The Role of Big Data in Promoting Sustainable Tourism Practices in Albania: Proposal for a National Intelligent Tourism Platform

Alma Zhilla

Abstract

In the context of digital transformation, Big Data has become a vital instrument in promoting sustainable tourism. This study aims to explore the potential of Big Data analytics to support sustainable tourism development in Albania, with a specific focus on designing a National Intelligent Tourism Platform (NITP). The main objective is to assess how real-time data, when properly collected and utilized, can enhance decision-making, optimize resource allocation, and minimize the environmental and social impacts of tourism activities.

The research adopts a mixed-methods approach, combining primary data collected through structured questionnaires with 90 tourists and semi-structured interviews with 20 tourism-related businesses,5 experts in the fields of technology and 5 legal frameworks, alongside secondary data from national statistics, legal documents, and international reports. The findings indicate that Big Data can significantly improve tourism planning, visitor flow management, and sustainability monitoring. However, challenges such as fragmented data sources, inadequate digital infrastructure, and limited institutional coordination persist.

The study concludes with six strategic recommendations for the development and governance of the Albanian NITP, emphasizing the need for cross-sectoral collaboration, standardization of data protocols, and investment in digital capacities. By addressing these factors, Albania has the potential to become a regional model for data-driven and sustainable tourism management.

Keywords: Big Data, Sustainable Tourism, Smart Tourism, Decision-Making, National Intelligent Tourism Platform, Albania

JEL classification: L83, L88, M10, P48

Alma Zhilla, Fan S.Noli University, Faculty of Economic Tourism, Department of Marketing –Tourism, Rilindasit 11, Korca, Albania, e-mail: almapulaha@hotmail.com

Introduction

Nowadays, tourism is one of the industries with the quickest rate of growth in the world. It creates jobs, promotes cross-cultural interaction, and makes a substantial contribution to the economic growth of countries. Over the past ten years, Albania, a nation known for its lively cultural history, archaeological monuments, and lush natural settings, has seen a steady rise in tourism. Significant contributions to the national economy have resulted from this migration. The quick growth of tourism, however, also presents a number of issues with regard to resource management, sustainability, and the conservation of the natural and cultural heritage. Adopting creative solutions that might limit the negative environmental and social effects of tourism while simultaneously promoting it is becoming more and more necessary in this scenario.

Big data technologies offer a chance to solve these issues and develop a framework for more sustainable tourism (Buhalis & Sinarta, 2019). Big data is the term used to describe the vast amounts of data produced by a variety of sources, including posts on social media, GPS monitoring, booking systems, sensor networks, and interactions between travelers and digital platforms. These datasets can provide insightful information about the tastes, habits, and travel habits of tourists. By properly analyzing big data, tourism authorities can create predictive and personalized models that optimize resources (e.g. Kontogianni et al., 2022; Ma, 2024), enhance destination management, and lessen the negative externalities that come with overtourism, like traffic, environmental damage, and cultural deterioration.

In Albania, a National Intelligent Tourism Platform (NITP) in particular might be a useful instrument for incorporating big data into the management and planning of tourism. The NITP would offer real-time insights into visitor happiness, lodging occupancy, tourist flows, and environmental impact by gathering, processing, and evaluating data from several sources. Public and private stakeholders may find it easier to make decisions as a result, allowing them to put data-driven plans into action that put sustainability, resource preservation, and inclusive growth first.

Big data plays a variety of roles in promoting eco-friendly travel strategies. It can be used, for instance, to maximize infrastructure development and transportation, lowering carbon emissions and avoiding crowding in well-known tourist locations. In order to ensure that natural resources like water, waste, and energy consumption are used effectively while leaving as little of an environmental impact as possible, it can also aid in improved management of these resources. Big data can also help monitor ecosystem health and biodiversity, which makes it possible to pinpoint regions that need conservation.

In addition to improving tourist management in Albania, the establishment of a National Intelligent tourist Platform will open doors for cooperation amongst different stakeholders, such as local communities, tourism enterprises, and government organizations. The platform would support sustainable development techniques that are sensitive to visitor needs while preserving the nation's natural and cultural heritage by encouraging a cooperative, data-driven approach.

This proposal examines the applications, difficulties, and anticipated results of establishing a National Intelligent Tourism Platform in order to demonstrate how big data may support sustainable tourism practices in Albania. By doing this, it highlights how important it is to have a cohesive, data-driven approach to tourist management that is in line with both international sustainability frameworks and national development goals. With this vision, Albania may set the standard for sustainable tourism in the region and show how data and technology integration can support social and environmental responsibility while balancing economic growth.

The study aims to:

- ✓ To analyze how big data might improve sustainable tourism in Albania, paying particular attention to the possible advantages and difficulties of incorporating it into tourism administration.
- ✓ To create a conceptual framework for the National Intelligent Tourism Platform (NITP), which will use big data to maximize tourism resources, lessen its impact on the environment, and encourage fair growth.
- ✓ To guarantee the effective application of big data solutions in the tourism industry, identify important tactics and best practices from global case studies that can be modified for the Albanian setting.
- ✓ To give stakeholders—such as governmental organizations, travel agencies, and local communities—actionable advice on how to successfully incorporate big data into their tourism operations in order to advance sustainability.

Study Questions:

1. How can big data analytics be used to optimize resource management (e.g., water, energy, waste) in Albania's tourism sector while minimizing its environmental impact?

2. What are the key challenges in integrating various data sources (e.g., social media, booking systems, GPS data) into a National Intelligent Tourism Platform, and how can these challenges be overcome?

3. In what ways can a National Intelligent Tourism Platform in Albania contribute to reducing over-tourism and to enhance visitor experiences while promoting sustainable tourism practices?

4. How can big data be used to engage local communities in the distribution of tourism benefits in Albania?

Methodology

This study adopts a mixed-methods research approach that integrates both primary and secondary data to assess the need for an intelligent tourism platform in Albania. Primary data were collected through structured questionnaires with 90 tourists, aimed at evaluating perceptions regarding the quality of the tourism experience, the need for centralized information, and the use of technology during travel. In addition, semi-structured interviews were conducted with 20 representatives of tourism businesses to understand current data collection practices, challenges in information management, and willingness to participate in a shared digital platform. Furthermore, interviews with 5 experts in the fields of technology, tourism, and 5 legal frameworks were conducted to gather insights on the potential application of emerging technologies—such as IoT, Big Data, and Artificial Intelligence—and to identify legal and institutional barriers related to data sharing and management.

In parallel, secondary data were analyzed to establish the theoretical and contextual background of the study. These included a review of academic literature on sustainable tourism and digital transformation in the sector, statistical data from national and international sources (such as INSTAT, the Ministry of Tourism, UNWTO, and Eurostat), and strategic and legal documents relevant to the current regulatory framework. The integration of these data sources provides a comprehensive and evidence-based foundation for analyzing the challenges and opportunities related to the digitalization of tourism in Albania and for formulating a well-grounded proposal for the development of an intelligent platform to support effective tourist flow management and the sustainable development of the sector.

Literature review

Society is already changing as a result of the data revolution, which includes the open data movement, crowdsourcing, new ICTs for data collecting, the explosion of big data availability, the advent of artificial intelligence, and the Internet of Things. Real-time processing and analysis of large data is now feasible because to developments in data science and computing (Sarker, 2021). Such data mining can yield new insights that enhance official statistics and survey data, giving information about human behaviors and experiences more depth and richness. High-quality information that is more current, relevant, and detailed should be produced by combining this new data with traditional data.[1] The tourism sector constitutes a major driver of economic growth and socio-economic development in numerous countries (Brida et al., 2020; Kar et al., 2021). Sectoral leadership is frequently characterized by a forward-looking and strategic orientation, enabling effective responses to the complexities of a highly dynamic global market. Rodriguesz et al. (2020) point out that tourism makes a notable contribution to national GDP and overall economic performance, particularly within the European context, where five countries are consistently ranked among the world's ten most visited destinations. Moreover, travel is increasingly regarded as an integral component of contemporary lifestyles, reflecting its growing socio-cultural and economic significance.

Prior to the COVID epidemic, travel and tourism (including its direct, indirect, and induced effects) contributed 10.4% of the world's GDP (US$10.3 trillion) and 10.5% of all jobs (334 million) in 2019. Meanwhile, US$ 1.91 trillion was spent in 2019 by foreign tourists. According to WTTC's most recent yearly study: In 2023, the travel and tourism sector accounted for 9.1% of global GDP, representing a 23.2% increase compared to 2022 and remaining only 4.1% below pre-pandemic levels recorded in 2019. The industry generated 27 million new jobs, marking a 9.1% year-on-year growth and falling short of the 2019 employment level by just 1.4%. Domestic visitor expenditure rose by 18.1% in 2023, surpassing the corresponding figure for 2019. In contrast, international visitor spending increased by 33.1% over 2022 but remained 14.4% lower than in 2019.[2]

The Role of Big Data Applications in Sustainable Tourism

According to UN estimates, 90% of the data has been generated in the previous two years, and it is expected to grow by 40% a year. The digitization of many industries and daily activities has intensified in the COVID-19 period, leading to an even stronger trend of data volume rise.[3]

Big data comes from a variety of sources, most commonly the digital footprints of users on social media, credit cards, and mobile devices. Big data sources in the tourism industry include:

- communication systems, such as social media and mobile network data;
- global web, such as personal and business websites;
- transaction data, such as flight booking systems and retail transactions;
- physical sensors, such as informational points; and
- crowdsourcing, such as photos and content from websites like YouTube and Trip Advisor.

Big data analytics plays a crucial role in understanding tourist behavior by analyzing various data sources, including user-generated content (UGC), device data, and transaction records

---

[1] https://www.un.org/en/global-issues/big-data-for-sustainable-development

[2] https://wttc.org/research/economic-impact

[3] United Nations (n.d.), 'Big Data for Sustainable Development', United Nations Global Issues (online), available at:

www.un.org/en/global-issues/big-data-for-sustainable-development (15-06-2021). This flood of digital data is known as big data

(Xiang, 2018). These insights help tourism businesses and policymakers develop personalized tourism experiences, enhance service quality, and improve overall customer satisfaction (Xiang et al., 2019). Through the analysis of big data, tourism destinations can optimize resource allocation, improve visitor flow management, and support sustainable tourism practices. By utilizing data-driven recommendations, destination managers can enhance tourist experiences while minimizing negative environmental and social impacts (Gretzel et al., 2015). Statistical modeling and predictive analytics enable tourism stakeholders to forecast visitor demand, anticipate industry trends, and assess potential environmental and economic consequences. These insights assist in developing proactive strategies to mitigate risks associated with over-tourism, economic fluctuations, and environmental degradation (Li et al., 2017). Additionally, big data analytics contributes significantly to crisis management by offering real-time monitoring and early warning systems. This is particularly useful in responding to natural disasters, health crises, and other unforeseen disruptions that may affect tourism flows and operations (Hall, 2019).Despite its advantages, several challenges hinder the full implementation of big data in tourism. Ensuring data quality, security, and privacy remains a critical issue, as improper data handling may raise ethical concerns and compliance challenges. Strengthening collaborations between academia, industry, and policymakers is essential to establish regulatory frameworks that address privacy concerns and ensure responsible data usage (UNWTO, 2021). Another major challenge is the high cost of data collection and analysis, which limits accessibility, especially for small and medium-sized enterprises (SMEs) in the tourism sector. Expanding the affordability of data-driven solutions and facilitating knowledge transfer can enhance the inclusivity of big data applications across the industry (Sigala, 2018).

Future research should focus on cross-sector data integration, allowing for a more holistic understanding of tourism systems by combining multiple data streams such as mobile network data, social media analytics, and transaction records. Expanding data collection methods to include real-time monitoring through environmental sensors and artificial intelligence can further improve decision-making in tourism planning and management (Li et al., 2017).In conclusion, big data offers significant benefits in sustainable tourism management by enhancing visitor experiences, optimizing operational efficiency, and improving crisis preparedness. However, addressing data privacy concerns, cost barriers, and cross-sector collaboration is crucial for maximizing its potential. Ongoing technological advancements and policy development will be key to fostering a more sustainable, data-driven tourism industry.

An Overview of Tourism Development in Albania

Albania, often referred to as 'Europe's last unturned stone,' is an increasingly popular destination for tourism, offering a unique blend of natural beauty and cultural heritage. Situated on the Balkan Peninsula, the country is home to a wide array of attractions, ranging from its pristine beaches to the rugged terrain of the Albanian Alps. Albania also boasts several UNESCO World Heritage Sites, providing ample opportunities for visitors interested in history, adventure, and relaxation. According to the UN Tourism Barometer, Albania is experiencing the highest growth in international visitors across Europe. Additionally, the country has committed to environmental preservation, designating over 21% of its land as protected areas, including national and natural parks. These areas provide exceptional opportunities for ecotourism, with notable sites such as the Vjosa River, considered Europe's last wild river.
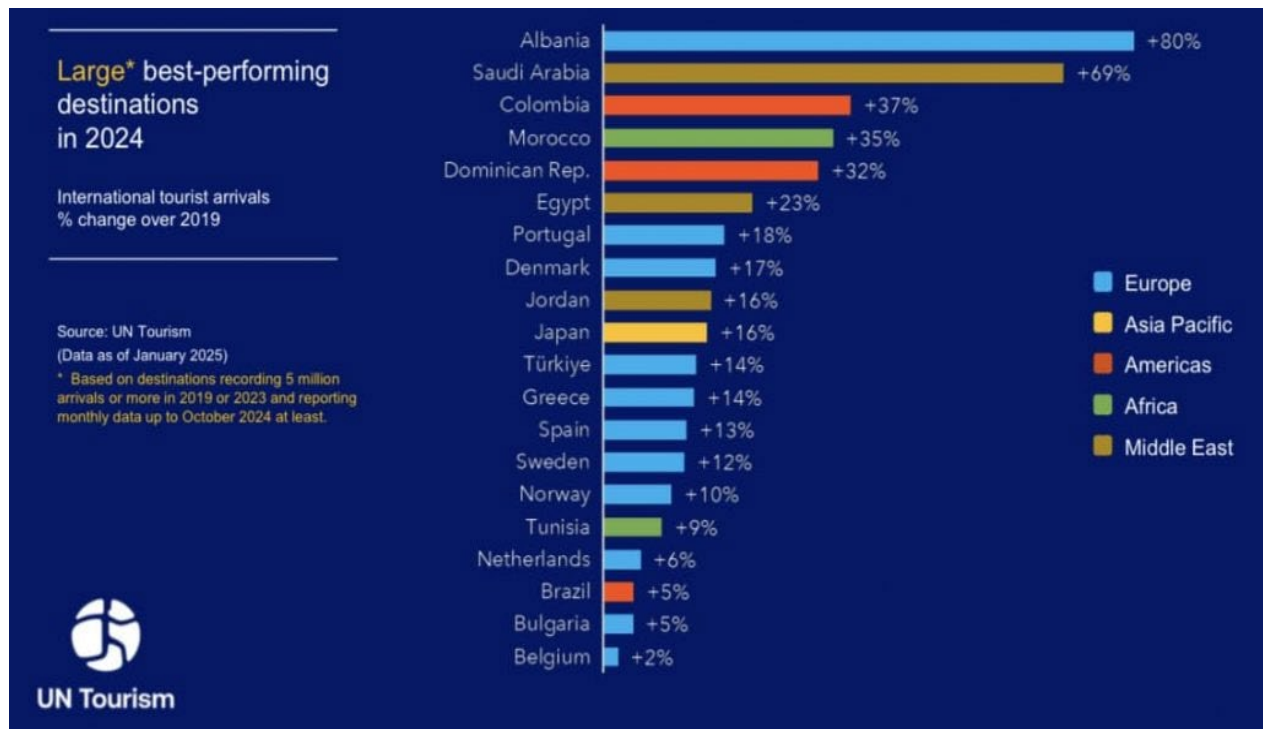
Fig 1. Best performance destination in 2024 Source: Oxford Economics, national sources and UN Tourism (formerly UNWTO)

The IMF estimates that Albania has 2.7 million people, and they have demonstrated exceptional resilience in the face of repeated shocks. The GDP increased at an average rate of 4.1% between 2022 and 2024 as a result of a robust tourism recovery. Albania's economic vitality and unrealized potential were confirmed by the GDP, which as of 2023 was USD 23 billion at current values, up from USD 12.3 billion in 2012.[4] According to data from INSTAT, in January 2025, a total of 1,158,204 Albanian and foreign nationals entered the territory of the Republic of Albania. This represents a 12.4% increase compared to January 2024. During the same month, 1,360,299 individuals departed from Albania, marking an 11.7% rise in comparison to the previous year. Regarding arrivals, 597,808 Albanian citizens entered the country in January 2025, reflecting a 10.6% increase from January 2024. Additionally, 560,396 foreign nationals visited Albania, an increase of 14.5% compared to the same period in 2024 (see figure 2).
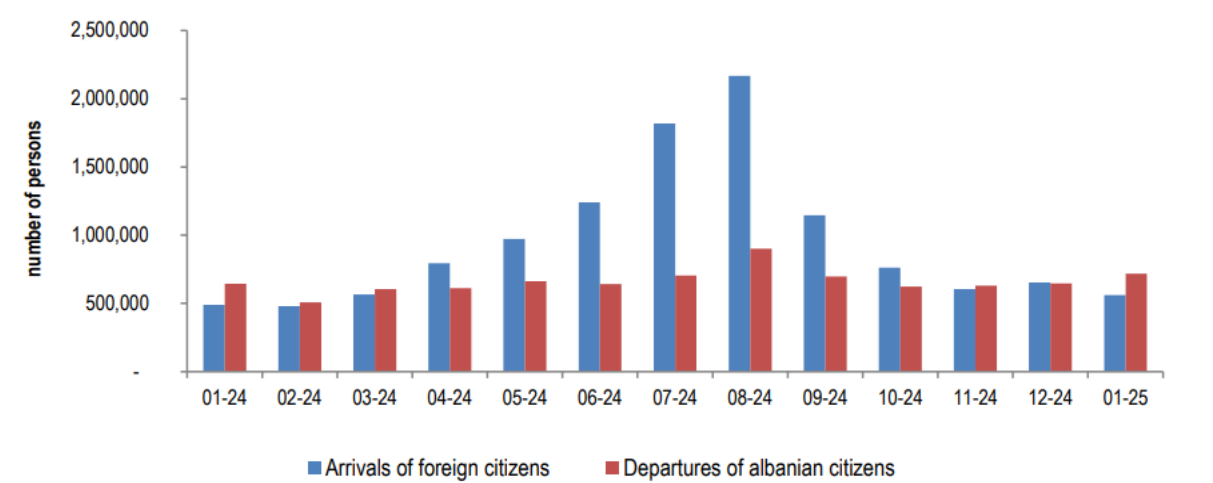

Fig. 2 Movements of citizens in Albania, January 2024-January 2025   Source: General directorate of state's office, Instant Calculations

According to recent studies, the country's tourism assiduity is poised for uninterrupted growth, driven by its rich artistic and natural means and the ongoing sweats to foster sustainable development (UNWTO , 2024; World Bank, 2023). These factors, combined with strategic planning and investment, position Albania as a crucial player in the indigenous tourism request, with significant eventuality for long - term success and profitable donation. Albania's increasing popularity is highlighted by the study of its competitiveness in the tourism industry, which positions it as an alluring travel destination for both tourists and investors. Albania made history in 2024 by ranking third globally for the highest chance change in transnational sightseer advents since 2019, despite the rapidly changing global tourist landscape. With an impressive growth rate of over 80 percent, Albania has emerged as a major and emerging participant in the European and Eurasian travel market. The country's growing role in the global tourist industry is highlighted by this accomplishment (UNWTO, 2024). Albania's gainful recovery is projected to be largely driven by the tourism and construction sectors, returning toper-pandemic growth situations (World Bank, 2023). International tourism is particularly vital to the frugality, representing 46 of total exports and 65 of service exports, pressing its significant part. Albania's profitable growth is also nearly tied to strategic hookups with countries similar as Germany, Greece, Italy, and Kosovo. The private sector has come a pivotal motorist of profitable progress, promoting trade integration with global and European requests. sweats to ameliorate the business climate, enhance productivity, boost competitiveness, attract investment, and strengthen fiscal stability are laying the foundation for Albania's sustained profitable development (European Commission, 2023).
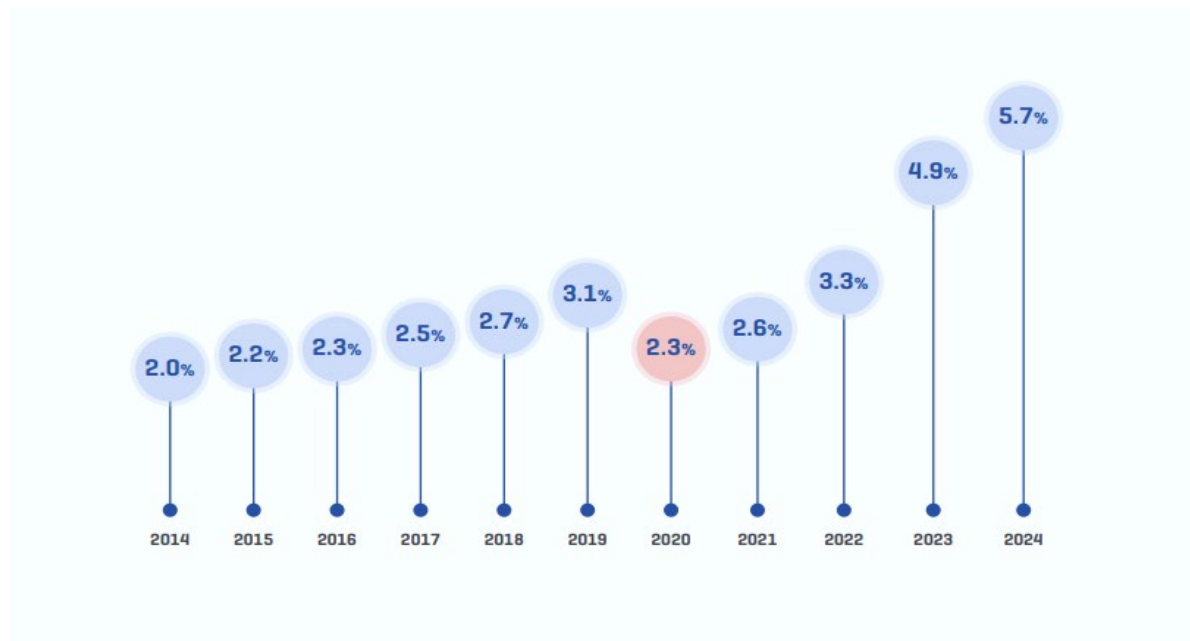
Fig. 3. Tourism Direct GDP 2014-2024 (Contribution of tourism sector to GDP)
Source: Albanian Institute of statistics INSTAT 2025

Albania from 2 December 2024 is the newest member country of the Global Sustainable Tourism Council(GSTC), a commitment that farther advances Albania's comprehensive vision for the tourism sector. The Ministry of Tourism and Environment of Albania(MOTE) has made notable progress in aligning the country's tourism sector with sustainability objects. In line with this commitment, Albania came a member of the Global Sustainable Tourism Council(GSTC), emphasizing its focus on environmental preservation alongside the creation of tourism. The country's tourism strategy effectively incorporates environmental considerations and fosters original community involvement, icing that sustainable practices serve as the foundation for the growth of the tourism assiduity. In October 2024, Albania's Minister of Tourism and Environment introduced the National Tourism Strategy 2024- 2030, an ambitious frame designed to promote sustainable tourism. This strategy seeks to enhance Albania's appeal as a time- round destination while diversifying its tourism immolations. It's structured around six crucial pillars structure development, financial programs, destination operation, product invention, marketing, and pool capacity- structure. Through these strategic areas, Albania aims to increase tourism profit, reduce the seasonality of the sector, and establish a more flexible profitable foundation. Albania's tourism industry is positioned for sustained growth, presenting an attractive destination for both tourists and investors. This growth is driven by the country's natural beauty, cultural heritage, and strategic initiatives that are collectively contributing to its future success.

Examining Albania's Potential for Growing Intelligent Tourism

The integration of modern technologies and innovative techniques into Albania's tourism industry to improve guest experiences and advance sustainable development is referred to as "intelligent tourism" (Gretzel et al., 2015; UNWTO, 2021). Utilizing digital tools, data analytics, and smart infrastructure, this strategy enhances tourist resource management, maximizes services, and offers travelers efficient and customized experiences (Buhalis & Amaranggana, 2015; Kavoura & Stavrianea, 2015). Real-time information systems, digital guides, and smartphone applications are examples of innovative approaches that Albania might use in order to satisfy the needs of both domestic and foreign visitors (Li & Wang, 2011). These

advances contribute to the preservation of the nation's natural and cultural resources for future generations and support the growth of ecotourism (Xhafa & Shehu, 2019) Furthermore, data-driven decisions on tourism policies, safety improvements, and increasing Albania's overall competitiveness as a tourist destination are all made possible by intelligent tourism (Bego, 2020). By adopting such technological innovations, Albania aims to position itself as a modern and sustainable destination in the global tourism market (Albanian Ministry of Tourism and Environment, 2022).The development of intelligent tourism in Albania offers opportunities to enhance visitor experiences through digital infrastructure, data-driven decision-making, and smart transportation solutions (World Bank, 2021). It promotes sustainable tourism by managing resources efficiently, preserving cultural heritage using digital technologies, and offering personalized experiences for tourists (Gretzel et al., 2015). Smart tourism ecosystems can foster collaboration between local businesses and government, while innovative marketing strategies can strengthen Albania's image as an attractive destination (Kavoura & Stavrianea, 2015). Ultimately, intelligent tourism can help Albania balance tourism growth with sustainability, enhancing its competitiveness in the global market (Buhalis & Amaranggana, 2015; Xhafa & Shehu, 2019).Applications of Big Data in Albanian tourism have the potential to improve infrastructure management, optimize marketing strategies, and create more personalized visitor experiences (Kavoura & Stavrianea, 2015; Bego, 2020). Big Data can promote sustainable practices, enhance policy-making, and enable better resource allocation by predicting tourism trends, analyzing visitor behavior, and monitoring environmental impacts (World Bank, 2021). Moreover, it contributes to cultural heritage preservation and crisis management, making the tourism industry more resilient and competitive (UNWTO, 2021).

Results of study

After the first phase which included a literature review on best practices for sustainable tourism and tourism development in Albania, analyzing the need for data collection and its effective use. The second phase consists of data collection through interviews, surveys and questionnaires addressed to stakeholders in the tourism industry (tourists, businesses and the community). The questionnaires used the Likert scale method to assess the importance of data collection and management. Data were collected from 90 tourists, 20 businesses .

Fig. 4 Tourists nationality

Figure 4 illustrates the distribution of the surveyed tourists based on their country of origin (N=90). The largest proportion of respondents are tourists from **Germany (n =21; 23.3%)**, indicating a strong presence of German visitors among the sample. In contrast, tourists from the **United States (n =2;2.2%)** represent a much smaller share of the respondents. The remaining tourists originate from various other countries, such as the Netherlands, the United Kingdom, Greece, and Italy, each contributing a smaller proportion to the overall sample.
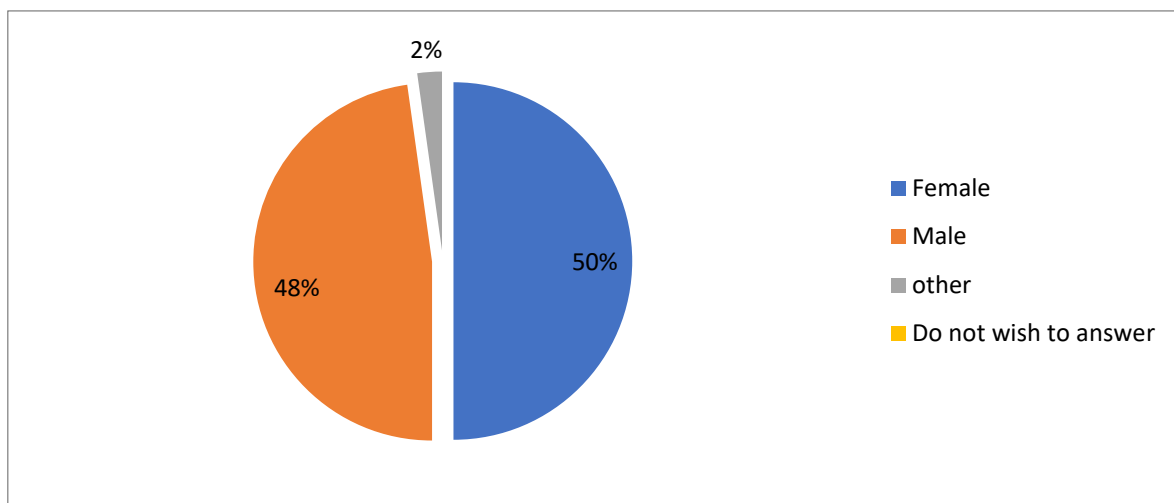

Fig. 5 Tourist gender

Figure 5 presents data collected from the tourist questionnaires (N = 90) regarding the gender distribution of the respondents.
The results indicate that the majority of the participants are **female (n = 45; 50%)**, followed closely by **male respondents (n = 43; 47.78%)**. A small minority of tourists identified as **other (n = 2; 2.22%)**. This near-equal gender representation suggests a balanced interest in

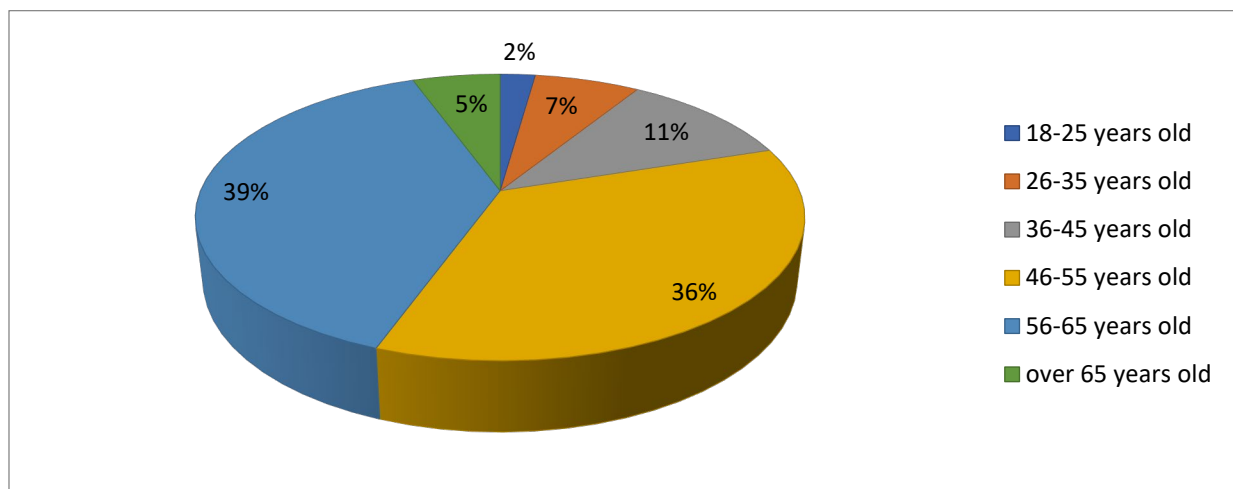the destination among both male and female travelers, with a slight predominance of female respondents.

Fig. 6 Tourists Age

Figure 6 presents information regarding the age distribution of the interviewed tourists

(N = 90).

The largest proportion of respondents belongs to the **56–65 age group (n = 35; 39%)**, making it the most represented category among the participants. The remaining tourists are spread across other age ranges, with a **relatively low number of younger respondents**. This finding may suggest that Albania currently attracts a more mature tourist demographic, and it could serve as a reference point for designing future strategies aimed at increasing the appeal of Albanian destinations among younger travelers.
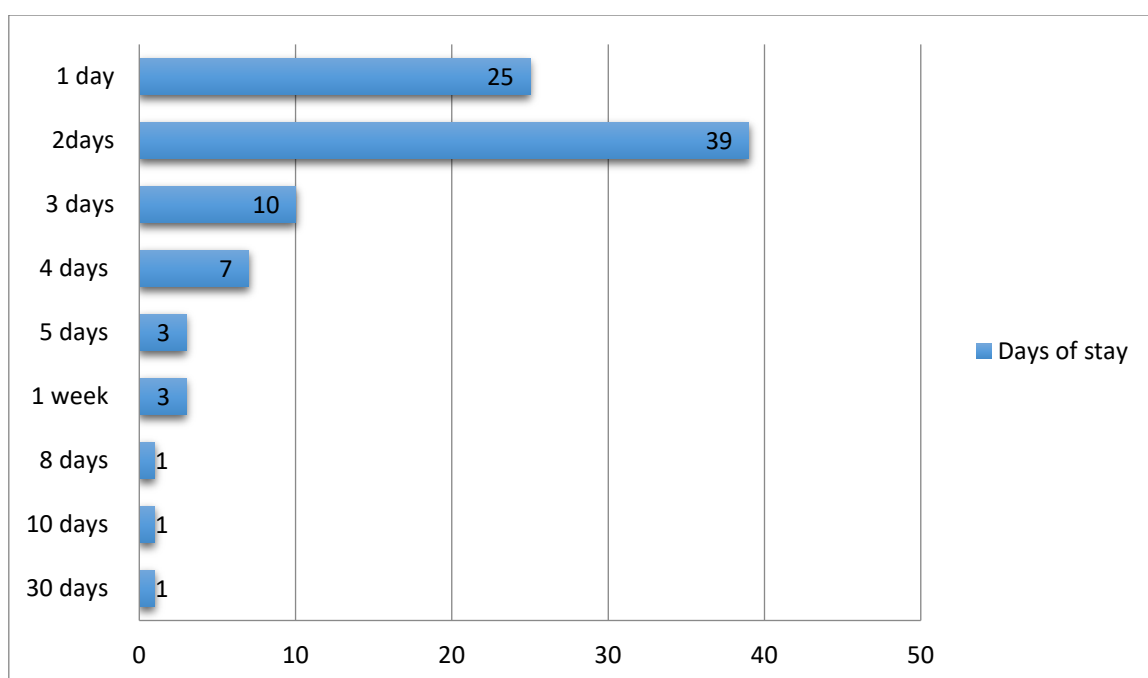

Fig. 7 Duration of Stay at the Destination

Figure 7 illustrates the duration of stay among the interviewed tourists in Albania (N = 90).

According to the data, the largest group of respondents **39 tourists (n = 39;43.3%)**—reported staying **no more than two days**, while **25 tourists (n = 25; 27.8%)** indicated that they stayed **less than one day**. These findings suggest that a significant portion of tourists are short-term visitors, which raises concerns about the limited economic impact of such visits. Consequently, this highlights the need to **diversify and enrich the tourist offer** in order to encourage longer stays and improve the overall value and sustainability of tourism in the country.

Figure 8 presents the distribution of tourists' responses (N=90) regarding the importance of Big Data in sustainable tourism development in Albania.

Using a Likert scale from 1 (strongly disagree) to 5 (strongly agree), the graph illustrates tourists' attitudes toward key aspects such as data collection, tourism management, environmental impact, the necessity of a national intelligent tourism platform, and overall satisfaction with tourism services. The majority of respondents expressed positive views, indicating broad recognition of the value of Big Data in enhancing sustainable tourism practices and improving their travel experience in Albania.

Legend: ■ Strongly Agree (N=90) ■ Agree (N=90) ■ Neutral (n=90) ■ Disagree (N=90) ■ Strongly disagree (N=90)

I would be willing to share my travel data if it hepls improve tourism management
- 49
- 37
- 3
- 1
- 0

The government should encourage the use of technology to manage tourism better
- 45
- 30
- 9
- 4
- 2

Tourism business should be more involved in the data collection process
- 48
- 32
- 5
- 3
- 2

The avilability of an international tourism platform would enhance my travel experience in Albania
- 62
- 25
- 2
- 1
- 0

I belive that better data management can help reduce over tourism
- 67
- 21
- 2
- 0
- 0

I would use a digital platform to find information about Albania's tourism options
- 65
- 20
- 4
- 1
- 0

I am concerned about the impact of tourism on the local environment .
- 60
- 23
- 5
- 2
- 0

There should be a platform to track tourist flows and manage tourism resources
- 48
- 38
- 2
- 1
- 1

Tourism data cloud improve the services and experiences for visitors
- 42
- 38
- 6
- 2
- 2

Data collection for tourism management necessary in Albania.
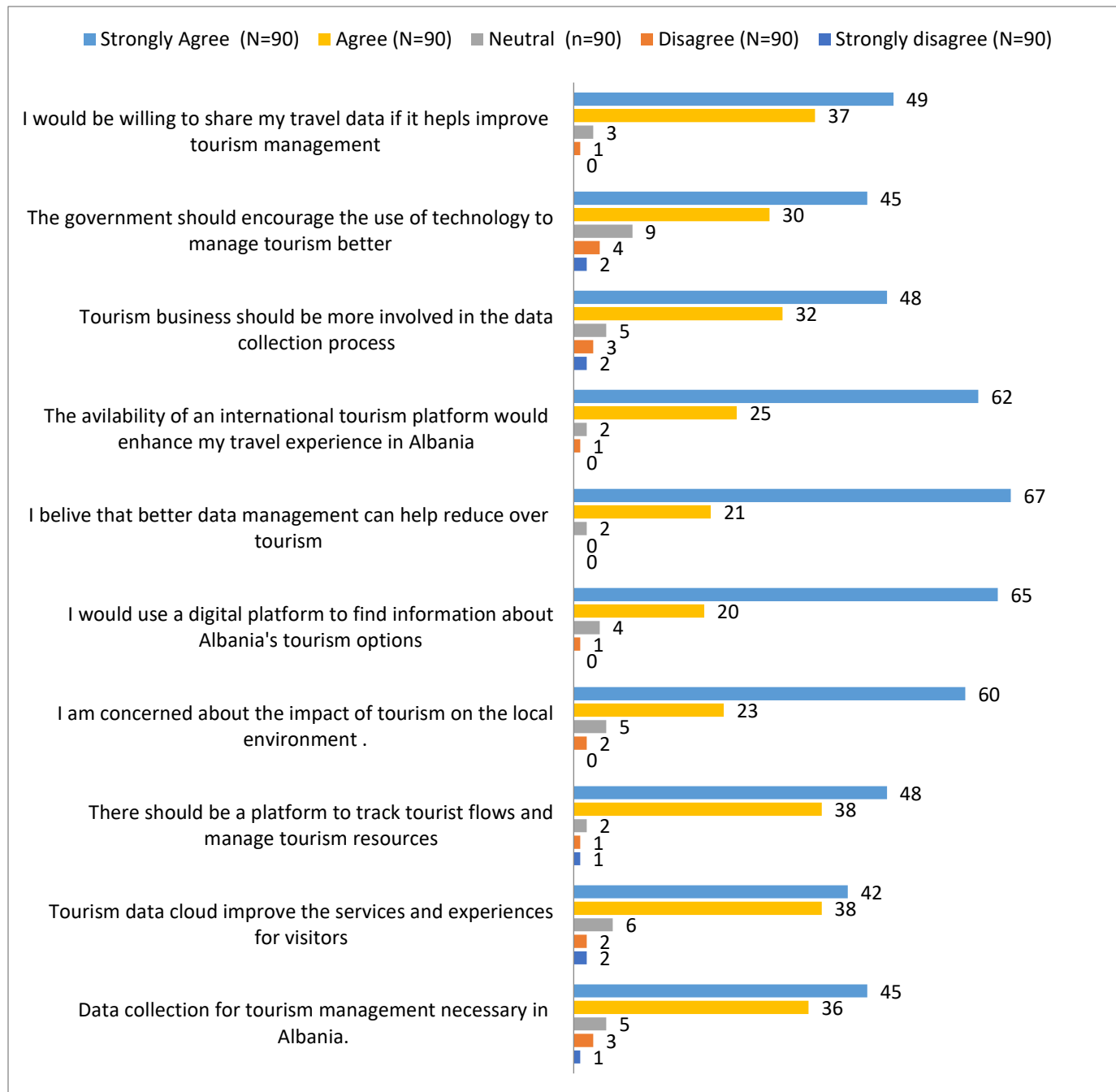- 45
- 36
- 5
- 3
- 1

Fig. 8 Summary of tourist response results

According to the graphical presentation, it is clear that tourists strongly agree not only on the use of Big Data in tourism but also on the significant benefits these data provide in managing tourist flows, destination control, and environmental pollution management. Out of 90 respondents, **over 65 tourists (n = 65; approximately 72%)** expressed willingness to share their data after completing their experience in Albania, while around **49 tourists (n = 49; 54%)** strongly agreed on the importance of sharing such data. Furthermore, a substantial majority of **65 tourists (n = 65; 72%)** fully agreed on the need for a national data collection platform in Albania, which they believe would contribute to sustainable and well-organized tourism development.
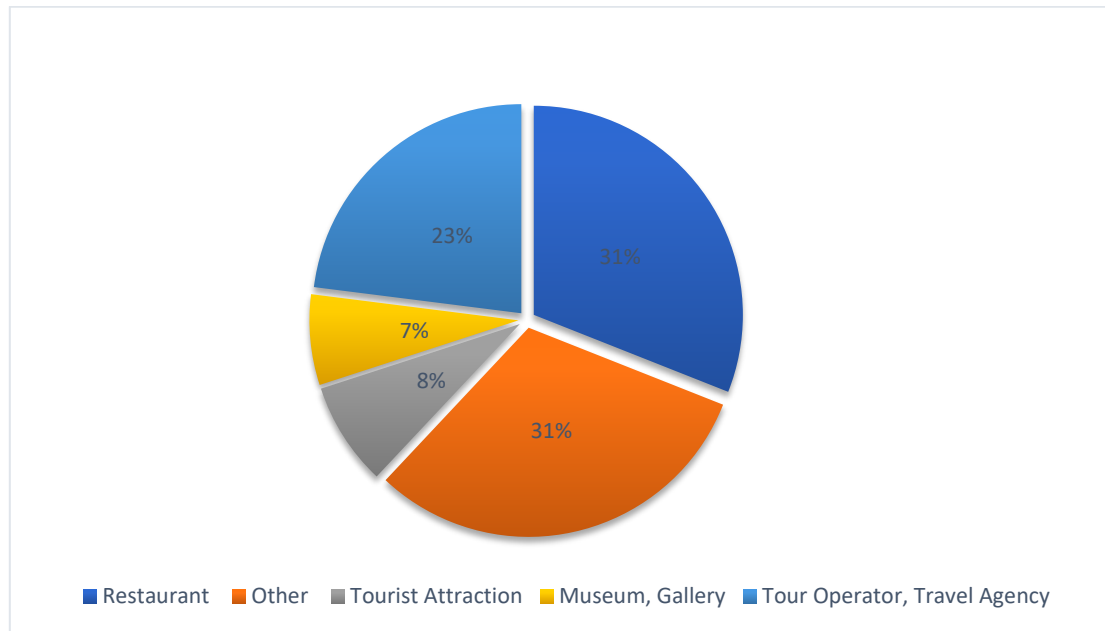
2. Business response results

Fig. 9 Business typology

Figure 9 illustrates the distribution of the 20 surveyed businesses across different tourism-related sectors.

Among the respondents, **6 businesses (n = 6; 31%)** are categorized as restaurants, which represents the largest sector. Similarly, the "Other" category also comprises **6 businesses (n = 6; 31%)**, indicating a diverse range of additional business types. Tour operators and travel agencies make up **5 businesses (n = 5; 23%)**, reflecting a significant share within the tourism industry. Tourist attractions are represented by **2 businesses (n = 2; 8%)**, while museums and galleries account for **1 business (n = 1; 7%)**.

This distribution highlights the predominance of restaurants and travel agencies in the sample, compared to a smaller presence of tourist attractions and cultural institutions like museums and galleries.

The following graph summarizes the responses of tourism businesses to key topics covered in the questionnaire, including data collection, tourism management, platform effectiveness, and business impacts.

Using a Likert scale ranging from 1 to 5 (where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree), the graph illustrates the distribution of opinions among the surveyed businesses. This analysis provides a comprehensive view of their attitudes toward the proposed national data platform and its potential benefits for their operations. The insights gained will be instrumental in guiding the design, development, and implementation of a platform that addresses the needs and concerns of tourism stakeholders.
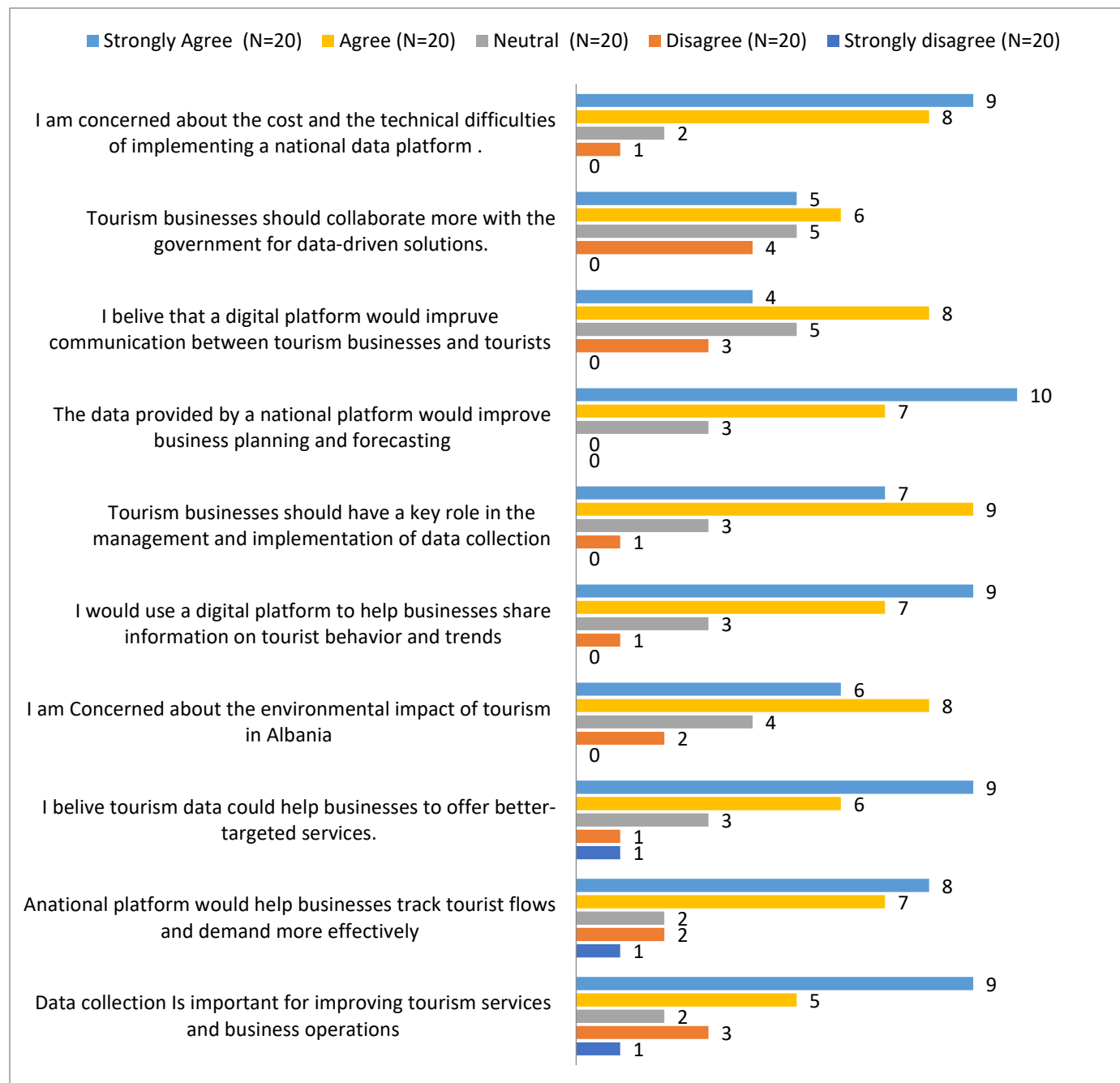
Fig. 10 Summary of businesses response results

Figure 10 shows the distribution of responses from tourism businesses (N = 20) regarding various statements on data collection and the implementation of a national intelligent tourism platform.

The majority of the 20 businesses expressed positive attitudes toward these initiatives. For most questions, the combined number of respondents who **agreed (n = 6 to 9)** or **strongly agreed (n = 4 to 10)** ranged between **10 and 17 out of 20** participants, indicating strong overall support. The number of businesses that **disagreed** or **strongly disagreed** was very low, generally between **0 and 1**, showing minimal opposition. Neutral responses varied from **2 to 5** businesses depending on the question.

These results suggest that tourism businesses recognize the importance of data-driven decision-making, are willing to share data, and support the creation of a national platform to better manage tourist flows and improve services. Nonetheless, some concerns remain about technical and financial challenges related to the platform's implementation.

3. Summary of Expert Interviews on the Feasibility of Implementing a National Tourism Big Data Platform in Albania

To evaluate the technological and legal feasibility of implementing a National Big Data Platform, it is essential to gather insights from five legal experts and five technology specialists. To present the opinions of these experts, a comparative table has been selected, providing a clear and simple format that categorizes their views into two distinct areas.

Issue	Legal Experts (5)	Technology Experts (5)
Albania's legal infrastructure	1. Data protection laws need to be improved. 2. GDPR compliance is essential. 3. Current legislation is unclear regarding data sharing. 4. A law on personal data protection and management is required. 5. International cooperation can help to standardize laws.	1. Digital infrastructure is developing, but not at the right level. 2. Data standardization is lacking in different sectors. 3. 4G and 5G infrastructure is still in its early stages. 4. More investment is needed in cloud services and cybersecurity. 5. Albania has sufficient capacity to develop an IoT platform.
Data Security and Cyber Protection	1. A strong system of personal data security is needed. 2. Legal concerns about data breaches and regulations are high. 3. Strong legal support for data monitoring and auditing. 4. Data protection rules need to be clearer and more appropriate. 5. Legal protections need to cover all levels of data collection.	1. Block chain can be used for the security of tourist data. 2. Cybersecurity systems should include the most modern tools. 3. Use of AI for security monitoring and threat detection. 4. Cloud systems and multi-factor authentication should be part of the platform. 5. Cybersecurity is a key priority for the development of the platform.
Use of New Technologies (Big Data, IoT, AI)	1. The law should enable the use of Big Data and AI in a controlled manner. 2. Regulation on the use of public data is necessary. 3. Cooperation between state institutions and businesses is essential.	1. The use of Big Data and AI can bring major improvements in tourism management. 2. IoT technologies can improve real-time tourist tracking. 3. Technological improvements are needed to enable the use of disparate data.

	4. The legal system should support and encourage the use of AI for data collection. 5. Regulation of the use of international data is important to avoid legal problems.	4. Integrating data from different sources requires more advanced platforms. 5. Cloud infrastructure and the use of AI will enable advanced analytics.
The applicability of the National Big Data Platform	1. The law should enable the controlled use of Big Data and AI. 2. The use of new technologies should be in accordance with existing laws. 3. Collaboration between institutions and business is essential. 4.The legal framework must support and encourage AI for data collection 5. Regulating the use of international data is important to avoid legalconflicts and ensure compliance with international standards.	1.The use of Big Data and AI could lead to significant improvements in tourism management. 2. IoT technologies could enhance real time tracking of tourists. 3. Technological advances are required to enable the use of shared data. 4. Integrating data from various sources requires more advanced platforms. 5. Cloud infrastructure and AI will facilitate advanced analytics.

Table 1. Summary of Expert Interviews on the Feasibility of Implementing a National Tourism Big Data Platform in Albania (done by authors)

This table serves as an effective visual tool for comparing and summarizing the perspectives of experts in law and technology. It offers a comprehensive overview of how these two domains should collaborate and align to establish a sustainable Big Data platform within the tourism sector. This comparative approach facilitates the understanding of how to balance legal regulations with technological opportunities, ensuring that the platform is both effective and secure while remaining compliant with industry standards and legal requirements. The interviews were conducted with five professionals specializing in information technology, smart tourism, data analytics, and digital infrastructure. The key findings from these interviews shed light on the current technological capabilities, challenges, and opportunities for developing such a platform.

Conclusions

In summary, the research findings indicate strong support from both tourists and businesses for the establishment of a national Big Data platform. Tourists are aware of the benefits of data collection for improving tourism services and managing visitor flows, emphasizing the importance of sustainable solutions to mitigate environmental impacts. They are also willing to adopt digital platforms, though concerns about data security and privacy remain crucial factors in increasing participation. On the business side, there is strong support for utilizing data to improve services and operations, as well as for the creation of a national platform that would enable more efficient management of tourist demand. However, some businesses express concerns regarding the costs and technical challenges of implementation, highlighting the need for financial and technical support from the government and other stakeholders. Legal experts stress the importance of establishing a clear and robust legal framework to ensure the protection of personal data and compliance with privacy regulations. They suggest that any national platform should incorporate stringent data security measures and align with international data

protection laws to address privacy concerns. From a technological perspective, experts emphasize the necessity of advanced technological infrastructure, including the use of IoT, AI, and Big Data, to create a successful platform. They highlight that the integration of these technologies could significantly enhance tourist flow management and the overall tourist experience. However, they also underline the need for sufficient resources to develop and maintain the platform effectively. These findings suggest that, to achieve a successful and sustainable data platform, it is essential to balance the integration of advanced technology with legal requirements for data security and privacy. Additionally, providing adequate financial and technical support for businesses is crucial to the successful implementation of such a platform.

Recommendations for Albania's National Big Data Platform for Sustainable Tourism:

1. **Establish a Legal Framework:** Draft clear regulations ensuring data protection, privacy, and compliance with international standards like GDPR to build trust and transparency in data handling.

2. **Invest in Technological Infrastructure:** Develop scalable Big Data, AI, and IoT infrastructure to handle and analyze tourism data efficiently, supporting real-time decision-making for sustainable tourism management.

3. **Support Businesses:** Provide financial incentives, training, and technical assistance to help SMEs adopt digital tools and integrate with the platform, ensuring broad participation.

4. **Promote Stakeholder Collaboration:** Foster cooperation between the government, tourism businesses, technology providers, and legal experts to align interests and ensure the platform meets all needs.

5. **Integrate Sustainability Goals:** Incorporate Big Data solutions for managing tourist flows and reducing environmental impacts, aligning the platform with sustainable tourism objectives.

6. **Build Public Trust:** Launch awareness campaigns to inform tourists about data-sharing benefits and privacy measures, encouraging participation and trust.

7. **Monitor and Evaluate:** Set up mechanisms to continuously assess the platform's effectiveness and impact, allowing for adjustments to ensure long-term sustainability and success.

These steps will help Albania establish a robust and sustainable Big Data platform for tourism that enhances management, sustainability, and the visitor experience.

References

Albanian Ministry of Tourism and Environment. (2022). *Strategjia Kombëtare e Turizmit 2023–2030*. Retrieved from https://turizmi.gov.al/strategjia-kombetare-e-turizmit

Bego, D. (2020). The role of digital transformation in the development of tourism in Albania. *International Journal of Tourism and Hospitality Research*, *34*(2), 151–164.

Brida, J. G., Gómez, D. M., & Segarra, V. (2020). On the empirical relationship between tourism and economic growth. *Tourism Management*, *81*, 104131.

Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer. https://doi.org/10.1007/978-3-319-14343-9_32

Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: Lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing*, 36(5), 563-582.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, *25*(3), 179–188. https://doi.org/10.1007/s12525-015-0196-8

Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 Agenda and the modernisation of tourism research. *Journal of Sustainable Tourism*, 27(7), 1044-1060.

Kar, N., Kar, B., & Kar, S. (2021). Stress and coping during COVID-19 pandemic: Result of an online survey. *Psychiatry research*, *295*, 113598.

Kavoura, A., & Stavrianea, A. (2015). The role of big data and analytics in the tourism industry. *Procedia - Social and Behavioral Sciences*, *175*, 382–387. https://doi.org/10.1016/j.sbspro.2015.01.122

Kontogianni, A., Alepis, E., & Patsakis, C. (2022). Promoting smart tourism personalised services via a combination of deep learning techniques. *Expert Systems with Applications*, *187*, 115964.

Li, J., & Wang, Y. (2011). Developing a sustainable tourism model with smart technologies: A case study of eco-tourism. *Journal of Sustainable Tourism*, *19*(6), 755–768.

Li, S., Hu, X., Huang, S. S., & Duan, L. (2017). The impact of big data on tourism research. *Tourism Management*, 62, 276-291.

Ma, S. (2024). Enhancing tourists' satisfaction: Leveraging artificial intelligence in the tourism sector. *Pacific International Journal*, *7*(3), 89-98.

Rodríguez, C., Florido, C., & Jacob, M. (2020). Circular economy contributions to the tourism sector: A critical literature review. *Sustainability*, *12*(11), 4338.

Sarker, I. H. (2021). Data science and analytics: an overview from data-driven smart computing, decision-making and applications perspective. *SN Computer Science*, *2*(5), 377.

Sigala, M. (2018). Market dynamics and sustainable tourism management. *Tourism Management Perspectives*, 26, 143-150.

UNWTO. (2021). *Global report on digital transformation in tourism*. World Tourism Organization. https://www.unwto.org/global-report-digital-transformation-tourism

UNWTO. (2021). *Big data in tourism: Challenges and opportunities*. United Nations World Tourism Organization.

UNWTO. (2024). *Tourism Highlights 2024 Edition*. United Nations World Tourism Organization.

World Bank. (2021). *Digital economy assessment: Albania*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/

World Bank. (2023). *Albania Country Report: Tourism and Sustainable Development*. World Bank.

World Bank (2025), Global Economic Prospects, January 2025, available online at: https://www.worldbank.org/en/publication/global-economic-prospects[05-01-2025].

Xhafa, G., & Shehu, E. (2019). Digitalization and sustainable tourism development in the Western Balkans: The case of Albania. *Sustainability*, *11*(12), 3301. https://doi.org/10.3390/su11123301

Xiang, Z. (2018). From digitization to the age of acceleration: On information technology and tourism. *Tourism Management Perspectives*, 25, 147-150.

Xiang, Z., Schwartz, Z., Gerdes, J. H., & Uysal, M. (2019). What can big data and machine learning do for tourism big questions? *Tourism Management*, 72, 185-196.

2024 Annual Research: Key Highlights1 https://researchhub.wttc.org. 1. All values are in constant 2023 prices & exchange rates. As reported in March 2024.

https://akt.gov.al/un-tourism-shqiperia-e-para-ne-bote-per-rritjen-e-turizmit/ agjensia kombetare e turizmit .

https://www.unwto.org/investment/tourism-doing-business-investing-in-albania