in Albania, the food they have is tasteless and they use the same food several times a day except in a different form and it is not fresh. are also used during all the second sites. It was not worth it, I suggest PREMIUM FINESSE, which is 100% better in all aspects We decided to try the full-body massage package, but unfortunately, it didn't meet our expectations. The person providing the service seemed inexperienced, which left an impression of amateurism. The wellness facilities were also not fully operational – they only had a regular sauna, while the salt room was out of service.	4
2	102	KLAJDI RESORT	1002	Scandalous service! We have waited 1 and a half hour to give the order, we asked 4 times the waiters to take our order and everything was teastless, we spend 4 hours for service that should last 1-1 and a half to finish the dining, waste of money and time lady by the reception Mary is so friendly and professional. The Spa is wonderful and I would like to thank Jamaica and Melody -these ladies made our spa experience great. I had a serious knee problem but after the pressotherapy I feel much better and definitely going back soon. Anyone wanting a great spa experience look for Jamaica	5
3	103	FAFA RESORT	1003	It was strange for me when I didn't find a kettle in the room, they don't have hot drinks service at night and they don't have kettles either. There were a couple more things, but not so critical. Overall, the staff is very polite, the room and the hotel are quite clean. The location is excellent. And food at the restaurant was really good. My stay at Grand Blue Fafa Resort was nothing short of amazing! The food was absolutely delicious, with a variety of options that satisfied every craving. …	5
4	104	SUPREME HOTEL	1004	Found a huge piece of plastic in my salad and the waiter acted like it was none of his business. It took them way to long to take our order and we didn't even get an ashtray after asking for it. Never again! I had lunch with my colleagues at Supreme Hotel and i enjoyed it the most at all the places i have been in Tirana and even elsewhere in Albania. The service was the best i have encountered and the dishes immaculate. Every product was very fresh and tasty. I cannot recommend this place enough!	5
5	105	PINEA HOTEL	1005	too much poeple and you can't find place to the beach and to eat ypu need to wait some. The beach is very clean thoo and the beach bar is amazing. The cocktails are very tasty and the staff are very friendly! absolutely packed with them. If you're young and looking to have fun and enjoy some nightlife, this hotel is definitely not for you.	4

Figure 3. Sample of extracted hotel reviews (comment) from Google using Selenium automation for hotels in Durrës (Source: Reviews collected by google using Selenium)

Based on reviews to assess customer satisfaction levels, we applied Sentiment Analysis using the TextBlob NLP library. Each review was classified into one of three categories:

- Positive comments whose polarity value is greater than 0.1 (i.e., "The hotel was great, staff were very friendly").
- Neutral: Reviews with a polarity score between -0.1 and 0.1 (like "The hotel was okay, nothing special").
- Negative: Reviews with a polarity score less than -0.1 (e.g., "Rooms were dirty and the staff was rude"). The sentiment categorization allowed us to rule out hotels with mostly negative reviews and prefer those with positive sentiment. The sentiment categorization allowed us to rule out hotels with mostly negative reviews and prefer those with positive sentiment. The Python code used to perform this classification is presented in Algorithm 2.

Algorithm 2: Classification of the hotels based on reviews

```
iimport pandas as pd
from textblob import TextBlob
file_path = "Durres_Hotel_Reviews.xlsx"
df_reviews = pd.read_excel(file_path)
def analyze_sentiment(text):
  blob = TextBlob(str(text))
  polarity = blob.sentiment.polarity
  if polarity > 0.1:
     return "Positive"
  elif polarity < -0.1:
     return "Negative"
  else:
     return "Neutral"
df_reviews["Sentiment"] = df_reviews["Review_Text"].apply(analyze_sentiment)
output_file = "Durres_Hotel_Reviews_With_Sentiment.xlsx"
df_reviews.to_excel(output_file, index=False)
print(df_reviews[["name_hotel", "Review_Text", "Rating", "Sentiment"]].head())
print(f"\n Updated file saved as: {output_file}")
```

Figure 4 illustrates the output results of the sentiment analysis, where each review is categorized based on its polarity as positive, neutral, or negative. To improve the efficiency of this process, we developed an AI-driven hotel recommendation system that analyzes customer reviews and recommends hotels depending on review sentiment and text similarity. This system merges Natural Language Processing (NLP) techniques to classify the reviews in terms of their quality and machine learning algorithms to rank the top hotel options (Sancho Núñez et al., 2024).

Review_ID	User_ID	name_hotel	Hotel_ID	Review_Text	Rating	Sentiment
1	101	BRILLIANT HOTEL AND SPA	1001	The hotel is good except for the boring food, even though it is the most expensive hotel I have paid in Albania, the food they have is tasteless and they use the same food several times a day except in a different	4	Neutral
				We visited this hotel and stayed for a few days. We decided to try the full-body massage package, but unfortunately, it didn't meet our expectations. The person providing the service seemed inexperienced,		Positive
2	102	KLAJDI RESORT	1002	Scandalous service! We have waited 1 and a half hour to give the order, we asked 4 times the waiters to take our order and everything was teastless, we spend 4	5	Negative
				This hotel is the best. I've gone there twice this year for birthday celebrations. The lady by the reception		Positive
3	103	FAFA RESORT	1003	It was strange for me when I didn't find a kettle in the room, they don't have hot drinks service at night and they don't have kettles either. There were a couple more things, but not so critical. Overall, the staff is	5	Positive
				My stay at Grand Blue Fafa Resort was nothing short of amazing! The food was absolutely delicious, with a variety of options that satisfied every craving. …		Positive
4	104	SUPREME HOTEL	1004	Found a huge piece of plastic in my salad and the waiter acted like it was none of his business. It took them way to long to take our order and we didn't even get an ashtray after asking for it. Never again!	5	Positive
				I had lunch with my colleagues at Supreme Hotel and i enjoyed it the most at all the places i have been in Tirana and even elsewhere in Albania. The service		Positive
5	105	PINEA HOTEL	1005	The hotel is not so bad. The view is amazing but not everything is perfect. There is too much poeple and you can't find place to the beach and to eat ypu need to wait some. The beach is very clean thoo and the beach bar is amazing. The cocktails are very tasty and the staff are very friendly!	4	Positive
				The hotel is primarily occupied by local Albanians with small children, and it's absolutely packed with them. If you're young and looking to have fun and enjoy some nightlife, this hotel is definitely not for		Positive

Figure 4. Sentiment classification of hotel reviews using TextBlob analysis (Source: Generated by sentiment classification algorithm)

```
from textblob import TextBlob
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import cosine_similarity
```

We shifted our focus from sentiment analysis to translate text reviews to numeric format through Term Frequency-Inverse Document Frequency (TF-IDF). TF-IDF approximates the significance of the word based on how often a word is repeated in the dataset to allow the system to quickly identify patterns and cluster similar reviews. TF-IDF vectorization allowed us to transform text data into numerically formatted numeric features such that we could measure proximity between dissimilar reviews. Using cosine similarity, we proceeded to calculate the similarity of hotel reviews in a way that we would be able to know how similar or different hotels were based on customer reviews (Wang et al., 2023). In order to give personal recommendations, the system follows the following process: the user selects first a hotel of interest, the algorithm searches for hotels with similar reviews based on TF-IDF similarity scores. The recommendations are then filtered again by removing hotels that have the majority of negative reviews, and only retaining those with the majority of positive reviews. Finally, the AI system ranks and presents the top three most suitable hotels, offering personalized suggestions based on real customer reviews and their semantic similarity as shown in Figure 5. By automating this process through artificial intelligence techniques such as sentiment analysis and similarity scoring, the system significantly improves operational efficiency, reduces manual workload, and supports faster, data-driven decision-making in the hotel selection process.

name_hotel	Review_Text	Rating	Sentiment
PINEA HOTEA	The hotel is primarily occupied by local Albanians with small children, and it's absolutely packed with them. If you're young and looking to have fun and enjoy some nightlife, this hotel is definitely not for you. The staff barely speaks any English, making communication very difficult. This might explain why we sensed a strong unwillingness and tension from the staff	4	Positive
Supreme Hotel	I had lunch with my colleagues at Supreme Hotel and i enjoyed it the most at all the places i have been in Tirana and even elsewhere in Albania. The service was the best i have encountered and the dishes immaculate. Every product was very fresh and tasty. I cannot recommend this place	5	Positive
FAFA RESORT	It was strange for me when I didn't find a kettle in the room, they don't have hot drinks service at night and they don't have kettles either. There were a couple more things, but not so critical. Overall, the staff is very polite, the room and the hotel are quite clean. The location is excellent. And	5	Positive

Figure 5. AI-based hotel recommendations using sentiment and review similarity

RESULTS AND INTERPRETATION

After executing the model on our data, we observed the following patterns:

- Hotels with a higher rating (4.0+) had a more positive sentiment.
- TF-IDF similarity scores helped us identify hotels with comparable guest experiences.

- The system effectively excluded hotels with an overabundance of negative reviews to maximize customer satisfaction. Using AI-powered review analysis, we demonstrated that text-based hotel recommendations provide more personalized and reliable suggestions compared to conventional rating-based filters. Figure 5 presents the final output of the AI-driven recommendation system, which ranks hotels based on textual review similarity and sentiment analysis. By combining TF-IDF vectorization with cosine similarity and filtering through sentiment scores, the system is able to suggest the most relevant and positively rated hotels.

DISCUSSION

This article proves that technology has indeed played a deep role in showing positive effects in the cause of developing the tourism industry, in particular, in the hotel sector and the tourism sector in Albania. Based on the surveys and interviews conducted with the existing businesses in this field, including Brilliant Hotel and Spa, Klajdi Resort, Fafa Resort, Supreme Hotel, and Pinea Hotel, market analysis points out that most of these entities have already employed technological tools and platforms to enhance their service quality. Reservation management, online payment systems and customer communication have all moved towards automating processes through digital platforms. The integration of Artificial Intelligence (AI) in tourism services has significant potential to improve operations by automating repetitive tasks, allowing human resources to focus on delivering more personalized experiences. AI-enabled applications, such as customer service chatbots and online booking systems, might be developed to enhance the productivity and efficiency of services provided to a client. An extension of the above research suggests an AI-driven hotel recommendation system based on the reviews by customers for better decision-making by a tourist. The system applies Natural Language Processing techniques, like sentiment analysis and TF-IDF-based text similarity to process the reviews from the guests to rank the hotels. In that respect, the system can suggest a few hotels having equivalent positive experiences as perceived by their guests with the help of Cosine Similarity, hence facilitating the traveling user in his choice. It does result in showing data-based hospitality selections that build greater transparency over businesses' business, making attraction for more consumers and bringing together a business from their customers more efficiently through presenting the positive features of the respective services. Study data showed positive trends regarding reliance on technology toward greater business appearance through website use and social networks to make places more accessible that attract tourists visiting such destinations along with creating favorable experience for clientele. Many companies also showed improved operational efficiency and increased competitiveness in the global arena. However, most of them pointed out difficulties involving high cost in introducing newly advanced technologies and necessary training for specialized manpower. These are considered as barriers to the adoption of technology, especially on the part of small businesses or firms with minimal finances.

CONCLUSION

Findings from this study indicate that technology is a salient factor for continuous development of tourism in Albania. It is viewed as a necessary tool by businesses not only to improve existing services but also to innovate new products and offerings. Technology has redefined new pathways for growth and improvement, thereby providing avenues for international interactions, thereby enhancing the overall quality of tourism offerings of the country. The example of an AI-powered recommendation system also shows how machine learning and data-informative decision-making serve as forces in pushing digitalization in the tourism sector. Summing up, this is a sure impact of technology on the tourism sector, while businesses that seize these innovations and especially with AI implement automation of service, personal experience for guests, and improve their marketing strategies greatly benefit in expansion and growth to contribute to the sustainable development of tourism in Albania. This study is not without limitations. The research focused on a limited number of resorts in Durrës, Albania, which may limit the generalizability of the findings to the broader tourism sector or to other regions. The data collected relied heavily on self-reported responses and publicly available ratings, which may carry subjective biases. In addition, the proposed AI-powered hotel recommendation system was not deployed in a real-world commercial environment, so its effectiveness was not validated in direct user conditions. The study also did not address long-term implications, such as financial sustainability or return on investment of AI and smart tourism technologies. Future research should expand the geographical scope, incorporate longitudinal methods, and aim to quantify the economic impact of technology adoption in tourism, particularly in relation to artificial intelligence and service automation.

Recommendations

This paper is recommended to all businesses operating in the tourism sector, with the aim of helping them understand the importance and benefits of adopting technology to further develop their services and attract a greater number of tourists. The results of this study can assist these businesses in improving their internal processes and increasing their presence in international markets through digital platforms. Besides, businesses must consider adopting AI-based tools, such as automated review analysis and recommendation systems, to enhance customer satisfaction, optimize service delivery, and increase operational efficiency. Additionally, this paper is recommended to local and central institutions to value the positive impact that technology has on the tourism industry. Governments and policymakers must promote digital innovation in tourism by funding research and development of AI, subsidizing technology take-up for small and medium-sized enterprises, and enhancing digital literacy training for tourism professionals. Promoting the use of AI-driven recommendation systems by companies can help ensure online hotel review transparency, build customer trust, and provide a more enjoyable experience for tourists. By investing in AI-based solutions, businesses and institutions can make Albania more competitive as a tourist destination, promoting sustainable development and long-term performance within the global tourism sector.

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