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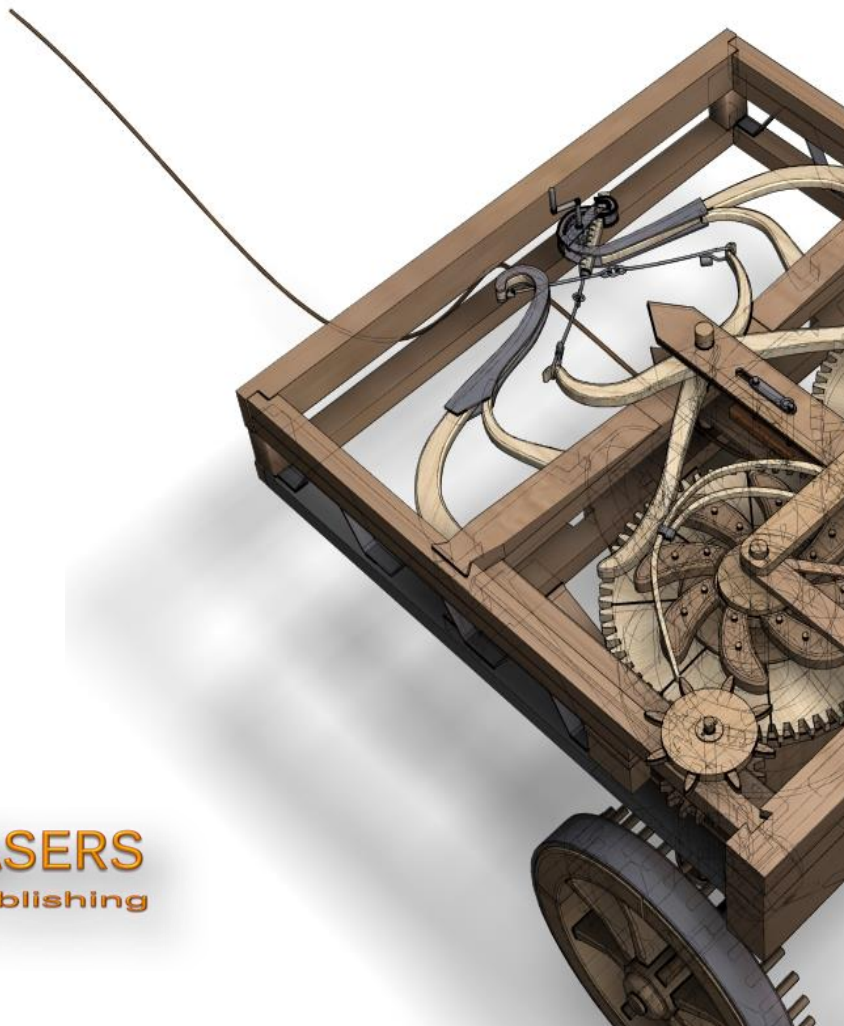

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Winter Issue 2024
Journal of Environmental Management and Tourism

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Food Security and Marine Capture Fisheries of BUGSAY Association of La Libertad, Negros Oriental, Philippines

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Abstract: Marine Capture Fisheries are a valuable food source, but challenges related to humanitarian and environmental factors often hinder access to sufficient nutrition. This study aimed to evaluate food security and analyze marine capture fisheries practices among members of the BUGSAY Association in La Libertad, Negros Oriental. Employing a stratified random sampling method, the researcher gathered data from 254 respondents from six coastal barangays in La Libertad - Pisong, Martilo, North Poblacion, South Poblacion, Cantupa, and San Jose. The majority of respondents, predominantly male fishermen aged 46-60, were married with 1-5 dependents, had incomplete elementary education, and earned less than ₱9,520 monthly. Findings revealed prevalent challenges in accessing adequate and nutritious foods, with many respondents experiencing these hardships ten times or more in the past four weeks. The study highlighted May as the peak fishing month, with 144 respondents engaging in high fishing activity, followed by June (129 respondents) and April (123 respondents). The ranking indicated heightened fishing activities in the first half of the year (April, May, June), coinciding with the spawning season of many fish species in the Philippines during late spring and early summer. This period witnesses increased fish abundance, driven by rising water temperatures that enhance fish activity and accessibility to fishermen. Warmer waters also promote plankton growth, a crucial food source for fish (Mcevoy, L., and Mcevoy, J., 2006). In contrast, February exhibited the lowest fishing activity, with only 34 respondents identifying it as a peak fishing period. February falls within the Amihan season, characterized by cooler temperatures, strong winds, and rough seas - conditions that pose risks and challenges for fishing endeavors. The use of cast nets, pump boats, and traditional fishing vessels is tailored to local environments and cultural norms, enabling fishermen to efficiently catch and sell fresh fish during peak fishing months (Xing, Q., Yu, H., and Wang, H., 2024).

Keywords: food security; marine capture fisheries; La Libertad; Negros Oriental; BUGSAY association.

JEL Classification: Q22; Q25; I19; R11.

Introduction

Food security poses a serious social and global concern as the global population increases. Fisheries constitute a significant source of proteins, vitamins, and micronutrients, especially for many low-income populations in rural areas, and the sustainable management of these resources for long-term global food security has attracted significant public policy attention. However, in changing ecosystems, maintaining or restoring fisheries' sustainability and stock sizes, minimizing environmental impact and degradation, and enhancing local and global food security continue to present enormous challenges despite some progress (Garcia and Rosenberg, 2010).

In the Philippines, a fishing nation, fisheries provide a livelihood to the people and sustain the economy. According to Lamarca (2018), the fishing sector employed over 1.6 million people, most of whom worked in municipal, commercial, and aquaculture sectors, significantly contributing to the country's Gross Domestic Product (GDP). This proves that marine capture fisheries hold the utmost significance in food security, particularly in the

Filipino community. However, the nation's resources are light to heavily exploited and overfished in municipal waterways, not to mention the gradual degradation of the mangrove resources. Factors include overfishing due to an increased number of fishermen and open access to fisheries, disputes among resource users as commercial fishing boats operate in municipal waterways, and the use of detrimental fishing methods (*e.g.*, dynamite and cyanide), which resulted to the quick depletion of fish stocks and habitat deterioration (Lamarca, 2018).

The Municipality of La Libertad relies on farming, carpentry, buy-and-sell, and fishing to sustain the local economy; thus, it seeks to preserve marine diversity. This pursuit establishes the Baryohanong Ugmad Gambalay sa Yanong Mangingisda (BUGSAY), an association that aims to preserve and protect marine life for present and future generations. Since there is an inadequate amount of studies concerning the food security and marine capture fisheries in the Philippines, nor is there a study solely dedicated to identifying and determining these variables in Negros Oriental, let alone in La Libertad, the researcher opted to set the ground for social and environmental research not only to foster marine life preservation but to advocate for sustainable livelihood for future generations amid the expected growth of the population.

The study on food security and marine capture fisheries among association members addresses a critical and under-researched intersection of sustainable food systems and marine resource management within the community. As the global demand for food escalates, the reliance on marine capture fisheries for nutrition and livelihoods intensifies, highlighting the need for sustainable practices. By focusing specifically on the members of BUGSAY Association, this research generates a tailored insight that reflect the distinct challenges and opportunities faced by the community. The study's findings not only advantageous to academic understanding but also inform targeted strategies for enhancing food security, promoting sustainable fisheries, and supporting the economic resilience of the members of the association.

1. Literature Review

The issue of food security cannot be categorized or confined by geography or defined by a particular grouping, *i.e.*, demography, education, geographic location, or income, food security is a complicated problem to handle. Currently, 16% of the world's population (1 billion people) experiences chronic hunger, despite the fact that there is more than enough food available to sustain every person on Earth. Herein lies the challenge of achieving food stability - how to deal with growing food shortages brought on by a confluence of waste and a population that continues to grow. Predictions assert, at current levels, that we must boost the global production of food by 70% earlier than 2050 on the already finite infrastructures (Carthy *et al.* 2018).

On the other hand, marine capture fisheries play a major part in this scenario. Fish have historically served an integral part in human diets, particularly in places nearby lakes, rivers, deltas, floodplains, and coastal regions, and especially on small islands just like Negros Oriental. Fisheries can help with food security in two ways: (i) immediately by providing vital nutrients; and (ii) indirectly by offering income for food expenditures (Garcia and Rosenberg, 2010). Moreover, Negros Oriental's First District had the highest rate of poverty incidence in Central Visayas. Nearly half of the families in the province derive most of their income from agriculture, such as fishing, earning a yearly income of less than PhP 17,500 on average (Calumpong *et al.* 1997; Ablong *et al.* 2001). In connection, the researcher of this study came to do a research which will help identify the food security and determine marine capture fisheries in the Municipality of La Libertad (who is included in the 2015 highest rate of poverty) particularly, on its active association of fishermen named BUGSAY. They are likewise interested to know the maritime trends and the future perspectives or outlooks of the members of the mentioned association regarding fishers and marine capture fisheries, for the aims of establishing a research paper that would as well, help address some of the respondents' concerns and contribute to the development of their association.

Loring *et al.* (2019) states that, it is ideal to achieve food security through strategies that foresee and adapt to changes in the food supply throughout time because many factors can weaken food security in any of these regions. This demonstrates that security goes beyond just food production. Carthy *et al.* (2018) show that there is no single measure that can guarantee sustained food security in the years to come. Thus, a thorough systems-based approach, anchored on the combination of policy and technological reform, will be vital for attaining sustainable food security worldwide which will use current systems in conjunction with innovative technologies, techniques, and best practices described in the study.

According to FAO (2011), the economy and well- being of coastal communities are greatly affected by marine fisheries, which offer food security, employment possibilities, income, and livelihoods as well as preserving traditional cultural identity. Marine capture fisheries are vital to the survival and nourishment of human civilization. Hence, in recent years, human activities have been compromising the health of the ocean and putting immense strain on marine ecosystems for many years. Thus, there is an urgent need to strengthen sustainable practices and

legislation in fisheries all over the world to propel marine capture fisheries toward sustainability (Jesintha and Madhavi, 2020).

The researcher is motivated to conduct a study to determine food security, identify marine capture fisheries by the members of the BUGSAY Association of La Libertad, Negros Oriental.

2. Research Methodology

This study was conducted in the coastal barangays of the Municipality of La Libertad, one of the provinces of Negros Oriental. This was specifically executed in the respective barangays of Pisong, Martilo, North Poblacion, South Poblacion, Cantupa, and San Jose which are the fortress of BUGSAY Association. Since Marine Capture Fishery is one of the livelihoods of the La Libertadnons that does not just sustain their lives but has also supported the local economy, the Local Government Unit (LGU) seeks to protect its inhabitants and their source of income. The respondents of this study were the registered members of the Baryohanong Ugmad Gambalay Sa Yanong Mangingisda (BUGSAY) Association from the different coastal Barangays of La Libertad. The Local Government Unit (LGU) of the Municipality of La Libertad shows that BUGSAY Association has 699 registered members as of May 2023. In order to identify the sample size of the study, Sloven's formula was used. The 254 sampled members of BUGSAY Association in La Libertad is proportionately distributed and randomly identified in six (6) coastal barangays of Pisong, Martilo, North Poblacion, South Poblacion, Cantupa, and San Jose of La Libertad. The respondents were well represented by the different coastal barangays of La Libertad to avoid bias and inconsistency in the result. This study utilized a stratified random sampling technique, and the researchers politely asked the members of the association to participate in the study willingly. The researchers ensured that all the respondents were members of BUGSAY Association with the help of the leadership of the BUGSAY Presidents from every coastal barangay. The main data-gathering instrument was modified questionnaires. It was composed of three (3) parts, namely, the Demographic Profile of the Respondents, Level of Frequency of Food Security in the last four (4) weeks, and Knowledge and Practices of the Respondents in Marine Capture Fisheries.

To determine the level of frequency of food security among the respondents, the researchers used this descriptive interpretation using the scale below:

Range	Verbal Interpretation
2.51 – 3.50	Rarely (1 to 2 times)
1.51 – 2.50	Sometimes (3 to 10 times)
0.51 – 1.50	Often (10 times or more)

To answer the knowledge and practices of the respondents in Marine Capture Fisheries in terms of fisheries calendar, the researchers use the percentage formula to convert their responses into percentages. Whereas, to answer problem which deals with the knowledge and practices of the respondents in Marine Capture Fisheries in terms of fisheries input and output, the researchers use the ranking method to rank the responses of the respondents.

3. Research Results and Discussions

3.1 Residents' Knowledge about Solid Waste Management Program

Generally, the level of food security within the BUGSAY Association of La Libertad, Negros Oriental, often eat a limited variety of food and often eat fewer meals in a day due to a lack of resources.

Table 1. Level of Frequency of Food Security

No	Statements	Mean	Interpretation
1	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	1.39	Often
2	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	1.45	Often
3	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	1.43	Often
4	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	1.35	Often
5	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	1.23	Often
6	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	1.35	Often

No	Statements	Mean	Interpretation
7	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	1.35	Often
8	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	1.35	Often
Total		1.37	Often

Only the top 5 statements with the highest and lowest percentage ratings were included in the table.

Statement number 2 and 5 count as the highest and lowest weighted mean, respectively, all of which have the same descriptive interpretation - often. This means that most of the respondents often eat a limited variety of food and often eat fewer meals in a day due to a lack of resources. This implies that they were able to experience the mentioned conditions ten times or more in the past four (4) weeks. The total weighted mean also reveals the same verbal interpretation. This implies that as the respondents earn the lowest income bracket every month, it is indisputable that they would have experienced all the conditions ten or more times in the past four (4) weeks.

3.2 Fisheries Calendar According to the Respondents

Table 2 is interpreted through the Months with High Fishing and Rank column beside. The data represents the high fishing months as ranked by respondents. The month of May was identified as having the highest fishing activity with 144 respondents, making it the peak month for fishing. This was followed by June with 129 respondents and April with 123 respondents.

Table 2. Fisheries Calendar

Month	High Fishing (H)	Rank
May	144	1
June	129	2
April	123	3
March	80	4
July	68	5
August	54	6
October	49	7
January	47	8
November	46	9
December	45	10
September	44	11
February	34	12

The ranking indicates that the first half of the year (April, May, June) sees the highest fishing activities. Many fish species in the Philippines spawn during the late spring and early summer months. This period sees an abundance of fish, making it a prime time for fishing activities. The transition from the cooler months to warmer ones increases water temperatures, which stimulates fish activity and makes them more accessible to fishermen. Warmer waters also encourage plankton growth, which serves as food for fish (Mcevoy, L., and Mcevoy, J., 2006).

Conversely, February is the month with the lowest fishing activity, with only 34 respondents indicating it as a high fishing period. February falls within the Amihan season, which brings cooler temperatures, strong winds, and rough seas. These conditions are not conducive to fishing activities as they can be dangerous and make it difficult to catch fish.

Table 3 shows that among the 254 respondents, 107 answered Cast Net as the common fishing equipment used, followed by Pump Boat corresponding 98 respondents, and Old Fishing Boat constituting 13 respondents. The rest includes pasol (indicated by the respondents themselves) with 12 respondents, Outboard Engine, Gill Net, Long Hand Line, Beach Seine, and Fish Traps - constituting 8, 7, 4, 3, 2 respondents respectively.

Table 3. Fisheries Input

Fisheries Input	Frequency	Fisheries Input
Cast Net (Pukot)	107	1
Pump Boat *(Pambot)*	98	2
Old Fishing Boat *(Sakayan)*	13	3
Others *(Pasol)*	12	4
Outboard Engine *(Makina)*	8	5
Gill Net *(Pahubas)*	7	6
Long Hand Line *(Bugsay)*	4	7
Beach Seine *(Sarap)*	3	8
Fish Traps *(Panggal)*	2	9

This is in consonance with the study of Kwen *et al.* (2013), which found that among fishing equipment, net is one of the commonly used tools since the findings of the study show that the Cast Net is usually utilized by BUGSAY Association, casually known as pukot/net. Institutional/governance aspects, on the other hand, displayed a high mean rating. city's solid waste management policies, rules, and laws.

Table 4. Quantity Landed and Processing Code

Kinds of Fish	Quantity Landed (in kilograms)					Processing Code				
	1-5	6-10	11-15	16-20	Total	1	2	3	4	Total
Lumyagan	72	64	0	0	**136**	136	0	0	0	**136**
Gutob	94	39	0	0	**133**	117	0	16	0	**133**
Bansikol	114	5	0	0	**119**	119	0	0	0	**119**
Malangsi	69	13	0	0	**82**	79	0	3	0	**82**
Pulag-ikog	65	14	0	0	**79**	72	0	7	0	**79**
Anduhaw	62	7	0	0	**69**	69	0	0	0	**69**
Sihag-sihag	15	20	0	0	**35**	35	0	0	0	**35**
Bakulan	30	0	0	0	**30**	30	0	0	0	**30**
Yellow Fin	25	0	0	0	**25**	25	0	0	0	**25**
Tuloy	24	0	0	0	**24**	24	0	0	0	**24**
Alukihok	23	0	0	0	**23**	23	0	0	0	**23**
Balo, Katambak, and Timbungan	22	0	0	0	**22**	22	0	0	0	**22**
Gurayan, Mamsa, and Tamban	21	0	0	0	**21**	21	0	0	0	**21**
Danggit, Bangsi, and Maya-maya	18	0	0	0	**18**	18	0	0	0	**18**
Lilang, Kinsan, and Bilason	15	0	0	0	**15**	15	0	0	0	**15**
Bilong- bilong, Budburon, and Tamarong	10	0	0	0	**10**	10	0	0	0	**0**

Processing Code (1 – Fresh; 2 – Sun Dried; 3 – Smoked; 4 – Iced)

Table 4 revealed that there are three most commonly fish landed, these are lumyagan (squid), gutob (Indian mackerel), and bansikol (rainbow runner). The total landed quantity of lumyagan or squid is 136 kg, with 72 kg in the 1-5 kg range and 64 kg in the 6-10 kg range. All 136 kg are processed as fresh (Processing Code 1). The gutob (Indian mackerel) fish quantity landed was 133 kg, with 94 kg in the 1-5 kg range and 39 kg in the 6-10 kg range. 117 kg are processed fresh, and 16 kg are smoked (Processing Code 3). On the other hand, the bansikol (rainbow runner) fish has a landed quantity of 119 kg, with 114 kg in the 1-5 kg range and 5 kg in the 6-10 kg range. All 119 kg are processed fresh. Understanding which fish species are most commonly landed can provide insights into the preferences of local consumers and the demand for different types of seafood. Lumyagan (squid), gutob (Indian mackerel), and bansikol (rainbow runner) are popular choices, indicating a significant market for these species. This information can help fishers and fishery managers make decisions about which species to prioritize in their fishing efforts.

Conclusions and Further Research

Having multiple options for sourcing and processing fish helps mitigate the impacts of supply chain disruptions and ensures continued access to nutritious food during emergencies. Monitoring the quantities of landed fish and implementing sustainable fishing practices are essential for ensuring long-term food security. Overfishing or unsustainable harvesting practices can deplete fish stocks, jeopardizing the availability of seafood as a food source for future generations. Therefore, efforts to promote sustainable fisheries management and conservation are crucial for maintaining food security of the members of BUGSAY Association. The importance of diverse, accessible, and sustainable seafood resources in ensuring food security for the people. It underscores the need for holistic approaches to fisheries management that prioritize both economic development and environmental sustainability.

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Credit Authorship Contribution Statement

Eden Grace V. Tabanao: Conceptualization, Formal analysis, Writing –original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, and Funding acquisition.
Christine B. Gallosa: Investigation, Methodology, and Project administration.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Fuzzy Analytical Hierarchy Process Evaluation of Stakeholder Groups Involvement in Forest Management Situations

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Abstract: Decision-makers frequently face numerous complex, unforeseen, and irreversible problems when choosing forest management for a given situation. In these kinds of circumstances, a multitude of stakeholders or interest groups may be involved, and it may be necessary to consider a variety of criteria. In a case study of Prespa Park, we employed an approach that integrates the Fuzzy Analytical Hierarchy Process (FAHP), extended goal programming (ExtGoalProg), and "Saaty-type" surveys to rank five forest management scenarios selected through a participatory process. We also looked at three techniques for normalizing stakeholder preferences to see if they affected FAHP scenario rankings. The study was based on different empirical analyses and conducted in three parts. The first part involved identifying the key stakeholders involved in the process, establishing the "stakeholders' panel," dividing it into four "interest groups," and creating a "study/professional panel." The next step involved the identification of five alternative forest management scenarios and their associated criteria. The second part involved applying the FAHP-ExtGoalProg approach, which combines FAHP and *ExtGoalProg*, to rank the scenarios. In the third part of this study, we looked at how the ExtGoalProg, geometric mean, and weighted arithmetic mean techniques compared when it came to combining the preferences of different stakeholders into a single preference for all five forest management scenarios. The techniques produced varying scenario rankings, indicating that stakeholders should consult and consider the situation before selecting the optimal normalization technique to prevent bias or misleading results. The suggested approach is suitable for addressing comparable issues in forestry and environmental management.

Keywords: analytic hierarchy process; extended goal programming; fuzzy analytic hierarchy process; geometric mean technique; participatory planning; Prespa Park; weighted arithmetic mean technique.

JEL Classification: Q23; C51; C65.

Introduction

Forest management has commonly served a variety of purposes. More people now recognize forests for their non-timber forest value, such as biodiversity and recreation, in addition to their timber and financial returns (Davis *et al.* 2001). This shift in focus from maximizing timber production, financial returns, and technical processes, which has occurred over the course of several decades, to recognizing forests as sources of other forest values is ongoing. For this reason, as Diaz-Balteiro and Romero (2008) point out, many forest management scenarios are complex and require balancing economic, environmental, and social aspects. As well, according to our reviewed literature (Karjalainen *et al.* 2003; Bolte *et al.* 2006; Diaz-Balteiro and Romero 2008; Krcmar and van Kooten 2008; Khadka *et al.* 2013; Grošelj *et al.* 2016), planning for forest management is complex because you have to think about what will happen in the long term, biophysical and socioeconomic factors that are hard to predict, and the interests and priorities of many actors who have different knowledge, experiences, and goals, which often conflict with each other. This study effectively addressed the problem.

Forest management, as mentioned above, frequently involves many stakeholders and/or interest groups with different needs, preferences, and ideas about how to manage the forest. Various participatory methods, like organizing workshops, can facilitate this involvement by allowing actors to express themselves and engage in

discussions. We can also use surveys to gather qualitative and/or quantitative information about actors' preferences. In this study, we used three one-day workshops and "Saaty-type" surveys. The main aim of the first one-day workshop was to identify stakeholder representatives who represent the interests of all relevant groups in the Prespa Park case study and must have a sufficient level of expertise and experience to ensure a comprehensive understanding of all discussed topics and organize them in interest groups, which must be as effective as possible in facilitating the implementation of "Saaty-type" surveys. To address the later issue, we took into account the findings of Mattsson *et al.* (2019) that a trans-border protected area, as in our case study, can achieve effective planning with as few as 15 stakeholders organized into six groups. So, in this workshop, first we identified a "stakeholders' panel" of the 26 most relevant stakeholders and then organized it into four "interest groups." Additionally, we also formed a "study/professional group" that aimed to generate a collective decision through direct debate.

Numerous studies (Nordström *et al.* 2010; Grošelj *et al.* 2016; Grazhdani 2017; Gunduz and Alfar 2019; Marques *et al.* 2020) demonstrate the importance of employing multiple-criteria decision-making analysis (MCDA) methods to understand forest issues, given their complexity and the involvement of numerous criteria and stakeholders. Furthermore, these methods can foster a participatory process by guaranteeing transparency, fairness, and comprehensibility, all of which are crucial for the process to gain legitimacy and acceptance from all involved stakeholders. A lot of other research, like Nordström *et al.* (2012) and Gunduz and Alfar (2019), shows that the Analytic Hierarchy Process (AHP) is one of the most extensively used multiple-criterion decision-making methods in forest field. It can also work well with participatory methods to mathematically depict the complicated processes involved in real-life forest management decisions. As a result, we established a three-level AHP hierarchical structure in this study.

Meanwhile, the AHP has certain drawbacks, particularly in its inability to capture the ambiguities or mistakes associated with group decision-making. Meanwhile, it can effortlessly integrate with various techniques, including fuzzy logic. To address these deficiencies and capabilities, Zadeh (1965) developed the integration of AHP and fuzzy theory. The fuzzy AHP (FAHP) (Saaty 1987) addresses these issues, making it a robust and flexible decision-making tool, as highlighted by Torfi *et al.* (2010). In light of this, we used the participatory FAHP approach in place of AHP to evaluate and ranked the five selected forest management scenarios in Prespa Park.

As noted by Nordström *et al.* (2012), choosing the normalization technique to combine the preferences of individual stakeholders into a collective preference is one debatable aspect of AHP modeling. The geometric mean technique (*GeoMeanTech*) (Ananda and Herath 2008; Nordström *et al.* 2012; Srdjevic *et al.* 2013), the weighted arithmetic mean technique (WeighArithMeanTech) (Nordström 2010; Grazhdani 2017), and the extended goal programming (*ExtGoalProg*) technique (Ignizio and Romero 2003; González-Pachón and Romero 2007; Nordström *et al.* 2012) are the three most common ways to solve this problem. Naturally, the question of whether the type of normalization technique affects the FAHP results is intriguing. To address this question, we compared the outcomes of three abovementioned normalization techniques in the third part of the study in the participatory FAHP process for ranking forest management scenarios.

In sum, for this study, we developed an approach that combines participatory FAHP with ExtGoalProg and used it to rank five forest management scenarios selected through a participatory process. We also compared three techniques for consolidating individual preferences from the "stakeholders' panel" into a collective preference.

1. Literature Review

A large number of research studies (Davis *et al.* 2001; Prell *et al.* 2009; Nordström *et al.* 1012; Maroto *et al.* 2013; Diaz-Balteiro *et al.* 2016; Focacci *et al.* 2017) have documented that managing forests sustainably means preserving and improving the numerous ecosystem services that woodlands provide, such as biodiversity, harvested wood products, recreation, and local livelihoods, while also addressing climate change, necessitating consideration of a wide range of evaluation criteria of highly different natures. Because of this, they all emphasize the necessity of using methods of multi-criteria decision analysis in order to handle decision-making challenges in forest management.

Furthermore, forest management frequently involves many stakeholders and/or interest groups, each with distinct interests, preferences, and points of view, which can enrich forest management planning. Nordström *et al.* (2010), Maroto *et al.* (2013), Borges *et al.* (2017), Nilsson *et al.* (2016) and Bruña-García and Marey-Pérez (2018) are among the studies that highlight the significance of considering and incorporating the interests and concerns of stakeholders in forest management processes. According to them, stakeholder participation in decision-making regarding forest planning and management is believed to have several advantages, such as making this process more open and transparent, giving a voice to underrepresented groups, bringing people together to understand

other actors' viewpoints, finding agreement on issues and values, resolving disagreements in a timely and organized manner to prevent conflicts, and, finally, making a better and more legitimate decision. This study effectively addressed this problem. Additionally, Carmona *et al.* (2013), Sarvašová *et al.* (2014), and Balest *et al.* (2016) all stress the significance of participatory processes. They also demonstrate that forest managers and decision-makers can create tailored scenarios and policies that improve social acceptance and sustainability by learning about the interests and priorities of different actors.

Researchers have conducted several studies to explore the potential benefits of incorporating stakeholder participation into protected area management. For example, Valasiuk *et al.* (2018) evaluated the preferences of stakeholders in terms of public good planning for boreal forest ecosystems. In his article, Holder (2016) discusses the success of a forest governance structure in a transboundary reserve that is located in three different countries in Central America. He attributes this success to increased indigenous engagement. In addition, Clamote Rodrigues and Fischborn (2016) offer a plethora of examples of transboundary conservation initiatives, detailing the achievements of these reserves through better transboundary cooperation and more participatory processes involving local stakeholders.

On the other hand, the authors of Marques *et al.* (2020) and Brody (2016) say that forest management is often hard because different stakeholders have different needs and wants. They say that participatory approaches might help bring together the needs and wants of stakeholders, thereby solving this problem. Furthermore, even with a few disagreements, a large number of participants might make it hard to reach a consensus. In this study, we took these insights into account when we identified the "stakeholders' panel," where we included the most relevant stakeholders and then organized them into four "interest groups," as well as the establishment of a "study/professional group."

Based on the aforementioned information, we can conclude that the participatory framework necessitates the use of multi-criteria decision analysis tools to structure and quantify complex decisions during the decision-making process. This fits with a lot of research that has been done in the last few decades (Kangas *et al.* 2002; Laukkanen *et al.* 2004; Munda 2004; Mendoza and Martins 2006; Bolte *et al.* 2006; Rauschmayer and Wittmer 2006; Diaz-Balteiro and Asensoc 2006; Saarikoski *et al.* 2013; Grošelj *et al.* 2016; Grazhdani 2017; Gunduz and Alfar 2019) that says that MCDA and participatory process work well together to evaluate and/or rank the effects of different resource management strategies on the economic, environmental, social, and cultural long-term sustainability of forests. This research employed participatory multi-criteria decision-making analysis as its methodological framework.

Meanwhile, a wide range of other studies (Kangas 1994; Sheppard and Meitner 2005; Hiltunen *et al.* 2008; Ananda and Herath 2009; Nordström *et al.* 2010; Khadka 2013) have used a variety of mathematical modelling methods of various levels of complexity to solve participatory multi-criteria problems in the field of forest management planning. According to Gunduz and Alfar (2019), the AHP holds an important position in the mathematical description of the complex processes, including forest management, which arise during the decision-making process. Through pairwise comparisons, the AHP solicits expert input collected through surveys (Thirumalaivasan *et al.* 2003; Garfi *et al.* 2011). Two distinct scales, one based on crisp numbers (ranging from 1 to 9) and the other on fuzzy numbers, primarily categorize the extensive body of material on the AHP method for recording pairwise comparisons. Saaty (1980; 1990) developed the original method, which uses a crisp scale ranging from 1 to 9. Natural language labels, such as weak, normal, strong, etc., evaluate decision-maker preferences, representing them as a single crisp number on this scale and recording them in comparison matrices.

Moreover, the fuzzy method uses fuzzy integers to record expert preferences in fuzzy comparison matrices. Fuzzy integers more accurately represent human judgments and preferences than crisp numbers can because of the uncertainty and ambiguity of human behavior. Zadeh's fuzzy set theory has widely integrated the original AHP to address the issues of ambiguity and lack of clarity. This incorporation allows for the transformation of human judgments into ratio scales by utilizing a weighing scale consisting of fuzzy numbers. This is the rationale behind our use of the FAHP framework in this study, which allows us to derive weights from fuzzy comparison matrix data. It then uses these comparisons to generate ratio scales that reflect the decision-maker's preferences for different scenarios based on the criteria, as well as the relative weights of the criteria themselves. Calculating the normalized weighted sum across the criteria results in an overall score associated with each accessible alternative, aiding the decision-maker in choosing the scenario that will lead to the optimal decision. Pérez-Rodríguez and Rojo-Alboreca (2017) and Chan *et al.* (2019) demonstrate the conditions relating to differences between FAHP and classical AHP from both a quantitative and qualitative perspective.

We then use these weights to rank the various alternatives, taking into account the scores each option achieves for each criterion. An important part of the process is, thus, finding the weights in the comparison matrices.

To accomplish this, the standard AHP framework primarily uses the eigenvectors method. In addition to the eigenvector method, the literature offers a number of other alternative techniques. Most commonly used are the arithmetic and geometric mean techniques, as well as the extended goal programming technique. This study applies all three techniques in the FAHP framework used in this study.

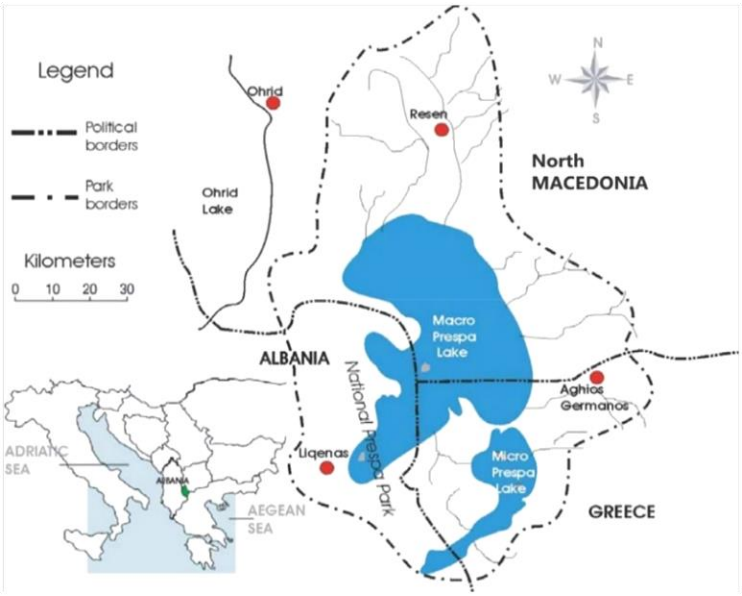
2. Material and Methods

2.1. Case Study Description

We conducted this study on the Prespa Park region, which serves as an excellent case study due to its status as a watershed area with rich biodiversity and a long human history (Grazhdani 2014). Prespa refers to a pair of freshwater lakes, namely Macro and Micro Prespa are two freshwater lakes located in southeast Europe (Grazhdani 2024a). Albania, Greece, and North Macedonia share these lakes (Figure 1). The prime ministers of three republics jointly formed it on February 2, 2000, making it the first trans-border protected area in the Balkans (Grazhdani 2023). At an altitude of 850 m above sea level (Grazhdani 2015), the park covers a combined drainage basin area of 2,519 km^2 and has a population of about 24,000 people (Grazhdani 2016), distributed among three municipalities: Pusteci-Albania, Resen-North Macedonia, and Prespa-Greece. According to the Ramsar Convention on Wetlands, there are two wetlands of international importance inside the Transboundary Prespa Park boundaries. WWF-International has designated the region as a Gift to the Earth, and the European Union has included Prespa Lakes in its water and biodiversity protection policy.

Prespa Park contains important freshwater and forest ecosystems, including pseudo-Alpine meadows located above the forest limit. Each of the three countries has designated lakes, shorelines, and the majority of forest regions as national protected areas. The entire Prespa region is home to a wide variety of remarkable habitats and species that are significant from a conservation perspective on both a European and a worldwide scale (Grazhdani 2024b).

Figure 1. Prespa Park Region



All of the forests in the Albanian part of the basin, which cover about 13,000 ha and 1,800 ha of pastures, are components of Prespa National Park (Grazhdani 2010). Eighty-six percent of all forests in Greece are included in the Prespa National Forest (Catsadorakis and Malakou 1997). According to Matevski *et al.* (2010), there are 356 km^2 of forests in the northern Macedonian part of the Prespa Park basin. Protected areas, including Pelister and Galicica National Parks, account for over 40% of these forests.

Although no habitat type can be considered uncommon on a worldwide scale, Prespa Park is home to many forests classified as habitat types of European interest. These forests include the following: *Quercetum trojanae macedonicum* thrives on stony, steep terrain at altitudes of up to 1,200 meters above sea level in Albania, Greece, and North Macedonia. The Grecian juniper woods *(Juniperus excelsa),* rare in Europe and only found in northern parts of Greece and North Macedonia, develop as another important forest habitat type in the oak forest zone (Matevski *et al.* 2010; Vrahnakis *et al.* 2011). North Macedonia should also recognize the well-preserved stands of

beech woods (*Abieti-Fagetum macedonicum* and *Calamintho grandiflorae Fagetum*), which are among the forest habitat types of European interest (Matevski *et al.* 2010).

Prespa Park, which encompasses 465 km^2 of forests, is home to a number of well-liked recreation areas and is one of the region's most important economic drivers, along with tourism and agriculture. It is home to a number of well-liked recreation areas. In the winter, skiing is available, while in the summer, hiking and cycling are. Throughout history, humans have relied on forests, woodlands, and sporadic trees for food, fuel, shelter, building materials, and medicinal purposes. These days, they rely on forests for many ecosystem services, including the provision of materials and goods (food, fuel, fiber, and pharmaceuticals), a variety of regulatory services (protection of watersheds, control of climate change, preservation of biodiversity), and cultural services (entertainment, tranquility, inspiration, and aesthetic pleasure). The local population's demand for places for recreational, hunting, and fishing activities has been increasing, while the commercial use of the forest has been decreasing. Human interventions have affected all the forests within Prespa Park's perimeter. The recovery of forests is crucial for the restoration of essential forest functions. Only forests with intact ecosystems can provide the requested long-term services.

In an effort to tackle and resolve the intricate problems related to forest planning situations in Prespa Park, Grazhdani (2017) conducted a study. Based on this study's findings and taking into account its limitations, the present study used an improved methodological framework and normalization techniques to rank five forest management scenarios selected through a participatory process at Prespa Park.

2.2. Participatory Planning

Participatory planning is a series of interaction activities between institutions and individuals, as well as the many governance arrangements, forms, and methods that moderate these with the goal of defining and resolving a specific issue. Many scholars (Adger *et al.* 2005; Lemos and Agrawal 2006; Renn and Schweizer 2009; Rossi *et al.* 2011; Burton and Mustelin 2013; Focacci *et al.* 2017) have recognized the importance, equity, acceptability, and, in the end, sustainability of citizen participation in transdisciplinary governance processes.

Participation has a long history in different domains, including forest management and planning, and has played out differently across the world. Participatory forest planning is hard because it involves a lot of different local communities and new, cross-disciplinary methods like collaborative governance (Mermet and Farcy 2011; Kabisch *et al.* 2016; Nesshöver *et al.* 2017; Wamsler and Raggers 2018; Frantzeskaki 2019; Wamsler *et al.* 2020).

This study employed a participatory forest process for forest stakeholders, who are typically decision-makers, representatives from forestry and non-forestry businesses, municipal officials, nature conservation, tourism, outdoor sports and recreation, and nongovernmental organizations, to evaluate forest management scenarios that account for multiple stakeholder values.

2.3. Participatory MCDA Method

The MCDA method evaluates and compares different options based on multiple criteria. Different authors (Nordström *et al.* 2012; Grazhdani 2017) present the MCDA method for participatory decision-making in a variety of ways. These authors draw attention to the consequences of alternative solutions within the context of planning and policy-making. Interestingly, each author uses a different set of names and numbers to identify the steps of the process. Furthermore, MCDA serves as a tool for managing wicked situations by facilitating the study and structure of the decision problem and incorporating subjective preferences into the decision-making process.

On the other hand, forest management involves many stakeholders, increasing the dimensions of forest planning and forcing the use of participatory techniques. The participatory MCDA method incorporates stakeholder values and provides a structured way of working, ensuring that it is fair, transparent, and simple to understand—qualities that are essential for the process's legitimacy and acceptance by the stakeholders (Mendoza and Martins 2006; Rauschmayer and Wittmer 2006; Nordström *et al.* 2010; Adem Esmail and Geneletti 2018).

As de Castro and Urios (2017) highlight, protected area planning using participatory MCDA methods has been successful and has proven to be effective in certain complicated circumstances (Cortina and Boggia 2014; Sánchez-Lozano and Bernal-Conesa 2017). This consideration prompted this study to use MCDA in a transboundary Prespa Park protected area to evaluate stakeholder groups' involvement in forest management situations.

2.4. Fuzzy Analytic Hierarchy Process (FAHP)

According to Ezquerro *et al.* (2016), Cegan *et al.* (2017), and Diaz-Balteiro *et al.* (2017), structured methods have become among the most popular and widely used for organizing, analyzing, and resolving complex multicriteria

decision-making. One of these is the AHP method. AHP assists decision-makers in determining the "answer" that best meets their purpose, rather than a "correct" selection, by setting a general objective with respect to a number of scenarios evaluated on multiple criteria.

AHP is also one of the most widely used MCDA methods in forestry applications, either alone or in combination with other MCDA approaches (Kangas *et al.* 2006; Ananda and Herath 2009). According to Kangas (1994), AHP is a tool that integrates public preferences for strategic planning decisions related to forest management, whereas Kangas *et al.* (2006) enhanced strategic forest planning's quantitative basis by employing the FAHP method. Additionally, according to Ortiz-Urbina *et al.* (2019), AHP has proven helpful in gathering stakeholder preferences during participatory planning processes in protected areas. Furthermore, Diaz-Balteiro *et al.* (2017) assert that AHP's attractiveness has increased over the preceding two decades. Today, the multi-criteria decision-making analysis process extensively uses the AHP analysis method, along with fuzzy set theory, known as the fuzzy AHP (FAHP) method. Kangas and Kangas (2005), Ananda and Herath (2009), and Ahmed and Kilic (2019) all say that researchers can combine FAHP with other MCDA methods, like goal programming, to make the results more accurate and to make the way humans make decisions more like real life. In this study, we used a hybrid approach, combining FAHP with extended goal programming.

We structured the procedure for using the FAHP in this study into four steps, as follows: In the first step, we construct a hierarchical structure that includes the main study goal, forest management scenarios, and criteria to evaluate the scenarios. In the second step, we compare the components (criteria, forest management scenarios) and derive weights for each level to establish their relative importance; then, in the third step, we calculate the weights of the criteria and scenarios using fuzzy arithmetic operations, and in the fourth step, we synthesize the weights to obtain normalized weights using extended goal programming. The ranking of the scenarios in descending order was based on the value of normalized weights (the greater the value of the normalized weights, the more highly ranked the forest scenario).

2.5. Extended Goal Programming

Goal programming (GP) addresses complex issues using the linear programming method. According to Ignizio and Romero (2003) and Nordström *et al.* (2012), GP develops compromise solutions that may not fully meet all the goals but do reach specific satisfaction levels defined by the decision-maker. This process involves the definition of an objective function and some defined constraints. Even in forestry environments, researchers regularly use GP as a method for measuring sustainability. In numerous studies (Cortina and Boggia 2014; Uhde *et al.* 2015; Diaz-Balteiro *et al.* 2016; de Castro and Urios 2017; Diaz-Balteiro *et al.* 2017; Sánchez-Lozano and Bernal-Conesa 2017), the researchers have successfully implemented GP to plan various forest resources and protected areas. In this study we used extended goal programming (*ExtGoalProg*) developed by González-Pachón and Romero (2007; 2010). For a detailed information of extended goal programming, consult the studies conducted by André and Romero (2008), Nordström *et al.* (2012), and Grazhdani (2017).

The operational procedure that we used for the *ExtGoalProg* technique to generate stakeholder preference data from the Prespa Park case study and five alternative forest scenarios for this study consisted of three steps: During the first step, we developed consensus matrices for each interest group and used these matrices to determine the criteria weights. During the second step, we established rankings for five different forest management scenarios for each interest group using the criterion weights. In the third step, we combined the forest management scenarios' rankings for each interest group to create their normalized ranking.

2.6. Data Collection

The study employed a number of methods to gather data and information during the course of 2019. For inclusive activities, we conducted three one-day participatory workshops and "Saaty-type" surveys.

People from the local community, forestry and non-forestry businesses, municipal officials, nature conservation, tourism, outdoor sports and recreation representatives, organizations that focus on natural resource management in the area, and those involved in forest management through policy were invited to participate in first one-day workshop. Prior to getting into the expectations and concerns of the forest stakeholders, we provided background information on the study, including its goals and objectives, to the participants upon their arrival at the workshop. During the remainder of the workshop, participants focused on two topics: identifying potential stakeholders and then establishing a stakeholders' panel; and forming a "study/professional group." The chosen stakeholders formed four "interest groups": the forest group, the nature-conservationists group, the tourism group, and the sports-outdoor life group. The number of representatives varied among the interest groups due to the nature of the circumstances. Nine people represented the forest group: six from forest companies or agencies and

three from municipalities. Seven people represented the tourism operator group. The nature conservationists were represented by five representatives from nongovernmental organizations. Five people made up the group of representatives for sports and outdoor life. During the study, these 26 stakeholders formed a "stakeholders' panel" and individually stated their preferences through a "Saaty-type" survey. In addition, the workshop also formed a "study/professional group" consisting of individuals with diverse areas of expertise to contribute to the planning process. This panel included 15 members with experience in the forest sector, community development, recreation, nature conservation, outdoor activities, and ecosystem management who work together as a group to establish a collective preference directly through discussion.

Participants from a variety of fields, possessing extensive expertise in the subjects under investigation, attended the second one-day workshop that established criteria. The stakeholders' panel refined the preliminary list of 10 criteria, and the "study/professional group" asked the participants to rate them using a "Saaty-type" survey in the second one-day workshop. The entire workshop was filled with lively discussions among the attendees. At the conclusion of the workshop, we had reached an agreement on the following five crucial criteria: The first is the area of forest, measured in hectares (ha), that is not managed for social or recreational purposes; the second is the area of forest, measured in hectares (ha), that is not managed for the purpose of conserving nature; the third is the amount of forest, measured in hectares (ha), that is older than 100 years; the fourth is accessibility to the forest: information is given for both a) the area of forest, measured in hectares (ha), that is used for the collection of forest products and b) the area of forest, measured in hectares (ha), that is managed for social or recreational purposes. The fifth criteria is the aesthetic and cultural-historical value of the forest, defined as a low of 1 and a high of 10.

The objective of the third one-day workshop was to develop a series of scenarios related to forest planning. The "study/professional group" and the "stakeholders' panel" came together to achieve this. Through a series of short presentations and panel discussions, we briefed the participants on the key principles of the participatory multi-criteria decision analysis, the possible forest management scenarios, and their features in Prespa Park. At the end of the workshop, the participants developed five alternative forest management scenarios (referred to as S_1, S_2, S_3, S_4, and S_5) based on the specified criteria selected during second one-day workshop. They were as follows: Scenario S_1 involves the development of sustainable tourism and recreation opportunities, while scenario S_2 focuses on the protection of biodiversity and natural assets. Scenario S_3 involves utilizing the potential of cultural heritage. Scenario S_4 is a mixed-use scenario that makes use of the potential for cultural heritage, biodiversity conservation, and, to a certain extent, recreation; scenario S_5 is a mixed-use scenario that makes use of the potential for forest product collection, cultural heritage, recreation, and, to a certain extent, biodiversity conservation.

3. Results and Discussion

3.1. Ranking of Forest Management Scenarios Using FAHP–ExtGoalProg Approach in Prespa Park

Evaluating and ranking different forest planning plans increases the efficiency of decision-making in sustainable forest management. To address this problem, we used the FAHP method, coupled with the extended goal programming normalization method and a "Saaty-type" survey completed by "stakeholders' panel" members.

We established an FAHP procedure, structuring it into four steps as follows: During the first step, we established a hierarchical structure with three levels. This structure included the main study goal in the first level, which was to rank the forest management scenarios in support of sustainable management of the forestry in Prespa Park, forest management scenarios (second level), and criteria to evaluate the scenarios (third level).

In the second step, we determined the variables preferences (criteria, forest management scenarios) at each level by generating a set of pair-wise comparison matrices of all the variables in relation to each other. To do this, we produced an FAHP questionnaire and shared it via email with the "stakeholders' panel" members for assessment. Each member provided a possible value for each analyzed issue using Saaty's 1–9 scale, where 1 represents equal importance and 9 shows the extreme importance of one variable compared to another (Saaty 1980).

The next step was to carry out a consistency test. We mathematically calculated the consistency ratio (CR) to verify this. It is important to note that *CR* describes the degree of consistency or inconsistency, as Scholl *et al.* (2005) point out. We found the overall consistency of the hierarchical structure to be a consistency ratio (CR) of 0.084. We deemed the inter-level interactions within the hierarchical structure and the overall hierarchy's consistency satisfactory because this number is lower than 0.1 (Saaty 2008).

In the fourth step, we completed the weight determination. To rank the scenarios using the ExtGoalProg technique, we normalized individual preferences into a collective preference. We used Expert Choice Software (2002) to analyze the consistency test and calculate the weighting in this study. Table 1 summarizes the results of S_1–S_5 scenarios ranking within each interest group and their overall ranking obtained by the FAHP–ExtGoalProg approach.

Table 1. Ranking of scenarios S_1–S_5 within each interest group, and their overall ranking obtained by FAHP–ExtGoalProg approach

Variable	Interest group				Overall plans ranking
	Forest	Tourism	Nature - conservationists	Sports-outdoor life	
Scenario S_1	1	1	1	1	1
Scenario S_2	4	5	5	5	5
Scenario S_3	5	3	3	4	4
Scenario S_4	2	2	2	2	2
Scenario S_5	3	4	4	3	3

A higher rank is indicated by a lower numerical value.

Source: The author's collected and elaborated survey data for 2019

The results (Table 1) revealed that the "Development of sustainable tourism and recreational opportunities scenario" (Scenario S_1) held the highest ranking, with the other scenarios following in descending order: Scenario S_4, a mixed-use scenario, utilizes the potential for cultural heritage, biodiversity conservation, and, to some extent, recreation. Similarly, scenario S_5, also a mixed-use scenario, utilizes the potential for forest product collection, cultural heritage, recreation, and, to some extent, biodiversity conservation. Finally, scenario S_3, which focuses on utilizing the potential of cultural heritage, and scenario S_2, which aims to protect biodiversity and natural assets, rank lower.

Overall, the process evaluation shows that using FAHP, participatory planning, and the *ExtGoalProg* technique together is a good way to handle complicated forest management situations involving several stakeholders and competing standards. The process evaluation demonstrates a good level of decision-making transparency by structurally integrating stakeholder values. Furthermore, the approach enhanced the quality of judgments by effectively balancing conflicting interests, resulting in broader acceptance among all stakeholders.

3.2. Results of Three Normalizing Methods in FAHP Participatory Forest Planning

Another goal of this study was to compare a trio of methods for normalizing stakeholders' individual preferences into a collective preference. The purpose of this comparison was to determine whether or not the choice of normalization method had an effect on the FAHP ranking of scenarios. To obtain preferences, we used the FAHP method, and to normalize individual preferences, we used the *WeighArithMeanTech*, *GeoMeanTech*, and *ExtGoalProg* techniques.

To address this goal, we first used the FAHP pairwise comparison approach to collect preferences from the "stakeholders' panel" about the criteria and the forest management scenarios. When the panel members had finished expressing their individual preferences, they next proceeded to make pairwise comparisons in order to figure out the relative importance of each stakeholder. After that, they normalized each individual's preferences into a group preference, and then they ranked the scenarios using three distinct techniques*:* *ExtGoalProg*, *WeighArithMeanTech*, and *GeoMeanTech*. Members of the "stakeholders' panel" were then engaged in a collective panel discussion where they together made comparisons between pairs of items.

Table 2. Scenario S_1–S_5 ranking using three normalized techniques

Variable		Forest management scenarios				
		S_1	S_2	S_3	S_4	S_5
Study/professional group preference approach		1	4	5	2	3
GeoMeanTech		1	2	5	3	4
WeighArithMeanTech	Variable weights	1	5	3	2	4
	Equal weights	1	3	5	2	3
ExtGoalProg	Variable weights					
	"majority principle"	1	5	2	4	3
	"minority principle"	2	5	4	3	1
	Equal weights					
	"majority principle"	1	5	4	3	2
	"minority principle"	2	4	4	2	1

A higher rank is indicated by a lower numerical value.

Source: The author's collected and elaborated survey data for 2019

The "study/professional group" that jointly performed the pairwise comparisons determined one ranking out of the eight in total. Additionally, the "stakeholders' panel," which performed the pairwise comparisons individually, established seven consensus rankings (Table 2).

The *GeoMeanTech* produced a single rating, while the *WeighArithMeanTech* produced two comparable rankings: one with equal weights for all stakeholders and another with variable weights determined by the stakeholders themselves. Meanwhile, the *ExtGoalProg* produced four distinct rankings.

The results (Table 2) show that using the study/professional group preference technique, scenario S_1 is ranked highest. The other scenarios are ranked in descending order as follows: scenario S_4, scenario S_5, scenario S_2, and finally, scenario S_3.

Second, all consensus rankings gave scenario S_1 the highest score, with two exceptions (Table 2) related to the *ExtGoalProg* technique. In this method, the distance metric parameter *r* from the ideal plan determined the ranking; a plan with a lower value (r = 1) ranks higher (place 1), while a plan with a higher value (r = ∞) ranks second (place 2).

Third, it is worth noting that the "mixed" scenario, specifically scenario S_4 and scenario S_5, gained the highest rank in *ExtGoalProg* when seen from the perspective of a minority (α = 0, β = 0, and r = ∞). When it comes to finding solutions that are balanced and consensus-based, the minority perspective of *ExtGoalProg* appeared to be helpful.

Given that different normalization methods yield varying rankings, stakeholders should carefully consider the specific circumstances when selecting a normalization technique.

Conclusions

This study focused on incorporating stakeholder values and combining individual preferences to establish a common choice. We used the FAHP to elicit preferences, and we normalized individual preferences using the weighted arithmetic mean technique, geometric mean technique, and extended goal programming. The findings indicate that these methods can formalize public participation in decision-making while also increasing the process's transparency and legitimacy.

An assessment framework that combined FAHP and *ExtGoalProg* proved to be a useful tool for managing difficult real-world forest management situations in Prespa Park. The case study's findings show that the two most highly ranked alternatives were scenario *S1*, which focuses on the development of sustainable tourism and recreational opportunities, and scenario *S5*, which combines employing the potential of cultural heritage, recreation, the collection of forest products, and, to some extent, biodiversity conservation.

The study also compares the *ExtGoalProg* technique with the more established normalization techniques *GeoMeanTech* and *WeighArithMeanTech*, which are based on geometric and arithmetic means, respectively. Due to their different characteristics, the normalizing techniques investigated in the study produced varying ranks of five forest management scenarios. As a result, stakeholders should adapt the normalization technique to the situation at hand and provide an explanation for it.

The case study of the Prespa Park area demonstrates that, under specific circumstances, a forest management situation could benefit from integrating FAHP with participatory processes. On top of that, by weighing

the competing interests of many stakeholders against one another, FAHP leads to solutions that result in increased overall satisfaction among the stakeholders. The suggested approach presents an interesting option for managing the points of view of several stakeholders, offers an operational foundation for sustainable forest management scenarios, and is suitable for handling analogous issues in environmental management.

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Declaration of Competing Interest

The author declares that she has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The author declares that she has not used generative AI and AI-assisted technologies during the preparation of this work.

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How Advanced Is Green Participatory Budgeting in Poland and Spain? A Case Study of Gdansk and Barcelona

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Abstract: This study explores the advancements in Green Participatory Budgeting (GPB) in Poland and Spain, focusing on case studies from Gdansk and Barcelona. GPB integrates participatory budgeting with environmental sustainability, enabling citizens to influence the allocation of municipal funds toward projects that enhance both environmental and social welfare. The research analyzes the implementation, outcomes, and challenges associated with GPB in the two cities. Spain, particularly Barcelona, has seen widespread adoption of participatory budgeting, providing valuable insights into its impact and effectiveness. The paper discusses the historical context, the evolution of participatory budgeting in these regions, and the specific green projects funded. It also highlights the environmental and social benefits, such as increased urban green spaces and enhanced community engagement, as well as the difficulties faced in achieving consensus and managing the complexities of the application process. By comparing these two cities, the study aims to shed light on the broader implications of GPB and its potential as a tool for sustainable urban development.
Purpose: This study explores the advancements in Green Participatory Budgeting (GPB) in Poland and Spain, with a focus on the cities of Gdansk and Barcelona. The goal is to analyze the implementation outcomes and challenges associated with GPB, highlighting its impact on environmental and social welfare.
Design/Methodology/Approach: The research employs a case study approach, examining GPB practices in Gdansk and Barcelona. Data were collected through document analysis, interviews, and direct observations conducted during the spring and summer of 2024. The study investigates the historical context, evolution, and specific green projects funded under GPB in these cities.
Findings: The study reveals that Barcelona has seen widespread adoption of participatory budgeting, providing valuable insights into its effectiveness and impact. In both Gdansk and Barcelona, GPB has led to increased urban green spaces, enhanced community engagement, and significant environmental and social benefits. However, challenges such as achieving consensus and managing the complexities of the application process persist.
Practical Implications: The findings suggest that GPB can be an effective tool for sustainable urban development, provided that local governments address the challenges associated with its implementation. The study offers practical recommendations for improving GPB processes, including enhanced civic education, streamlined application procedures, and continuous public outreach.
Originality: This paper contributes to the understanding of GPB by comparing its implementation in two different European contexts. It provides a comprehensive analysis of GPB's potential and challenges, offering insights that can guide policymakers and practitioners in other cities considering similar initiatives.

Keywords: green participatory budget; participatory budget; case study; Poland; Spain.

JEL Classification: H72; Q56; R58.

Introduction

Green Participatory Budgeting (GPB) merges participatory budgeting with environmental sustainability, allowing citizens to decide on projects that enhance environmental and social welfare. This study examines GPB practices in Gdansk, Poland, and Barcelona, Spain, focusing on their implementation, outcomes, and challenges.

In the European context, Spain was the country where participatory budgeting spread the most (Sintomer *et al.* 2008; Sintomer and Ganuza, 2011). There, we analyzed, up until 2010, over fifty experiments implemented that, in one way or the other, provided almost five million people the opportunity to participate, although we must consider the criteria used to consider any experiment as a participatory budget. The experiments started in 2001 in three Andalusia municipalities (Cabezas de San Juan, in Seville, Cordoba and Puente Genil, in Cordoba province). In 2002, Rubí, in the province of Barcelona, and Albacete have also initiated the process. The 2003 local elections have boosted the implementation of new experiments. Up until the end of 2006, right before the elections of the following year, over twenty-five municipalities had started the process. Two of them (Cabezas de San Juan and Rubí) had abandoned the experiment with the change of government following the local election of 2003. After the 2007 elections, participatory budgeting had a new impulse, which leaded it to its largest presence in Spanish municipalities. By then, the difference lay in the fact that conservative parties started to implement similar experiments (Ganuza, Francés 2014, 302).

For the first time, participatory budgeting schemes began to appear in large cities such as Madrid, Valencia, Zaragoza, and Barcelona (the four largest cities in the country, comprising around 20% of the Spanish population) (Francisco, Carratalá, Ganuza 2018, 278.)

1. Literature Review

Participatory budget is based on public co-governance. It is a kind of bottom-up process that involves the activation of residents to actively participate in decisions regarding the spending of a portion of the funds financed from the budget of a given local government unit on previously submitted projects (Owsiak 2017). It is a process of decision-making in a democratic manner by the people living in a municipality that implements a participatory budget. Decisions made in this way, show how money from the municipal budget is to be spent (Burchard – Dziubińska. 2016). Participatory budget can be also understood as a separate part of the local government budget under which a specified amount of spendings is allocated to initiatives and investment projects directly proposed by the local communities. The idea of a participatory budget is part of the concept of civil society and public governance (https://www.sejm.gov.pl/sejm10.nsf/BASLeksykon.xsp?id=667DCF4F24778F74C1257A710030C2E9andliteraB).

In the world, the first participatory budget was introduced back in 1989 in Porto Alegre, Brazil. The event followed the end of the military dictatorship in the country. Such activity was intended to establish a new kind of governance, involving public discussion, and lowering the level of incidence of inequality among the residents of Porto Alegre. The idea of public consultations became very popular all over the world (Sintomer, 2008)

Participatory budgeting facilitates not only the daily life of the inhabitants, but also for local, authorities, which, thanks to citizen engagement initiatives, can find out what are the most important needs of the inhabitants of a given territory and the development of which areas of life are most important to them (Krześ, 2016).

Green participatory budget has both advantages and disadvantages. One of the main benefits indicated by the cities which implemented Participatory budgets is a more effective way of public expenditures. This results on the one side in an increased responsiveness to expressed public needs, on the other side there is an incorporation of residents' pioneering spending ideas (https://www.participatorybudgeting.org/about-pb). Furthermore, the following advantages were indicated:

- citizens have direct influence on decisions on public investments in their local communities,
- better understanding of residents' concerns by the local authorities,
- it can also help to improve relations between residents and local authorities,
- more transparent and accountable relationships with local authorities,
- as an opportunity for youth to gain confidence, communication skills, and experience in leading participatory budget projects.

On the contrary, the following disadvantages were mentioned:

- some leaders may use the Green PB for their own purposes,
- complicated application procedure with numerous documents,
- it may be difficult to reach consensus among residents on what public funds should be used for.

Despite its many benefits, green participatory budgets also pose some challenges for local governments, such as the need for civic education, ensuring broad and equal access to the process, or the risk of popular projects dominating at the expense of those that are more needed but less attractive. It is important that the system of PB

be constantly improved and adapted to the changing needs of residents and local conditions (https://www.budzetobywatelski.pl/strefa-mieszkanca/jak-dzialaja-budzety-obywatelskie).

The main effects of the implementation of participatory budgets in cities include higher quality of life, increased satisfaction with public services, greater transparency and credibility of local public authorities.

Within the framework of the participatory budget there is a so-called green participatory budget (GPB). Under this term are funds, allocated specifically for improving the natural appearance of a given city (https://zpe.gov.pl/a/budzet-obywatelski/DXojz1pTD).

Summary note prepared by OECD in 2022 answered three questions regarding participatory budgeting OECD, 2022):

- what is the typical scale and focus of Participatory Budgeting, and can or should its impact be strengthened?
- who participates in PB projects and why? Does it strengthen the democratic process, or the opposite?
- are there related approaches, e.g., through legislatures or referenda, that could be more effective?

The results showed that most of green PB projects are going on at the local level to allocate small-scale public funds mainly to capital investment projects. There is some evidence that green PB has led to increase the level of budget transparency and even efficiency of spending public funds. Green PB processes have evolved from in-person set-ups to hybrid or online set-ups. This type of solution was the result of pandemic and affected in broader participation but on the other side if local authorities rely on online-only this can lead to reduce the deliberative aspects. Sun-Moon Jung, in his research, indicated that PB can work for two different but interconnected needs: the quality of democracy (resource allocation and poverty alleviation) and government efficiency (fiscal sustainability and cost efficiency (OECD, 2022). Mechanisms for the application of participatory budgeting vary, adapting to the local context, and the percentage of the budget placed at the disposal of residents also varies.

Since 2007, a lot of transformations have taken place in the market for green finance, given the Paris Agreement of 2015 and the European Green Deal of 2019. Numerous areas of activity can be targeted by green finance, such as green industry, renewable energy, energy efficiency, distribution and storage, emission reduction, green building, and green transport (Siemionek-Ruskań, Lepczyński, Fanea-Ivanovici. 2022).

Projects submitted for voting in green participatory budgets should contribute to one of six environmental objectives indicated by European Union Taxonomy for Sustainable Finance namely (OECD.2021): climate change mitigation, climate change adaptation; sustainable use and protection of fresh water and marine resources, transition to a circular economy, pollution prevention and control, protection and restoration of biodiversity and ecosystems, without harming any of the other activities.

The Green Participatory Budget assumes the development of public, publicly accessible urban green areas through the construction of new green spaces and the renovation and modernization of the development of existing ones, in accordance with the current study of the conditions and directions of spatial development of the city and the provisions of local spatial development plans. This is in response to the needs of residents expressed in the form of submitted projects.

Green budgeting “offers a range of tools and techniques for governments seeking ways to bring green perspectives to bear on the budget process” (OECD, 2021). Many OECD countries have introduced green budgeting into their public financial management frameworks, policies, and practices to help pursue climate and environmental objectives. According to report prepared by OECD in 2022, 24 out of 36 OECD countries implemented green budgeting measures. This shows a significant increase in the number of countries involved in green budgeting where only 14 countries did it.

Starting from 2008 in Lisbon in Portugal many countries started e-budgeting in participatory budget as a form on innovation which involves the use of digital technology. Such solution has two main advantages: it increased the number of residents of cities to take part in voting of the public in budgetary decisions, on the other side it increased the level of knowledge of residents about investments financed from the city budget (OECD, 2016).

Kimic K., Polko conducted a study to pinpoint the expansion trends of the Katowice Green Budget based on editions from years 2020 to 2023. In the mentioned period citizens of Katowice proposed 715 green projects and 347 of them were selected for implementation. The authors found that there is a growing trend in the number of green projects in the first 3 editions and stabilization in the 4th edition. Project were related to the development of greenery as well as green education (Kimic K., Polko 2024).

Kociuba and Rabczewska (2019) analyzed the implementation of participatory budget and green participatory budget in Lublin in years 2015-2019. detailed analysis of the PB showed that 86% of investment projects submitted and 87% of projects selected for implementation were directly associated with activities in public

space. They also focused on describing main assumptions and models of participatory budgeting as well as the legal basis and rules of PB execution in Poland (Kociuba and Rabczewska 2019).

Falanga others (2023) investigated the emerging trends of citizen proposals, projects, votes, and public funding in participatory budget in city of Lisbon. The authors noticed the accomplishments of the Lisbon PB of city of Lisbon played a dominant role in urban sustainability. The trends of the achievements depend on the one side on residents' voice and on the other side on influence of policymakers from the City Council of Lisbon (Falanga, *et al.* 2023).

Kimic and Polko focused in their research on projects from participatory budget in Warsaw in Śródmieście district from the years 2015 to 2022. The results showed that more than half of selected projects were addressed to older adults. Among these projects, the urban greenery category accounted for 29.58%. This indicates the growing need for creation of projects suitable for older adults (Kimic, Polko 2023).

Nowak presented a proposal to separate a green budget in the participatory budget, due to the low, at about 13%, share of projects on green project in year 2013-2015. The author proposed activities that can be implemented within the framework of a participatory green budget in Olsztyn such as: informational meetings on the role and importance of greenery in the city, plant care, engaging residents to identify sites with devastated urban greenery and planting new trees and shrubs (Nowak 2017).

Maczka and others investigated 49 cases of participatory budgeting implementation in Western Poland, mainly in the Wielkopolska Province and the neighboring provinces. The authors pointed out that there is no one leading participatory model presented in the analyzed municipalities, but the two-model dominated: Porto Allegre and Consultation of Public Finance (Maczka *et al.* 2021). The Porto Allegre model is aimed at residents who have real power. According to Sintomer and others, the basic idea was "to allow non-elected citizens to have a role in the allocation of public money, with direct decision-making power at the local level, the power of co-decision at the city level, and oversight capacity at all levels" (Sintomer, *et al.* 2012). Consultation model (CF) is described also as a consultative type and is based on selective listening. Local authorities are responsible for control and monitoring activities (Maczka *et al.* 2021).

Klemens indicated that the pandemic has contributed to the reversal of the attitudes of city inhabitants towards using ICT tools and taking greater care of environmental issues in 2019-2021 in participatory budgets in Poland. The Author suggested creating participatory budget database with standardized categories. This would enable to make a comparative analysis with other cities. The other recommendation was to create green participatory budgets in each city in Poland (Klemens, 2022).

Wetoszka examined Poland and Germany PB. He confirmed in his research that "PBs in both countries have been mostly simple innovations of limited quality, but those in Poland tended to perform better, judged by the two chosen criteria PBs in both countries utilize their functionalities in diverse ways" (Wetoszka, 2022).

2. Method

This study employs a qualitative case study approach, focusing on the cities of Gdansk in Poland and Barcelona in Spain to explore the implementation, outcomes, and challenges of Green Participatory Budgeting (GPB). In-depth analysis was conducted in the year 2024. The case study method allows for a comprehensive and detailed examination of the GPB processes in two distinct urban contexts. This depth of analysis helps in understanding the complexities and nuances associated with GPB implementation. By selecting Gdansk and Barcelona, the study provides comparative insights into how different cultural, political, and administrative contexts influence the success and challenges of GPB. This comparative approach highlights the adaptability and variability of GPB practices.

3. Case Study

3.1 Gdansk

The participatory budget was first implemented in Poland in 2011 in Sopot. It quickly became one of the most popular local initiatives aimed at involving residents in the process of city management. The main goal of participatory budgeting is to create a common space by residents and local authorities.

In Poland in 2018, a new regulation was introduced for cities with county rights, the establishment of a participatory budget is mandatory, except that the amount of the participatory budget is at least 0.5% of the municipality's expenditures included in the last submitted budget execution report. (Ustawa 2018, art 5a).

Within the framework of the participatory budget, residents decide annually on the share of the municipality's budget expenditures in direct voting. Tasks selected as part of the participatory budget are included in the municipal budget resolution. The municipal council, in the process of drafting the budget resolution, cannot remove or

significantly change the tasks selected as part of the civic budget. Funds spent on the participatory budget may be divided into parts covering the whole municipality and its parts (Ustawa 2018).

Stages of green participatory budget in Poland are as follows (Najwyższa Izba Kontroli. 2019):

1. Determining the procedure and tasks of carrying out consultations on BP;
2. BP advertising campaign;
3. Accepting applications with BP project proposals;
4. Verification of submitted BP project proposals;
a. Possible rejection of applications that do not meet formal requirements
b. Any appeals against decisions to rejection of applications that do not meet formal requirements
5. Voting on selection of BP projects;
6. Execution of projects selected by BP voting;
7. BP evaluation.

The first voting under the participatory budget of the city of Gdansk took place in 2013. Green participatory budget was introduced in Gdansk in 2020 (https://www.gdansk.pl/budzet-obywatelski/zielony-budzet). Every resident has the right to submit a project. What is worth mentioning is also the fact that children can also vote in participatory budgets with help of their parents or legal guardians. In Gdansk funds disbursed under the participatory budget are divided into categories including district projects (80% of participatory budget) and city projects (20% of participatory budget). Green participatory budget projects are allocated 20% of funds for district projects of a given district and 30% of funds for all city projects.

The scope and impact of GBP in year 2024 was described in Table 1.

Table 1. The scope and impact of Green Participatory Budgeting in Gdansk in year 2024

Budget allocation		**Green Project proposals on all city level and selection**		**Green Project proposals on district level and selection**	
Total PB	20 441 573 PLN				
Percentage for all city green projects	20%	Total projects proposals submitted	1 140 000 PLN	Total projects proposals submitted	3 306 790 PLN
Percentage for district green projects	30%	Green project proposals submitted	12		84
		Green projects selected for implementation	5	Green projects selected for implementation	40

Source: Authors own research based on: https://www.gdansk.pl/budzet-obywatelski, access date 30.07.204

In 2024, there were 12 GBP city projects (1 140 000 PLN), and 84 green district GBP projects (3 306 790 PLN) on the list to vote. Voting for BO projects took place in 2024 from September 11th to 25th with overall attendance on the level of 10,65%.

As in previous years, votes could be submitted via the city's portal www.gdansk.pl. Each voter is entitled to a total number of total 8 points: 5 points for PB district projects and 1 point for a citywide PB project, and 1 point for a GBP district project and 1 point for a GBP project. In voting there were 5 city GPB projects and 40 district projects selected. The selected city GBP projects are presented in Table 2.

Table 2. The list of selected city GBP projects in Gdansk for year 2024

Title of all -city GBP project	Cost
Gdansk saves old trees - South Edition	380 000 PLN
Green Oliva - project to restore tree canopies along Grunwaldzka Avenue	380 000 PLN
Paradise Gardens in Long Gardens	225 000 PLN
Guided nature walks in every district of Gdansk	22 000 PLN
Gdansk solar tree to charge mobile devices	380 000 PLN

Source: Authors research based on https://www.gdansk.pl/budzet-obywatelski

When taking into consideration 40 district GPP projects, which were chosen it is worth mentioning key areas regarding those projects such as: planting of new trees and shrubs, nesting boxes for birds, clean ponds, green parks, flower meadows, green relaxation zone by the stadium, removal of illegal garbage and waste dumps in Letnica district, water tanks in Przymorze district, hotels for insects and others.

On 17th of September 2024 City of Gdansk organized picnic full of numerous attractions promoting the PB voting. Everyone who cast a vote on the spot received a pot of heather. This is why the picnic slogan was "Heather for a vote". Citizens had an opportunity to meet with representatives of different project which were on the list. The was also a possibility of voting via iPads on special stand with the help of city hall representatives. It could be noticed as an attractive method of promoting PB among especially older people who mostly need help with ICT services. – The main aim was to encourage residents during the picnic to participate in the PBP voting. There were also yellow ecological bags distributed among residents of Gdansk with logo of BP as a part of the advertising campaign.

In 2025, PLN 4,137,851 PLN (of the total BO amount) will be allocated for this purpose:

- all-city green projects - PLN 1,304,922;
- green district projects - PLN 3,718,649.

For the year 2025, in Gdansk, there is possibility of submitting projects for the Green Participatory Budget in five thematic areas such as: (https://www.gdansk.pl/budzet-obywatelski/Co-to-jest-Zielony-Budzet-Obywatelski, access date 25.07.2024)

1. Planting and maintenance of vegetation in urban green areas;
2. New green spaces;
3. Rain garden construction;
4. Renovation and modernization of the development of existing green areas;
5. Ecological activities.

3.2. Barcelona

In 2024, Barcelona has allocated a significant portion of its municipal budget to Green Participatory Budgeting (GPB) (https://www.barcelona.cat/ca).

To present the significant role of GPB in Table 3 and 4 will be presented numbers that highlight the scope and impact of these initiatives.

Table 3. The scope and impact of Green Participatory Budgeting in Barcelona in year 2024

Budget allocation		Green Project proposals on all city level and selection		Green Project proposals on district level and selection	
Total PB	€100 million				
Percentage for green projects	35%	Total projects proposals submitted	1500	Total projects proposals submitted	12 000 000 Euro
Percentage for district green projects	30%	Green project proposals submitted	525	Projects implemented	50
Total funds for green projects	35 000 000 Euro	Green projects selected for implementation	150	Key initiatives	15 new corridors, 20 new gardens, 15 park improvement projects

Source: authors own research based on: https://www.barcelona.cat/ca and https://opendata-ajuntament.barcelona.cat

There is an important impact of participatory budgeting on civic engagement in Barcelona. It examines how the process has fostered community involvement and assesses the effectiveness of participatory mechanisms (Subirats, Brugué, Parés 2023, 8-15). There are visible broader implications of participatory budgeting on urban governance in Barcelona and many case studies present successful green projects and their impacts on the city (Ferranti, Vericat, Konig, 2017)

Table 4. The scope and impact of Sustainable Transportation, Renewable Energy and Waste Reduction within Green Participatory Budgeting in Barcelona in year 2024

Sustainable Transportation		Renewable Energy		Waste Reduction	
Total Budget	€10 million	Total Budget	€8 million	Total Budget	€5 million
Projects Implemented	45	Projects Implemented	30	Projects Implemented	25
Key Initiatives	New bike lanes: 50 km	Key Initiatives	Installation of solar panels on public buildings: 25 installations	Key Initiatives	Introduction of new recycling points: 50 locations
	Secure bike parking facilities: 30 new locations		Subsidies for residential solar panels: 500 households supported		Expansion of composting facilities: 20 new sites
	Expansion of electric vehicle charging stations: 100 new stations		Energy efficiency upgrades in municipal buildings: 10 major upgrades		Public awareness campaigns on waste segregation: 5 major campaigns

Source: authors own research based on: https://www.barcelona.cat/ca and https://opendata-ajuntament.barcelona.cat

There are environmental benefits such as (Epting 2020):

- reduction in carbon emissions: 5% reduction city-wide,
- 15% increase in municipal renewable energy capacity.

Following social benefits can be noted:

- community garden plots created: 2,000 new plots,
- public parks enhanced: 100 hectares of parks improved.

Barcelona's Green Participatory Budgeting in 2024 demonstrates a robust commitment to sustainability and citizen engagement, with substantial investments in urban green spaces, sustainable transportation, renewable energy, and waste reduction. The significant participation and positive environmental and social impacts underscore the success of these initiatives, offering a valuable model for other cities worldwide.

4. Research Results

Gdansk has been practicing participatory budgeting since 2013. The process allows residents to propose and vote on local projects funded by a portion of the city's budget, promoting civic engagement and transparent governance.

Within the projects integration of green aspects can be observed. Gdansk has seen an increasing number of green projects within its PB framework. Examples include urban gardens, renewable energy installations, and initiatives aimed at improving air quality and promoting cycling. The city actively promotes the submission of green project proposals through workshops and public consultations, highlighting the importance of sustainability. A dedicated portion of the PB budget is often reserved for environmental projects, ensuring that green initiatives receive consistent support. Those projects should present both Environmental and social benefits. The funded projects have led to more green spaces, better waste management, and improved urban biodiversity. Community involvement in green projects has fostered a stronger sense of community and increased public awareness of environmental issues. On the other hand, there are issues that remain a challenge such as awareness and participation. Another fact which could be difficult would be to balance priorities such as allocating funds to green projects while addressing other community needs.

Barcelona's participatory budgeting process, initiated in 2016, involves citizens in the allocation of municipal funds, encouraging proposals and votes on community projects. The municipal budget in Barcelona for 2024 is 3,807 million euros, up 5.9% on the previous year. Integration of green aspects was the main advantage. Barcelona has implemented various green projects through its PB process, such as creating green corridors, improving public parks, promoting urban agriculture, and enhancing cycling infrastructure. The city conducts extensive campaigns and workshops to educate residents about the environmental impact and encourage green project proposals. A

significant portion of the PB budget is allocated to green projects, reflecting Barcelona's commitment to sustainability and climate action.

The conducted project has impact on citizens life. There are environmental benefits because projects have resulted in increased urban greenery, reduced carbon emissions, and greater public engagement in environmental issues. Social benefits could be also observed. The GPB process has strengthened community ties and increased civic participation in local governance.

In comparison to Gdansk there are other obstacles to overcome. Keeping residents engaged in the GPB process over the long term remains a challenge. Ensuring that selected projects are implemented efficiently and effectively can be hindered by bureaucratic and logistical issues.

Comparative analysis revealed following similarities: both Gdansk and Barcelona have successfully integrated green projects into their PB processes. Community education and involvement are crucial components in both cities. Both cities have observed environmental and social benefits, including improved green spaces and enhanced community cohesion.

There are also some differences regarding:

- scale and scope: Barcelona's PB process is larger in scale compared to Gdansk, with a greater budget and more extensive projects,
- funding allocation: Barcelona allocates a higher percentage of its PB funds to green projects compared to Gdansk,
- challenges: Gdansk faces more significant challenges in raising awareness and participation, while Barcelona struggles more with sustaining long-term engagement and efficient project implementation.

Both Gdansk and Barcelona have made significant progress in integrating green participatory budgeting into their municipal governance. Barcelona, with its larger scale and higher funding allocation, demonstrates a more extensive approach, whereas Gdansk shows steady progress and increasing community involvement. The experiences of these cities highlight the potential and challenges of GPB, offering valuable insights for other municipalities aiming to incorporate environmental sustainability into their budgeting processes.

5. Discussions

What was the reason to compare Gdansk with Barcelona? First, diverse Geographical and Cultural Contexts. Gdansk is located in the Northern Poland. Gdansk is a historic city with a strong maritime heritage. It has a population of approximately 470,000 and is known for its rich history and cultural significance in Poland. Barcelona, as the capital of Catalonia in Spain, Barcelona is a major global city with a population of around 1.6 million. It is renowned for its architecture, cultural vibrancy, and economic importance in Europe. Comparing a mid-sized Central European city with a major Southern European metropolis provides insights into how different geographical and cultural contexts influence the implementation and effectiveness of GPB.

There were observed different stages of participatory budgeting development. Gdansk introduced participatory budgeting in 2013 and has gradually integrated green aspects into its PB process. The city's experience reflects the early stages of developing and refining GPB. Barcelona implemented PB in 2016 and has quickly advanced in integrating green projects. The city's experience showcases a more mature stage of GPB with broader community engagement and larger-scale projects.

Poland's economic and political environment, characterized by its transition from a centrally planned economy to a market economy, influences Gdansk's approach to GPB. The city operates within a framework of increasing decentralization and democratization. Spain's economic and political environment, marked by a stronger tradition of regional autonomy and a well-established market economy, shapes Barcelona's GPB practices. The city's governance model includes a higher degree of local autonomy and a strong emphasis on civic engagement.

Comparing cities in different economic and political contexts allows for an understanding of how these factors impact the design and success of GPB initiatives. **There were also observed diverse approaches to environmental sustainability.** The focus in Gdansk has been on integrating smaller-scale green projects, such as urban gardens and improving air quality, reflecting the city's evolving approach to sustainability. Barcelona has implemented a wide range of large-scale green projects, including green corridors, urban agriculture, and extensive cycling infrastructure, demonstrating a comprehensive and ambitious approach to sustainability.

Both cities can learn from each other's experiences, challenges, and successes. Gdansk can benefit from Barcelona's advanced and comprehensive approach to GPB, while Barcelona can gain insights from Gdansk's community engagement strategies and incremental integration of green projects. Sharing best practices and

innovative solutions between these cities can foster improvements in GPB processes, leading to more effective and sustainable outcomes.

Conclusions and Further Research

Comparing the GPB practices of Gdansk and Barcelona offers valuable insights due to their diverse geographical, cultural, economic, and political contexts, as well as their different stages of PB development and approaches to environmental sustainability. This comparative analysis not only highlights the unique challenges and successes of each city but also provides a framework for other municipalities aiming to implement or enhance GPB initiatives. The potential for cross-learning and innovation makes this comparison particularly worthwhile, contributing to the broader discourse on sustainable urban development and participatory governance.

Credit Authorship Contribution Statement

Małgorzata Siemionek-Ruskań: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition;
Anna Siemionek-Lepczyńska: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of generative AI and AI-Assisted Technologies

The author declares that she has not used generative AI and AI-assisted technologies during the preparation of this work.

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Alternative Forms of Tourism: User Generate Content Promote Birdwatching Tourism in Kefalonia Island, Greece

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Abstract: Kefalonia, an island in the western part of Greece, renowned for its unique geomorphology, lush vegetation, and Mediterranean climate, is an ideal habitat for diverse bird species, making it a prime destination for birdwatching tourism and intercultural communication. This paper harnesses the power of user-generated content (tourists) by systematically collating and analyzing 1,776 ornithological observations recorded online from 1981 to 2018 (human computers and new media). Organized initially using records and further processed with Geographic Information System (GIS) software, the data revealed the presence of 254 bird species across 54 families, with Scolopacidae being the most prevalent. The most frequently sighted species included *Lanius senator* and *Buteo buteo*. Notably, Livadi Marsh in Lixouri on the Paliki peninsula emerged as the hotspot with the highest number of observations. This research highlights the rich biodiversity and the critical habitats within Kefalonia Island. The richness of the data collected offers a unique opportunity to understand the dynamics of bird populations over time, examining trends in both common and rare species. The integration of these observations into conservation planning is crucial for targeting efforts that protect vulnerable species and their habitats. This approach not only aids in the preservation of biodiversity but also enriches the global birdwatching community by providing data that supports sustainable birdwatching practices that are sensitive to the ecological needs of observed species.

Keywords: vulnerable species; birds' habitat; user-generated content; intercultural communication; digital marketing; birdwatching.

JEL Classification: P28; Q57; Z32.

Introduction

Birdwatching has evolved from its origins in the early 18th century, transitioning from the collection of birds and eggs to the observation of birds in their natural habitats. This evolution was supported by a shift towards

conservation, highlighted by the founding of organizations such as: The Royal Society for the Protection of Birds in the United Kingdom (RSPB) and The National Audubon Society in the United States, which have played pivotal roles in promoting avian preservation (Macdonald, 2002). From the 20th century onwards, birdwatching has been recognized both as a popular recreational activity and a scientific endeavour, particularly in developed nations (Cordell and Herbert 2002; Hvenegaard *et al.* 1989; Sekercioglu 2002; Wiedner and Kerlinger 1990).

The community of birdwatchers is diverse, often described as middle-aged, well-educated individuals with middle to high income levels. Despite this generalization, the demographics show considerable variety, including a significant representation of women, depending on the nature and type of birdwatching undertaken (Connell 2009; Jones *et al.* 2001; Rouche 2003; Lee and Scott 2004; Maple *et al.* 2010; Scott and Thigpen 2003). The common bond among birdwatchers is their passion for observing birds (Steven *et al.* 2018). This community is marked not only by shared interests but also by the economic impact of their activities, as they often invest significantly in travel and equipment to pursue their hobby. The motive, methodology, and level of commitment among birdwatchers vary considerably. Birdwatchers often enhance their reputation within the community through the records they keep and share, which may span a lifetime (Connell 2009; Steven *et al.* 2018). The types of birdwatchers range from casual observers to dedicated ”twitchers” who specialize in spotting rare birds, often traveling long distances and investing substantial resources (Dooley 2005). Such endeavours not only fulfil their personal birdwatching ambitions but also contribute to conservation efforts by providing valuable data on bird populations and behaviours (Davies and Miller 2010; Hvenegaard 2002; Kim *et al.* 2010; Koeppel 2006).

Birdwatchers, both Greek and international, frequently visit Kefalonia, and many share their observations on specialized websites and research papers (Vittery *et al.* 1996). These contributions not only enhance the knowledge of the island’s avifauna but also aid in the species’ protection and preservation. Despite the wealth of data generated by these enthusiasts, there has historically been little effort to systematically collect and analyze these bird observations - a gap this research aims to address. The objective of this study is to collect, process, and draw conclusions about Kefalonia’s avifauna from the observations recorded by birdwatchers. This effort will not only expand the knowledge base regarding the island’s bird species but also contribute to broader biodiversity conservation efforts.

1. Literature Review

1.1 Ecotourism. A Modern Asset in the Tourism Industry

Ecotourism is a specific type of sustainable tourism defined by the International Ecotourism Society as responsible travel to natural areas that conserves the environment and improves the welfare of local people. It combines elements of both rural and cultural tourism, adopting principles that ensure the conservation of natural and cultural heritage. This includes engaging local communities in planning, development, and operational activities to enhance their well-being. This tourism model provides comprehensive and engaging explanations to visitors about natural and cultural resources, catering primarily to individual travelers and small, organized groups. It often encompasses activities like hiking, mountaineering, and wildlife observation (Moscardo 2001). Additionally, ecotourism may include cultural activities, playing a significant role in education. It offers opportunities to learn respect for nature and local culture and, for some, a chance for self-reflection inspired by the beauty of the environment. Another important aspect of ecotourism is its benefit to local communities, which includes hiring local staff, sourcing local products, and involving community members in decision-making processes. These efforts support the sustainable development of the tourism area (Butowski 2012).

The primary goal of creating a sustainable tourism strategy for a given area is to increase the number of tourists while adhering to sustainable development principles. Achieving this goal involves several specific objectives: Coordinating all stakeholders interested in the tourism development of the area. Inventorying the area’s tourism products to better understand and market them. Documenting the benefits to local communities and the environment from shaping the tourism product. Evaluating the effectiveness of destination marketing and the responsiveness of local products by potential buyers. Developing comprehensive marketing plans, along with a clear vision and mission, during the strategic planning phase. Creating a common brand for the area that encapsulates its unique qualities and sustainable practices. Developing tools to monitor and assess the progress in implementing the strategy, ensuring adaptive management and continuous improvement (Murphy and Price 2012).

Since the 1980s, the concept of ecotourism has gained traction. This includes ”soft tourism”, ”local-scale tourism”, ”green tourism” and ”nature tourism”, which are seen as ideal for development because they potentially have fewer negative impacts on destination areas, the environment, and the population. These forms of tourism do not reduce the positive economic impacts and are supported by the preservation of social, environmental, and

historical elements of tourist destinations (Measells and Grado 2007; Smith and Eadington 1992). Ecotourism supports gentle sustainable development and is sensitive to local social and economic needs. It is based on small groups, families, or singles, and activities can be conducted all year round to foster capacity building. Ecotourism considers the long-term interests and quality of tourism for all stakeholders, valuing the natural environment and local resources. In contrast to mass tourism, which has many disadvantages but can yield high revenues during peak periods, ecotourism incorporates nature conservation, which positively impacts tourist perceptions and enhances the social, economic, and cultural sustainability of local communities (Dodds and Kuehnel 2010). Implementing green service quality in accommodation management is also critical as it improves the mental health and well-being of travelers and employees (Winter *et al.* 2019). Furthermore, ecotourism is seen as an ideal model during a pandemic, with increased popularity expected in the post-COVID-19 era. It serves as a means to reduce overtourism in popular destinations (Arora and Sharma 2021). Greece has developed new tourism strategies such as birdwatching tourism, aimed at shifting from low-budget mass tourism to high-quality alternative forms of tourism. This shift is driven by the increasing demand for comprehensive and quality-oriented tourism, aiming to extend the tourist season to support year-round tourism activities (Vayanni *et al.* 2005). Such strategies are essential for maintaining Greece's success as an international tourist destination (Christou 2012).

1.2. The Use of Internet Sites to Promote the Icon of a Place

Tourism, traditionally seen as an intangible service sector, has transformed with the advent of the internet, making it somewhat tangible as potential buyers can now view images and videos of products and services before purchase. This digital exposure not only enhances the trust in the purchase of tourism products but also improves the perceived quality of websites. It has been observed that effective multimedia usage significantly increases user engagement and satisfaction, influencing the decision-making processes of potential tourists by providing them with a clearer expectation of the services offered.

The concept of a destination image is crucial for promoting tourism locales and involves both emotional and cognitive elements that develop over time from various sources. This image significantly influences tourists' choices; emotional images relate to the feelings people hold for a destination, while cognitive images involve beliefs and knowledge about it (Phillips *et al.* 2017). Negative perceptions of either can deter tourists, highlighting the importance of maintaining a balanced and positive presentation to encourage visits. Effective management of these images can significantly enhance a destination's competitiveness and attractiveness, making it a critical focus for tourism marketers. It has been emphasized that both emotional and cognitive images are critical in assessing a destination's appeal. Emotional images capture the enthusiasm and liveliness of a destination, while cognitive images include elements such as cultural attractions, landscapes, and infrastructure (Becken *et al.* 2017). These components collectively define the destination image and must be communicated effectively to attract and retain tourists. Enhancing these images involves sophisticated marketing strategies that highlight unique cultural and natural assets, thereby fostering a deeper connection with potential visitors. Furthermore, satisfaction levels are found to significantly affect tourists' intentions to revisit a destination (Kim *et al.* 2015). Positive destination images, cultivated through strategic marketing, lead to success while a negative image leads to failure or limitation (Chaulagain *et al.* 2019; Ketter 2016). The strategic development of marketing plans that focus on reinforcing positive images and addressing any negative perceptions can lead to improved tourist retention and attraction rates, ultimately impacting the economic viability of tourism destinations (Lykoudi *et al.* 2023).

Tourism websites are pivotal in creating strong and positive destination images, motivating travelers to visit these destinations. Online resources such as newspapers, TV websites, blogs, and forums substantially impact the destination image. Positive information on these platforms can persuade tourists to visit, while a lack of information can deter them (Huete-Alcocer *et al.* 2019; Leung *et al.* 2017). These digital platforms are integral in shaping the narrative around a destination, offering a medium through which vivid storytelling and engaging content can captivate and allure potential tourists (Paiva *et al.* 2023). Effective communication through these websites is crucial for marketing and influencing tourist behavior. Highlighting the attractive features of a destination can significantly alter tourists' perceptions and convince them to visit (Kim *et al.* 2017). Moreover, these platforms facilitate interactive engagements such as virtual tours and customer reviews, which can further enhance the persuasive power of destination marketing. Travel websites also serve as effective marketing communication channels, enhancing the visibility of destinations and influencing potential visitors' perceptions (Marine-Roig 2022; Rizky *et al.* 2017). These platforms are essential for deploying targeted marketing campaigns that can dynamically adapt to market trends and tourist preferences, ensuring that the marketing messages resonate well with diverse audiences. The significance of online information in shaping tourists' plans is notable, as extensive website usage for information gathering influences tourists' travel decisions (Shafiee *et al.* 2016).

Providing detailed and attractive information on travel websites is vital for promoting a destination effectively. This involves enriching the content with high-quality images, engaging narratives, and accessible booking options, which collectively enhance the usability and appeal of the website. In conclusion, the image of a tourist destination is significantly affected by online information about the tourist destination. When tourists plan to visit a place, they develop an overall image of that place through exposure to available information, affecting their decision to visit the destination (Kim *et al.* 2019). Websites are indispensable tools for creating positive destination images and play a critical role in the tourism industry's marketing strategies. They are key to enhancing the visibility and appeal of destinations, fundamentally shaping tourist perceptions and decisions. A robust and dynamic online presence, coupled with strategic content management, is critical for harnessing the full potential of internet-based tourism marketing.

1.3. Kefalonia Island, Greece as an Alternative Tourism Destination

Kefalonia Island offers a unique wealth of geological monuments and geomorphs scattered across its expanse. These include karst formations such as caves, impressive relief forms, paleontological sites, coastal geomorphs, geotectonic formations such as faults, and wetlands. All these elements together compose the geological history of Kefalonia. Additionally, the island features prehistoric-Hellenistic archaeological sites as well as Roman monuments, medieval castles, Byzantine-post-Byzantine monasteries, traditional settlements, mills, bridges, and lighthouses. The Kefalonia-Ithaca Geopark, established to protect and highlight this entire collection of Earth's" monuments" focuses on emphasizing geological heritage in conjunction with cultural heritage and the local community, following a strategy of sustainable development (Maple *et al.* 2010). In April 2022, it was designated a UNESCO Global Geopark, underscoring its significance in promoting sustainable development and the growth of geotourism and ecotourism (Kefalonia-Ithaca Geopark 2024).

Kefalonia's natural environment is unparalleled, fostering the development of Ecotourism. The protected areas of Kefalonia-Ithaca, integrated into the European" Natura 2000" network, total six and cover an area of 57,998.48 ha. Notably, the terrestrial area GR2220001 in northern Kefalonia encompasses the limestone Kalon Oros. This area's sparse vegetation is mainly composed of maquis (*Quercus coccifera, Pistacia lentiscus, Arbutus unedo,* etc.), with significant habitats such as the phryganas, dominated by *Sarcopoterium spinosum*. The most significant protected area is Aenos National Park (GR2220002), which is renowned as the smallest National Park in Greece, covering 2,862 ha. Established in 1962, it is primarily aimed at protecting the endemic Kefalonian Fir (*Abies cephalonica* Loudon), recognized as an International Biogenetic Reserve. Additional areas like GR2220004 and GR2220005 contribute to the diverse ecosystem, supporting a variety of marine and terrestrial life forms critical for biodiversity conservation. Kefalonia is also a crucial location for birdwatching, supported by the observation of 237 different species and subspecies of birds according to bibliography Vittery *et al.* 1996), and serves as a significant migratory hub due to its diverse habitats. The richness of Kefalonia's biodiversity is further exemplified by the presence of 450 species of flora, many of which are endemic and rare, 33 species of amphibians and reptiles, orchid species, and semi-wild horses living on the S.E. slopes of Mount Aenos. The local products of Kefalonia are of high quality and nutritional value, contributing to the development of gastronomic tourism. Some of these products include the handmade sweet "mandoles","Robola of Kefalonia", a white wine with Protected Designation of Origin from the Omala area, highly nutritious honey rich in vitamins and trace elements, Kefalonian cheeses, and olive oil. Local delicacies and dishes, such as the famous and delicious Kefalonian meat pie, are promoted by the Association of Hoteliers of Kefalonia-Ithaca at exhibitions and through the promotion of the local Kefalonian breakfast in the island's hotels.

Additionally, hiking tourism is rapidly developing on the island. Throughout Kefalonia, trails are placed through landscapes of unparalleled aesthetic value. In Aenos National Park, there are 5 hiking trails, while the Municipality of Argostoli and Lixouri, in cooperation with Path of Greece, have conducted a study for the opening and signaling of the trails. The Municipality of Sami already has 5 operational trails in its jurisdiction. In summary, visitors to Kefalonia could engage in a plethora of alternative tourist activities, such as sea cycling in the Koutavos Lagoon, diving in wrecks, visiting geosites, stargazing on Aenos, sea kayaking, hang gliding over Myrtos, hiking on trails, climbing, and more. Each of these activities attracts tourists not only for their leisure and recreational aspects but also for the educational insights they offer into the natural and cultural heritage of Kefalonia.

Regarding tourist infrastructure for supporting ecotourism activities, Kefalonia offers a variety of hotel facilities, which are presented in the following Table 1:

Table 1. Hotel Capacity in Kefalonia

Year	Hotels	Rooms	Beds
5* Hotels	8	629	1,357
4* Hotels	24	1,551	3,163
3* Hotels	40	1,597	3,181
2* Hotels	68	1,648	3,240
1* Hotels	9	112	244
Total	149	5,537	11,185

Source: Hellenic chambers of hotels 2021

The data presented in Table 1 showcases the distribution of hotel accommodation across various categories in Kefalonia. The island has a broad range of options, with a significant emphasis on more accessible two-star accommodation, as evidenced by the 68 hotels providing 3,240 beds. This category outstrips the three-star accommodations, which also plays a significant role in the hospitality landscape with 40 hotels. Interestingly, the luxury sector, represented by five-star hotels, although smaller in number (only 8 hotels), still offers a considerable number of beds (1,357), highlighting the island's appeal to both budget and upscale tourists. The total hotel infrastructure supports a substantial capacity of 11,185 beds, indicating Kefalonia's preparedness to host many tourists, which is crucial for sustaining the island's robust tourist industry. To understand the flow of tourism and its seasonal dynamics within the Ionian Islands, Table 2 compiles the monthly arrival figures for the year 2021 for four key islands: Kerkyra, Zakynthos, Kefalonia, and Lefkada. These statistics are pivotal for assessing the effectiveness of tourism strategies and infrastructure in accommodating and attracting visitors. The analysis helps to highlight the relative popularity of these destinations and provides insights into potential areas for development and marketing within Kefalonia's tourism sector.

Table 2. Tourist Arrivals in the Ionian Islands in 2021

Month	Kerkyra	Zakynthos	Kefalonia	Lefkada
January	0	0	0	0
February	0	0	0	0
March	108	0	0	0
April	38	0	0	0
May	14,705	7,212	582	3,337
June	79,684	49,386	6,444	14,835
July	228,935	130,515	27,066	45,168
August	268,428	151,423	43,807	52,227
September	199,120	104,051	31,295	40,991
October	109,365	29,266	7,511	17,241
November	0	0	0	0
December	0	0	0	0
Current Year	900,383	471,853	116,705	173,799

Source: INSETE 2021

According to Table 2, Kefalonia experiences a significant influx of tourists primarily in the summer months, with the highest number of arrivals recorded in August (43,807), followed by September (31,295) and July (27,066). This trend is consistent across the Ionian Islands, where summer is the peak tourist season. Despite these numbers, Kefalonia's total annual tourist arrivals amount to 116,705, which positions it last among the islands compared. In contrast, Kerkyra (Corfu) leads with an overwhelming 900,383 arrivals. The comparison highlights a substantial gap in tourist numbers, suggesting that while Kefalonia enjoys a favorable peak season, it still lags behind in attracting year-round tourism compared to its regional counterparts. The data emphasizes the need for developing new alternative forms of tourism in the island like birdwatching and possibly improving tourism strategy and existing infrastructure to increase its competitiveness and appeal throughout the year.

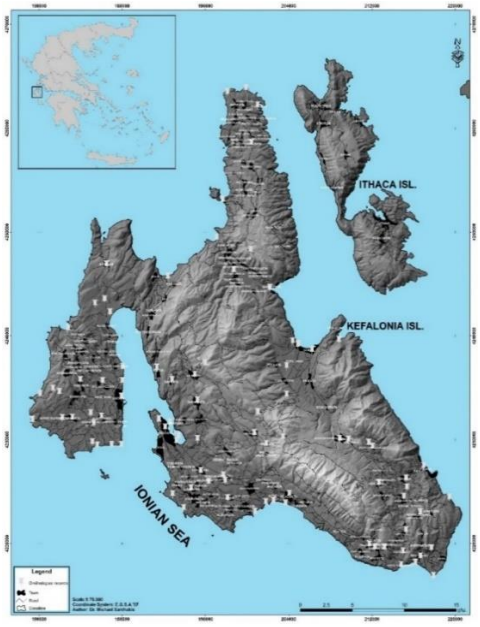
1.4. Birdwatching Tourism as an Alternative Form of Tourism in Kefalonia Island

Birdwatching tourism is increasingly recognized as a significant component of alternative tourism globally, drawing well-off tourists who travel specifically for bird observation (Cordell and Herbert 2002; Hvenegaard *et al.* 1989; Newsome and Rodger 2012; Sekercioglu 2002). Studies indicate that birdwatching can generate substantial economic benefits for local communities in both developed and developing countries, such as the United Kingdom, the USA (Kerlinger 1993; Measells and Grado 2007; Stoll *et al.* 2006), South Korea (Lee *et al.* 2010), Canada, South Africa (Biggs *et al.* 2011), and Greece (Vavanni *et al.* 2005). Protected areas networks, including the European Network of Spatial Protection Areas, wildlife shelters, Important Bird Areas (IBA), and the Ramsar wetlands, along with various non-protected areas, support tourism activities centered on bird observation.

Destinations offering unique and rare birdwatching experiences are particularly popular among enthusiasts. Kefalonia's diverse geomorphology and array of habitats make it an ideal location for birdwatching. The island's landscape has been shaped by a series of geological events, including faults, earthquakes, uplifts, and submersions, creating a variety of habitats such as wetlands, natural and artificial lakes, expansive fir forests, and rugged terrains like steep slopes, cliffs, and canyons. These features, combined with the prevalent limestone formations in Aenos National Park that provide excellent nesting sites for predatory birds, create perfect conditions for bird habitats. The vegetation of Kefalonia also plays a crucial role, with 30% of the island covered with broadleaved shrublands. This diverse environment supports a rich bird population, many of which are rare and endangered. Several of these species are priorities for conservation in the European Union and are protected under the 2009/147/EC European Directive on the conservation of wild birds.

2. Study Area

Figure 1. The study area with the spatial distribution of bird observations by birdwatchers



The study is conducted in Kefalonia (Figure 1), in the Ionian Islands region of Greece, known as "Ionio Archipelagos". This insular region stretches along the western coast of Greece, within the central Mediterranean marine area. The Ionian Islands are celebrated for their distinctive natural environment and rich biodiversity, which contribute significantly to their ecological importance. Kefalonia, the focal point of this study, stands as the largest and most mountainous of the Ionian Islands. It is strategically positioned at the entrance to the Gulf of Patras, nestled north of Zakynthos, south of Lefkada, and west of Ithaca.

The island spans an area of 781 square kilometers and is home to approximately 36,066 residents as per the 2021 census by the Hellenic Statistical Authority (ELSTAT. 2021). A significant portion of Kefalonia is dominated by Mount Aenos, which features some of the region's highest peaks including Megas Soros at 1,628 meters, Agia Dynati at 1,131 meters, Evmorfia at 1,043 meters, and Kokkini Rachi at 1,078 meters. These elevations not only define the island's rugged landscape but also support diverse ecosystems that are critical for regional biodiversity. The prominence of Mount Aenos in the island's topography is central to its appeal as a destination for birdwatching,

geotourism (Spyrou *et al.* 2022), astronomical tourism (Xanthakis *et al.* 2024), hiking and other forms of nature-based tourism.

3. Materials and Methods

The methodology for this study involved a comprehensive collection of bird observations in Kefalonia. Data were compiled from several sources including direct submissions by foreign birdwatchers, contributions from the Management Unit of Zakynthos, Aenos and Protected areas of Ionian islands (NECCA), postings from the online local Facebook group (Biodiversity of Cephalonia Island, 2024), scientific publications by English ornithologists, and birdwatching websites (Birdforum 2024, Birdtours 2024, Bubo 2024). A total of 1,776 ornithological observations were systematically gathered, involving both visitors and local citizens. Data were initially recorded and organized using Microsoft Excel to facilitate ease of processing. Each observation was detailed in a structured format with nine primary columns: Species, Prefecture, Place of Observation, Month of Observation, Year of Observation, Projective Coordinates (x, y), Name of Observer, Source, and Additional Information/Remarks. The species were listed by their Latin names to maintain consistency and scientific accuracy. Geographical data, including the location and time of each observation, were noted with precise details to enable effective mapping and analysis in a Geographic Information System (GIS). The coordinates were recorded using the Hellenic Geodetic Reference System (HGRS87) to ensure accuracy in spatial analysis using ArcGIS 10.1 software by ESRI. This approach enabled the study to highlight the spatial distribution of bird species across Kefalonia, enhancing the understanding of their habitat preferences and observation frequencies. The observations spanned several years, ranging from 1981 to 2018, providing a long-term view of avian biodiversity and birdwatching activity on the island. Below, Table 3 summarizes the distribution of these observations over the years, illustrating the fluctuation and trends in birdwatching activities.

Table 3. Number of Observations and Percentage in Total Per Year

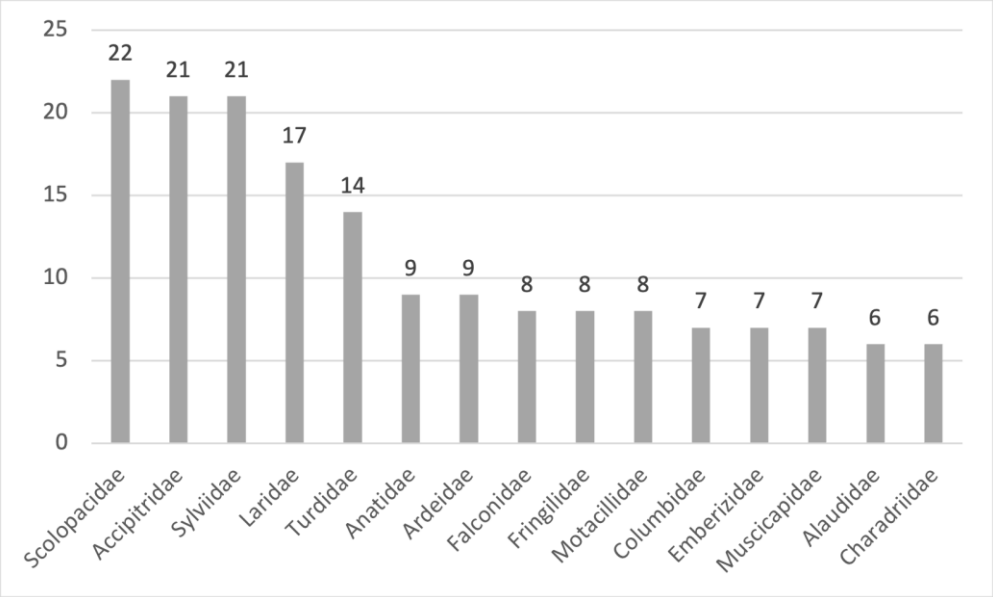
Year	Number of Observations	Total Percentage
1981	1	0.06%
1986	2	0.11%
1988	13	0.73%
1989	23	1.30%
1990	48	2.70%
1991	84	4.73%
1992	7	0.39%
1993	42	2.36%
1994	179	10.08%
1996	1	0.06%
1998	241	13.57%
2003	71	4.00%
2004	76	4.28%
2005	109	6.14%
2006	116	6.53%
2008	30	1.69%
2009	63	3.55%
2010	44	2.48%
2011	2	0.11%
2012	40	2.25%
2013	85	4.79%
2014	38	2.14%
2015	176	9.91%
2016	124	6.98%
2017	119	6.70%
2018	42	2.36%

The data presented in Table 3 highlights a significant increase in bird observations during certain years, particularly in 1998 and 2015, where the percentages of total observations reached 13.57% and 9.91%, respectively. These peaks may correspond to specific environmental or promotional events that drew higher numbers of bird watchers. The spread of observations over the years also suggests a growing interest and possibly improved awareness and reporting mechanisms in the birdwatching community over time. This increase in data collection and interest supports conservation efforts and enhances the scientific understanding of avian diversity on Kefalonia.

4. Research Results

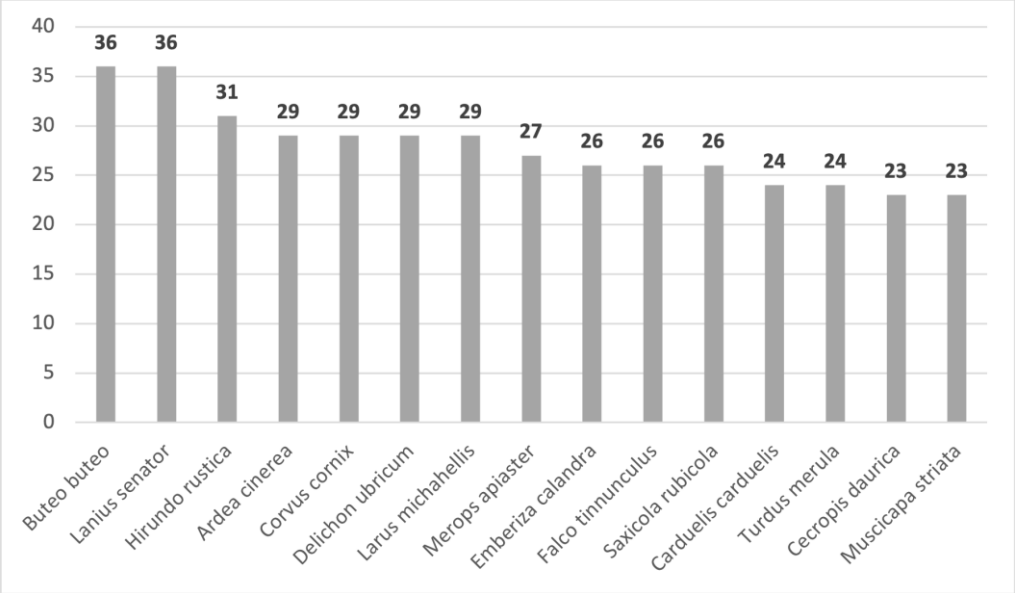
During the study, a total of 254 different bird species were recorded by foreign birdwatchers. These species are distributed across 54 diverse avian families. To provide a clearer overview, Figure 2 displays the number of species within the fifteen families that have the highest species count, facilitating a focused discussion on the most significant observations. From the data presented in Figure 1, it is evident that the family Scolopacidae, known for its shorebirds, is the most species-rich, boasting 22 distinct species. This is closely followed by the Accipitridae and Sylviidae families, each containing 21 different species. Notably, the Laridae family, which includes gulls, and the Turdidae family, known for thrushes, contain 17 and 14 species respectively. Additionally, the families Anatidae and Ardeidae, representing ducks and herons, have 9 species each. Other notable families such as Falconidae, Fringillidae, and Motacillidae each host 8 different species. Interestingly, there are several families that are represented by a single species within the region, highlighting the unique biodiversity of Kefalonia. These include Alcidae, Burhinidae, Caprimulgidae, Certhiidae, Cettidae, Cisticolidae, Coraciidae, Cuculidae, Glareolidae, Gruidae, Meropidae, Oriolidae, Pandionidae, Phoenicopteridae, Prunellidae, Stercorariidae, Sternidae, Sulidae, Threskiornithidae, Troglodytidae, and Upupidae. This variety underscores the importance of the island as a habitat for a wide range of avian life, reflecting its significant ecological value.

Figure 2. The Families Represented in Records with the Most Species



Regarding the diversity of bird species recorded, a total of 254 different species were noted, as illustrated in Figure 3.

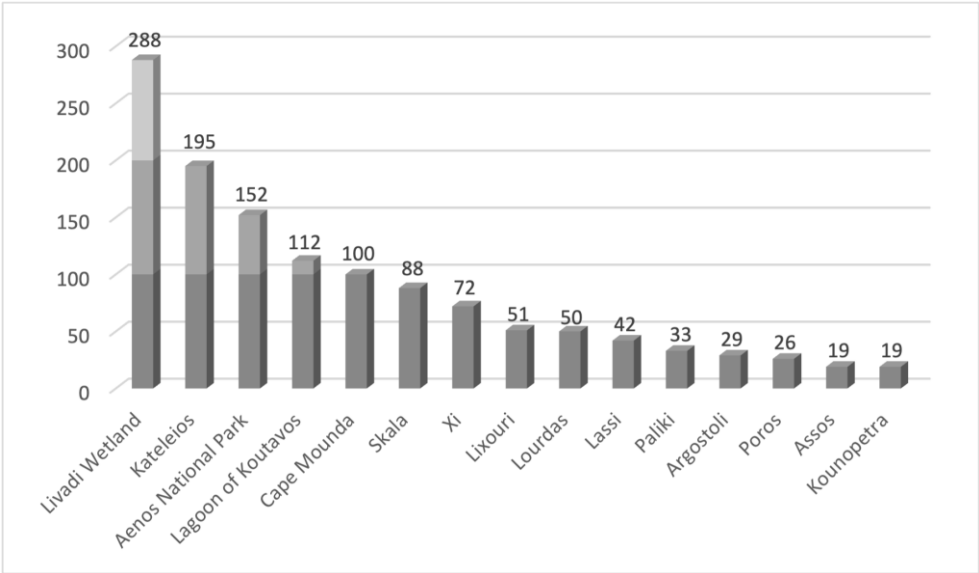
Figure 3. Species with the most Recordings



As shown in Figure 3, the Common Buzzard (*Buteo buteo*) was observed the most frequently, recorded 36 times. This was the same with the Woodchat Shrike (*Lanius senator*). The Grey Heron (*Ardea cinerea*), Hooded Crow (*Corvus cornix*), House Martin (*Delichon urbicum*), and Yellow-legged Gull (*Larus michahellis*) each were observed 29 times. The European Bee-eater (*Merops apiaster*) and several other species such as the Common Kestrel (*Falco tinnunculus*) and the Stonechat (*Saxicola rubetra*) were also frequently sighted, with 27 and 26 observations respectively. The dataset reflects the rich avifaunal diversity present in Kefalonia, showcasing both common species and those that are more unique to the region. This extensive range of species recorded underscores the island's significance as a birdwatching destination, attracting enthusiasts eager to observe both common and rare species in their natural habitats. The presence of unique species such as the Alcenidae, Burhinidae, and Caprimulgidae—each represented by only one recorded species—highlights the ecological value and diverse bird life of the island.

The geographical distribution of bird observations is a critical aspect of understanding avian biodiversity in Kefalonia. This is visually represented in Figure 4, which illustrates the frequency of observations across various locations on the island.

Figure 4. Distribution of Bird Observations by Location in Kefalonia



According to Figure 4, the highest number of bird recordings was made at the Wetland of Livadi, Paliki, with 288 observations, highlighting this area as a significant bird habitat. Following closely, Kateleios accounted for 195

observations, and Aenos National Park, a protected area known for its rich biodiversity, registered 152 observations. Notably, the lagoon of Koutavos was also a prominent site with 112 recordings, followed by Cape Mounda with 100, and Skala with 88 observations. Other notable areas that proved to be important for avifauna include Xi with 72 observations, and additional sites such as Lixouri, Lourdas, Lassi, Argostoli, Poros, and Assos also made significant contributions to the dataset. This spatial distribution of observations underscores the importance of diverse habitats in Kefalonia, supporting a wide range of bird species. It also indicates potential areas for focused conservation efforts and further research to ensure the protection and understanding of the island's avifauna.

The avifauna of Kefalonia comprises a diverse range of species, whose presence and conservation status are meticulously documented. The classification of these species according to their presence on the island provides insights into their ecological roles and the temporal aspects of their occurrences. Table 4 categorizes these species into several types of presence, offering a structured view into their life cycles and migration patterns on the island.

Table 4. Presence Status of Avifauna Species in Kefalonia

Presence status	Description
R	Resident
B	Breeder
P	Passage Migrant
W	Winter Visitor
AV	Accidental Visitor

Concurrently, the protection status of these species is critical for understanding the conservation priorities and measures needed. Table 5 delineates these statuses as per the International Union for Conservation of Nature (IUCN) and the Greek Red Data Book, reflecting both global and local conservation efforts (Baillie *et al.* 2004).

Table 5. Species Protection Status Based on IUCN

Presence status	Description
EX	Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
NT	Near Threatened
LC	Least Concern
DD	Data Deficient

Source: Baillie *et al.* 2004

Following these classifications, Table 6 provides a detailed list of the avifauna species observed in Kefalonia, annotated with their presence and protection statuses. This comprehensive enumeration aids in the targeted conservation and study of these birds, highlighting the need for continued ecological monitoring and adaptive management strategies.

Table 6. Avifauna Species Observed in Kefalonia by birdwatchers, their Presence Status, and IUCN Protection Status

A/A	Family	*Species*	Presence Status	IUCN Status
1	Accipitridae	*Accipiter brevipes*	P	LC
2	Accipitridae	*Accipiter gentilis*	P, W	LC
3	Accipitridae	*Accipiter nisus*	B, P, W	LC
4	Accipitridae	*Aquila chrysaetos*	R	LC
5	Accipitridae	*Aquila fasciata**	AV	LC
6	Accipitridae	*Aquila heliaca**	AV	VU
7	Accipitridae	*Buteo buteo*	R	LC
8	Accipitridae	*Buteo lagopus*	AV	LC
9	Accipitridae	*Buteo rufinus*	R	LC

A/A	Family	*Species*	Presence Status	IUCN Status
10	Accipitridae	*Buteo vulpinus*	AV	LC
11	Accipitridae	*Circaetus gallicus*	P, B	LC
12	Accipitridae	*Circus aeruginosus*	P, W	LC
13	Accipitridae	*Circus cyaneus*	P, W	LC
14	Accipitridae	*Circus macrourus*	P	NT
15	Accipitridae	*Circus pygargus*	P	LC
16	Accipitridae	*Clanga clanga**	AV	VU
17	Accipitridae	*Clanga pomarina*	AV	LC
18	Accipitridae	*Gyps fulvus*	AV	LC
19	Accipitridae	*Hieraaetus pennatus*	P, W	LC
20	Accipitridae	*Milvus migrans*	P, W	LC
21	Accipitridae	*Neophron percnopterus*	P	EN
22	Accipitridae	*Pernis apivorus*	P	LC
23	Acrocephalidae	*Acrocephalus arundinaceus*	B, P	LC
24	Acrocephalidae	*Acrocephalus melanopogon*	P, W	LC
25	Acrocephalidae	*Acrocephalus paludicola**	P	VU
26	Acrocephalidae	*Acrocephalus schoenobaenus*	P	LC
27	Acrocephalidae	*Acrocephalus scirpaceus*	B, P	LC
28	Acrocephalidae	*Hippolais icterina*	P	LC
29	Acrocephalidae	*Hippolais olivetorum*	P	LC
30	Acrocephalidae	*Hippolais opaca*	P	LC
31	Acrocephalidae	*Hippolais polyglotta*	AV	LC
32	Acrocephalidae	*Iduna pallida*	B, P?	LC
33	Alaudidae	*Alauda arvensis*	B, P, W	LC
34	Alaudidae	*Calandrella cinerea*	P	LC
35	Alaudidae	*Galerida cristata*	R	LC
36	Alaudidae	*Lullula arborea*	R, P	LC
37	Alaudidae	*Melanocorypha bimaculata*	AV	LC
38	Alaudidae	*Melanocorypha calandra*	B, P	LC
39	Alcedinidae	*Alcedo atthis*	P, W	LC
40	Anatidae	*Anas acuta*	P, W	LC
41	Anatidae	*Anas clypeata*	P, W	LC
42	Anatidae	*Anas crecca*	P, W	LC
43	Anatidae	*Anas penelope*	P, W	LC
44	Anatidae	*Anas platyrhynchos*	B, P, W	LC
45	Anatidae	*Aythya fuligula*	AV	LC
46	Anatidae	*Cygnus olor*	R	LC
47	Anatidae	*Spatula querquedula*	P, W	LC
48	Anatidae	*Tadorna tadorna*	AV	LC
49	Apodidae	*Apus apus*	B, P	LC
50	Apodidae	*Apus pallidus*	P	LC
51	Apodidae	*Tachymarptis melba*	B, P	LC
52	Ardeidae	*Ardea alba*	P, W	LC
53	Ardeidae	*Ardea cinerea*	B, P, W	LC
54	Ardeidae	*Ardea purpurea*	P	LC
55	Ardeidae	*Ardeola ralloides*	P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
56	Ardeidae	*Botaurus stellaris**	P, W	LC
57	Ardeidae	*Bubulcus ibis*	P, W	LC
58	Ardeidae	*Egretta garzetta*	P, W	LC
59	Ardeidae	*Ixobrychus minutus*	P	LC
60	Ardeidae	*Nycticorax nycticorax*	P, W	LC
61	Burhinidae	*Burhinus oedicnemus*	R	LC
62	Caprimulgidae	*Caprimulgus europaeus*	B, P	LC
63	Certhiidae	*Certhia brachydactyla*	R	LC
64	Cettiidae	*Cettia cetti*	R	LC
65	Charadriidae	*Charadrius alexandrinus*	P, W	LC
66	Charadriidae	*Charadrius dubius*	P, W	LC
67	Charadriidae	*Charadrius hiaticula*	P, W	LC
68	Charadriidae	*Charadrius morinellus*	W	LC
69	Charadriidae	*Pluvialis squatarola*	P, W	LC
70	Charadriidae	*Vanellus vanellus*	P, W	NT
71	Ciconiidae	*Ciconia ciconia*	P	LC
72	Ciconiidae	*Ciconia nigra*	AV	LC
73	Cisticolidae	*Cisticola juncidis*	R	LC
74	Columbidae	*Columba livia*	R	LC
75	Columbidae	*Columba oenas*	B, P, W	LC
76	Columbidae	*Columba palumbus*	R	LC
77	Columbidae	*Streptopelia decaocto*	R	LC
78	Columbidae	*Streptopelia roseogrisea*	AV	LC
79	Columbidae	*Streptopelia turtur*	B, P	VU
80	Coraciidae	*Coracias garrulus*	P	LC
81	Corvidae	*Corvus corax*	R	LC
82	Corvidae	*Corvus cornix*	R	LC
83	Corvidae	*Garrulus glandarius*	R, B	LC
84	Corvidae	*Pica pica*	AV	LC
85	Cuculidae	*Cuculus canorus*	P	LC
86	Emberizidae	*Emberiza caesia*	P	LC
87	Emberizidae	*Emberiza calandra*	P, R	LC
88	Emberizidae	*Emberiza cia*	P	LC
89	Emberizidae	*Emberiza cirlus*	R	LC
90	Emberizidae	*Emberiza hortulana*	P	LC
91	Emberizidae	*Emberiza melanocephala*	P	LC
92	Emberizidae	*Emberiza schoeniclus*	W	LC
93	Falconidae	*Falco biarmicus*	R, P	LC
94	Falconidae	*Falco cherrug*	P	EN
95	Falconidae	*Falco eleonorae*	P, B	LC
96	Falconidae	*Falco naumanni*	B, P	LC
97	Falconidae	*Falco peregrinus*	R	LC
98	Falconidae	*Falco subbuteo*	P	LC
99	Falconidae	*Falco tinnunculus*	R	LC
100	Falconidae	*Falco vespertinus*	P	NT
101	Fringillidae	*Carduelis carduelis*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
102	Fringillidae	*Chloris chloris*	B, P	LC
103	Fringillidae	*Coccothraustes coccothraustes*	P, W	LC
104	Fringillidae	*Fringilla coelebs*	R	LC
105	Fringillidae	*Linaria cannabina*	P, B	LC
106	Fringillidae	*Loxia curvirostra*	AV	LC
107	Fringillidae	*Serinus serinus*	R	LC
108	Fringillidae	*Spinus spinus*	P, W	LC
109	Glareolidae	*Glareola pratincola*	P	LC
110	Gruidae	*Grus grus*	P	LC
111	Hirundinidae	*Cecropis daurica*	B, P	LC
112	Hirundinidae	*Delichon urbicum*	B, P	LC
113	Hirundinidae	*Hirundo rustica*	B, P	LC
114	Hirundinidae	*Riparia riparia*	P	LC
115	Hydrobatidae	*Hydroprogne caspia*	AV	LC
116	Laniidae	*Lanius collurio*	P	LC
117	Laniidae	*Lanius excubitor*	AV	LC
118	Laniidae	*Lanius minor*	P	LC
119	Laniidae	*Lanius senator*	B, P	LC
120	Laridae	*Chlidonias hybrida*	P	LC
121	Laridae	*Chlidonias leucopterus*	P	LC
122	Laridae	*Chlidonias niger*	P	LC
123	Laridae	*Chroicocephalus ridibundus*	P, W	LC
124	Laridae	*Gelochelidon nilotica*	AV	LC
125	Laridae	*Hydrocoloeus minutus*	P, W	LC
126	Laridae	*Ichthyaetus melanocephalus*	AV	LC
127	Laridae	*Larus argentatus*	AV	LC
128	Laridae	*Larus audouinii*	AV	LC
129	Laridae	*Larus cachinnans*	P, W	LC
130	Laridae	*Larus fuscus*	P, W	LC
131	Laridae	*Larus genei*	AV	LC
132	Laridae	*Larus marinus*	AV	LC
133	Laridae	*Larus melanocephalus*	P, W?	LC
134	Laridae	*Larus michahellis*	R	LC
135	Laridae	*Spilopelia senegalensis*	AV	LC
136	Laridae	*Sternula albifrons*	P	LC
137	Locustellidae	*Locustella luscinioides*	P	LC
138	Locustellidae	*Locustella naevia*	P	LC
139	Meropidae	*Merops apiaster*	B, P	LC
140	Motacillidae	*Anthus campestris*	B, P	LC
141	Motacillidae	*Anthus cervinus*	P, W	LC
142	Motacillidae	*Anthus novaeseelandiae*	AV	LC
143	Motacillidae	*Anthus pratensis*	B, P, W	LC
144	Motacillidae	*Anthus spinoletta*	P, W	LC
145	Motacillidae	*Motacilla alba*	R	LC
146	Motacillidae	*Motacilla cinerea*	R	LC
147	Motacillidae	*Motacilla flava*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
148	Muscicapidae	*Cercotrichas galactotes*	P	LC
149	Muscicapidae	*Erithacus rubecula*	P, W, B	LC
150	Muscicapidae	*Ficedula albicollis*	P	LC
151	Muscicapidae	*Ficedula hypoleuca*	P	LC
152	Muscicapidae	*Ficedula parva*	P	LC
153	Muscicapidae	*Ficedula semitorquata*	P	LC
154	Muscicapidae	*Luscinia megarhynchos*	B, P	LC
155	Muscicapidae	*Muscicapa striata*	B, P	LC
156	Muscicapidae	*Oenanthe hispanica*	B, P	LC
157	Muscicapidae	*Oenanthe isabellina*	B, P	LC
158	Muscicapidae	*Oenanthe oenanthe*	B, P	LC
159	Muscicapidae	*Phoenicurus ochruros*	P, W	LC
160	Muscicapidae	*Phoenicurus phoenicurus*	P, W	LC
161	Muscicapidae	*Saxicola maurus*	AV	LC
162	Muscicapidae	*Saxicola ruberta*	B, P	LC
163	Muscicapidae	*Saxicola rubicola*	B, P	LC
164	Oriolidae	*Oriolus oriolus*	P	LC
165	Pandionidae	*Pandion haliaetus*	P	LC
166	Paridae	*Cyanistes caeruleus*	B, P, W	LC
167	Paridae	*Lophophanes cristatus*	AV	LC
168	Paridae	*Parus major*	R	LC
169	Paridae	*Periparus ater*	B, P	LC
170	Paridae	*Poecile lugubris*	P	LC
171	Passeridae	*Passer domesticus*	R	LC
172	Passeridae	*Passer hispaniolensis*	B, P, W	LC
173	Passeridae	*Passer montanus*	R	LC
174	Passeridae	*Petronia petronia*	AV	LC
175	Phalacrocoracidae	*Microcarbo pygmeus*	AV	LC
176	Phalacrocoracidae	*Phalacrocorax aristotelis*	R	LC
177	Phalacrocoracidae	*Phalacrocorax carbo*	P, W	LC
178	Phasianidae	*Alectoris chukar*	R, B	LC
179	Phasianidae	*Alectoris graeca*	R, B	NT
180	Phasianidae	*Coturnix coturnix*	P	LC
181	Phasianidae	*Phasianus colchicus*	AV	LC
182	Phoenicopteridae	*Phoenicopterus roseus*	P, W	LC
183	Phylloscopidae	*Phylloscopus bonelli*	AV	LC
184	Phylloscopidae	*Phylloscopus collybita*	P, W	LC
185	Phylloscopidae	*Phylloscopus sibilatrix*	P	LC
186	Phylloscopidae	*Phylloscopus trochillus*	P	LC
187	Picidae	*Dendrocopos leucotos*	AV	LC
188	Picidae	*Dryocopus martius*	AV	LC
189	Picidae	*Jynx torquilla*	B, P, W	LC
190	Podicipedidae	*Podiceps cristatus*	P, W	LC
191	Podicipedidae	*Podiceps nigricollis*	P, W	LC
192	Podicipedidae	*Tachybaptus ruficollis*	R	LC
193	Procellariidae	*Calonectris borealis*	AV	LC

A/A	Family	*Species*	Presence Status	IUCN Status
194	Procellariidae	*Calonectris diomedea*	B, P	LC
195	Procellariidae	*Puffinus yelkouan*	B, P	VU
196	Prunellidae	*Prunella modularis*	W	LC
197	Rallidae	*Fulica atra*	P, R	LC
198	Rallidae	*Gallinula chloropus*	B, R	LC
199	Rallidae	*Porzana parva*	P	LC
200	Rallidae	*Porzana porzana*	P	LC
201	Rallidae	*Rallus aquaticus*	B, P, W	LC
202	Recurvirostridae	*Himantopus himantopus*	P	LC
203	Recurvirostridae	*Recurvirostra avosetta*	P	LC
204	Regulidae	*Regulus ignicapillus*	R	LC
205	Regulidae	*Regulus regulus*	R	LC
206	Scolopacidae	*Actitis hypoleucos*	P, W	LC
207	Scolopacidae	*Arenaria interpres*	P, W	LC
208	Scolopacidae	*Calidris alba*	P	LC
209	Scolopacidae	*Calidris alpina*	P, W	LC
210	Scolopacidae	*Calidris canutus*	AV	NT
211	Scolopacidae	*Calidris falcinellus*	AV	LC
212	Scolopacidae	*Calidris ferruginea*	P	NT
213	Scolopacidae	*Calidris minuta*	P, W	LC
214	Scolopacidae	*Calidris pugnax*	P	LC
215	Scolopacidae	*Calidris temminckii*	P	LC
216	Scolopacidae	*Gallinago gallinago*	P, W	LC
217	Scolopacidae	*Gallinago media*	P	NT
218	Scolopacidae	*Limosa limosa*	P	NT
219	Scolopacidae	*Numenius arquata*	P, W	NT
220	Scolopacidae	*Numenius phaeopus*	P	LC
221	Scolopacidae	*Numenius tenuirostris*	P	EN
222	Scolopacidae	*Scolopax rusticola*	P, W	LC
223	Scolopacidae	*Tringa glareola*	P	LC
224	Scolopacidae	*Tringa nebularia*	P	LC
225	Scolopacidae	*Tringa ochropus*	P, W	LC
226	Scolopacidae	*Tringa stagnatilis*	P	LC
227	Scolopacidae	*Tringa totanus*	P, W	LC
228	Stercorariidae	*Stercorarius parasiticus*	AV	LC
229	Strigidae	*Asio flammeus*	AV	LC
230	Strigidae	*Asio otus*	R, P	LC
231	Strigidae	*Athene noctua*	R, B	LC
232	Strigidae	*Otus scops*	R	LC
233	Strigidae	*Strix aluco*	AV	LC
234	Sturnidae	*Pastor roseus*	AV	LC
235	Sturnidae	*Sturnus vulgaris*	P, W	LC
236	Sulidae	*Morus bassanus*	AV	LC
237	Sylviidae	*Sylvia atricapilla*	R	LC
238	Sylviidae	*Sylvia borin*	P	LC
239	Sylviidae	*Sylvia cantillans*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
240	Sylviidae	*Sylvia communis*	B, P	LC
241	Sylviidae	*Sylvia conspicillata*	AV	LC
242	Sylviidae	*Sylvia crassirostris*	P	LC
243	Sylviidae	*Sylvia curruca*	P	LC
244	Sylviidae	*Sylvia hortensis*	AV	LC
245	Sylviidae	*Sylvia melanocephala*	R	LC
246	Sylviidae	*Sylvia rueppelli*	B, P	LC
247	Threskiornithidae	*Plegadis falcinellus*	P	LC
248	Troglodytidae	*Troglodytes troglodytes*	R	LC
249	Turdidae	*Monticola saxatilis*	P	LC
250	Turdidae	*Monticola solitarius*	R	LC
251	Turdidae	*Turdus merula*	R, P, W	LC
252	Turdidae	*Turdus philomelos*	P, W	LC
253	Turdidae	*Turdus viscivorus*	P, W	LC
254	Upupidae	*Upupa epops*	B, P	LC

5. Discussions

The present research synthesizes observational data collected by birdwatchers on the island of Kefalonia, Ionian islands, Greece marking a significant compilation of 1,776 bird recordings. Utilizing Microsoft Excel for data management and Geographic Information System (GIS) software for spatial analysis, this study maps the observations onto Kefalonia's topographical layout, providing a detailed view of avifauna distribution across various habitats. The extensive dataset underscores Kefalonia's ecological richness, attributed to its diverse physical geography which includes wetlands and rocky outcrops - habitats that are crucial for numerous bird species. The study confirms that Kefalonia's climate and geography make it an ideal locale for birdwatching, which is further enriched by the island's vibrant culture, traditions, and natural beauty. These factors collectively foster the growth of birdwatching tourism (Maniatis *et al.* 2020).

An analysis of the timing and frequency of excursions reveals that birdwatching activities predominantly occur during morning and afternoon hours, which could potentially bias observational data against nocturnal species such as the Eagle Owl or the Tawny Owl (Weston *et al.* 2015). Additionally, changes in agricultural practices and land use over recent years raise concerns about their impacts on local avifauna, possibly contributing to the reduced sightings of some species like the Griffon Vulture (Wretenberg *et al.* 2010). Furthermore, this research highlights several key observation sites across Kefalonia that are particularly favourable for birdwatching, including the Livadi Wetland, Aenos National Park, and the coastal areas of Kateleios and Mounda. The findings suggest that easily detectable species tend to be observed more frequently, while cryptic species are less commonly recorded, indicating a potential area for targeted research and conservation efforts.

The collected data not only enhance our understanding of Kefalonia's bird species but also hold significant potential for promoting conservation awareness and ecotourism. Recommendations for future initiatives include the development of educational materials such as guides, posters, and brochures, involvement in thematic exhibitions like the BirdFair UK, contributions to wildlife magazines, and the creation of digital content including specialized websites and smartphone applications. These resources would serve both to educate the public and to support birdwatching practices on the island. Moreover, the systematic analysis and reporting of these observations to the Hellenic Ornithological Society play a crucial role in the broader scientific community, contributing to ongoing research and conservation strategies. Such efforts are vital for monitoring population dynamics of key species, understanding their habitat needs, and ensuring the long-term preservation of Kefalonia's rich biodiversity (Karris *et al.* 2020).

In conclusion, this research not only expands our knowledge of Kefalonia's avian diversity but also underscores the importance of integrating scientific research with tourism and conservation efforts. By doing so, it enhances the protection of biodiversity and supports the development of specialized, thematic tourism that appreciates and preserves the natural environment (Martinis *et al.* 2023).

Conclusions and Further Research

This research aimed to harness the observational data collected by birdwatchers on Kefalonia to derive meaningful insights about the island's avifauna, contributing to the broader catalog of Greek bird species. Through meticulous data collection and analysis of bird observations, this study provided a detailed overview of the species present on the island, their habits, and their ecological niches. Notably, these efforts highlighted Kefalonia as a significant stopover for migratory birds in Europe and underscored its potential as a prime destination for birdwatching tourism.

The study successfully demonstrated the utility of special thematic websites for gathering birdwatcher observations. Using Microsoft Excel and ArcGIS 10.1, the data were efficiently organized and spatially mapped, confirming the feasibility of such digital tools for ecological research and tourism development. The analysis revealed that Kefalonia remains a crucial habitat for both migratory and resident bird species, including rare and endangered species like the Snake eagle (*Circaetus gallicus*), Golden eagle (*Aquila chrysaetus*), and Shag (*Phalacrocorax aristotelis*). The island's blend of natural diversity and minimal human encroachment creates a favorable environment for avian biodiversity. Lastly, the research identified a significant opportunity in the digital recording and processing of bird observations. The current lack of a centralized database means many valuable observations remain underutilized. Establishing an integrated digital platform could revolutionize how data are collected and analyzed, promoting more dynamic conservation efforts and enriching the birdwatching experience.

Future initiatives should focus on developing a comprehensive digital database for Kefalonia's avifauna, which would streamline data collection and accessibility, and integrate with global citizen science projects to enhance data richness and availability. Additionally, expanding observational studies to include more systematic night-time observations would provide a more comprehensive understanding of the island's avian biodiversity, including nocturnal species. There is also a critical need for enhanced public engagement and education. Developing interactive applications and educational programs would increase public involvement in birdwatching and conservation activities, enriching local tourism offerings and fostering a deeper community connection to the island's natural and cultural heritage (Mylonopoulos *et al.* 2022). Furthermore, conducting longitudinal studies on avian population dynamics would assess the impact of environmental changes and human activities on bird populations, providing essential data for effective conservation strategies. By addressing these areas, future efforts can build on the current study's findings to promote sustainable tourism and conservation on Kefalonia, ensuring the protection of its avian populations for generations to come.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Integration of the Pro-Environmental Concepts in Various Management Accounting Tools

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Abstract: Integrating pro-environmental concepts into management accounting tools is essential for organizations aiming to enhance their sustainability performance. Measures to support a pro-environmental attitude in each enterprise can be implemented differently. This diversity should result from the specifics of its activities.
The case study was conducted during an audit of management accounting tools in the company in Poland. The main goal was to evaluate the accuracy of the management accounting tools and identify areas for improvement. This was an audit of the management accounting. During the audit, it was observed that many of the examined management accounting tools meet the pro-environmental requirements and are integrated. This means that information from one tool is utilized by others, creating a multidirectional relationship. During the audit, the adaptation of management accounting tools to pro-environmental requirements was observed but not interfered with, allowing the use of ethnographic research methods. Integrating these pro-environmental concepts into management accounting tools helps organizations achieve better resource efficiency, reduce environmental impact, and enhance long-term sustainability.
In the paper there were also described various management accounting tools such as for example: Balanced Scorecard (BSC), Life Cycle Costing (LCC), Target Costing or Budgeting. The aim was to examine how to incorporate these concepts to reach pro-environmental aims to support sustainable development.
Structured abstract: This study aims to integrate pro-environmental concepts into management accounting tools to enhance sustainability performance within organizations. The research explores various methods of incorporating these concepts and assesses their effectiveness through a case study conducted during an audit of management accounting tools in a Polish company. The study employed ethnographic research methods during an audit of management accounting tools, observing the adaptation of these tools to pro-environmental requirements without interference. The audit evaluated the accuracy of the management accounting tools and identified areas for improvement. Various tools such as Balanced Scorecard (BSC), Life Cycle Costing (LCC), Target Costing, and Budgeting were examined for their integration of pro-environmental concepts. The audit revealed that many of the management accounting tools in the examined company already meet pro-environmental requirements and are well-integrated, facilitating multidirectional relationships where information from one tool informs others. This integration helps organizations achieve better resource efficiency, reduce environmental impact, and enhance long-term sustainability. The findings suggest that management accounting tools can be adapted to support pro-environmental objectives, leading to improved sustainability performance. Organizations can benefit from a tailored approach to implementing these tools based on their specific activities and requirements, enhancing their overall environmental and resource efficiency. This study provides practical insights into how pro-environmental concepts can be seamlessly integrated into management accounting tools. It highlights the importance of a customized approach based on organizational specifics and demonstrates the benefits of such integration for sustainability performance.

Keywords: green economics; pro-environmental concepts; management accounting tools; sustainability performance; balanced scorecard; life cycle costing; target costing; budgeting; environmental impact.

JEL Classification: G19; Q01; Q56; Q59.

Introduction

The role of analysis and strategic forecasting is to identify future operating conditions for the enterprise. Correctly determining these conditions allows for the consideration of changes in both revenue and costs. In terms of revenue, there is a noticeable increase in interest in products meeting pro-environmental requirements among specific buyer groups. This allows for directing the sales offer to this group of buyers.

Strategic analysis indicates trends in changing prices due to the implementation of the pro-environmental concept. An example of this is the increase in prices of non-ecological energy materials or waste disposal. Accurate estimation of future values of these parameters has practical applications in other management tools, including budgeting and the balanced scorecard.

The implementation of environmental tasks requires an unconventional approach to measuring effects. Consequently, appropriate management accounting tools should be used for this. This requires adaptation of management accounting tools to the requirements of environmental management.

1. Literature Review

Environmental, Social, and Governance (ESG) factors are increasingly important in the realm of business and finance. ESG has wider impact on corporate performance, investment strategies, and regulatory developments. ESG criteria are used by investors to evaluate corporate behavior and to determine the future financial performance of companies. These criteria encompass:

1. Environmental: how a company performs as a steward of nature,
2. Social: how it manages relationships with employees, suppliers, customers, and the communities where it operates,
3. Governance: how it governs itself, including executive pay, audits, internal controls, and shareholder rights.

Numerous studies indicate a positive correlation between strong ESG practices and financial performance. Companies with high ESG ratings tend to have better operational performance and lower risk, leading to higher profitability and market valuation. Friede, Busch, and Bassen (2015) conducted a meta-analysis of over 2,000 empirical studies and found that approximately 90% show a non-negative relationship between ESG and financial performance, with a majority indicating a positive relationship (Friede, Busch, Bassen 2015, 210-233).

There is a growing trend toward sustainable investing, where asset managers incorporate ESG criteria into their investment processes. This approach is driven by both the desire to achieve better financial returns and the ethical considerations of investors. A survey by Morgan Stanley's Institute for Sustainable Investing (2019) reported that 85% of individual investors are interested in sustainable investing, and 95% believe it's possible to balance financial gains with social/environmental impact (Morgan Stanley Institute for Sustainable Investing 2019, 18-30).

The growing trend toward sustainable investing reflects a shift in investor priorities, balancing the desire for financial returns with the need to address social and environmental issues. The high levels of interest and optimism about sustainable investing, as highlighted by the Morgan Stanley survey, suggest that this approach will continue to gain traction. As more investors recognize the potential for sustainable investing to deliver both financial and societal benefits, the integration of ESG criteria into investment strategies is likely to become more widespread and sophisticated.

One of the major challenges in ESG investing has been the lack of standardized reporting. However, recent efforts by organizations like the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD) are aimed at improving transparency and consistency.

ESG integration is associated with long-term value creation. Companies that proactively manage ESG issues tend to be more resilient and better positioned for long-term success.

A good practice should be the principle of correlating pro-environmental activities with the profile of the company's operations. This will achieve a synergistic effect in the form of benefits occurring in the following areas (Berrone, Gomez-Mejia 209, 103-126):

1. are carried out in a professional manner in accordance with the core business,
2. they support the company's business strategy in brand promotion.

Thus, it is worthwhile for any company to assume that many pro-environmental activities can be profitable. This profitability can be measured from the immediate and short-term. These are undertakings that produce

specifically measurable financial results in the short term. Examples of such activities include reducing energy costs or environmental fees (Gale 2006, 1228-1236). Profitability of pro-environmental activities, however, can be achieved in a long-term and indirect manner. This group can include brand promotion ventures or research and development work. Testing the profitability of pro-environmental ventures is therefore not a simple task of merely comparing revenues and costs over a short period of time. For this reason, it is worthwhile to select appropriate management accounting tools to measure this profitability. These should be tools that have been proven and applied to a specific enterprise. They should use measurable parameters / metrics. This will make their results reliable. Demonstrating that many pro-environmental activities can be profitable will help convince company managements to undertake them (Gray, Owen, Adams 1996, 18-34).

Activities which support the sustainable development of a company's pro-environmental are implemented in many different areas of its operation. They also use many different management tools (Adams, Frost 2008, 288-302). These are normally used management tools regardless of the pro-environmental concept. However, the implementation of the pro-environmental concept requires some adaptation of their design. Management accounting tools that can be used in support of the operation of the pro-environmental concept include:

1. strategic analyses and forecasts,
2. balanced scorecard,
3. target costing,
4. product life cycle accounting,
5. task-based budgeting,
6. incentive systems,
7. accounting recording systems,
8. management reporting system.

The role of analysis and strategic forecasts is to identify the future conditions of the enterprise. Correctly identifying them will allow us to consider the changes taking place in the areas of both revenue and costs. In terms of revenue, the growing interest in pro-environmental -compliant products by specific groups of buyers is increasingly evident. This makes it possible to target the sales offer addressed to this group of buyers (Cooper, Slagmulder 1997, 25-33).

Regarding cost forecasting, strategic analysis indicates trends in changes in their prices. In terms of pro-environmental, an example of this is the increase in the price of energy, non-organic materials, or waste disposal.

The strategic analysis carried out at the company should therefore be directed at areas related to pro-environmental. In terms of forecasting, it is therefore worthwhile to select specific parameters directly derived from pro-environmental requirements. This will result in the adaptation of this management accounting tool to the specific requirements of pro-environmental activities.

Proper estimation of future values of these parameters has practical applications in other management tools.

In budgeting, strategic analysis makes it possible to estimate such parameters as energy prices or trends in the development of sales of environmentally friendly products.

Another area of integrating strategic analysis with pro-environmental budgeting can be task-based budgeting. Undertakings in this area can be covered by individual task budgeting. Individual sentences can be aggregated into an aggregate program. It will make it possible to determine the financial results of individual tasks and the entire pro-environmental activity carried out in the enterprise.

One such budget task may be the introduction of a product that meets pro-environmental characteristics. In this case, target costing and product life can be used to assess profitability.

Knowing buyers' preferences for product features that meet the requirements of the pro-environmental concept, a product can be designed accordingly. This requires adding elements derived from the pro-environmental concept to the product features desired by buyers. In this case, too, there is an adaptation of this management accounting tool to pro-environmental requirements (Burns, Scapens 2000, 3-25).

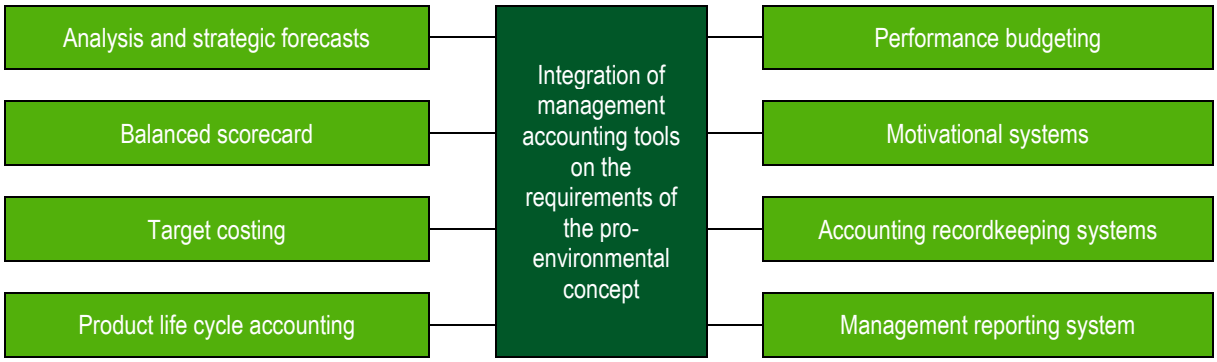
With such a broad focus of many different management accounting tools on the requirements of the pro-environmental concept, this factor can be considered in the construction of the balanced scorecard. When setting goals according to the concept of the balanced goal sheet, one should introduce goals directed exclusively to the requirements of the pro-environmental concept. If one adapts so many different management accounting tools to the requirements of pro-environmental, it is worth adapting the system of accounting records to this. The system of accounting records should provide actual data on the implementation of all the management accounting tools presented system (Kotapski, Chalastra 2021, 227-233). Having planned and actual data considering the requirements of the pro-environmental concept can be incorporated into incentive systems. Another management

accounting system that can be adapted to pro-environmental requirements is management reporting (Adams, McNicholas 2007, 382-402). It allows the presentation of the results of this activity in different cross sections.

This reporting includes elements in line with ESG reporting requirements. ESG reporting is a tiered standard. It is being implemented in enterprises in stages. It is not currently required for all enterprises. It is required in large companies. For this reason, many companies do not create this type of reporting. Other companies are just in the process of implementing this reporting standard (Arvidsson, Dumay 2022, 1091-1110) Reporting for internal use does not have to fully comply with this standard. In addition, however, it may involve the presentation of detailed financial parameters such as costs, revenues, or profits of environmental activities. This data can come from the company's budget. The structure of this budget may be more detailed than the requirements of ESG reports.

To sum up, the concept of pro-environmental can influence the construction of many different management accounting tools. Individual tools are integrated with each other. This means that data from one tool is used in others. These relationships are multidimensional as presented in Figure 1.

Figure 1. Integration of management accounting tools on the requirements of the pro-environmental concept



Source: own work.

Information obtained from strategic analysis can be used by target costing (Ansari 2007, 14-21). Knowing the buyers' preferences for product features that meet pro-environmental requirements allows for appropriate product design. This requires adding elements resulting from the pro-environmental concept to the desired product features (Epstein 2008, 45-62).

Another tool integrated with the previous ones can be budget and life cycle costing. The budget can use task budgeting methods, with one of the tasks being the introduction of a product meeting pro-environmental characteristics (Moller 2018, 57). Planning future significant parameters of such products requires conducting strategic analysis (Gray 1996, 22).

When various management accounting tools are broadly directed towards pro-environmental requirements, this factor can be considered in the construction of a balanced scorecard. When setting goals according to the balanced scorecard concept, goals should be introduced that are aimed at pro-environmental requirements. Once goals considering pro-environmental issues are established, an accounting system should be put in place to provide information on the degree of their realization. The accounting system should provide actual data on the implementation of all presented management accounting tools. With planned and actual data considering pro-environmental requirements, they can be included in motivational systems (Kaplan, R. S., and Norton, D. P. 1996, 98-105).

The pro-environmental concept can influence the construction of many management accounting tools. Individual tools are integrated with each other, meaning that data from one tool is used in others. These relationships are multidimensional.

An important issue is identifying the benefits of using the indicated tools in the enterprise management process. These benefits should include the adaptation of these tools to the specific requirements of the pro-environmental concept.

2. Method

The research method which was used in this paper is case study. The analyzed enterprise is medium-sized manufacturing company in Poland. The main purpose of this analysis was to assess the correctness of the management accounting tools used and to identify areas for improvement. This was an audit of the management accounting system. During this audit, it was identified that many of the management accounting tools examined incorporate the requirements of the pro-environmental concept. In addition, they are integrated with each other.

This means that information from one tool is coaxed out of the others. The relationship is multidirectional. During the audit, the adaptation of management accounting tools to pro-environmental requirements was studied but not interfered with. For this reason, an ethnographic research method could be used.

3. Case Study

Pro-environmental activities supporting the sustainable development of the enterprise are implemented in various areas of its operations, utilizing multiple management tools. These tools are typically used independently of the pro-environmental concept. However, implementing pro-environmental requires some adaptation of their design. Management accounting tools that can support pro-environmental include:

1. Strategic analyses and forecasts;
2. Balanced scorecard;
3. Target costing;
4. Product lifecycle costing;
5. Task-based budgeting.

An audit of the management accounting system was conducted in the enterprise. The goal was to identify elements for improving the used management accounting tools. While examining individual management accounting tools, it was noted that some of them were aimed at fulfilling pro-environmental related tasks. This state caught the auditors' attention and became the subject of an additional study, independent of the main audit scope. The question was whether this adaptation was deliberate in view of implementing the pro-environmental policy. The management's response was negative. The enterprise had not undertaken coordinated tasks to comprehensively adapt management accounting tools to environmental requirements. The inclusion of pro-environmental elements in individual tools was due to factors significant to their operation areas.

The first mentioned and implemented management accounting tool adapted to environmental needs was strategic analysis.

Due to the specific operation of the production enterprise, the following issues were analyzed:

1. Prices and energy consumption
2. Trends in the costs and types of packaging
3. Increasing market interest in products with pro-environmental features.
4. Waste costs.

Forecasted significant increases in energy prices prompted the enterprise to take actions aimed at reducing energy consumption. These actions were carried out in two areas. The first involved using solutions aimed at saving energy consumption. The second reduced energy purchases due to the purchase of photovoltaic installations and energy storage. These actions could be classified as pro-environmental, although they were taken for economic reasons rather than pro-environmental. The presented example is just one of several actions taken due to created forecasts.

Strategic analysis directly affects another management accounting tool, which is budgeting.

Budgeting was another management accounting tool implementing the pro-environmental concept in the examined enterprise. All projects with significant costs had individual budgets, consistent with good task budgeting practices. The already mentioned investment in photovoltaics also had an individual budget, showing the profitability of this undertaking. Projects were grouped into different collective categories, one of which was pro-environmental projects, to gather information on all undertaken pro-environmental activities. This information aimed to be used broadly in promotion. Promotional activities considering pro-environmental principles were directed at both business and individual clients. In this case, business goals were also the main factor for including the pro-environmental perspective in the budget. Task budgeting allowed determining which projects were profitable (Kezenbayeva G. 2019, 1624-1630). The enterprise decided that some unprofitable pro-environmental projects would be carried out, based on the company’s promotional policy, marking the first time non-economic factors decided the implementation of specific undertakings. However, the entire program of all pro-environmental tasks had to have positive profitability. Profitable projects financed unprofitable ones.

Other management accounting tools considering pro-environmental requirements were target costing and product life cycle costing. These tools intentionally included pro-environmental requirements, based on market research indicating growing interest in products meeting these requirements. Some of these features, however, had economic justification. For example, appropriate packaging for business customers interested in fully recyclable packaging due to rising waste costs. The economic factor was also significant in introducing pro-environmental oriented product features. It is worth mentioning that pro-environmental product features were considered less

important, but their significance is growing. Thus, product life cycle costing showed the profitability of such policies in the long term.

The number of pro-environmental actions taken in the examined enterprise became significant enough to be included in an individual perspective of the balanced scorecard. pro-environmental actions led to modifying the balanced scorecard by introducing an additional category of goals solely for pro-environmental activities. Each undertaken pro-environmental activity had set goals and task budgets. Task budgets allowed planning not only costs but also financial effects of individual tasks.

4. Research Results

Not all potentially possible management accounting tools were implemented in the examined enterprise, and not all used tools considered pro-environmental requirements. This includes the motivational system. The enterprise's motivational system rewarded achieving specific economic results or completing specific tasks. At the time of the study, it did not include parameters directly resulting from the pro-environmental concept. Similarly, the accounting system was not directly aimed at precise and comprehensive recording of costs and revenues related to undertaken pro-environmental actions.

The surveyed company does not currently have the system for reporting the results of environmental protection activities. This applies to reporting to external institutions in accordance with ESG reporting requirements due to the fact that it is a small enterprise not currently subject to this legal requirement. The ESG reporting directive came into effect on January 5, 2023. The first entities will be required to report under it in 2025 (data will cover the 2024 fiscal year). Member states were required to transpose the directive into national law by July 6, 2024. Some analyses are currently being undertaken as to the feasibility of implementing this reporting standard. However, the company's management has not performed significant activities in this regard. This is due to the anticipation of the development of practical solutions that take into account the specifics of a small business. There is also no system of internal reporting to demonstrate environmental activities. This is due to the fact that their scope in the company is not large. The management of the company plans to launch two ESG reports in the future, within the Full scope of adaptation of management accounting tools to pro-environmental and the achieved effects in the examined production enterprise is presented in Table 1.

Table 1. The extent of adaptation of management accounting tools to pro-environmental and the achieved effects in the examined production enterprise

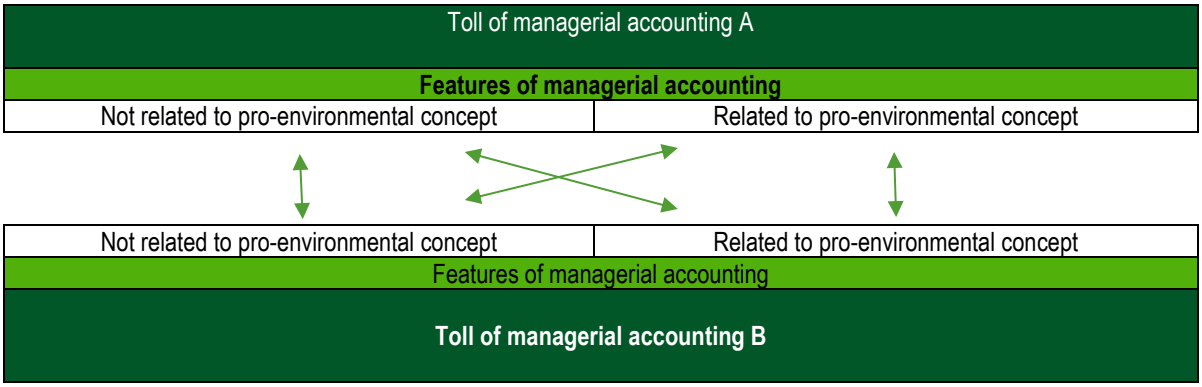
Management Accounting Tools	Extent of Adaptation to pro-environmental requirements	Achieved Effects
Strategic Analysis and Forecasts	Identifying trends in important cost and revenue parameters from a pro-environmental perspective	Indicating the need for pro-environmental actions
Balanced Scorecard	Introducing a pro-environmental perspective in the balanced scorecard structure	Identifying measurable parameters of pro-environmental actions' effects
Task Budgeting	Planning revenues and costs of projects	Ability to determine profitable pro-environmental tasks
Target Costing	Including PRO-ENVIRONMENTAL requirements in desired product features	Defining specific product parameters resulting from pro-environmental
Life Cycle Costing	Individual planning of future cost and revenue parameters important for pro-environmental	Indicating the effects of including pro-environmental features in designed products over the long term
Accounting Records	No adaptation of management accounting to pro-environmental requirements in the examined enterprise	
Internal Reporting		
Motivational Systems		

Source: own work.

Many management accounting tools have been adapted to environmental management requirements.

However, this state is justified, as many other management accounting tools contain elements intentionally considering pro-environmental. The relationships between these individual tools are complex, where elements of one management accounting tool influence elements of another. An example is the goals contained in the balanced scorecard, connected with specific budget positions or strategic analysis. Pro-environmental -dedicated elements of these tools are integrated with other elements of other tools (Siemionek-Ruskań, M., Siemionek-Lepczyńska A. 2018, s. 4207–4215). This can represent the principle of each with each, as shown in Figure 2.

Figure 2. Comprehensive relationship between management accounting tools meeting pro-environmental requirements



Source: own work.

5. Discussions

Initially, these actions did not constitute a general concept applied to the entire management accounting system. Pro-environmental data from some tools began to be used in others, leading to integration between individual management accounting tools in the pro-environmental area. This integration increased over several years due to the management's growing importance attached to pro-environmental requirements, creating a synergy effect. Management accounting tools indicated that many broadly understood pro-environmental activities could bring measurable financial effects, motivating increased activity in this area. To best select profitable actions, management accounting tools were increasingly used. However, this does not mean only profitable actions were undertaken. Currently, many enterprise activities have identified areas affecting pro-environmental, defined in specific management accounting tools.

In the analyzed company, the share of environmental features in the materiality structure of individual management accounting tools is at a low level. The number and value of all projects included in the environmental category in the overall structure of the task budget of the entire company is rather minor. A similar situation refers to the weights of environmental features in the structure of the target costing of new products. The number of objectives in the Balanced Scorecard relating to environmental activities is also small. The share of environmental feature weights in individual management accounting tools does not exceed on average 5%.

For this reason, it is worth considering whether it is reasonable to adapt these tools to measure the performance of environmental activities. The process of this adaptation requires a lot of work and efforts. This refers to the stage of implementation and then ongoing operation of the various management accounting tools.

If the measurement of the effects of environmental projects is conducted by classical methods of short-term analysis, then the results obtained are not satisfactory. Few environmental projects are profitable. However, the proposed management accounting tools make it possible to indicate which environmental projects are profitable. The advantage of classical methods of short-term profit measurement is confidence in the results obtained.

However, it is worth to mention that the importance and effectiveness of environmental activities are increasing. They are more often introduced in many different areas of enterprise activity. It is therefore necessary to study their results with various management accounting tools. The company should not rely only on one of them. Information from each tool is used by the others. Therefore, appropriate adaptation of multiple management accounting tools to the needs of environmental management seems to be justified. It is worthwhile to perform this task at the present time. This is due to the long time it takes to implement them and to gain experience in their practical application. In the future, it is forecast that the requirements of environmental activities will increase in importance. At that time, it is worth having an efficient system for measuring the effects of environmental activities. An integrated set of different management accounting tools serves this purpose.

Conclusions and Further Research

In the examined enterprise, many management accounting tools introduced specially dedicated elements of their construction considering pro-environmental requirements. These actions initially resulted from individual needs in constructing specific management accounting tools, primarily driven by economic factors. These actions indicated measurable business benefits from undertaking specific pro-environmental activities.

In conclusion, the pro-environmental concept can influence the construction of many management accounting tools. Individual tools are integrated, meaning that data from one tool is used in others, creating multidimensional relationships.

Identifying the Benefits of Using Various Tools in Enterprise Management is essential. To identify the benefits of using the mentioned tools in the enterprise management process it is important to assess how these tools adapt to the specific requirements of the pro-environmental concept.

The case study presented in the paper indicates that many environmental activities bring tangible financial benefits to the company. These effects cannot always be determined by short-term classical methods of determining financial returns. Measuring the effects of environmental activities is additionally worthwhile in the long term. It is also worthwhile to use unconventional methods to measure these effects. Therefore, management accounting tools should be adapted to the specific requirements of environmental management. The analysis of this profitability should be conducted considering various factors. It is reasonable to use a variety of management accounting tools. This article indicates what kind of tolls could be implemented. In addition, it is presented that the various management accounting tools adapted to the requirements of environmental management complement each other. Information from some tools is used in others. Therefore, it is worth creating an integrated system of multiple management accounting tools. Elements of such a system have been positively verified in the practice of one enterprise. This example could be therefore treated as a pattern which could be used in other companies.

Credit Authorship Contribution Statement

Anna Siemionek-Lepczyńska: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.

Michał Chalastra: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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How Green Are Hotels in Ghana? Evidence from Star-Rated Hotels in Kumasi Metropolitan Area

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Abstract: The study was conducted to assess green business practices among star-rated hotels in the Kumasi Metropolitan Area. This employed a survey and used a questionnaire to collect data from 60 managers from 84 licensed star-rating hotels. Data was analysed using both descriptive and inferential tests. The study results showed that star-rated hotels have implemented environmentally friendly practices, taking steps to reduce their water usage, adopting sustainable business practices for the long-term benefit of the environment, regular maintenance of sanitary facilities and pipes to prevent losses, and switching off the lights in unoccupied rooms. The study revealed that energy conservation, water conservation, eco-friendly cleaning, and water and energy monitoring were key green business policies adopted by star-rated hotels in the Kumasi Metropolitan Area. The study also showed that cost savings, customer demand, industry regulations and standards, environmental awareness, competitive advantage, and availability of resources were major factors that influenced the adoption of green practices by star-rated hotels in the Kumasi Metropolitan Area. The study suggests that the government should be involved in all issues on the enforcement of green practices, as well as that employees' knowledge be raised consistently and their training be enhanced about the use of green business practices.

Keywords: green economics; environmental impact; star-rating hotels; Kumasi Metropolitan Area; practices.

JEL Classification: Q57; Z32; R11.

Introduction

According to Abdullah and Al-Ghwayeen (2020), a green business practice is an aspect of the environment that implements and complies with ecologically sound programs, such as reducing energy and water consumption, solid waste creation, and energy utilization. Green practices are defined by Chandran and Bhattacharya (2021) as the existence of policies and initiatives aimed at promoting both business sustainability and environmental excellence.

The need for business organizations to implement green practices has grown over the past several years as a result of dreadful environmental conditions, such as climate change. In addition to the rise in global surface temperatures, the effects of climate change also include extreme weather conditions, habitat loss, and an increase in sea level (National Geographic 2020). The hotel sector consumes a lot of resources, non-durable goods, water, and power; thus, hotel management needs to be proactive about adopting green practices (Dimara *et al.* 2017). The hotel sector produced around 20% of all emissions related to tourism, according to Merli *et al.* (2019).

The hotel business must attain carbon emission abatement levels of 66% and 90% by 2030 and 2050, respectively, to comply with the Paris Climate Change Agreement and the United Nations Global Goals (United Nations 2018). Additionally, according to a recent survey, 87% of millennials are more devoted to hotel chains that use eco-friendly techniques (Shedd 2020). Yi *et al.* (2018) state that there is an increasing demand for hotels that are actively pursuing green initiatives due to consumers' increased worries about the environment.

Green business practices often include a variety of initiatives aimed at lessening negative environmental effects (Kim *et al.* 2017). Kim *et al.* (2017) go on to define green practices in the hotel industry as a value-added business strategy that helps operators by protecting the environment. Hotels that support green practices frequently participate in resource conservation initiatives (such as waste management, and reducing water and energy usage), buy eco-friendly goods, and create environmental policies and training programmes (Song *et al.* 2020; Choi *et al.* 2019; Kim *et al.* 2018). Larger hotels often have greater resources for adopting green practices, but recent research showed that smaller hotels are also jumping on the green train (Fernández-Robin *et al.* 2019). Small-scale hotels benefit from green initiatives as well since they may be more individualized and adaptable than bigger or chain hotels (Musavengane 2019).

Prior studies have shown that adopting green practices may benefit hoteliers in several ways, including improved brand recognition, operational effectiveness, financial success, customer happiness, and repeat business (Yin *et al.* 2019, Han *et al.* 2018; Alonso-Almeida *et al.* 2017; Teng *et al.* 2018; Wan *et al.* 2017). As a result, hotels are emphasizing the significance of implementing green measures to win over customers (Moise *et al.* 2021).

In furtherance, there has been a notable rise in the past several decades in awareness of global environmental challenges such as resource shortages, carbon emissions, global warming, and the use of harmful substances. Consequently, many organizations worldwide have adopted green ideas in response to this, and activists and lawmakers are working to create a more environmentally friendly future (Bentahar *et al.* 2023).

In Ghana, the government established regulatory bodies like the Ghana Tourism Authority (GTA) and the Environmental Protection Agency (EPA) to oversee and protect the operations of hotels in the nation to halt the possible environmental impacts of hotel operations. For instance, hotels must undertake and submit for evaluation an Environmental Impact Assessment (EIA) of their planned project by the statutory instrument (Environmental Assessment Regulations LI 1652). Following that, hotels must file an Environmental Management Plan (EMP) with the Environmental Protection Agency within 18 months of opening for business. How hotel operations' environmental effects will be controlled is described in the Environmental Management Plan. However, a study conducted by Lamm (2021) found that many hotels, do not adhere to the regulations even after being awarded licenses and permits to operate. Studies on green business practices in Africa, particularly Ghana, are still in their infancy, even though there have been many works in the field in the past, most of which have been centered on Western nations.

Furthermore, a prior study has confirmed that hotels in Sub-Saharan Africa, particularly Ghana, are implementing comparatively few green initiatives (Lamm 2021). In Ghana, Deri *et al.* (2022) studied to explore the extent to which hotels in the Sunyani Municipality in the Bono Region had adopted green business practices, Kenney (2018) focused on green practices among star-rated hotels in the La-dadekotopon Municipality in the Greater Accra Region, Mensah (2014, 2020) concentrated on a few hotels in the Greater Accra Region whiles Kuuder *et al.* (2013) looked at the Northern region and Boateng (2019) focused on Eastern region. Given the distinctive features of the Kumasi Metropolitan Area, it is not possible to generalize the findings of this research to understand the different kinds of green practices, policies, and variables influencing the adoption of green practices in this area.

Additionally, the Kumasi Metropolitan Area's star-rated hotels have not been the subject of much, if any, research on green business practices. This has left a gap that this study aims to fill. Consequently, the purpose of this study is to respond to the following research questions:

1.Are there any green business practices among star-rated hotels in the Kumasi Metropolitan Area?
2.What are the green policies adopted by star-graded hotels in the Kumasi Metropolitan Area?
3.What factors are influencing the adoption of green practices in the Kumasi Metropolitan Area?

1. Literature Review

1.1 Definitions of Green Business Practices

Green practices are steps hotels take to lessen their adverse environmental consequences, such as cutting back on energy and water use, utilizing renewable energy sources, recycling garbage, and procuring locally, according to Santos *et al.* (2020). Leyva *et al.* (2021) contended that a green hotel is a lodging facility that minimizes solid waste, conserves electricity and water, and reduces both. Green hotel practices, on the other hand, are defined by Abdou *et al.* (2020); Ioannidis *et al.* (2021); and Salama and Abdelsalam (2021) as a group of environmentally conscious activities that aim to reduce their adverse effects on the environment by conserving energy through measures like installing energy-efficient appliances and putting renewable energy programs into place. Green practices are also defined by Chandran and Bhattacharya (2021) as the existence of policies and initiatives aimed at promoting both business sustainability and environmental excellence. According to this study, a "green business practice" is any organization (in this case, a hotel) that makes the required efforts to reduce its adverse effects on both its internal and external ecosystems.

1.2 Empirical Studies of Hotel Green Business Practices

Deri *et al.* (2022) studied to explore the extent to which hotels in the Sunyani Municipality had adopted sustainable initiatives. Simple random sampling and stratified procedure were employed to gather data from forty (40) hotel managers in the Sunyani Municipality. The study revealed that there are no policies in place for greening practices and few managers were aware of and involved in green measures to some extent in hotels in the Sunyani Municipality. The study further found that solid waste management, liquid waste management, green energy consumption, and efficiency, were the three green practices most frequently used by hotels in the Sunyani Municipality. The study established that customer demand is the pressing factor that influenced hotels in the municipality to go green.

Behera and Jatav (2022) investigated how small hotels in Uttarakhand, India handle their waste. A cross-sectional survey and a structured questionnaire were used to elicit information from hotel managers. The study found that every waste management strategy except for training staff on waste avoidance strategies, utilizing returnable containers to cut waste, and separating trash into recyclable materials like paper and glass was statistically insignificant. The study also showed that there were no statistically significant variations in the waste management techniques used by different types of small hotels.

Yusnita *et al.* (2021) looked at how homestay operators in Selangor, Malaysia, used green practices concerning their environmental awareness. A basic random selection method was employed to choose 147 homestay hosts. The data that was gathered was examined using both descriptive and inferential tests. The findings indicated that the age, gender, and educational attainment of the host family operators did not significantly differ from one another. The study also discovered a favorable and substantial relationship between green practices and the environmental understanding of host family operators.

Mensah (2020) investigates Accra's small hotels' trash management procedures. Using a simple random technique, a cross-sectional study was conducted to elicit information from 260 managers of small hotels located across Accra. The primary tool was a questionnaire, and data analysis was conducted using SPSS version 20 software. The study's findings suggest that the hotels' waste management procedures do not always adhere to the waste management hierarchy model. Reclaim, recycling, and recovery techniques were less accepted than waste disposal, preventive, and reduction techniques. According to the survey, hotels should implement the sufficiency strategy by encouraging employees and visitors to have a good attitude toward waste reduction and avoidance.

For improved future hotel business in Bali, Ketut *et al.* (2020) looked into the integration of green hotels and green supply chain methods. To gather information from 63 hotel staff members working in the food and beverage, purchasing, receiving, and inventory departments, questionnaires, interviews, and observation were the methods utilized. According to the findings, respondents felt favorably about eco-friendly lodging options and hotels. The findings also demonstrated that ecologically friendly items are generally more popular among Bali's customer base.

Boateng (2019) looked at how to create green hotels in Ghana to create resilient towns. A purposive sample method was employed to choose star-rated hotels in Koforidua, Ghana. Fifteen managers were interviewed and observations were used to get information. The study found that hotels in Koforidua are environmentally cautious in terms of promoting resilient and vital cities. The study recommends policymakers and hoteliers develop an approach to promote hotel operations that combines environmental protection and awareness with business.

Kenney (2018) looked at the eco-friendly business methods used by star hotels in the La-dadekotopon neighborhood in Greater Accra. GTA, hotel management, and the EPA were interviewed in-depth. According to the study, higher-rated hotels had a stronger commitment to environmental sustainability due to their stated environmental management policies, whereas lower-rated hotels only had a few "reactive" environmental activities. The primary green measures used by hotels in this study were garbage creation and management, water management and rationing, and energy efficiency and conservation. However, it was once again demonstrated that upscale hotels had more comprehensive green measures than budget hotels, including sizable liquid waste treatment facilities and energy management systems installed in each room. The study's findings once again showed how important cost reductions and legal compliance are in motivating hotels to implement green business practices.

Research was carried out by Mbasera *et al.* (2016) to ascertain the environmentally friendly methods employed by hotels in South Africa and Zimbabwe. The study gathered information from eight hotels using several case studies. To gather information, semi-structured interviews were also done with the management of star-rated hotels in South Africa and Zimbabwe. According to the survey, all hotels involved in the study have adopted certain eco-friendly practices but lack green management strategies overall. Examples of these include employing solar energy, recycling soap bottles, cutting down on water consumption by using towels many times before washing them and managing garbage. The study's findings also demonstrate that some hotels have used green management for marketing purposes to attract and keep consumers while gaining a competitive edge. The study suggests that to facilitate the adoption of eco-friendly activities, hotels should create green management rules.

Fadhil (2015) conducted related research to ascertain the extent to which the hospitality industry in Lamu County, Kenya, has adopted green practices. Primary data was gathered via a cross-sectional survey using questionnaires from twenty-four hotels. The data was analysed using SPSS. The study's findings showed that European travelers frequently stayed at hotels in Lamu County. According to the report, hotels in Lamu have begun to recognize the value of using eco-friendly methods in their day-to-day operations. The report suggested that given there were possible advantages for the county, players in the hotel sector should adopt green practices.

Petrevska and Cingoski (2015) looked at the level of environmental preservation activities in Macedonian hotels. Managers of five-star hotels were informed to complete an online survey to provide statistics. The study found that a sizable fraction of hotels lacked environmental and energy-efficient policies and practices. The poll also revealed that Macedonian hotels recognize the importance of a proactive environmental policy to the development and prosperity of the travel and tourism sector. However, hotel management dismissed the notion as insignificant and attributed its success to greater costs. According to the study, managers should concentrate on altering their professional ethics and creating and implementing a variety of environmental protection initiatives.

A study by Čekanavičius *et al.* (2014) aimed to define "green businesses" more precisely and investigate the hypothesis that national characteristics on public awareness and economic development are critical in determining how differently "green" ideas are adopted by businesses across different nations. An email survey was used for the study to gather data from respondents in Lithuania and Ireland. Descriptive and inferential statistics were employed in the analysis of the data. According to the survey, Lithuanian and Irish businesses have quite different "green" beliefs and practices. While the latter is aware that turning green" creates new potential to boost sales, the former is more focused on the expenses of becoming green than the advantages.

Jamaludin and Yusof (2013) researched Green Island Resorts' best practices. The study's objective was to identify resort operators' best practices and the variables influencing such practices. The study found that green practices helped to reduce operating costs and that each resort used different best practices that suited their operations and environment.

2. Materials and Methods

2.1 Study Setting

The study was carried out in the Kumasi Metropolitan Area, which is the home of the Ashanti Kingdom and serves as the regional capital of the Ashanti Region. The city has a population of about 2.5 million people and a radius of 32 kilometers (Ghana Statistical Service 2021). The Kumasi Metropolitan Area has major landmarks such as the Manhyia Palace, Kumasi Zoological, Kumasi Cultural Centre, Armed Forces Museum, Komfo Anokye Sword Site,

Kumasi Airport, Pankrono Artefacts and the Kwame Nkrumah University of Science and Technology. The beautiful green appearance of the city has also earned it the title 'Garden City of West Africa'.

2.2 Population and Sample

All of the managers of star-rated hotels in the Kumasi Metropolitan Area made up the research population. In this study, 20 hotels were selected using a simple random sampling method. This was possible because the researchers had a complete list of 84 registered hotels with stars in the Kumasi Metropolitan Area (Ashanti Region, GTA 2019). The hotel managers were chosen using stratified random selection. This sampling technique was used because the population and sampling frame of the study were known from the data (Ashanti Region, GTA 2019). The researchers identify the population and strata, lists the elements of each stratum, and selects a sample from each stratum using a simple random sampling technique. The researchers also employed this strategy to guarantee that the study's subgroups were fairly represented. Consequently, the GTA's hotel classification system served as the stratification criteria. The strata were 1–5-star hotels (Ashanti Region, GTA 2019).

2.3 Instrumentation

The researchers used a closed-ended questionnaire to ask the hotel management for information. The reason was that a closed-ended questionnaire made it easy for respondents to tick the appropriate response box for the answers that were provided and simpler to code and statistically evaluate answers. The questionnaire included biographical questions about the managers as well as questions regarding the various kinds of green practices, policies, and factors that impact the adoption of green practices. A four-point Likert scale ranging from strongly agree to strongly disagree was used to respond to the questions. Colleagues refined and verified the questionnaire before distributing it to the respondents at their workplaces. It took two weeks, from June 1 to June 14, 2023, to complete the questionnaire.

2.4 Data Analysis

To create statistics and information about the data gathered, Statistical Package for Service Solution (SPSS v. 25) was utilized. To describe the data on the variables under examination, descriptive statistical techniques of analysis were employed, such as frequencies, means, standard deviations, and basic regression analyses.

2.5 Ethical Consideration

The study involved human beings; hence ethical issues were taken seriously during the exercise where permission was sought from the managerial staff before delivery of the questionnaires. All participants in this study were properly briefed and the objectives of the study were indicated to them. Finally, the participants were assured of confidentiality and anonymity of their responses.

3. Research Results and Discussion

Table 1 presents the background information on the respondents. More than half (62%) of the management staff were females and 38% were males. The higher representation of females in management positions suggests a positive trend toward gender diversity and inclusivity within the hospitality industry. For the age group, 37% of the respondents were aged between 30-39 years, 30% were aged between 20-29 years, 25% were aged between 40-49 years and 8% were aged 50 years and above. The distribution of respondents across different age groups signifies a diverse workforce with representation from multiple generations. The higher percentage of respondents aged between 20-29 years indicates a relatively youthful workforce, which might bring new perspectives and technological fluency to the workplace.

About the respondents' educational level, HND/Diploma holders made up 45%, degree holders made up 35%, and senior high school graduates made up 20%. The implication is that employees with HND/Diploma education, degree holders, and those with senior high school education bring different skill sets and qualifications to the hotel industry. Moreover, 68% of the respondents were married, 20% were single and 12% were divorced. Additionally, 47% of respondents have been working with this hotel for less than 1 year, 25% of respondents have been working with this for more than 5 years, 15% have been working with this hotel and 13% have been working with this hotel for 1-2 years. A significant number of employees with less than a year of experience could indicate a relatively high turnover rate within selected hotels.

The average mean (3.16) indicates that the star-rated hotels in the Kumasi Metropolitan Area have been adopting green business practices. The respondents agreed (mean=3.80) that star-rated hotels have implemented environmentally friendly practices. This implies that these hotels are effectively communicating their efforts to be

more sustainable and are likely to be well-received by consumers who care about the environment. This finding is in line with that of Hsiao *et al.* (2018), who found that star-rated hotels in Taiwan have adopted eco-friendly measures such as conserving electricity, managing water, and using fewer chemicals. The findings of this investigation corroborate those of Khatter *et al.* (2019), who found that the hotels included in the sample showed a strong commitment to ecologically friendly business practices.

Table 1. Background Information on Respondents (n=60)

Variables	Frequency	Percentage
Gender		
Male	23	38
Female	37	62
Age group (Years)		
20-29s	18	30
30-39	22	37
40-49	15	25
Above 50 years	5	8
Educational level		
SHS	12	20
Diploma/HND	27	45
Degree	21	35
Marital status		
Single	12	20
Married	41	68
Divorced	7	12
Years of working in the hotel		
Less than 1 year	28	47
1-2 years	8	13
3-5 years	9	15
More than 5 years	15	25

Source: (Field Survey, 2023)

The majority of the respondents agreed (mean=3.17) that star-rated hotels in Kumasi Metropolis are taking steps to reduce their water usage. The implication is that by actively reducing water usage, hotels contribute to the responsible management of water, especially in regions where water scarcity or stress is a concern. This data confirms the reports of Mendoza *et al.* (2023) that water management techniques are used by hotels and resorts in the Euro-Mediterranean.

Again, the majority of the respondents agreed (mean=3.25) that star-rated hotels are making efforts to reduce waste and recycle materials. The implication is that star-rated hotels are at the point of reducing negative environmental impact. According to Langgat *et al.* (2023), waste reduction and recycling initiatives help decrease the quantity of waste sent to landfills, conserve natural resources, and mitigate pollution.

In addition, most of the respondents agreed (mean=3.38) that star-rated hotels are adopting sustainable business practices for environmental benefits. The implication is that the adoption of sustainable business practices by star-rated hotels for the long-term benefit of the environment yields numerous positive implications, from environmental conservation to economic savings, positive branding, and societal impact. Chan *et al.* (2021) also reported that long-term green business practices help reduce the ecological footprint of hotels, leading to the conservation of resources, reduction in pollution, and overall environmental preservation.

The majority of the respondents agreed (mean=3.27) that star-rated hotels should repair their plumbing fixtures and pipelines regularly. Regular maintenance of plumbing fixtures and piping in hotels has far-reaching implications that touch on cost savings, guest satisfaction, resource conservation, environmental responsibility, and overall operational efficiency. According to Gurmu and Mudiyanselage (2023), regular maintenance helps identify and repair leaks, drips, and other plumbing issues that can lead to water wastage. This not only conserves water resources but also reduces water bills for the hotel.

Table 2. Green business practices in star-rated hotels

Green business practices	Mean	Std. Dev.
Star-rated hotels have implemented environmentally friendly practices	3.80	0.48
Star-rated hotels are actively reducing their energy consumption.	2.98	0.43
Star-rated hotels are taking steps to reduce their water usage	3.17	0.72
Star-rated hotels are making efforts to reduce waste and recycle materials	3.25	0.51
Star-rated hotels use eco-friendly products and supplies.	3.13	0.75
Star-rated hotels are promoting green practices to their guests.	3.00	0.71
Star-rated hotels are participating in local environmental initiatives	3.15	0.73
Star-rated hotels are committed to reducing their carbon footprint	3.15	0.69
Star-rated hotels are investing in renewable energy sources.	3.00	0.88
Star-rated hotels are adopting sustainable business practices for the long-term benefit of the environment	3.28	0.78
Maintain plumbing pipelines and fixtures regularly to prevent losses.	3.27	0.63
Star-rated hotels cover pool outside of the opening hours so that the water does not evaporate or get dirty	3.02	0.81
The hotels make sure that outside illumination is only turned on at night and minimize ambient lighting during the day.	2.98	0.75
Installing light bulbs that are 12 times more energy-efficient than standard incandescent lights	2.97	0.82
Verify that all lights are off in vacant rooms (magnet cards automatically off the electricity to the room when a visitor departs).	3.22	0.76
Average mean	**3.16**	

Source: (Field Survey, 2023). Scale: 1.0-2.4=Disagree, 2.5-3.9=Agree

Finally, the majority of the respondents agreed (mean=3.22) that the hotels must make sure the lights are switched off in unoccupied rooms. This implies that turning off lights in unoccupied rooms reduces electricity consumption, contributing to lower energy bills and a smaller carbon footprint. Kostić *et al.* (2019) view that energy-efficient practices lead to cost savings on utility bills. Over time, these savings can be substantial for hotels, especially those with a large number of rooms.

Table 3. Type of green business policies adopted by star-rated hotels

Type of green business policies	Mean	Std. Dev.
Energy conservation	3.75	0.51
Water conservation	3.80	0.36
Waste management	2.83	0.79
Sustainable food practices	3.05	0.62
Eco-friendly cleaning	3.65	0.87
Renewable energy	2.95	0.59
Green certifications	2.85	0.88
Environmental education	2.92	0.69
Local community engagement	2.85	0.936
Water and energy monitoring	3.73	0.88
Average mean	**3.24**	

Source: (Field Survey, 2023). Scale: 1.0-2.4=Disagree, 2.5-3.9=Agree

The average mean score of 3.24 for the study indicates that the star-rated hotels in the Kumasi Metropolis have adopted green business policies. The respondents agreed (mean=3.75) that energy conservation is a green business policy adopted by star-rated hotels in the Kumasi Metropolitan Area. The implication is that energy conservation efforts make hotels more resilient to energy price fluctuations and potential shortages, ensuring consistent service for guests. Star-rated hotels are taking a proactive and effective stance by adopting energy saving as a green business policy (Asfaw 2022). This strategy entails putting into effect a variety of procedures and efforts targeted at lowering energy usage, lowering carbon emissions, and improving the sustainability of the environment as a whole (Kassim 2023).

According to the survey, most respondents (mean=3.80) believed that star-rated hotels in the Kumasi Metropolitan Area practice water conservation. According to Salama and Abdelsalam's (2021) research, star hotels

are generally expected to consume more water and have more complicated consumption structures with a variety of water-consuming services offered to both tourists and guests. Many writers, like Abdou *et al.* (2020) and Langgat (2019), have pointed out that conserving water and energy is one of the green practices that many businesses have used to help the environment. Abrudu *et al.* (2020) assert that hotels have a competitive edge due to their adoption of water and energy-saving strategies, based on studies conducted in Romania.

Furthermore, most of the respondents agreed (mean=3.65) that their hotels adopt eco-friendly cleaning. The use of solutions that are decomposable and avoid the use of hard chemicals like chlorine, phosphates, and artificial perfumes is part of eco-friendly cleaning (Lee and Cheng, 2018). These products have a reduced impact on indoor air quality and are less harmful to aquatic ecosystems when they enter water systems (Lee and Cheng, 2018). According to Tiwari *et al.* (2020), eco-friendly cleaning in hotels refers to the practice of using environmentally responsible cleaning products, methods, and practices that minimize negative impacts on both human health and the environment. The goal is to maintain a clean and hygienic environment while reducing the use of harmful chemicals, conserving resources, and promoting sustainability. According to Yusof *et al.* (2017), guest satisfaction and intention to return are directly correlated with eco-friendly hotel sector policies. As a result, to compete, hoteliers whether or not they are considered green, must employ ecologically friendly methods that contribute to environmental preservation.

Additionally, the majority of the respondents agreed (mean=3.73) that star-rated hotels in the Kumasi Metropolitan Area adopt a green business policy of water and energy monitoring. The implication is that incorporating water and energy monitoring into hotel operations allows for evidence-based decision-making that benefits the environment, reduces operational costs, enhances guest satisfaction, and aligns with sustainable business practices. According to Gülaçtı (2022), water and energy monitoring in hotels refers to the systematic tracking, measurement, and analysis of water and energy consumption within the hotel's facilities. Data on the quantity of energy and water used in the hotel's different areas, including the kitchens, laundry facilities, public areas, and guest rooms, is what the monitoring aims to collect (Wang *et al.* 2022).

Regression Analysis

This assessed the variables influencing the adoption of green practices by hotels in the Kumasi Metropolitan Area.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.963	0.837	0.815	0.274

According to Table 4, the R-squared value is 87.3%, or 0.837. The study's independent variables—cost savings, customer demand, industry regulations and standards, environmental awareness, corporate social responsibility, competitive advantage, resource availability, and technological advancement—account for 87.3% of the explanations of green practices. Other factors, not included in the study, account for the remaining 12.7%.

Table 5. Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	82.763	15	5.518	85.210	0.000[a]
Residual	2.849	44	0.065		
Total	85.612	59			

The results of the analysis of variance (ANOVA) indicated that the model was statistically significant. Additionally, the outcomes show that the independent variables are trustworthy markers of green practices. This is confirmed by an F-statistic of 85.210 and a reported p-value of 0.000, which was less than the typical probability of 0.05 for a significant level.

The influence of the independent variables (cost savings, customer demand, industry regulations and standards, environmental awareness, competitive advantage, and availability of resources) on the adoption of green practices is shown in Table 6 through the use of regression analysis. The results show that cost savings (r=0.787, p value=0.000), customer demand (r=0.841, p=0.000), industry regulations and standards (r=0.804, p=0.000), environmental awareness (r=0.794, p=0.000), competitive advantage (r=0.674, p=0.007, and resource availability (r=0.872, p=0.000), were statistically significant in explaining the adoption of green practices among star-rated hotels in Kumasi Metropolitan Area. The study revealed that cost savings significantly impact the adoption of green practices among hotels, as sustainable initiatives can lead to long-term financial benefits and improved

operational efficiency. This result corroborates that of Fauziah *et al.* (2017), who found that a variety of factors impact the adoption of green practices in the hotel business, including cost, perceived advantages, staff and customer assistance, and consumer support.

Table 6. Results of Multiple Linear Regression Analysis

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	3.844	0.161		23.903	0.000
Cost savings	0.787	0.075	1.312	10.551	0.000
Customer demand	0.841	0.064	1.409	13.063	0.000
Industry regulations and standards	0.804	0.072	1.340	11.091	0.000
Environmental awareness	0.794	0.079	1.331	12.048	0.000
Corporate social responsibility	0.193	0.062	0.104	3.485	0.085
Competitive advantage	0.674	0.056	1.258	9.678	0.007
Availability of resources (funds, trained staff)	0.872	0.058	1.461	15.028	0.000
Technology advancements	0.444	0.056	0.048	0.783	0.438

Dependent variable: Green practices

The study also showed that customer demand influences the adoption of green practices among star-rated hotels in the Kumasi Metropolitan area. The implication is that hotels respond to customer demand for green practices and position themselves as relevant and attractive choices for environmentally conscious travelers. This result is in line with that of Jiang and Gao (2019), who discovered that consumer demand affects hotels in China's adoption of green practices. According to Butler (2008), cited in Deraman *et al.* (2017), many hotel operators hold off on implementing green practices until consumer demand rises and operating expenses fall.

Industry regulations and standards were found to influence the adoption of green practices among star-rated hotels in the Kumasi Metropolitan Area. These regulations and standards provide a framework for hotels to follow, encouraging and sometimes mandating the implementation of green practices. Srivastava *et al.* (2023) are of the view that regulations and standards create a level playing field by establishing a baseline of environmental responsibility.

The study found that environmental awareness also influences the adoption of green practices by star-rated hotels in the Kumasi Metropolitan Area. The finding is in line with the observation made by Kuar *et al.* (2022) that environmental awareness affects Malaysian hotels' adoption of green practices. The study showed that the availability of resources such as funds, trained staff, etc., influences the adoption of green practices among star-rated hotels. The implication is that the availability of funds and trained staff can catalyze star-rated hotels to adopt and prioritize green business practices. This finding collaborates with the findings of Li *et al.* (2020) that available funds in star-rated hotels in eastern China impact the implementation of green practices.

Conclusions and Further Research

This study aimed to assess green business practices among star-rated hotels in the Kumasi Metropolitan Area. The study showed that star-rated hotels have implemented environmentally friendly practices, taking steps to reduce their water usage, and adopting sustainable business practices for the long-term benefit of the environment. In preventing losses, making sure that the lights are turned off in vacant rooms and doing routine maintenance on water fittings and pipelines. The study also, established that energy conservation, water conservation, eco-friendly cleaning, and energy monitoring were key green business policies adopted by star-rated hotels in the Kumasi Metropolitan Area. The study further, revealed that cost savings, customer demand, industry regulations and standards, environmental awareness, competitive advantage, and available resources were major factors that influence the adoption of green practices by star-rated hotels in the Kumasi Metropolitan Area.

Theoretical Implications

The results of implementing green practices in star-rated hotels can contribute to the development and refinement of sustainability theories and concepts related to corporate environmental responsibility and provide insights into the practical implementation of sustainable strategies in the hospitality industry. This study's findings add to the hospitality literature on hotel green business practices in Ghana.

Practical Implications

The findings from the study emphasized the observable financial benefits and operational improvements brought about by the implementation of green practices, which may persuade more hotels to make sustainable initiatives and investments to boost their bottom line.

Recommendations

First, the study suggests that the government be involved in all issues about the enforcement of green practices, as well as that employees' knowledge be raised consistently and their training be enhanced about the use of green practices.

Second, since guests are seen as essential components in building green capacity, they are likely to increase productivity and promotion in addition to educating, training, and raising staff members' awareness of the value of green practices in hotel enterprises. The reason for this is that a small number of dedicated hotel employees and eco-aware guests may help maintain green standards.

Third, the managers of hotels should install water-saving fixtures, promote guest awareness about water conservation, and monitor water usage to identify opportunities for reduction.

Finally, regulators such as the Environmental Protection Agency (EPA) and Ghana Tourism Authority (GTA) need a more comprehensive inspection plan than the ceremonial periodic visits that do not review the core environmental business practices of hotels.

Limitations and Future Research

The study is limited to only star-rating green business hotel practices in the Kumasi Metropolitan Area in Ghana. Future research should look at small business hotel practices in other jurisdictions to ascertain what pertains there.

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Credit Authorship Contribution Statement

The authors contributed equally to this research.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work manuscript.

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Integrating Marine Tourism into the Blue Economy Framework

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Abstract: Marine tourism is an integral part of the blue economy, contributing significantly to economic development and environmental sustainability. This paper explores the various dimensions of marine tourism within the blue economy framework, emphasizing its economic, social, and environmental impacts. The conceptual framework defines marine tourism activities and highlights their importance. Current trends and practices in marine tourism are analyzed, along with their economic implications and the resulting environmental and social impacts. The paper also delves into governance models, focusing on public-private partnerships and the role of non-governmental organizations (NGOs) in promoting sustainable tourism practices. National and regional policies are examined through case studies and comparative analysis. The economic integration of marine tourism with other blue economy sectors, such as fisheries and coastal infrastructure, is discussed, highlighting the revenue generation and economic diversification benefits. The findings underscore the need for effective governance, stakeholder engagement, and adaptive management to achieve sustainable marine tourism development.

Keywords: sustainable development; marine tourism; blue economy; public-private partnerships; economic diversification.

JEL Classification: Q01; Q56; Q26; Z32.

1. Introduction

Marine tourism is a pivotal component of the blue economy, an emerging framework that seeks to sustainably harness ocean resources for economic growth while ensuring the conservation and preservation of marine ecosystems. This paper delves into the multifaceted role of marine tourism within the blue economy, highlighting its contributions to sustainable development. The study is particularly significant as it integrates marine tourism into the broader blue economy context - a perspective that remains underexplored in existing literature.

Unlike traditional approaches that tend to examine marine tourism as an isolated sector, this research underscores its interconnectedness with other key blue economy sectors such as fisheries, coastal infrastructure, and marine conservation efforts. This interconnected approach allows for a more comprehensive understanding of how marine tourism not only drives economic growth but also influences social and environmental outcomes.

The novelty of this study lies in its holistic analysis of marine tourism's impact across multiple dimensions - economic, social, and environmental - offering a more nuanced understanding of its role in sustainable development. By exploring governance models, including the dynamics of public-private partnerships and the involvement of non-governmental organizations (NGOs), the paper addresses the critical need for well-rounded sustainable development strategies. These strategies are essential for balancing economic growth with environmental sustainability and social equity, ensuring that marine tourism contributes positively to local and global sustainability goals.

This expanded perspective is crucial for policymakers, industry stakeholders, and researchers, as it provides a robust framework for promoting sustainable practices in marine tourism. The findings of this study are intended

to guide the development of policies and initiatives that foster economic diversification and revenue generation while safeguarding marine environments and enhancing the quality of life for coastal communities.

1.1 Importance of the Blue Economy and Marine Tourism

The blue economy encompasses a wide range of activities including fisheries, aquaculture, coastal tourism, marine biotechnology, and renewable energy. It seeks to balance economic advancement with ecological integrity, addressing pressing issues such as climate change and marine pollution. Recent projections by the International Finance Corporation (IFC) suggest that the blue economy could double its value to $3 trillion by 2030, creating about 40 million jobs globally (IFC, 2023).

The blue economy is essential for promoting sustainable development, offering economic resilience and environmental sustainability through its integration of diverse marine and coastal activities. The World Bank underscores its potential to drive economic growth while ensuring the health of oceans (World Bank, 2024). Nations like Malaysia recognize the blue economy as pivotal in achieving sustainable development goals, contributing significantly to GDP growth, and fostering inclusive economic progress (Akhtar, 2023).

Marine tourism, a cornerstone of the blue economy, enhances local economies by attracting tourists and generating substantial revenue. Activities such as recreational boating, fishing, water sports, and cruises not only bolster economic growth but also promote environmental awareness and conservation efforts. Sustainable marine tourism practices engage tourists in eco-friendly activities, contributing to the preservation of marine ecosystems and cultural heritage (IFC, 2023; Akhtar, 2023).

1.2 Objectives, Aims and Scope of the Review

This review aims to critically examine the role of marine tourism within the blue economy, assessing its economic, environmental, and social impacts on coastal communities and ecosystems. It will analyze strategies and policies implemented by various countries to promote sustainable marine tourism practices and evaluate the challenges and opportunities in integrating marine tourism into sustainable development frameworks. Additionally, the review seeks to identify gaps in current research and propose future directions to enhance the sustainability of marine tourism initiatives. By providing a comprehensive overview of marine tourism's significance in advancing sustainable development goals, the review will explore its definition and components, including recreational activities, eco-tourism, and cultural tourism. It will present case studies and examples of successful integration of marine tourism with sustainable practices, examine the economic benefits such as job creation, revenue generation, and local economic development, and address the environmental impacts and strategies for mitigating negative effects on marine ecosystems and biodiversity.

Key research questions to be addressed in this review include: What are the economic benefits of marine tourism within the blue economy context, and how do they contribute to local economies? What environmental impacts does marine tourism have on marine ecosystems, and what measures are in place to minimize these impacts? How do policies and regulations support or hinder the sustainable development of marine tourism? What are the social and cultural implications of marine tourism for local communities, and how can these be effectively managed? Finally, what gaps exist in current research on marine tourism, and what future research directions should be pursued to enhance sustainability?

1.3 Structure of the Paper

This paper comprehensively explores marine tourism within the context of the blue economy. The introduction emphasizes its significance and outlines the paper's objectives, including assessing the economic, environmental, and social impacts of marine tourism and exploring policy implications.

The paper evaluates the economic benefits of marine tourism by examining its contributions to local economies through job creation, revenue generation, and infrastructure development. It also analyzes the environmental impacts, such as habitat disturbance and waste generation, and discusses strategies for mitigating these effects through sustainable practices and conservation efforts. The review section details the effectiveness of policies and regulatory frameworks at local, national, and international levels in promoting sustainable marine tourism.

Furthermore, the paper examines the social and cultural implications of marine tourism, including its effects on local communities and cultural heritage, and highlights opportunities for cultural exchange and community engagement. By identifying challenges such as over-tourism and infrastructure development, as well as opportunities for innovation and collaboration, the paper aims to enhance sustainable tourism practices. The

conclusion proposes future directions and recommendations for addressing research gaps and promoting responsible tourism in marine environments.

2. Conceptual Framework

This section provides a detailed conceptual framework for understanding marine tourism within the context of the blue economy, focusing on its various activities and broader socio-economic impacts.

2.1 Definition and Scope of Marine Tourism

2.1.1 Marine Tourism Overview

Marine tourism refers to travel and recreational activities undertaken in coastal and marine environments, encompassing a wide range of leisure pursuits and experiences. These activities include recreational boating, scuba diving, snorkeling, whale watching, fishing tours, and cruise tourism (Papatheodorou and Jones, 2020). Each of these activities not only attracts tourists seeking unique marine experiences but also contributes significantly to local economies and environmental conservation efforts.

2.1.2 Types of Marine Tourism Activities

Marine tourism activities can be categorized into several types. Recreational boating and water sports, such as sailing, yachting, jet skiing, and windsurfing, are popular among tourists seeking leisure and adventure in coastal waters (Hall and Weiler, 2021). Scuba diving and snorkeling appeal to marine enthusiasts interested in exploring underwater ecosystems, coral reefs, and marine wildlife habitats (Cater, 2020). Cruise tourism offers comprehensive experiences of coastal destinations, combining leisure activities with cultural and historical tours (Rodrigue *et al.* 2019). Fishing tourism, including fishing tours and charters, attracts anglers interested in sport fishing, contributing to local economies through tourism expenditures and licensing fees (Egan *et al.* 2021).

2.1.3 Economic, Social, and Cultural Importance

The economic impact of marine tourism is substantial, contributing to job creation, revenue generation, and infrastructure development in coastal communities (Jones and Phillips, 2021). Marine tourism boosts local economies by attracting high-spending tourists and supporting related industries such as hospitality, retail, and transportation (Mason and Pomering, 2019). Socially, marine tourism fosters cultural exchange and community engagement by promoting local traditions, cuisine, and cultural heritage (Nienhueser *et al.* 2020). Tourists often participate in cultural activities and interact with local communities, enhancing mutual understanding and appreciation of diverse cultures. Culturally, marine tourism plays a crucial role in raising awareness about marine conservation issues and promoting sustainable practices among tourists and local populations (Meffre *et al.* 2020). Sustainable tourism initiatives, such as marine protected areas and responsible whale watching guidelines, aim to mitigate environmental impacts and preserve marine biodiversity (Hawkins *et al.* 2018).

3. Marine Tourism: Current Trends and Practices

Marine tourism represents a significant sector within the broader tourism industry, characterized by its unique appeal to coastal and marine environments. This section examines current trends and practices in marine tourism, emphasizing global and regional perspectives, growth statistics, market analysis, popular destinations, and activities.

3.1 Global and Regional Trends

Recent research underscores the dynamic growth of marine tourism on a global scale. Higham and Lück (2021) highlight a consistent rise in marine tourism activities, driven by increasing global incomes, enhanced accessibility to coastal areas, and heightened awareness of marine conservation issues. This growth attracts a diverse range of tourists, including adventure seekers, nature enthusiasts, and luxury travelers, each contributing significantly to the economic impact of marine tourism.

Across various regions, popular marine tourism destinations offer unique attractions and activities. The Caribbean, known for its pristine beaches, vibrant coral reefs, and popular water sports like snorkeling and diving, remains a top choice for travelers (UNEP, 2020). Southeast Asia, particularly countries such as Thailand and Indonesia, attracts visitors with its rich marine biodiversity and cultural experiences, including traditional fishing practices and initiatives for marine wildlife conservation (UNWTO, 2019).

Furthermore, there is a notable shift towards sustainable practices in marine tourism worldwide. Many destinations are now actively promoting eco-tourism initiatives such as marine sanctuaries, responsible fishing

tours, and community-based tourism projects that engage local populations (UNWTO, 2021). These initiatives not only enrich visitor experiences but also contribute significantly to environmental preservation and socio-economic development in coastal communities.

3.2 Economic Impact of Marine Tourism

Marine tourism plays a crucial role in economic development, significantly contributing to GDP and employment in coastal regions worldwide. The World Travel and Tourism Council (WTTC) highlights that marine tourism accounts for a substantial portion of the global travel and tourism industry, contributing billions of dollars annually to national economies (WTTC, 2022). Recent studies reaffirm the importance of marine tourism in bolstering the economies of coastal nations. For instance, a 2024 report by the World Tourism Organization (UNWTO) underscores the continued reliance of countries like the Maldives and the Bahamas on marine tourism, with activities such as diving, snorkeling, and beach tourism remaining vital to their GDP (UNWTO, 2024; WTTC, 2022). These activities not only attract international visitors but also create employment opportunities, supporting a wide range of jobs directly and indirectly. Employment opportunities in sectors such as hospitality, transportation, tour guiding, and marine services provide livelihoods for local communities (UNWTO, 2021).

The economic benefits of marine tourism extend beyond direct spending, creating multiplier effects in local economies. Every dollar spent on marine tourism generates additional income for suppliers, retailers, and service providers in the tourism value chain, stimulating economic growth, boosting infrastructure development, and enhancing the quality of life in coastal communities (UNEP, 2020). Recent findings from a 2024 study by the International Institute for Sustainable Development (IISD) highlight that these multiplier effects are crucial in sustaining local economies, particularly in small island developing states (IISD, 2024). Additionally, research by Higham and Lück (2021) shows that marine tourism activities not only generate direct revenues but also catalyze investment in infrastructure improvements such as ports, marinas, and recreational facilities, further supporting tourism growth and enhancing the overall attractiveness of coastal destinations.

3.3 Environmental and Social Impacts

Marine tourism significantly influences both the environment and local communities, offering positive contributions alongside challenges that require careful management. Marine tourism can positively impact the environment by fostering conservation awareness and supporting marine protected areas (MPAs). Tourism revenues often fund conservation efforts like coral reef restoration and marine biodiversity protection (Higham and Lück, 2021). However, activities such as snorkeling, diving, and boating can damage coral reefs and disturb marine habitats (UNEP, 2020). Coastal developments for tourism infrastructure, including resorts and marinas, may exacerbate habitat loss and alter coastal ecosystems, impacting species like mangroves and seagrass beds (UNWTO, 2021).

Effective community engagement is crucial for mitigating negative impacts and promoting sustainable practices. Tourism benefits local communities economically through employment, income generation, and improved infrastructure (UNWTO, 2021). It also aids cultural preservation by showcasing traditional practices and facilitating cultural exchanges (UNWTO, 2019). Community-based tourism initiatives empower local communities, integrating cultural heritage into tourism and ensuring that cultural values are respected (UNEP, 2020; UNWTO, 2021).

4. Policy and Governance

Policy and governance frameworks play a crucial role in shaping the sustainable development of marine tourism, ensuring that economic benefits are balanced with environmental and social considerations.

4.1 International Policies and Regulations

The United Nations Sustainable Development Goals (SDGs), particularly SDG 14, focus on conserving and sustainably using oceans, seas, and marine resources. SDG 14 emphasizes protecting marine ecosystems, reducing pollution, and managing marine resources sustainably. Achieving these targets requires integrated ocean governance involving governments, industries, and local communities. Research highlights SDG 14's role in guiding policy and regulatory frameworks for marine tourism, advocating for sustainable practices that contribute to ocean health and resilience (Jones and Macfadyen, 2020). Effective implementation enhances marine biodiversity conservation and supports the viability of marine tourism destinations.

The International Maritime Organization (IMO) sets global standards for shipping activities impacting marine tourism operations. IMO guidelines address environmental protection, safety at sea, and sustainable maritime transport, including regulations on ship emissions, ballast water management, and safety standards for passenger vessels. Research underscores the importance of IMO guidelines in mitigating environmental impacts from marine

tourism, reducing pollution, and enhancing safety measures (Hall *et al.* 2019). Compliance with IMO regulations ensures responsible marine tourism activities, minimizing adverse effects on marine ecosystems and coastal communities.

4.2 National and Regional Policies

National and regional policies are pivotal in shaping marine tourism development and management, addressing specific environmental, economic, and social challenges within diverse geographic contexts.

Case studies provide insights into sustainable policy implementation. Australia's Great Barrier Reef Marine Park Authority uses zoning regulations and visitor management to protect coral reefs while facilitating tourism. The Galápagos Islands in Ecuador employ strict visitor quotas and rigorous environmental impact assessments to preserve marine biodiversity. These examples highlight the importance of adaptive management and stakeholder engagement in achieving sustainable outcomes.

Comparative analysis assesses how environmental, economic, and social factors influence marine tourism policies across regions. EU member states have unified regulations under the Marine Strategy Framework Directive to achieve environmental goals. In Southeast Asia, countries like Thailand and Indonesia face challenges balancing tourism growth with marine conservation, leading to varied policy responses. Research underscores the need for tailored approaches that consider local contexts and stakeholder interests in crafting effective marine tourism policies. Comparative studies facilitate learning from best practices and addressing gaps in policy implementation to promote sustainable marine tourism development.

4.3 Governance Models for Marine Tourism within the Blue Economy

Effective governance models are crucial for managing marine tourism sustainably within the blue economy, balancing economic benefits with the preservation of marine ecosystems.

Public-private partnerships (PPPs) involve collaboration between governmental bodies and private sector entities to achieve shared goals in marine tourism. These partnerships leverage resources and expertise to enhance infrastructure, promote sustainable practices, and improve visitor experiences. In the Caribbean, PPPs have been key in developing marine protected areas and eco-tourism initiatives that support local communities while conserving marine biodiversity. Such partnerships foster inclusive growth and empower stakeholders in decision-making, ensuring balanced economic development and environmental stewardship.

Non-governmental organizations (NGOs) are vital in advocating for sustainable practices and supporting governance frameworks in marine tourism. NGOs work with governments, communities, and businesses to influence policy, raise environmental awareness, and implement conservation initiatives. In destinations like the Maldives, NGOs collaborate with local stakeholders to establish marine protected areas and promote sustainable tourism practices, mitigating environmental impacts and enhancing destination attractiveness through eco-certifications and community engagement.

5. Economic Integration

5.1 Economic Benefits of Marine Tourism in the Blue Economy

Marine tourism plays a pivotal role in economic integration within the blue economy by generating revenue, diversifying economies, and creating synergies with other sectors. It drives revenue in coastal economies by attracting tourists to activities like snorkeling, diving, and boat tours, which support local businesses, create jobs, and enhance infrastructure (Hall and Higham, 2020; UNEP, 2020). For example, the Caribbean relies on marine tourism for income, diversifying its economy and promoting inclusive growth (CTO, 2021).

Marine tourism also enhances other blue economy sectors, such as fisheries and coastal infrastructure. Tourist demand for fresh seafood supports sustainable fisheries management (Mora *et al.* 2018). Investments in coastal infrastructure, including marinas and ports, benefit both marine tourism and maritime transport (UNWTO, 2021). Australia's integrated coastal zone management strategies highlight this synergy by promoting sustainable tourism, preserving marine biodiversity, and supporting fisheries (GBRMPA, 2021).

5.2 Value Chain Analysis of Marine Tourism

Marine tourism involves a complex value chain with stakeholders contributing to tourism experiences, local economies, and environmental sustainability. Key stakeholders include tourists, tourism operators, local communities, government bodies, environmental organizations, research institutions, and infrastructure providers (Snyder *et al.* 2021; Hall and Higham, 2020).

Local businesses benefit from marine tourism by offering services such as guided tours, equipment rentals, specialized accommodation packages, local crafts, cuisine, and transportation options (Coles *et al.* 2021; Scott and Gössling, 2021). These efforts drive economic growth, preserve cultural heritage, and promote environmental sustainability.

5.3 Investment and Financing Mechanisms

Investment and financing mechanisms are crucial for the sustainable growth of marine tourism within the blue economy. Funding sources include public funding, private investment, international aid, public-private partnerships, and community-based financing (Hall and Higham, 2020; Simpson and Gössling, 2021). Each source supports different aspects of marine tourism, highlighting the need for collaborative efforts.

Financial instruments and incentives such as tax incentives, green bonds, carbon offsets, payments for ecosystem services, microfinance, and insurance products attract investments and promote sustainability (Gössling and Hall, 2020; Dwyer *et al.* 2021). These mechanisms encourage responsible tourism practices, environmental stewardship, and social inclusivity, supporting economic resilience in coastal areas.

6. Sustainability and Environmental Considerations

Sustainability is critical in marine tourism to conserve marine ecosystems, protect biodiversity, and enhance socio-economic benefits while minimizing negative impacts. This section explores sustainable practices, eco-certifications, standards, business models, and best practices within marine tourism.

6.1 Sustainable Practices in Marine Tourism

Marine tourism can integrate various sustainable practices to mitigate environmental impacts and support conservation efforts. Key certifications and standards guide these practices:

Global Sustainable Tourism Council (GSTC) Criteria: Establish benchmarks for responsible tourism management across environmental, socio-cultural, and economic dimensions (GSTC, 2020).

Blue Flag Certification: Awarded to beaches, marinas, and boating operators meeting rigorous environmental and educational standards (Foundation for Environmental Education, 2021).

Marine Stewardship Council (MSC) Certification: Promotes responsible fishing practices and traceability in seafood supply chains (MSC, 2021).

Green Key Eco-label: Recognizes establishments committed to sustainable operations, including energy efficiency and waste reduction (Green Key, 2021).

Costa Rica's Certification for Sustainable Tourism (CST): Encourages sustainable practices across tourism sectors, enhancing conservation and community engagement (Costa Rica Tourism Board, 2021).

Sustainable business models and best practices further enhance environmental performance:

Community Engagement: Involves local communities in planning and decision-making for equitable benefits (Lew and Hall, 2020).

Resource Efficiency and Waste Management: Focus on reducing energy consumption, water use, and waste generation (Lovelock and Fennell, 2020).

Conservation Efforts: Initiatives such as marine protected areas (MPAs), coral reef restoration, and sustainable fisheries management, funded by tourism revenue (Fletcher *et al.* 2021).

Education and Interpretation Programs: Raise awareness about marine conservation and sustainable practices (Ballantyne *et al.* 2020).

Low-Impact Activities: Promote snorkeling, kayaking, and wildlife watching to minimize disturbances to marine ecosystems (Papathanassis and Gössling, 2020).

By adopting these practices, marine tourism operators can advance environmental conservation, enhance destination resilience, and promote sustainable development.

6.2 Conservation and Marine Protected Areas

Marine tourism can adopt sustainable practices to mitigate environmental impacts and support conservation efforts. Key certifications and standards guide these practices, such as GSTC Criteria, Blue Flag Certification, MSC Certification, Green Key Eco-label, and Costa Rica's CST. These certifications help marine tourism operators minimize environmental impacts, enhance visitor experiences, and contribute to marine ecosystem preservation.

Examples of successful conservation initiatives include:

Great Barrier Reef Marine Park, Australia: Uses zoning, regulations, and collaborative management to conserve the world's largest coral reef system (Great Barrier Reef Marine Park Authority, 2021).

Galápagos Marine Reserve, Ecuador: Protects unique marine biodiversity with regulations for sustainable tourism operations and visitor management (Galápagos National Park Directorate, 2021).

Tubbataha Reefs Natural Park, Philippines: Supports sustainable diving tourism and research initiatives with strict protection measures (Tubbataha Management Office, 2021).

Punta de Choros-Damas Island National Reserve, Chile: Supports sustainable tourism activities like whale watching, contributing to local economic development (CONAF, 2021).

Bonaire National Marine Park, Caribbean: Recognized for community-based management, sustainable dive tourism, and coral reef conservation efforts (STINAPA Bonaire, 2021).

6.3 Climate Change and Marine Tourism

Climate change poses significant challenges to marine ecosystems and tourism activities, necessitating effective adaptation and mitigation strategies. Key impacts include:

Ocean Warming: Leads to coral bleaching, affecting dive tourism (Hughes *et al.* 2018).

Sea Level Rise: Increases coastal erosion risks and threatens tourism infrastructure (Nicholls *et al.* 2020).

Extreme Weather Events: Disrupt tourism operations and damage coastal infrastructure (Hall *et al.* 2019).

Ocean Acidification: Negatively impacts marine organisms vital for diving and seafood-related tourism (Gattuso and Magnan, 2015).

Shifts in Marine Biodiversity: Affect wildlife tourism activities like whale watching (Lester *et al.* 2020).

Adaptation and mitigation strategies include:

Sustainable Tourism Practices: Reduce the carbon footprint, conserve water resources, and minimize waste (Simpson *et al.* 2019).

Integrated Coastal Zone Management: Protects coastal infrastructure and manages beach erosion (McFadden *et al.* 2021).

Community Engagement: Builds resilience by leveraging local knowledge (Hill and Gale, 2019).

Resilient Infrastructure: Ensures continued operation and safety for tourists (Scott *et al.* 2019).

Robust Policies and Regulations: Curb greenhouse gas emissions, promote renewable energy, and enforce sustainable tourism practices (Higham *et al.* 2020).

These strategies safeguard marine ecosystems, support tourism-dependent communities, and ensure the long-term sustainability of marine tourism in the face of climate change.

7. Technological Innovations and Digital Transformation

Technological advancements are revolutionizing marine tourism by improving operational efficiency, sustainability, and visitor experiences. This section explores the impact of smart tourism technologies and innovations in marine vessel design and operations.

7.1 Role of Technology in Enhancing Marine Tourism

Smart Tourism Technologies

Internet of Things (IoT): Facilitates real-time monitoring of environmental conditions, such as water quality and marine life, enhancing safety and resource management (Kounoudes *et al.* 2020).

Artificial Intelligence (AI): Improves operational efficiencies through predictive analytics, personalized recommendations, and responsive services (Alavi *et al.* 2021).

Virtual Reality (VR) and Augmented Reality (AR): Provide immersive experiences and interactive guides, enhancing visitor engagement and education (Hassan *et al.* 2020).

Innovations in Marine Vessel Design and Operations

Hybrid and Electric Propulsion: Reduces carbon emissions and environmental impact (European Commission, 2021).

Autonomous Vessels: Enhances safety, efficiency, and navigational precision by minimizing human intervention (Yang *et al.* 2021).

7.2 Digital Tools and Platforms

Online Booking Systems and Travel Apps

Booking Platforms: Streamline reservations with secure, user-friendly interfaces, allowing real-time updates and itinerary management (Chang *et al.* 2020).

Travel Apps: Offer real-time weather updates, interactive guides, and personalized recommendations, enhancing the visitor experience (Gretzel *et al.* 2021).

Use of Social Media and Marketing

Social Media: Platforms like Instagram and Facebook showcase marine attractions through engaging content, enhancing visibility and community engagement (Kang and Morrison, 2020).

Digital Marketing: Includes SEO, content marketing, influencer partnerships, and targeted advertising to attract and convert tourists (Hays *et al.* 2021).

7.3 Case Studies of Innovative Practices

Examples from Leading Destinations

Whale Watch Kaikoura, New Zealand: Utilizes VR to offer immersive, educational marine experiences, promoting conservation while reducing physical interactions with wildlife (Whale Watch Kaikoura, 2021).

Visit Svalbard, Norway: Integrates IoT sensors for wildlife tracking and environmental monitoring, enhancing safety and minimizing habitat disturbance (Visit Svalbard, 2021).

Impact of Technology on Visitor Experience and Management

Visitor Experience: VR and AR technologies provide immersive tours and educational content, significantly enhancing satisfaction and engagement (Hassan *et al.* 2020).

Management Efficiency: IoT and AI improve operational management by optimizing routes, monitoring conditions, and personalizing services, thus enhancing resource allocation and reducing costs (Alavi *et al.* 2021).

By integrating these technological innovations, marine tourism operators can enhance visitor experiences, support sustainable practices, and improve operational efficiency while maintaining competitiveness.

8. Case Studies and Best Practices

Successful marine tourism integrates economic development with environmental conservation and community engagement. This section explores case studies that highlight effective practices and identifies key success factors for sustainable marine tourism.

8.1 Successful Integration Examples

8.1.1 Great Barrier Reef Marine Park, Australia

Sustainable Practices: Implements a comprehensive zoning system to manage activities like diving and snorkeling while protecting coral reefs. Includes visitor limits, designated mooring areas, and educational programs to promote reef conservation (Great Barrier Reef Marine Park Authority, 2021).

8.1.2 Cabo Pulmo National Park, Mexico

Community-Driven Conservation: Local community involvement in sustainable fishing and ecotourism has led to significant recovery of marine biodiversity, including coral reefs and fish populations, illustrating how tourism can support ecosystem regeneration (Cabo Pulmo Divers, 2021).

8.1.3 Baa Atoll Biosphere Reserve, Maldives

Eco-Certification and Community Involvement: Adheres to rigorous eco-certification standards, promoting waste management, energy efficiency, and water conservation among resorts and dive operators. Local community engagement aligns tourism with conservation goals (UNESCO, 2021).

8.2 Lessons Learned from Global Practices

8.2.1 Common Challenges and Solutions

Environmental impact is mitigated through eco-certifications such as Green Globe and EarthCheck, which enforce sustainable practices in waste management and energy efficiency (Dredge and Jenkins, 2021). Overcrowding is effectively managed by implementing zoning and visitor management plans, which protect sensitive areas and help maintain visitor satisfaction (Gössling and Hall, 2020; Jones *et al.* 2020). Community opposition is addressed by involving local communities in decision-making processes, ensuring cultural preservation and the equitable distribution of benefits (Scheyvens *et al.* 2020; Higham and Lück, 2021).

8.2.2 Transferable Strategies and Approaches

Adaptive management integrates research, monitoring, and stakeholder feedback to adjust strategies for ecosystem protection and enhance visitor experiences (Jones *et al.* 2020). Capacity building through training programs for operators and communities promotes awareness and fosters responsible behaviors (Scheyvens *et*

al. 2020). Effective policy development, with clear regulations and governance frameworks, ensures compliance and supports robust management practices (Dredge and Jenkins, 2021).

8.3 Comparative Analysis of Different Regions

Australia's Great Barrier Reef exemplifies strong regulatory frameworks and stakeholder engagement, setting a global standard for sustainable tourism (Great Barrier Reef Marine Park Authority, 2021). The Caribbean Islands benefit from their rich biodiversity and cultural diversity, bolstered by regional initiatives such as the Caribbean Challenge Initiative, which enhances ecological resilience (UNEP, 2020). Scandinavia leverages technology and eco-certifications to minimize environmental impact, successfully maintaining its pristine environments (Visit Norway, 2021). Southeast Asia on the other hand faces issues with unregulated tourism growth, inadequate infrastructure, and coastal pollution (UNEP, 2020). The Mediterranean Basin struggles with high tourist densities, habitat degradation, and climate change impacts, which are further complicated by socio-economic pressures (Euro-Mediterranean Center on Climate Change, 2021).

8.4 Opportunities for Cross-Regional Collaboration

Joint research and workshops facilitate the sharing of best practices in marine conservation and tourism management (UNEP, 2020). Consistent sustainable practices and environmental protections across regions are crucial for effective marine management (UNEP, 2020). Collaborations among governments, private stakeholders, NGOs, and local communities are essential for driving conservation and tourism initiatives (Euro-Mediterranean Center on Climate Change, 2021). Leveraging these strategies can help address common challenges, promote sustainable practices, and ensure the resilience of marine ecosystems and communities.

9. Key Challenges in Marine Tourism

9.1 Environmental Challenges

Marine tourism faces significant environmental challenges, including habitat degradation, pollution, overfishing, and biodiversity loss. Habitat Degradation arises from activities like anchoring and diving, which damage coral reefs and seagrass beds, and from coastal development, which causes habitat loss and fragmentation (Cesar *et al.* 2003; Hall and Higham, 2005). Pollution includes marine debris, such as plastics, which threaten marine life and ecosystems, and untreated sewage and runoff that contribute to issues like eutrophication and water quality degradation (Laist, 1997; Baker *et al.* 2001). Overfishing exacerbates the depletion of fish stocks and leads to bycatch, harming endangered species through unsustainable fishing practices (Gutierrez *et al.* 2011; Lewison *et al.* 2014). Biodiversity Loss results from these combined effects, impacting marine ecosystems and reducing their ability to provide essential services, thereby lowering ecosystem resilience (Hughes *et al.* 2003; Costanza *et al.* 1997). Addressing these challenges requires sustainable practices, pollution control, and effective management of marine protected areas, along with community engagement in conservation efforts.

9.2 Economic and Market Barriers in Marine Tourism

Marine tourism encounters several economic and market barriers, including market volatility, economic instability, competition, and market saturation. Market volatility is evident in seasonal fluctuations in visitor numbers and revenues, which can affect financial stability and business operations, as peak seasons typically coincide with favorable weather or holidays, while off-peak periods see reduced traffic (Hall and Higham, 2005). Additionally, global economic factors such as downturns, currency fluctuations, and geopolitical instability can decrease disposable income for travel, impacting demand for marine tourism services (Dwyer *et al.* 2005). Economic instability further exacerbates these issues, particularly in regions heavily reliant on tourism, which are vulnerable to external shocks like pandemics, natural disasters, or shifts in global travel patterns (UNWTO, 2021). Such instability can constrain funding for essential tourism infrastructure, such as ports and marinas, during downturns, limiting the ability to expand or maintain facilities (UNWTO, 2021).

To address these challenges, several strategies can be employed. Diversification of Offerings involves creating a range of tourism products and experiences to attract visitors year-round, helping to mitigate the impact of seasonality (Hall and Higham, 2005). Risk Management Strategies include developing robust practices, such as maintaining financial reserves and diversifying market sources, to buffer against economic volatility (Dwyer *et al.* 2005). Public-Private Partnerships involve collaborating with various stakeholders, including government bodies and private investors, to secure investment in infrastructure and tourism development, sustaining growth during economic fluctuations (UNWTO, 2021). Finally, the Promotion of Sustainable Practices can attract environmentally

conscious travelers and contribute to long-term economic stability by aligning with the growing trend towards responsible tourism (Dwyer *et al.* 2005).

9.3 Competition and Market Saturation

Marine tourism faces several economic and market barriers, including increased competition, market saturation, and associated challenges. Competition among destinations can lead to price wars and reduced profit margins, which may compromise the quality of visitor experiences and sustainable practices (Song *et al.* 2012). Emerging destinations, in particular, may struggle against established ones with stronger branding and infrastructure. Overcoming these hurdles requires strategic marketing and differentiation to attract niche markets (Song *et al.* 2012). Market Saturation is another challenge, as popular marine tourism sites often experience overcrowding, particularly during peak seasons, which can diminish visitor experiences and strain local resources (Gössling and Hall, 2020). Managing carrying capacities is crucial to prevent environmental degradation and ensure sustainable tourism. Effective strategies include visitor quotas, timed entry systems, and infrastructure improvements (Dwyer *et al.* 2005).

To navigate these challenges, several strategies can be considered. Strategic Differentiation involves highlighting unique features and niche offerings to attract travelers seeking authentic experiences. Collaborative Management ensures stakeholder involvement in developing and enforcing sustainable tourism policies, balancing tourism demand with environmental conservation. Infrastructure Development focuses on investing in eco-friendly infrastructure and waste management systems to enhance visitor experiences while minimizing environmental impact. Visitor Education promotes responsible tourism practices and cultural sensitivity through educational programs, fostering more sustainable tourism behaviors. By addressing these economic and market barriers through targeted strategies, marine tourism businesses can enhance resilience, promote sustainable growth, and preserve marine ecosystems for future generations.

9.4 Policy and Regulatory Obstacles

9.4.1 Inconsistent Regulations

Marine tourism encounters significant barriers due to inconsistent regulations across different regions and countries, affecting operational consistency and compliance. Varied Standards in regulatory requirements, such as permits, zoning laws, and environmental impact assessments, differ widely among regions, complicating business operations and hindering the adoption of sustainable practices (Cochrane and Dolan, 2010). Jurisdictional Issues further exacerbate these challenges, as overlapping jurisdictions between national, regional, and local authorities can lead to conflicting regulations or gaps in oversight. This creates legal uncertainties for marine tourism operators and complicates the establishment of coherent management frameworks (Cochrane and Dolan, 2010).

9.4.2 Enforcement Challenges

Effective enforcement of regulations is crucial for sustainable marine tourism, yet several challenges undermine these efforts. Capacity and Resources pose significant hurdles, as limited funding, insufficient personnel, and outdated technological infrastructure can impede effective regulatory compliance (UNEP, 2020). Additionally, Corruption and Governance Issues weaken enforcement mechanisms, with corruption, lack of transparency, and ineffective governance structures undermining regulatory compliance and potentially encouraging illegal or unsustainable practices among marine tourism operators (UNEP, 2020).

9.4.3 Addressing Regulatory Challenges

To address regulatory and enforcement obstacles in marine tourism, coordinated efforts are essential. Harmonization of Standards involves establishing uniform standards and guidelines across jurisdictions to enhance operational consistency and better protect the environment. Capacity Building requires investing in initiatives to improve monitoring capabilities and enforcement efficiency, thereby strengthening regulatory compliance among authorities. Governance Reform entails strengthening governance frameworks, enhancing transparency, and combating corruption to improve regulatory oversight and enforcement effectiveness.

9.4.4 Lack of Integrated Policy Frameworks

The absence of integrated policy frameworks complicates the coordinated management of marine tourism, impacting sustainability and effectiveness. Sectoral Approach: Current policies often adopt a narrow, sectoral approach, focusing either on tourism development or environmental protection without considering their interdependencies. This limited integration overlooks broader impacts and interactions (Hall and Higham, 2005).

Fragmented Governance: Responsibilities for marine tourism management are typically divided among various government agencies, tourism operators, and community stakeholders. This fragmentation can lead to conflicting priorities, inefficient resource allocation, and difficulties in achieving consensus (Hall and Higham, 2005).

9.4.5 Addressing Policy Integration Challenges

To address the barriers and foster integrated policy frameworks in marine tourism, several strategies should be considered. Policy Integration: Developing comprehensive policies that harmonize economic, social, and environmental considerations is crucial. This approach ensures that tourism development goals are aligned with conservation objectives, creating a balanced framework that supports both economic growth and environmental preservation. Governance Coordination: Improving coordination among government agencies, tourism stakeholders, and local communities is essential. Establishing platforms for dialogue, joint planning, and decision-making can enhance management strategies and resolve conflicts. Capacity Building: Investing in training for policymakers, regulators, and stakeholders can significantly improve skills in integrated planning, sustainable tourism practices, and collaborative governance. By addressing these regulatory and policy challenges, policymakers can promote a more sustainable marine tourism sector that effectively balances economic benefits with environmental preservation, thereby ensuring the long-term resilience and health of marine ecosystems and coastal communities.

10. Future Directions and Opportunities

This section explores future directions and emerging opportunities in marine tourism, focusing on emerging trends such as adventure tourism, niche markets, wellness tourism, and eco-tourism.

Emerging trends in marine tourism are reshaping the sector, emphasizing sustainability and innovation:

Wellness Tourism: This trend integrates health-focused experiences into marine settings. Wellness-themed cruises now offer spa treatments, yoga sessions, and mindfulness activities, providing relaxation in scenic marine environments. Coastal eco-lodges and resorts cater to wellness seekers with activities such as hiking and wildlife observation, promoting eco-friendly practices and a deep connection with nature (Cohen, 2014).

Eco-Tourism: In marine contexts, eco-tourism focuses on conservation and education. Programs raise awareness about marine ecosystems and biodiversity, involving tourists in activities that support marine conservation while highlighting the ecological significance of coastal environments. Sustainable marine expeditions led by eco-friendly operators aim to minimize environmental footprints and promote wildlife conservation (UNWTO, 2021).

Marine Adventure Tourism: This trend includes high-thrill activities such as scuba diving, snorkeling with sharks, and deep-sea fishing. Adventure tourism attracts thrill-seekers with immersive marine experiences while operators incorporate safety measures and conservation principles to reduce environmental impacts (Buckley, 2012).

Digital and Virtual Marine Tourism: Technological advancements enable virtual marine experiences, like VR tours of coral reefs. These innovations provide educational and immersive experiences remotely, reducing the environmental footprint associated with physical travel (Tuzunkan, 2018).

Community-Based Marine Tourism: This approach emphasizes collaboration with local communities to ensure equitable sharing of tourism benefits. Community-based projects involve local stakeholders in decision-making and revenue sharing, promoting sustainable practices and cultural preservation while boosting local economies (Scheyvens *et al.* 2020).

Regenerative Tourism: Moving beyond sustainability, regenerative tourism focuses on restoring and enhancing ecosystems. It includes initiatives such as coral reef restoration and habitat rehabilitation, ensuring that tourism activities contribute positively to environmental recovery and improvement (Goodwin, 2021).

Embracing these trends allows marine tourism to diversify offerings, cater to evolving traveler preferences, and promote sustainability, contributing to the preservation of marine ecosystems and enhancing visitor experiences.

10.2 Potential for Growth within the Blue Economy

The blue economy offers significant growth opportunities for marine tourism through new destinations, innovative products, and technological advancements.

New Destinations and Products: Emerging maritime tourism hubs, noted for their unique biodiversity and cultural richness, are gaining attention. These new coastal and marine destinations, including newly identified island nations and protected areas, offer pristine environments and authentic cultural experiences. Promoting these

destinations diversifies global tourism, alleviates pressure on overcrowded sites, and supports local economies while encouraging responsible tourism practices (UNWTO, 2020). Sustainable tourism development emphasizes eco-friendly practices and community-based initiatives, advocating for stringent environmental regulations to protect marine ecosystems and support local economies, thus enhancing the sustainability of new destinations (UNESCO, 2019).

Innovative Marine Experiences: Marine adventure tourism is expanding with unique experiences like deep-sea diving, underwater photography tours, and interactions with species such as whale sharks and dolphins, attracting niche travelers seeking memorable encounters with marine life (Gössling and Higham, 2018). Culinary and cultural experiences in coastal settings, including seafood tours, coastal festivals, and eco-friendly accommodations, are also becoming popular, enhancing cultural appreciation and promoting sustainable practices (UNWTO, 2020).

Cross-Sectoral Linkages and Innovation: Cross-sectoral linkages are crucial for blue economy growth. Blue innovation hubs integrate tourism with marine conservation, fisheries management, renewable energy, and sustainable development, fostering interdisciplinary collaboration and effective marine resource management (OECD, 2019). Integrated coastal management strategies align tourism with conservation efforts and community engagement, balancing economic activities with environmental protection (OECD, 2019). Technological advancements, such as virtual reality (VR), artificial intelligence (AI), and big data analytics, enhance visitor experiences, operational efficiency, and environmental monitoring, supporting sustainable practices (UNWTO, 2020). Circular economy initiatives focus on waste reduction, recycling, and sustainable resource management to minimize ecological footprints and promote sustainability (OECD, 2019).

Embracing these trends and innovations drives sustainable growth in marine tourism, enhances visitor experiences, and supports the preservation of marine ecosystems and coastal communities.

10.3 Strategies for Enhancing Integration in Marine Tourism

Enhancing integration in marine tourism involves a comprehensive approach that includes policy recommendations, strategic planning, collaboration, and stakeholder engagement. These strategies aim to foster sustainable development and maximize the benefits of marine tourism while preserving marine ecosystems.

10.3.1 Policy Recommendations and Strategic Plans

To foster integration in marine tourism, the following policy recommendations and strategic plans are essential:

Policy Recommendations: Harmonizing regulatory frameworks is crucial for streamlining permits, standards, and guidelines across national and international levels, reducing bureaucratic hurdles, and ensuring consistent enforcement of sustainability measures (UNWTO, 2020). Ecosystem-Based Management (EBM) promotes an integrated approach that links marine tourism with conservation, fisheries management, coastal planning, and cultural heritage preservation, ensuring tourism development supports ecological and socio-cultural integrity (UNESCO, 2019).

Strategic Plans: Developing comprehensive destination management plans is vital for aligning tourism with environmental conservation, community empowerment, and economic diversification. These plans should be tailored to the specific needs of each destination, ensuring that tourism contributes positively to local communities and ecosystems (OECD, 2019). Additionally, integrating climate resilience and adaptation strategies into tourism planning is essential for addressing climate change impacts on coastal and marine ecosystems. These measures should enhance the adaptability of tourism infrastructure and practices to environmental changes, protecting both tourism assets and ecological health (UNEP, 2020).

10.3.2 Collaboration and Stakeholder Engagement

Effective integration in marine tourism relies heavily on robust collaboration and stakeholder engagement:

Collaboration: Public-private partnerships are vital for advancing sustainable tourism by combining expertise, resources, and innovation. These collaborations enhance infrastructure investment, marketing efforts, and overall management, leading to more effective and sustainable tourism practices (OECD, 2019). Additionally, establishing multi-stakeholder platforms - comprising government agencies, tourism operators, local communities, conservation organizations, and academia - is crucial. These platforms facilitate dialogue, joint decision-making, and the achievement of shared goals, thereby enhancing sustainability practices and promoting responsible tourism that benefits both local communities and marine ecosystems (UNWTO, 2020).

Stakeholder Engagement: Involving local communities in decision-making, capacity building, and benefit-sharing is fundamental for equitable tourism benefits. This engagement supports local livelihoods and fosters a

sense of ownership and responsibility towards marine conservation (UNESCO, 2019). Additionally, encouraging certification programs for tour operators promotes sustainable practices, cultural sensitivity, and environmental stewardship, ensuring that tourism operations adhere to best practices for environmental and social responsibility (UNEP, 2020).

11. Conclusion

This section provides a summary of key findings from the review paper on integration of marine tourism into the blue economy framework.

11.1 Summary of Key Findings

Emerging trends in marine tourism, such as adventure tourism, wellness tourism, and eco-tourism, reflect a shift towards more sustainable and immersive experiences aligned with evolving consumer preferences (UNWTO, 2020; Gössling and Higham, 2018). These trends highlight the growing demand for activities that blend excitement and relaxation with a commitment to environmental conservation. Technological advancements also play a crucial role, with smart tourism technologies, digital platforms, and innovative solutions enhancing visitor experiences, operational efficiencies, and environmental monitoring (UNWTO, 2020).

Addressing policy and regulatory challenges is essential for fostering sustainable development, as inconsistencies in regulations and gaps in enforcement can undermine efforts to integrate tourism with environmental conservation and community interests (UNESCO, 2019; OECD, 2019). Economic opportunities, including job creation, income generation, and GDP contributions, demonstrate marine tourism's potential for growth, while underscoring the need to balance economic benefits with environmental protection (OECD, 2019; UNEP, 2020).

Critical success factors for marine tourism include the adoption of sustainable practices, effective stakeholder collaboration, and ongoing innovation. Sustainable practices, such as eco-certifications and conservation initiatives, are crucial for minimizing environmental impacts and ensuring long-term viability (UNESCO, 2019; UNEP, 2020). Collaboration among governments, tourism operators, local communities, and conservation organizations is necessary to achieve sustainable development goals and implement integrated management strategies (UNWTO, 2020; OECD, 2019). Innovation drives the creation of new products, technologies, and strategies to address challenges like climate change and market volatility (Gössling and Higham, 2018; OECD, 2019).

Integrating marine tourism into the blue economy framework offers significant opportunities for sustainable development, economic growth, and cultural enrichment. By leveraging these trends and critical success factors, stakeholders can enhance the sector's potential while safeguarding marine ecosystems and promoting community well-being.

11.2 Policy Recommendations for Enhancing Integration of Marine Tourism into the Blue Economy Framework

Sustainable Tourism Development is essential. Promote eco-certifications, capacity-building programs, and incentives to minimize environmental impacts while enhancing socio-economic benefits (UNWTO, 2020). Adopt ecosystem-based management to balance tourism with conservation, fisheries management, and coastal planning (UNESCO, 2019).

Strengthening Policy Coherence involves establishing harmonized regulatory frameworks to streamline permits and guidelines, ensuring consistency and effectiveness (OECD, 2019). Invest in monitoring and enforcement to uphold environmental standards and combat illegal activities (UNEP, 2020).

Supporting Community Engagement is crucial. Involve local communities in decision-making, benefit-sharing, and capacity-building to ensure equitable tourism benefits and preserve cultural heritage (UNESCO, 2019; OECD, 2019).

Framework for Future Policy Development

Develop **Strategic Planning** at national and regional levels to align economic development with environmental conservation and resilience (OECD, 2019). Integrate climate adaptation strategies to address risks from climate change (UNEP, 2020).

Innovation and Technology should be promoted through research and partnerships to advance sustainable marine tourism products and practices. Embrace digital tools like virtual reality (VR) and artificial intelligence (AI) to enhance visitor experiences and improve environmental monitoring (UNWTO, 2020).

By focusing on these areas, policymakers can foster sustainable marine tourism, safeguard ecosystems, and support coastal communities.

11.3 Knowledge Gaps and Research Agenda

11.3.1 Identified Knowledge Gaps

To effectively integrate marine tourism into the blue economy, addressing key knowledge gaps is crucial:

Environmental Impacts and Conservation: A deeper understanding is needed of marine tourism's long-term effects on coastal ecosystems, such as coral reefs and seagrass beds, and the effectiveness of conservation initiatives like marine protected areas (MPAs) (UNEP, 2020; UNESCO, 2019).

Socio-Economic Dimensions: Research should explore how tourism affects coastal communities, focusing on employment, income distribution, cultural preservation, and social cohesion. It is also vital to develop methods for assessing the carrying capacity of marine environments, taking into account ecological limits and socio-economic impacts (OECD, 2019; UNWTO, 2020).

Policy and Governance Challenges: Analysis is needed on the effectiveness of policy interventions and regulatory frameworks for promoting sustainable marine tourism. Additionally, investigating governance structures that support integrated coastal zone management and multi-stakeholder collaboration is essential (OECD, 2019; UNESCO, 2019).

11.3.2 Proposed Research Agenda

Research Priorities: Conduct longitudinal studies to monitor the cumulative impacts of marine tourism on ecosystems, integrating ecological, socio-economic, and cultural dimensions (UNEP, 2020). Implement adaptive management approaches to address changing environmental conditions and stakeholder dynamics (UNWTO, 2020).

Methodological Innovations: Develop integrated assessment frameworks combining ecological modeling, socio-economic analysis, and cultural heritage evaluations for comprehensive marine tourism planning (UNESCO, 2019). Encourage participatory and community-based research methodologies to involve local communities in understanding and managing tourism impacts (OECD, 2019).

By addressing these gaps and advancing research, stakeholders can improve policy formulation, management practices, and stakeholder engagement, leading to more sustainable and resilient marine tourism within the blue economy framework.

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Kiran Reddy: Conceptualization, Methodology, Supervision, Validation, Visualization.
Bhaskar Sailesh: Conceptualization, Methodology, Investigation, Project Administration, Writing – Original Draft, Supervision, Data Curation, Validation, Writing – Review and Editing, Visualization, Funding Acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The author declares that generative AI and AI-assisted technologies were used only for correcting grammar and language during the preparation of this work. No AI tools were used for conceptualization, data analysis, or content generation.

Appendices

A. List of Acronyms and Abbreviations

AI: Artificial Intelligence
IoT: Internet of Things
MPA: Marine Protected Area
UNWTO: United Nations World Tourism Organization
OECD: Organisation for Economic Co-operation and Development
UNESCO: United Nations Educational, Scientific and Cultural Organization
UNEP: United Nations Environment Programme
VR: Virtual Reality

B. Glossary of Key Terms

Blue Economy: Refers to sustainable use of ocean resources for economic growth, improved livelihoods, and ocean health.

Eco-certification: Certification granted to tourism businesses meeting specific environmental criteria.

Integrated Coastal Zone Management: Holistic approach to managing coastal areas considering ecological, economic, and social factors.

Sustainable Tourism: Tourism that conserves ecosystems, supports local communities, and minimizes environmental impacts.

Smart Tourism Technologies: Technologies like IoT and AI applied to enhance tourism experiences and operational efficiencies.

Adventure Tourism: Tourism involving exploration of remote or exotic natural environments.

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Tourists' Preferences in the Context of Their Psychological Well-Being: Conjoint Analysis

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Abstract: The Purpose: The aim of the study is to determine how tourists' psychological well-being influences their preferences regarding various aspects of travel, such as the type of chosen destination, forms of leisure activities, and the expected intensity of social interactions.
Design/methodology/approach: A conjoint analysis was conducted with a sample of 600 respondents. Participants completed a psychological well-being questionnaire and a conjoint analysis survey to assess their preferences for various aspects of travel. The sample was representative of the adult Polish population according to demographic data.
Findings: The study found that the level of tourists' psychological well-being influences their preferences, particularly concerning the type of chosen tourist destination. Preferences for natural destinations were positively correlated with higher levels of psychological well-being.
Originality: This research fills a gap in the literature by incorporating psychological well-being into the study of tourists' preferences, providing insights into how mental health can influence travel decisions. The findings underscore the importance of considering psychological factors in tourism management and marketing.
Practical implications: Understanding the relationship between psychological well-being and travel preferences can aid in developing tourism offerings that support mental health, thereby contributing to overall social well-being. The study highlights the necessity of considering tourists' psychological well-being during the development of tourism offerings, as tourists' preferences are linked to their psychological well-being.

Keywords: management of tourism, conjoint analysis, tourists' preferences, tourists' behaviour, psychological wellbeing.

JEL Classification: D91; I31; Z32; Z33.

Introduction

The tourism sector is one of the areas of the economy that has experienced a significant downturn in recent years. However, following the crisis and pandemic period, it is recovering (UNWTO,2022). Various crises and fluctuations are inherent in tourism activities, necessitating the development of mechanisms to cope with them (Garau-Vadell et al., 2018; Jiménez-Guerrero et al., 2021). In the tourism sector, knowledge about tourists forms the foundation for flexible responses to changes and for making managerial decisions related to the nature of the conducted activities (Ferrer-Rosell and Coenders, 2018; Litvin and Rosene, 2018). However, tourists, their behaviours, and preferences are highly diverse (Sánchez-Pérez et al., 2021; Parra Vargas et al., 2021; Penagos-Londoño et al., 2021). Similarly, consumer decisions regarding tourist trips are based on numerous variables (Tang et al., 2021; Dogra and Adil, 2023; Saini et al., 2023), which are primarily related to tourists' subjective perceptions of the available opportunities. This subjectivity applies to both external factors related to the choice of tourist destination

and internal factors, such as the tourist's personality (Alves et al., 2020), attitudes, or perceived psychological well-being (Fredricson and Joiner, 2002; Fredricson, 2009).

Therefore, in the evolving environmental, social, and economic conditions, it is crucial to investigate tourists' preferences at the most general level to comprehend the fundamental mechanisms upon which consumers base their choices. Incorporating tourists' fundamental preferences allows for the enhancement of the tourist experience and serves as the foundation for further and broader personalisation of the tourist offering (Mahdi and Esztergár-Kiss, 2023). Preferences are indeed an integral part of making tourist decisions.

Considering the increasing social uncertainty associated with deepening crises - economic, climatic, and energy-related (Piontek, 2022) - it is also pertinent to examine tourists' preferences in the context of their perceived psychological well-being (Buckley, 2022). The study of the relationship between psychological well-being and various aspects of individuals' lives finds its reflection in various scientific domains (Brooker and Vu, 2020; Bester, 2020; Joseph and McGregor, 2020). This stems from the significance that psychological well-being holds for the quality of individuals' lives. Simultaneously, the incorporation of the context of psychological well-being in the investigation of tourists' preferences represents a recognised research gap. In light of this, the following research question was formulated: does the level of psychological well-being affect specific preferences of tourists related to a tourist trip?

Attempting to answer the posed research question, a study was conducted within the framework of the conjoint analysis model of tourists' preferences regarding selected options for making tourism decisions. These options pertained to the preferred intensity of social interactions during a tourist trip, the nature of the tourist destination, and preferences regarding leisure activities during the tourist trip.

Based on the information provided, the researchers conducted a study using both the psychological well-being questionnaire and a questionnaire developed within the conjoint analysis model to examine tourists' preferences regarding selected features of leisure destinations. During the study, the researchers sought to verify the following research hypotheses:

H1: Preferences regarding the intensity of social interactions during a tourist trip are related to the level of psychological well-being exhibited by the respondents.

H2: Preferences regarding the nature of the tourist destination are related to the level of psychological well-being exhibited by the respondents.

H3: Preferences regarding leisure activities during a tourist trip are related to the level of psychological well-being exhibited by the respondents.

The study was conducted between October and November 2022 using the Computer-Assisted Web Interviewing (CAWI) method. It involved 600 respondents recruited through the research panel poznaj.to, which belongs to the PBS Research Agency. The respondents were selected based on quota sampling, with quotas determined according to the data from the Central Statistical Office (GUS) on the gender, education, and place of residence of adult Poles in 2020 (Demographics base, GUS, 2021). In this regard, the selected sample is representative of the adult Polish population with respect to the identified characteristics.

1. Literature Review

1.1. Preferences Regarding Tourist Trips

The decision-making process in tourism is a multifaceted interplay of internal motivations, external influences, emotional connections, and cultural considerations. Certainly, the spectrum of preferred factors influencing tourist decision-making is wide, and researchers typically make subjective selections of the preferences under study.

The COVID-19 pandemic has resulted in changes in tourists' behaviours and preferences (Bęben et al., 2021; Hysa et al., 2022; Khan et al., 2022; Szymańska, 2023; Młynkowiak-Stawarz et al., 2024). Interest in domestic tourism, sustainable travel, individual travel, and short-distance trips has increased due to the pandemic's impact on travel restrictions, health concerns, and economic conditions (Khan et al., 2022; Szymańska, 2023). Additionally, there is a growing global awareness of ecological and green tourist destinations (Gogonea et al., 2021). Tourist preferences are also shaped by factors such as air pollution levels in destination cities, which can influence the attractiveness of a city to tourists (Łapko et al., 2020) previously unseen temperatures in attractive tourist places or other extreme weather phenomena. Furthermore, the planning of tourist trips must consider individual preferences, especially in group settings, to ensure the satisfaction of all tourists involved (Ruiz-Meza et al., 2021).

Simultaneously, it is anticipated that in the post-COVID-19 era there will be a shift towards more deliberate and experiential travel, with a decreasing interest in mass tourism (Wen et al., 2020). Self-planned and self-

executed trips are likely to dominate over group tours, indicating a preference for more personalised and independent travel experiences (Ivanova et al., 2020).

Research on preferences regarding tourist trips often focuses on a single selected element related to such trips, such as the mode of transportation (Kim et al., 2023; van Rensburg et al., 2023), the choice of a specific destination (Da Shi et al., 2023), preferences revealed by specific tourist segments (Otoo et al., 2020), preferences for specific decision-making tools in tourism (Kovačić, 2022; Chen et al., 2023), or preferences concerning specific activities during the tourist trip (Mimbs et al., 2020; Liu et al., 2022). Blešić et al. (2021) highlight the diversity of factors influencing destination choices, ranging from social and personal factors to the availability of attractions, pricing, and the overall tourism landscape (Madkhali, 2024). Agyapong and Yuan (2022) demonstrate the impact of social media on tourism destination decisions, explaining how elements such as tourism infrastructure, environmental safety, pricing, and human resources play pivotal roles in influencing the choices of international students. Emotional connections to a place can also influence tourism decision-making (Richins and Pearce, 2000). Tourists' choices can be shaped by both internal and external factors, as shown by Seyidov and Adomaitienė (2017). Internal factors include personal desires for relaxation, adventure, and social interaction. Combined with external factors such as destination attractiveness and perceived value, these shape tourists' choices (Li et al., 2021). Xu (2021) identifies additional dimensions influencing tourism decision-making, highlighting the significance of attributes related to tourism services, social connections, and goal orientation as key drivers of choice (Gu and Wang, 2019). Thus, determining which preferences are crucial in making tourist decisions is challenging.

In the study described in this article, an attempt was made to identify attributes influencing decision-making in tourism at a high level of generality, so that they can be determined for the majority of tourist trips. Preferences were selected regarding the type of tourist destination (e.g., urban or natural settings) (Jang and Cai, 2002; Byun and Jang, 2015), leisure activities (Kimball and Freysinger, 2010; Zhu et al., 2020; Dai et al., 2021), and the intensity of social interactions during the tourist trip (Li et al., 2023; Zhou et al., 2023).

Destination attributes play a crucial role in the processes of tourism decision-making. Raazim and Munasinghe (2021) highlighted that tourists compare destination attributes when choosing a place to visit, ultimately selecting destinations that align with their preferences and needs. This suggests that the unique characteristics and offerings of a destination significantly impact tourists' choices. Tourism can be conducted in destinations of varying characteristics. The two extreme types are tourism in urbanised areas and tourism in natural settings. Tourists choosing between these types of destinations have different needs. Urban destinations offer diverse cultural, architectural, technological, social, and natural experiences (Kiráľová and Hamarneh, 2018). They are characterised by unique cityscapes, historical heritage sites, socio-cultural structures, and lifestyle offerings (Akgoz, 2023). Conversely, natural destinations, such as rural areas, are known for their landscapes, tranquillity, outdoor activities, and opportunities for relaxation (Velea et al., 2022). Tourists are drawn to rural destinations for their natural beauty, clean environment, and minimal human interference (Amoah et al., 2018).

Preferences regarding the spending of time during a holiday hold significant value in shaping tourists' decisions. The ability to choose between relaxation and active engagement plays a crucial role in the tourism decision-making process. The perceived benefits of tourism services, including relaxation, entertainment, and recreation, positively influence travel behaviour (Chen and Petrick, 2014). Adventure activities have become central products in many tourist destinations, indicating the importance of active engagement in tourist experiences (Bichler and Peters, 2020). On the other hand, the importance of relaxation is underscored by the fact that visitors rate the experience of "relaxing and finding peace" higher than other experiences, highlighting its significance in tourism experiences (Gill, n.d.).

Differences in preferences for the intensity of social interaction may be associated with personality variables specific to the tourists. Individual recreation opportunities and a low level of social interaction during a tourist trip offer a sense of independence and personalisation, enabling tourists to tailor their activities to their own preferences and pace (Kozak and Metİn, 2014). Conversely, group recreation opportunities and a higher level of social interaction during a tourist trip foster social interactions among tourists, providing a platform for shared experiences, the creation of bonds, and the formation of new connections (Fardous et al., 2019).

Additionally, a benefit of these selected preferences is the possibility of determining them in the majority of tourist trips. The criteria identified for decision-making related to tourist trips are limited, yet they encompass both elements characterising the destination and the potential division of recreational activities. The selection of a specific type of tourist destination is one of the fundamental criteria for the classification of tourism (Pisarska, 2013).

1.2. Conjoint Analysis in Tourism Research

By examining the significance of preferences regarding selected variables, the researchers utilised the conjoint analysis method. This method aims to identify product or service attributes that consumers perceive as most important when making specific choices. Conjoint analysis belongs to experimental methods and is based on utility theory, which assumes that consumers, when making decisions, seek to maximise the perceived utility by considering the partial utilities of individual elements that make up a given good (Luce and Tukey, 1964; Krantz and Tversky, 1971). Conjoint analysis is a research method used to understand how individuals make decisions based on multiple attributes or features of a product or service. It has gained popularity in various fields such as marketing, political science, and consumer research. The core principle of conjoint analysis is that products or services can be deconstructed into different attributes, and the value individuals derive from these attributes can be quantified (Jaeger et al., 2011). By evaluating preferences for various attributes and their levels, researchers can determine the relative importance of each attribute in influencing decision-making (Sammer and Wüstenhagen, 2006).

One of the significant strengths of conjoint analysis is its capability to estimate the causal effects of multiple treatment components simultaneously (Hainmueller et al., 2013). This is particularly valuable when researchers need to comprehend how different factors contribute to overall preferences or choices. By presenting individuals with various attribute combinations, conjoint analysis allows for a systematic exploration of the trade-offs people are willing to make when faced with complex decisions (Sammer and Wüstenhagen, 2006). This method offers a more detailed understanding of consumer preferences compared to traditional survey methods (Guo et al., 2022). This information is crucial for businesses aiming to customise their offerings to better align with customer needs and preferences (Prasetyo, 2024).

Conjoint analysis has many variations, making it applicable to various research topics, including those involving diverse types of tourist preferences. This method allows researchers to understand consumer preferences by analysing how individuals make trade-offs between different attributes of a product or service (Bridges et al., 2011).

In tourism research, conjoint analysis has been used in significant areas, such as preferences related to travel destinations and transportation mode (Suh and McAvoy, 2005), preferences regarding leisure activities (Kucukusta and Guillet, 2014), tourist preferences for travel packages (Menegaki et al., 2021), luxury shopping destinations (Hung et al., 2018), Generation Y's travel preferences (Vukić et al., 2014), and even the design of undergraduate programs in tourism (Ring et al., 2008). For instance, Dellaert, Borgers, and Timmermans utilised conjoint analysis to study Dutch tourists' preferences concerning travel destinations and transportation for short city trips (Dallaert et al., 1997) and to examine tourists' activity preferences in cities (Dallaert et al., 1995). Zhang and colleagues investigated preferences for purchasing souvenirs from tourist trips based on social media sharing behaviours, adapting the conjoint analysis method to this context (Zhang et al., 2021). In the Polish literature, an interesting example of the application of conjoint analysis in tourism-related issues is Wąsowicz-Zaborek's work (2018) analysing customer preferences for travel agencies. An intriguing study utilising conjoint analysis is the Japanese research aimed at identifying preferred performing arts tourism products. The study conducted by Kim and colleagues indicates the versatile possibilities of using conjoint analysis to understand niche preferences within the tourism industry (Kim et al., 2016). Furthermore, the application of conjoint analysis has extended to the branding of wellness tourism in specific destinations, such as Kerala in India, where stakeholders' input was crucial in shaping the offerings through a participatory process facilitated by conjoint analysis (Romão et al., 2021).

In the realm of tourism marketing, conjoint analysis has been pivotal in assessing and optimising various aspects of the industry. It has been used to analyse tourists' choice of hotel attributes presented in travel agent brochures, providing insights into what influences accommodation decisions (Huertas-García et al., 2012).

The application of conjoint analysis in tourism research also encompasses understanding the preferences of different demographic segments. An example of such research is the analysis of destination choices by Chinese long-haul tourists. Through the use of conjoint analysis, offerings were tailored to specific target groups (Li et al., 2017). The use of conjoint analysis in tourism research goes beyond traditional market analysis, encompassing broader strategic considerations. This strategic application of conjoint analysis aids not only in understanding current preferences but also in shaping future offerings to align with evolving consumer demands and industry trends. Conjoint analysis can thus be utilised to meet diverse research needs in the tourism sector, from general preferences to specialised niche markets.

1.3. Psychological Well-Being of Tourists

The article employs an approach that integrates knowledge from the fields of psychology and marketing. The benefits of integrating psychological and marketing knowledge in the tourism domain lie in optimising offers and catering to customer needs. The psychological perspective allows for a deeper understanding of the complex mechanisms behind consumer decisions and the levels at which to identify the reasons for specific consumer behaviours. Cognitive and emotional factors, as postulated by the theory of bounded rationality (Tyszka, 2004), which influence the consumer decision-making process, often require the use of complex research procedures that encompass various disciplines within the social sciences. Therefore, to study tourists' psychological well-being, a shortened version of Carroll Ryff's (1989) questionnaire on psychological well-being, adapted for Poland by Karaś and Cieciuch (2017), was utilised. According to Ryff's assumptions, individuals' psychological well-being is a holistic construct consisting of six dimensions: coping, positive relationships, autonomy, personal development, self-acceptance, and life purpose (Młynkowiak-Stawarz, 2023). Moreover, research has shown that psychological well-being influences other areas of individuals' lives, including health, life satisfaction, and vulnerability to depression (Heszen-Cielińska and Sęk, 2020).

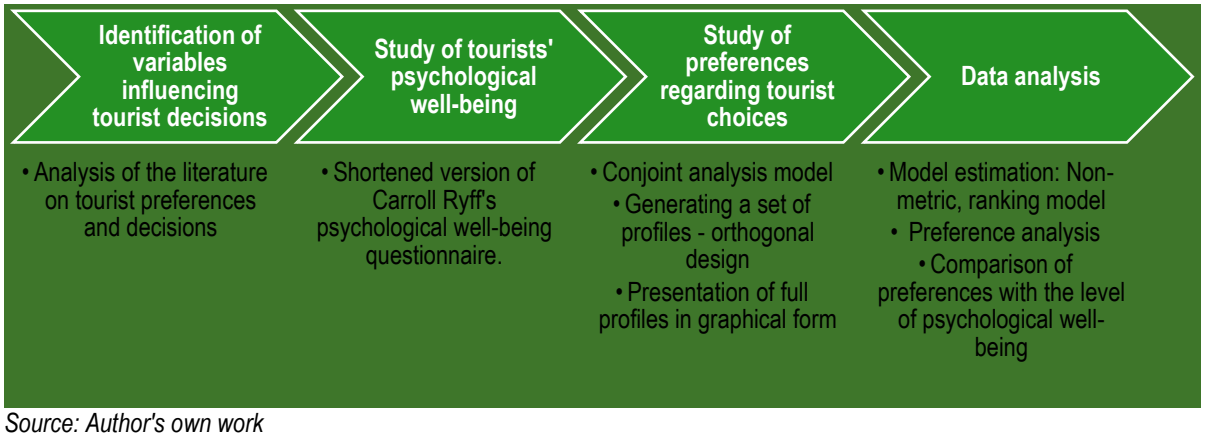
Psychological well-being is also linked to behaviours in the tourism domain. Studies in this area have explored the impact of psychological well-being on emotional experiences during tourist activities (Ntoumanis et al., 2020; Jamaluddin et al., 2022), the influence of perceived psychological well-being on the choice of specific activities (Bosnjak et al., 2016), and its effects on achieving tourist goals (Kruger et al., 2015; Kang andSong, 2021).

The concept of psychological well-being that forms the basis of the questionnaire developed by Ryff pertains to the eudaimonic dimension of this issue. However, psychological well-being is examined in two domains – eudaimonic and hedonistic, which are encompassed within the Aristotelian concept of happiness (Ryan and Deci, 2001). Considering the eudaimonic approach represented by Ryff (2017) is a result of the creation of comprehensive models of the good life within this concept (Czapliński, 2008). On the other hand, approaches based on the hedonistic perspective seek solutions to issues related to specific dimensions of psychological well-being (Diener, 2000).

2. Research Method

In order to address the research question, "Are specific preferences for tourist trips dependent on the level of disclosed psychological well-being?" and verify the research hypotheses, a research plan was developed. The research plan is presented in the Figure 1.

Figure 1. Research plan

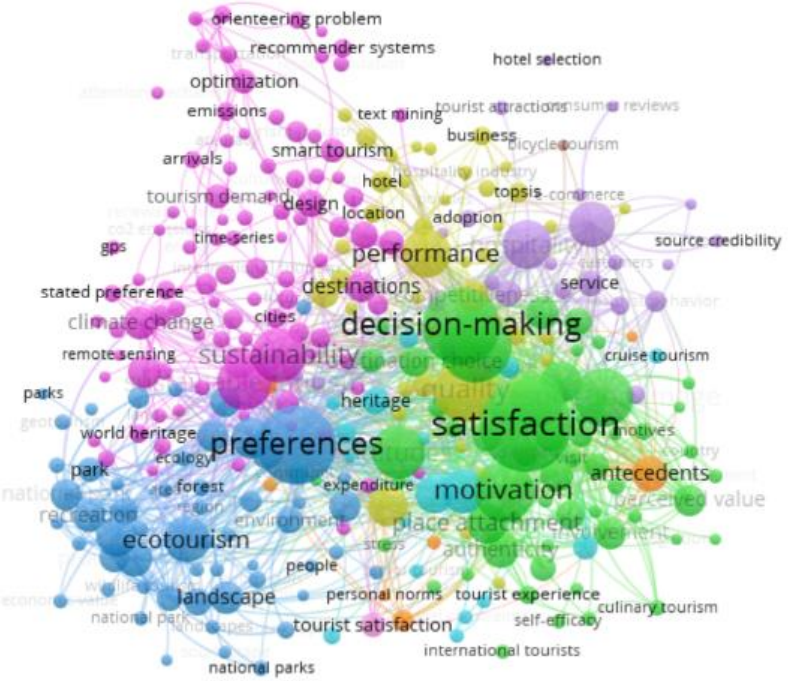


Source: Author's own work

The determination of the preferences considered in tourist decisions posed a significant challenge. The selection of specific variables was based on the analysis of literature and previous research. A total of 3,763 scientific articles were examined from the Web of Science, Scopus, and Science Direct databases, using keywords related to "tourist preferences" and "tourist decision" in the search queries. Taking into account the changes that have occurred in the tourism sector due to the COVID-19 pandemic and the military crisis in Europe, publications from the last five years (2019-2023) were considered. The analysis was conducted using the VOSviewer software, which identified 13,371 keywords. VOSviewer is an open-access program designed for the construction and visualisation of co-occurrence networks of important terms within the analysed literature. Among the extracted keywords, words forming networks with at least 10 connections (527 words) were selected. Words related to specific countries and

research procedures were excluded, resulting in the identification of 300 keywords grouped into nine clusters, as shown in Figure 2.

Figure 2. Connections between keywords in articles on tourist preferences and decisions



Source: Author's own work

Taking into account the connections between selected words, the composition of the extracted clusters, literature analysis regarding tourists' preferences in the context of making travel decisions, and the impact of specific factors on tourists' psychological well-being, three types of attributes related to tourists' preferences in the context of making travel decisions were identified: the type of tourist destination, leisure activities, and the intensity of social interactions between tourists during the tourist trip. Due to the respondents' perceptual capabilities, the multitude of possible attributes associated with the characteristics of tourist trips considered when making decisions in this area, and formal criteria related to the conjoint analysis method, three attributes were chosen, each characterised by two levels.

The preferences considered related to the type of tourist destination, understood as the environment - natural or urban. The determination of levels of the "tourist destination type" attribute is associated with the specific impact of the natural environment (Seymour, 2016; Smith and Turner, 2023) and the urban environment (Baumann and Brooks-Cederqvist, 2023) on the psychological well-being of individuals. "Leisure activities" are understood as the manner in which time is spent during a tourist trip. Two levels of this attribute have been distinguished: active and relaxing activities. Engaging in activities can impact the level of stress (Kimball and Freysinger, 2010) experienced during a tourist trip, which undoubtedly relates to perceived well-being. Another attribute is the intensity of social interactions among tourists during a tourist trip. Low and high levels of interaction intensity have been distinguished. Research indicates that the quality and quantity of interactions among tourists during a tourist trip (Li et al., 2023) influence their sense of loneliness (Tan and Lu, 2019), satisfaction with the trip, tourism experiences (Zhou et al., 2023), and tourists' behaviour (Su et al., 2022).

For the study design, the conjoint analysis method based on full profiles presented in graphical form was used (Walesiak, 2001; Walesiak, 2002). As three attributes were distinguished, each with two levels, a full profile plan created eight variations (Figure 3). Respondents were presented with a hypothetical situation in which they won a voucher for a 7-day vacation and were asked to rank the eight types of 7-day vacations from 1 (first choice) to 8 (last choice) they would like to take.

Figure 3. Compilation of profiles used in the study

Profile	Contact with others/Place/ Spending time	Choice (1-8)
A		
B		
C		
D		
E		
F		
G		
H		

Source: Author's own work

The order of items for each respondent was random. The study of psychological well-being was conducted using a shortened version of the C. Ryff Psychological Well-Being Scale. In the Polish adaptation, this version consists of 18 questions, which measure the overall level of individuals' well-being. Respondents rated the questionnaire statements on a 6-point scale, ranging from strongly disagree to strongly agree.

3. Research Results

3.1. Respondents

In typical studies using conjoint analysis, the sample size usually ranges from 300 to 550 respondents (Bartłomowicz and Bąk, 2021). In the conducted study, responses were collected from 600 respondents. The respondents were participants in the research panel of poznaj.to, which belongs to the Polish research agency PBS. They were selected on a quota basis. Quotas were determined based on the demographic data from the Central Statistical Office (GUS), concerning the gender, age, place of residence, and education of adults in Poland in 2020 (GUS, 2021). The respondents were also asked a screening question regarding whether they had made decisions about a tourist trip in the last year. Only individuals who answered affirmatively to this question qualified for the subsequent part of the study.

Among the participants, 54% were female, and 46% were male. The majority of respondents lived in rural areas (36.7%), slightly fewer lived in cities with over 100,000 inhabitants (35%), and the fewest lived in cities with up to 100,000 inhabitants (28.3%). Regarding education, 62% of the participants had completed secondary education, 35.3% had higher education, and 2.7% indicated lower education (vocational, lower secondary, and primary education). Participants were also asked to provide their year of birth. The average age in the study group was 41 years (SD = 13 years). The youngest participant was 19 years old, while the oldest was 77 years old.

3.2. Analysis

The analysis of research results was conducted using the IBM SPSS software. In order to examine the relationship between preferences regarding tourist trips expressed by the respondents and their perceived psychological well-being, the respondents' well-being scores were divided into four groups: individuals experiencing very low well-being, those experiencing low well-being, those experiencing moderate well-being, and those experiencing high well-being. The participants were divided into four relatively equal quantitative groups using the visual categorisation function. The average level of psychological well-being reported by the participants was 3.72 points (SD = 0.36) on a 6-point scale. The grouping of participants based on their perceived well-being level is presented in Table 1.

The variation in the level of perceived psychological well-being among the identified groups is not large, which is a common situation when measuring well-being (Czapliński, 2008b). Most studies show that the level of well-being tends to cluster around the mean (Wojciszke, 2020).

Table 1. Characteristics of groups experiencing varying levels of well-being

Groups with specified levels of psychological well-being (PW)	Frequency	Percentage	Mean level of psychological well-being in the group.	SD
Very low	167	27.80	3.36	0.22
Low	151	25.20	3.64	0.04
Moderate	150	25.00	3.80	0.06
High	132	22.00	4.24	0.29
Total	600	100		

Source: Author's own work.

In the further part of the study, the total utilities and partial parameters of the conjoint analysis model were estimated. The conjoint analysis for the developed experimental design was conducted using the SPSS package. Based on the responses provided by the participants on the ordinal scale, the partial utility of the analysed attributes was determined (Table 2).

Table 2. Estimation of the utility of factors preferred by respondents in the process of making tourist travel decisions.

		Estimation of utility	Standard Deviation	Average Importance Value
Contact with others	Low intensity of social interactions	0.66	0.27	36.35 %
	High intensity of social interactions	1.32	0.54	
Place	Nature	-0.18	0.27	31.13%
	Urban	-0.35	0.54	
Spending time	Active	0.02	0.27	32.52%
	Relaxing	0.05	0.54	
(Constant)		3.74	0.71	

Source: Author's own work.

During the analysis, the importance of the studied attributes was also determined. Among the surveyed attributes, the type of destination is the most significant factor in making tourist travel decisions (36.35). The other two attributes have similar utilities. The way of spending time is slightly more important (32.52) than the intensity of social interactions (31.13). Regression analysis also estimated the B coefficients, which indicate the direction and strength of the influence of each attribute on preferences regarding tourist trips, as shown in Table 3.

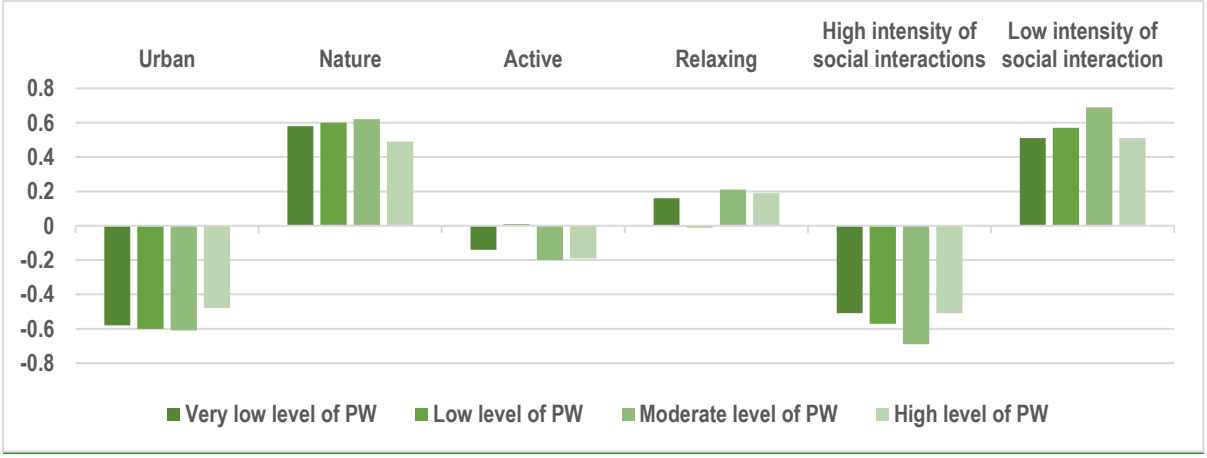
Table 3. Estimation of coefficient B for the studied attributes

	Estimation of coefficient B
Contact with others	0.66
Place	-0.18
Spending time	0.02

Source: Author's own work.

The correlation between observed and estimated parameters in the model is high, equalling $r = 0.79$ ($p < 0.01$). A strong correlation between the observed and estimated parameters of a conjoint model may indicate a strong fidelity of the developed model in representing respondents' preferences. Furthermore, it may also suggest that the selected attributes effectively capture elements of significance in the context of making tourism-related decisions. In order to test the research hypotheses, models of heterogeneous preferences regarding tourist trips (individually for each participant) were compared with the level of psychological well-being indicated by the respondents. The partial utilities for the levels of the studied attributes were calculated for the groups of respondents characterised by a specific level of psychological well-being.

Figure 4. Comparison of average partial utilities in groups with different levels of perceived psychological well-being.



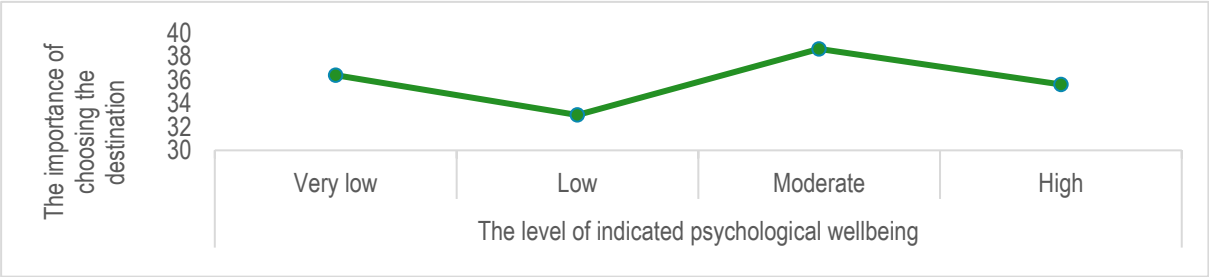
Source: Author's own work.

At each studied level, among the three considered attributes, the highest average partial utilities are observed among individuals with moderate levels of psychological well-being. It is also noticeable that individuals with high levels of well-being do not express such strong average preferences towards the studied variables as the other groups. Figure 4 also illustrates how little significance is attached to average preferences regarding spending time, especially among individuals with low levels of psychological well-being.

In the next step of the study, the statistical significance of differences between groups with different levels of psychological well-being in relation to preferences for the studied attributes was examined. As a result of the conducted analysis of variance using the ANOVA method, it was found that the only variable related to the studied preferences for tourist trips that differentiates the respondents based on their perceived psychological well-being is the importance attributed to the choice of tourist destination (F (1, 596) = 2.83, p = 0.04).

A post-hoc Games-Howell test was also conducted to examine significant differences between groups. The results of the test are illustrated in Figure 5.

Figure 5. Comparison of the importance of choosing the tourist destination for groups with different levels of psychological well-being.



Source: Author's own work.

The analysis revealed a statistically significant difference in terms of the importance of choosing the tourist destination environment between individuals with low perceived well-being (the importance of choosing the destination M = 33.01, SD = 15.86) and those with moderate perceived well-being (the importance of choosing the destination M = 38.64, SD = 17.79).

4. Discussions

Studying tourists' preferences related to various aspects of tourism is an extremely broad subject. Most researchers focusing on this topic concentrate on specific destinations, examples of tourist activities, or other factors influencing travel decisions. In this study, we considered preferences regarding three aspects of tourism – the type of tourist destination, ways of spending time, and the number of social interactions. The nature of the destination has been examined, for example, by Da Shi et al. (2023) in determining the preferences of Chinese tourists in relation to their

decision to travel to North Korea. Positive aspects in the mentioned study were cultural places, entertainment, and modern forms of sightseeing, which align more with urban destinations rather than natural ones. Differences in preferences may have a cultural basis (Boski, 2009).

It also seems that researchers pay more attention to studying preferences related to travelling to cities (Dellaert et al., 1995; Suh and McAvoy, 2005) than to naturally attractive areas. However, the results of this study indicate that individuals in the surveyed group preferred destinations of a natural rather than urban character. This may also be related to preferences regarding ways of spending time - positive indications favoured relaxation more than active activities during the tourist trip. Some studies suggest that seeking psychological well-being justifies peaceful contact with nature (Lück and Aquino, 2021), which the respondents favoured.

The positive relationship between psychological well-being and contact with nature, especially green spaces, has been scientifically examined and proven (Seymour, 2016; Smith and Turner, 2023). The results of this study demonstrate that respondents prefer destinations that can be considered naturally attractive. Furthermore, a difference in the level of perceived well-being based on the importance of these preferences in this area has been observed. It can be assumed that individuals who pay more attention to their surroundings consciously make decisions to engage with nature and may, therefore, experience this contact more frequently, partially enhancing their psychological well-being. This is consistent with research findings on the relationships between well-being, perception of life quality, and the environment in which individuals reside (Lewicka, 2021).

The relationship between perceived psychological well-being and the intensity of social interactions among tourists and the type of leisure activities did not significantly differentiate the respondents. However, both of these attributes were taken into consideration when making tourism-related decisions. A low level of social interaction among tourists turned out to be significant in decision-making. Individuals with moderate levels of psychological well-being attached the most importance to this level of social interaction. Research indicates that tourists expect occasional interactions associated with seeking assistance or emotional support rather than forming strong social and companionable bonds (Li et al., 2023). Perhaps tourists themselves perceive tourism activities as more of an individual pursuit (Reichenberger, 2017), despite the fact that it is not devoid of communal aspects with a positive impact on well-being (Gao et al., 2020).

In the process of making a tourism-related decision, respondents also found their preference for experiencing relaxation during a tourist trip to be valuable. Research by Kimball and Freysinger (2003) suggests that even the planning of activities alone can be a stressful experience for individuals. Therefore, the choice associated with relaxation can protect respondents from the need to plan and participate in activities that might be stressful for them, something most people aim to avoid during a tourist trip.

Practical Implications

The study indicates that tourist preferences are highly diverse. They depend on numerous factors, including personality, internal and external motivations, and socio-economic context. Managers should collect and analyse data on their clients' preferences to tailor their offerings to different market segments. Customising tourism offerings to accommodate tourists' preferences can enhance customer satisfaction and loyalty. Considering the importance tourists place on the intensity of social interactions when making travel decisions, it is crucial to design offerings that allow tourists to maintain a balance in this aspect.

Tourists have different needs depending on their choice of urban or natural destinations. Managers should diversify their offerings to cater to both tourists seeking cultural and urban attractions and those who prefer tranquil, natural surroundings. Providing a variety of recreational activities, ranging from active engagement to relaxation, can attract a broader group of tourists.

Incorporating psychological aspects into tourism management can aid in better understanding tourists' needs and behaviours. Managers should invest in research on the relationship between psychological well-being and customer behaviours, as well as develop programmes and services that support their mental health.

Conclusions

In response to the research question posed in the introduction regarding whether specific preferences for tourist travel are dependent on the level of psychological well-being revealed, it is necessary to refer to the analysis of variance using the ANOVA method. Among the subjects, statistically significant differences related to the level of well-being were observed only in the case of preferences related to the type of tourist destination. When verifying the research hypotheses, it must be stated that the first and third hypotheses were negatively verified. There was no observed relationship between the level of psychological well-being exhibited by the subjects and their preferences for the intensity of social interactions during tourist travel (H1) or preferences for how to spend their

time during tourist travel. However, the second hypothesis was partially confirmed in a positive manner. The level of psychological well-being exhibited by the subjects and their preferences for the nature of the tourist destination were statistically significant in the case of individuals with low and moderate levels of psychological well-being.

At the same time, it should be noted that the prepared model of conjoint preferences of tourists related to making decisions about tourist travel takes into account attributes that are important to the respondents. The most significant preference related to making decisions about tourist travel is the type of destination. The average partial utility of choosing a naturally attractive (nature) destination for all respondent groups had a positive value (highest for individuals with low and high levels of psychological well-being, and lowest for those with a high level of psychological well-being). Positive partial utility values were also observed in the case of a low number of social interactions. This was most significant for individuals with moderate levels of psychological well-being, somewhat less so for those with low levels of psychological well-being, and least for those with high and very low levels of psychological well-being.

Regarding preferences for ways of spending time, only individuals with low levels of psychological well-being considered an active approach to be more useful than relaxation. Individuals in the other three studied groups preferred relaxation when choosing the type of tourist trip. In all groups, the partial utilities related to this attribute had the least impact on the preferred types of trips.

The similarity in preferences between the group with very low and high levels of psychological well-being, especially regarding the preference for a low number of social interactions, is intriguing. Various reasons appear to underlie this, which should be further explored in subsequent research.

The use of the full profile method has made it possible to present all selected attributes to the respondents for evaluation simultaneously, which mimics the real situation in consumer decision-making. This is a significant advantage of utilising the full profile model. However, a drawback of this approach is the limited number of attributes and their levels that can be employed due to the perceptual constraints of respondents and the decreasing reliability of measurement as the number of ranked profiles increases when using a ranking scale.

The results of the above study suggest that when making decisions related to activities in the tourism sector, it is essential to pay attention to customer preferences related to natural destination attractiveness, providing opportunities for relaxation, and fostering a sense of intimacy during tourist travel. Individuals responsible for shaping spaces, especially in tourist cities, should also take note of designing such spaces to incorporate places for relaxation and readily accessible green areas. The ongoing crises that individuals are experiencing require entrepreneurs and decision-makers to focus on service areas that contribute to increasing psychological well-being, which, in turn, has a positive impact on health and the perception of one's quality of life, leading to tangible social benefits.

Limitations and Future Research

The main limitation of the study was the selection of tourist attributes that respondents considered when making their travel decisions. The classification used in the study is quite general and does not cover all possible options, and it also has a subjective nature, although it was based on the analysis of literature. In future research, other attributes important for respondents in their travel decision-making process can be explored. These attributes can be categorised based on characteristics of the tourist destination, attributes related to the consumer-tourist, social relationship attributes during the travel, and attributes related to activities during the trip. Of course, this classification may not encompass all possible factors that can influence the decision-making process to a certain extent. Additionally, the conjoint analysis method is a complex research procedure that does not have a single defined approach, which can pose challenges in determining the appropriate course of action.

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Credit Authorship Contribution Statement

Anna Młynkowiak-Stawarz: Conceptualization, Investigation, Methodology, Formal analysis, Writing – original draft, Data curation, Validation, Visualization
Robert Bęben: Conceptualization, Methodology, Supervision, Validation, Writing – review and editing

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Improving Tourist Loyalty: Examining the Role of Environmental Tourism Policy on Tourist Behavior

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Abstract: **Purpose:** This research aims to develop a model of tourist loyalty based on relationship marketing theory and consumer decision-making model. Moreover, this research also aims to examine the effect of implementing the CHSE certification policy on tourist satisfaction and loyalty in the context of the hospitality business in the tourism area around Borobudur Temple.
Methodology: This research uses a quantitative approach. The primary data collection method uses a questionnaire distributed to 212 tourists as respondents who were selected based on the purposive sampling method. Data were analyzed based on PLS-SEM using Smart-PLS 3.
Findings: The research results show that implementing CHSE certification in the hospitality industry can increase tourist satisfaction and tourist loyalty. Aspects of cleanliness, health and environmental sustainability have a positive influence on tourist satisfaction and loyalty, although safety aspects have not shown a significant influence.
Originality: Although studies on tourist loyalty are abundant, empirical research that focus on examining the influence of tourism policy on tourist loyalty are still rare. This research therefore serves as one of the first attempts to examine the influence of tourism policy on tourist behavior (tourist satisfaction and tourist loyalty) in the context of the hospitality industry, in Indonesia.
Research Implication: The research results provide managerial implications for hospitality businesses to implement CHSE certification to satisfy tourists and their loyalty. By having loyal tourists, it is hoped that the tourism business can develop and be sustainable.

Keywords: tourism policy; tourist behavior; tourist loyalty; tourist satisfaction; hospitality industry.

JEL Classification: M31; Z32; Z33.

Introduction

Several previous studies explain that customer loyalty is the key to business sustainability (Jani and Han, 2014; Poku *et al.* 2013; Qawasmeh, 2016). In the context of a service business, customer loyalty is needed to reduce marketing costs, increase market share opportunities, and increase opportunities to add new customers (Haksever *et al.* 2000; Tjiptono, 2014). Besides, in accommodation services businesses or hospitality businesses, it is also proven that the costs for getting new customers is much greater compared to the costs for retain customers (Sugandini, 2003). Thus, business profits can increase by having loyal customers (Almeida-Santana and Moreno-Gil, 2018). Based on these, the hospitality industry as a provider of accommodation services such as hotels, resorts and homestays also need tourists who are loyal in order to develop their business and become sustainable.

Meanwhile, the Indonesian Government through the Ministry of Tourism and Creative Economy has developed a CHSE policy (Cleanliness, Health, Safety, Environment sustainability) as standards for business activities in tourism sector (Amelia, 2020). This policy requires tourism businesses and tourism destination CHSE certified. CHSE certification is explained as the process of granting certificates to tourism businesses, tourist attractions and other tourism products to provide guarantees to tourists that the products and services are clean, healthy, safe and support conservation environment (Sudirja and Limantara, 2022). In Indonesia, the CHSE policy is implemented in the form of certification which aims to guarantee tourists the implementation of cleanliness, health, safety and environmental sustainability in the tourism sector. It is hoped that the CHSE certification guarantee will motivate tourists to return travel.

Recovery in the tourism sector in the new normal era is necessary so that the existence of the tourism business can continue to develop and be sustainable (Madani *et al.* 2020; Musriha and Rapitasari, 2023). Meanwhile, the Borobudur area is one of the National Tourism Strategic Areas according to the National Tourism Development Master Plan (RIPPARNAS) for 2010-2025. Based on this, the area around Borobudur Temple has tourism potential to be developed and is expected to have a positive influence on economic, social, cultural and environmental growth. The development of a tourism area needs to be supported by the availability of accommodation facilities (Górska-Warsewicz and Kulykovets, 2020). Besides, the presence of the hospitality industry as a provider of accommodation services can increase the length of stay of tourists in tourism destinations. If the length of stay of tourists increases, it is hoped that tourist spending on other tourism products and services in the tourism destination will also increase. Therefore, factors that can increase tourist loyalty need to be studied further.

1. Literature Review

The model in this research was developed based on a simple consumer decision-making model. This model consists of 3 stages, (1) the input stage, (2) the processing stage, and (3) output stage (Schiffman and Kanuk, 2008). In the first stage, input factors come from marketing efforts and the consumer's external environment (Schiffman and Kanuk, 2008). Marketing efforts include product attractions, promotions, price offers, and distribution channels (Kotler and Keller, 2018). The external environment consists of family, colleagues, social class, and culture (Schiffman and Kanuk, 2008). In this research, the CHSE variable is an input aspect originating from the marketing efforts of tourist accommodation service providers. The second stage is processing, input factors is processed within the consumer (internal) and is influenced by psychological conditions such as evaluation and perception (Schiffman and Kanuk, 2008). In this research, the tourist satisfaction variable is considered a factor that exists within tourists (internal) at the processing stage. Next, the output stage is the result of consumer decisions such as attitudes toward the product, one of which is the decision to make repeat purchases (Schiffman and Kanuk, 2008). In this research, loyal attitudes are included in the output stage in the model.

Furthermore, the conceptual model in this research was also developed based on relationship marketing theory. The theory describes an approach that focuses on building and maintaining long-term relationships with customers (Baker and Saren, 2010; Rather, 2019). The relationship marketing approach has been expanded effectively marketing concepts into areas such as services and business-to-business markets (Baker and Saren, 2010). This theory is very relevant in explaining how service quality reflected by CHSE certification can influence consumer satisfaction and loyalty. Furthermore, in the hospitality sector, relationship marketing aims to develop long-term relationships with valued customers (Rather, 2019). Accommodation service managers need to develop long-term relationships with tourists through efforts such as implementing CHSE certification so that tourists are satisfied and loyal. Therefore, the development of a tourist loyalty model for hotels and homestays in the Borobudur Temple tourism area is based on this theory.

The proposed loyalty model developed in this research was tested in the context of the hospitality industry. The research object is the hospitality industry located in the area around Borobudur Temple. This location was

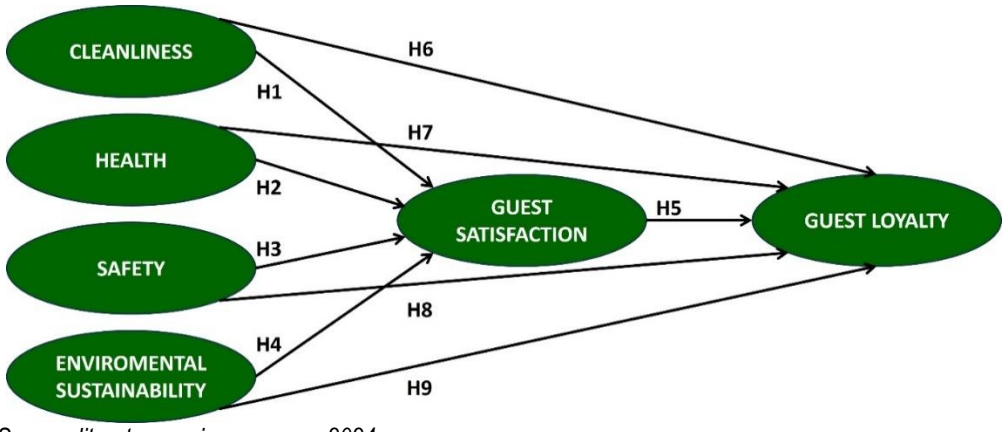
chosen as a research object with the consideration that the Borobudur Temple area is a strategic national tourism area in Indonesia. However, based on the research team's observations, not all accommodation service providers in this location are CHSE-certified. This practical gap underlies why it is necessary to study the influence of CHSE on tourist behavior in the context of the hospitality industry in the area around Borobudur Temple. Furthermore, based on a review of several previous studies, gaps in research results were found. Thus, further research is needed to examine the relationship between CHSE, satisfaction, and loyalty to clarify how the implementation of CHSE policies impacts consumer behavior. It is hoped that the research results can fill gaps in previous research, provide managerial implications, and expand the literature related to the application of tourist loyalty models, especially in the hospitality industry.

CHSE is one of the factors currently being considered to examine its impact on the tourism industry (Diarta and Sukendar, 2021; Juliana *et al.* 2021). Previous researchers prove that implementing CHSE is the most important thing to maintain reputation hotels (Juliana *et al.* 2021). If the hotel's reputation is good, it can increase satisfaction and hotel guest loyalty (Al-Msallam, 2015). These results are also supported by previous research, Novitaningtyas *et al.* (2021) explain that quality services and implementing health protocols during the new normal period can increase guest loyalty in homestays in several tourism villages. However, Diarta and Sukendar (2021) explain different results in agro-based tourist attractions that the implementation of CHSE does not significantly affect tourist satisfaction because it is seen as limiting activities tour while at the destination. There are inconsistencies in the results of previous research. Based on these research gap, further research is needed to examine how the influence of CHSE to tourist behavior.

Furthermore, several previous researchers have identified the satisfaction variable as the antecedent of tourist loyalty in their research model (Hung *et al.* 2021; Keshavarz and Ali, 2015; Kusumah, 2024; Marpaung *et al.* 2024; Novitaningtyas, Rahardjo, *et al.* 2021; Robustin *et al.* 2020; Soliman *et al.* 2024; Suhartanto *et al.* 2020). However, in the context of tourism in Indonesia, there is nothing yet adding CHSE to the development of tourist loyalty models, especially for research object hospitality industry. Besides, since the implementation of the CHSE policy by the Government Indonesia, it turns out that until the end of 2021 there are not all accommodation service providers CHSE certified. Moreover, in the area around Borobudur Temple, which is a super-priority tourism destination in Indonesia, not all businesses in the tourism sector comply with this policy. Therefore, research is needed to examine how does CHSE policy influence the development of tourist loyalty.

2. Methodology

Figure 1. Proposed Tourist Loyalty Model



Source: literature review process, 2024

This research was conducted based on a quantitative approach. The population in this study is accommodation service customers who have implemented CHSE and are located in the area around the Borobudur temple. The population size is infinite and not yet known for certain, so the sample size was set more than 200 respondents to meet the assumption that the sample size should be between 30-500 or 10 times the number of research variables (Sekaran and Bougie, 2017). Samples are selected based on the purposive sampling method with the consideration that the sample is guests who have stayed more than once. Finally, we used primary data from 212 respondents. The data collection method used was a survey through a questionnaire with a Likert scale to obtain primary data and interviews. The questionnaire was distributed online via Google form and offline to tourists at the Borobudur temple area. Indicators as variable measurements are presented in Table 1.

Table 1. Variable Measurement

Measurement	References
Cleanliness C1. Cleanliness of the hotel/homestay environment C2. Availability of trash cans C3. Cleanliness of public areas in hotel/homestay C4. Availability of hand washing facilities/hand sanitizer	(Diarta and Sukendar, 2021; Kemenparekraf, 2020)
Healthy H1. Air circulation conditions H2. Implementation of standard health protocols H3. Implementation of food safety practices	(Diarta and Sukendar, 2021; Kemenparekraf, 2020)
Safety S1. Availability of fire extinguishers S2. Availability of evacuation routes S3. Availability of security officers S4. Availability of CCTV in public areas	(Diarta and Sukendar, 2021; Kemenparekraf, 2020)
Environmental Sustainability E1. Environmentally friendly waste processing E2. Use of environmentally friendly materials E3. Green hotel/homestay environmental conditions E4. Efficient use of water and energy sources for ecosystem balance	(Diarta and Sukendar, 2021; Kemenparekraf, 2020)
Guest Satisfaction GS1. Fulfillment of expectations GS2. Satisfied with the service GS3. Worth the time and money spent GS4. Overall satisfaction	(Assaker *et al.* 2020)
Guest Loyalty GL1. The experience of staying at a hotel/homestay is meaningful GL2. The experience of staying at this hotel/homestay is more pleasant than other hotels GL3. Really liked staying at this hotel/homestay GL4. Willingness to say positive things about this hotel/homestay to others GL5. Willingness to recommend to others to stay at this hotel/homestay GL6. Willingness to stay again at a hotel/homestay if there is an opportunity in the future GL7. Have stayed at this hotel/homestay more than once	(Kharouf *et al.* 2019; Roy *et al.* 2014)

Source: literature review process, 2024

Data analyzed using Partial Least Squares (PLS) - Structural Equation Model (SEM) with the program Smart-PLS. PLS-SEM is used to test the measurement model and structural model with considerations (1) PLS-SEM can handle complex models with many relationships structural, and second order construct, (2) research objectives for model development and prediction, and (3) PLS-SEM can handle reflective and formative measurement models (Dash and Paul, 2021). The outer model or measurement model test is used to test validity and reliability. Validity was tested based on the loading factor value and AVE value, the results must show > 0.6 for loading factor and > 0.5 for AVE (Dash and Paul, 2021). As for reliability assessed based on Cronbach Alpha and Composite Reliability (CR) value > 0.7. As for the internal test model or structural model is used to measure how good the proposed model is based on the R-square value. Furthermore, hypothesis testing is seen from the coefficient results path and p-value (Ghozali, 2017).

3. Research Results

Of the total 212 respondents, 48% were male, and 52 were female. Respondents came from several areas, from Magelang 42%; Central Java apart from Magelang 23,6%; West Java 9,4%; DIY 4,2%; DKI Jakarta 15,1%; East Java 0,5%; Banten 4,2%; and Bali 0,9%. Age is in the range of 15 to 63 years old. Then, the motivation of respondents to stay at hotel or homestay in Borobudur area is dominated by holiday motivation 46%, while the remaining because of MICE activities motivation and education activities motivation.

Table 2. Outer Model Evaluation Results

Variables	Item	Loading Factor	Cronbach Alpha	CR	AVE	Results
Cleanliness	C1	0.818	0.801	0.870	0.628	Valid and reliable
	C2	0.826				
	C3	0.818				
	C4	0.700				
Health	H1	0.788	0.808	0.886	0.722	Valid and reliable
	H2	0.895				
	H3	0.863				
Safety	S1	0.852	0.823	0.882	0.653	Valid and reliable
	S2	0.839				
	S3	0.764				
	S4	0.772				
Environmental Sustainability	E1	0.720	0.747	0.841	0.572	Valid and reliable
	E2	0.816				
	E3	0.646				
	E4	0.830				
Guest Satisfaction	GS1	0.876	0.852	0.900	0.694	Valid and reliable
	GS2	0.855				
	GS3	0.740				
	GS4	0.854				
Guest Loyalty	GL1	0.743	0.903	0.924	0.638	Valid and reliable
	GL2	0.777				
	GL3	0.884				
	GL4	0.812				
	GL5	0.871				
	GL6	0.842				
	GL7	0.633				

Source: data processed, 2024

Outer model evaluation aims to ensure that the indicators or items used in the model correspond to the latent variables being measured. The results in table 2 show that all items in each variable have a loading factor value > 0.60 and an AVE value > 0.50, it can be conclude that the value meet the convergent validity criteria (Dash and Paul, 2021). Meanwhile, the Cronbach Alpha value for each variable is > 0.70 and the CR value is > 0.70, thus meeting the criteria for reliability (Dash and Paul, 2021; Widarjono, 2015). Thus, the results of the outer model evaluation meet the validity and reliability criteria, the results are proven valid and reliable.

Table 3. Inner Model Evaluation Results

Variable	Adjusted R-Square
Guest Satisfaction (GS)	0.543
Guest Loyalty (GL)	0.648

Source: data processed, 2024

Inner model evaluation is used to understand that the proposed conceptual model fits the empirical data that has been collected. In this research, the inner model evaluation was carried out using the adjusted R-square value approach. The results in table 3 show that the exogenous variable in the research model, CHSE, is able to explain the guest satisfaction variable by 54.3%. Moreover, the CHSE variable and guest satisfaction variable can explain the guest loyalty variable by 64.8%. Referring to the results of this research, it shows that the research model meets the research criteria so that the structural model is suitable for hypothesis testing.

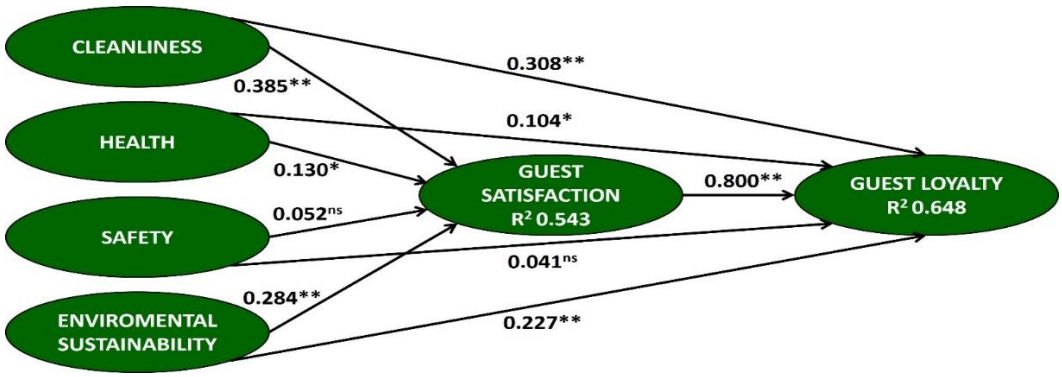
After the data meets the outer model and inner model criteria, the research hypothesis is then tested through path analysis. The results of the hypothesis test are presented in table 4.

Table 4. Hypothesis Test Results

Path	β	T Stat	P Values	Results
C -> GS	0.385	4.656	0.000**	Supported
H -> GS	0.130	1.681	0.047*	Supported
S -> GS	0.052	0.801	0.212ns	Not supported
E -> GS	0.284	4.107	0.000**	Supported
GS -> GL	0.800	27.993	0.000**	Supported
C -> GL	0.308	4.595	0.000**	Supported
H -> GL	0.104	1.672	0.048*	Supported
S -> GL	0.041	0.799	0.212ns	Not supported
E -> GL	0.227	3.932	0.000**	Supported

*Note: ** significance at α 1% (two tailed); * significance at α 5% (two tailed); ns is not significant*
Source: data processed, 2024

Figure 2. Structural Models and Path Analysis



*Note: ** significance at α 1% (two tailed); * significance at α 5% (two tailed); ns is not significant*
Source: data processed, 2024

4. Analysis and Discussion

The parameter coefficient for the Cleanliness variable on Guest Satisfaction is 0.385 with a p-value of 0.000, which means there is a positive influence (H1 is supported). Thus, it can be interpreted that the cleaner the hotel or homestay environment, the greater the increase in tourist satisfaction. A one-unit increase in the Cleanliness variable will increase Guest Satisfaction by 38.5%. These results are in accordance with previous research which proves that the implementation of the CHSE policy has a positive impact on visitor satisfaction at tourism destination (Arlinda and Sulistyowati, 2021; Suci and Batubara, 2022). Furthermore, the Cleanliness variable has also been proven to have a positive effect on Guest Loyalty. The parameter coefficient for the Cleanliness variable on Guest Loyalty is 0.308 with a p-value of 0.000 (H6 is supported). A one-unit increase in the Cleanliness variable will increase Guest Loyalty by 30.8%. These results support previous research which proves that CHSE has a positive impact on Guest Loyalty in tourism destinations (Sudirja and Limantara, 2022). The results of this research show that in the context of accommodation services, such as hotels and homestays, it is also proven that the cleanliness aspect can increase tourist satisfaction and loyalty.

The parameter coefficient for the Health variable on Guest Satisfaction is 0.130 with a p-value of 0.047, which means there is a positive influence (H2 is supported). Thus, it can be interpreted that if hotels or homestays implement standard health protocols, it will further increase tourist satisfaction. A one-unit increase in the Health variable will increase Guest Satisfaction by 13%. These results are in accordance with previous research which proves that the implementation of the CHSE policy has a positive impact on visitor satisfaction at tourist attractions (Arlinda and Sulistyowati, 2021; Suci and Batubara, 2022). Furthermore, the Health variable has also been proven to have a positive effect on Guest Loyalty. The parameter coefficient for the Health variable on Guest Loyalty is 0.104 with a p-value of 0.048 (H7 is supported). A one-unit increase in the Health variable will increase Guest Loyalty by 10.4%. These results support previous research which proves that CHSE has a positive impact on Guest Loyalty in tourist destinations (Sudirja and Limantara, 2022). The results of this research show that in the context of accommodation services, such as hotels and homestays, it is also proven that aspects of implementing standard health protocols can increase tourist satisfaction and loyalty.

The parameter coefficient for the Environment Sustainability variable on Guest Satisfaction is 0.284 with a p-value of 0.000, which means there is a positive influence (H4 is supported). Thus, it can be interpreted that if a hotel or homestay maintains environmental sustainability, it will further increase tourist satisfaction. A one-unit increase in the Environment Sustainability variable will increase Guest Satisfaction by 28.4%. These results are in accordance with previous research which proves that the implementation of the CHSE policy has a positive impact on visitor satisfaction at tourism destination (Arlinda and Sulistyowati, 2021; Suci and Batubara, 2022). Furthermore, the Environment Sustainability variable has also been proven to have a positive effect on Guest Loyalty. The parameter coefficient for the Environment Sustainability variable on Guest Loyalty is 0.227 with a p-value of 0.000 (H9 is supported). A one-unit increase in the Environment Sustainability variable will increase Guest Loyalty by 22.7%. These results support previous research which proves that CHSE has a positive impact on Guest Loyalty in tourism destinations (Sudirja and Limantara, 2022). The results of this research show that in the context of accommodation services, such as hotels and homestays, it is also proven that aspects of environmental preservation can increase tourist satisfaction and loyalty.

Although the elements, Cleanliness, Health, and Environmental Sustainability in the context of this research were proven to have a positive effect on tourist satisfaction and loyalty, the Safety element did not significantly affect tourist satisfaction and loyalty. The results show that the p-value is greater than 0.05 (S->GS 0.212; S->GL 0.212). Thus, the Safety element has not satisfied tourists and increased their loyalty (H3 and H8 are not supported). Previous research also found that the implementation of CHSE has not been able to increase tourist satisfaction in the context of tourism destination (Diarta and Sukendar, 2021). In previous research, it was found that tourists actually thought that CHSE limited their tourism activities at tourism destinations. Still, because it was an obligation that tourism destinations had to carry out in order to be allowed to operate, visitors complied (Diarta and Sukendar, 2021). Meanwhile, the results of interviews with several respondents showed that they did not know where fire extinguishers were located, evacuation routes in case of a disaster, and the location of CCTV cameras in public spaces. This ignorance causes the safety element to have no impact on tourist satisfaction and loyalty. Even though hotels or homestays already provide facilities that guarantee safety and security, it turns out that not all hotel guests know that these facilities are available.

Furthermore, the Guest Satisfaction variable is proven to have a positive effect on the Guest Loyalty variable (H5 is supported). The results show that the parameter coefficient for the Guest Satisfaction variable on Guest Loyalty is 0.800 with a p-value of 0.000. Thus, it can be interpreted that the more satisfied tourists are, the more tourist loyalty will increase. A one-unit increase in the Guest Satisfaction variable will increase Guest Loyalty by 80%. These results are in accordance with previous research which proves that tourist satisfaction will increase tourist loyalty (Alketbi *et al.* 2020; Assaker *et al.* 2020; Keshavarz and Ali, 2015; Winarno, 2019). Thus, satisfied tourists will tend to be willing to stay at the hotel or homestay again and will be willing to recommend staying at the hotel or homestay to other tourists.

The results of this research show that implementing CHSE policies in hotels and homestays can increase tourist satisfaction. Furthermore, if tourists are satisfied then these tourists will become loyal guests. Although of the four elements of CHSE, the Safety aspect has not shown a significant impact in the context of this research, the other three elements are able to increase tourist satisfaction and loyalty. Based on the results of this research, the CHSE policy launched by the Government is appropriate for improving the quality of tourism industry services and is able to influence tourist behavior. The results of interviews with several respondents also prove that the majority of tourists already know about CHSE and would consider staying at accommodation service providers that are CHSE certified. Thus, it is important for hotel and homestay managers, especially in the Borobudur Temple tourism area and its surroundings, to be CHSE certified in order to satisfy tourists who stay overnight and increase their loyalty.

The results of this research also support relationship marketing theory. The hospitality sector is an industry with characteristics that focus on customer service and experience. Therefore, a marketing approach focusing on managing strong and sustainable customer relationships is necessary. The goal is to create mutually beneficial value for the company and customers through consistent and personalized interactions. The implementation of CHSE certification aims to provide an extraordinary experience and meet customer expectations. Through CHSE certification, hotel businesses can increase the level of satisfaction and loyalty of tourists, as well as achieve long-term profits.

Conclusions

This research examines the influence of tourism policy on tourist behavior (tourist satisfaction and tourist loyalty) in the context of the hotel industry, in Indonesia, where similar research examining the impact of tourism policies

related to the environment on tourist behavior has not been widely conducted. The results of this research indicate that the implementation of CHSE policies in accommodation service businesses in the tourism sector can influence tourist behavior. If accommodation service businesses implement CHSE certification, this condition will make tourists satisfied with the services provided, and in turn will increase tourist loyalty. Satisfied and loyal tourists will be willing to stay again, willing to share their positive experiences while staying, and willing to recommend it to others. Having loyal tourists and establishing long-term good relationships with tourists can increase profits and support business sustainability. The influence of CHSE on tourist satisfaction and loyalty in the context of accommodation services is proven in this research (cleanliness, health and environmental sustainability aspects), although the safety aspect has not shown a significant influence.

These results provide managerial implications for accommodation service managers to implement CHSE certification (for those who have not yet CHSE certified), then improve service quality and increase tourist awareness, especially on safety aspects (for those who have been CHSE certified). The results of this research also provide implications for policymakers such as local tourism offices to periodically socialize the importance of CHSE certification to tourism business owners so that those who have not yet been certified can immediately apply for CHSE certification. Meanwhile, the findings of this research may be limited to the context or setting of accommodation services in the tourism sector and cannot yet be generalized to different populations or settings. Therefore, further research can examine it in other contexts, for example travel businesses, restaurants or tourist attractions. Besides, this research has not grouped accommodation services based on their categories. Research results at one hotel or hotel chain may not be generalizable to all hotels. Suggestions for further research could be to test the influence of CHSE on tourist satisfaction and loyalty in certain accommodation categories or to conduct a comparative study of the effect in each accommodation category.

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Credit Authorship Contribution Statement

Ivo Novitaningtyas: conceptualization, literature review, research model development, data analysis, writing, review and editing;
Clarisa Alfa Lionora: literature review, collecting data, writing;
Andhatu Achsa: collecting data, writing, visualization;
Budi Hartono: methodology, collecting data, writing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Assess the Barrier of Small and Medium-Sized Hotel Digitalization: A Combination of AHP and DEMATEL Analysis

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Abstract: This study investigates the barriers to digitalization in small and medium-sized hotels through a combined Analytic Hierarchy Process (AHP) and Decision-Making Trial and Evaluation Laboratory (DEMATEL) analysis. It aims to identify and rank the barriers to technology adoption and understand their interrelationships. The findings emphasize that the most significant barriers are technological context and organizational context, precisely data security, IT infrastructure, competition, skilled digital workforce, and financial resources are challenges for this process. Besides, the technological context and organizational context belong to the cause group, which directly and indirectly influences the environmental context. The study provides a comprehensive framework for understanding the multifaceted barriers to digitalization in the hotel industry, suggesting that managers focus on overcoming these critical barriers to improve performance through digital adoption. This research solves a gap in the literature by focusing on independent hotels' challenges in technology adoption. It offers practical insights for hotel managers and technology developers aiming to support digitalization in this industry.

Keywords: analytic hierarchy process in tourism; barrier factors; decision-making trial and evaluation laboratory; technology adoption; technology-organization-environmental framework.

JEL Classification: L83; M15; O33.

Introduction

Technology is creating a massive revolution for manufacturing and service companies regarding management, organization, and operations. Integrating multiple technologies and enhancing processes is anticipated to lead to significant change in the workplace, requiring employees to acquire new skills for future production systems (Horváth and Szabó, 2019). For more than many years, the adoption of information technology (IT) systems has significantly transformed business operations within the hospitality industry (Buhalis and Leung, 2018), enabling direct engagement with customers (Leung *et al.* 2013), boosting competitiveness (Inversini and Masiero, 2014), and enhancing overall organizational performance (Melián-González and Bulchand-Gidumal, 2016).

Adopting information and communication technology (ICT), the Internet, and mobile applications has become exciting for researchers, policymakers, and managers. Primarily, that interest has recently increased in the hospitality and tourism industries (Berne *et al.* 2012; El-Gohary, 2012; Lin, 2017). As an inevitable consequence, researchers have developed and utilized the accepted theoretical frameworks to examine the adoption and diffusion of IT and Internet applications in business (El-Gohary, 2012). Competition in the open business environment will become fiercer and fiercer. Maintaining and surviving in that dynamic business environment requires travel companies and hotels to constantly change their strategies and approaches to get the best customer experience through products and services (Berne *et al.* 2012; Lin, 2017). With the growth of wireless devices and the explosion of mobile devices, mobile technology applications have played an essential role in changing the landscape of many organizations (D. Wang *et al.* 2012). Technology adoption, as well as digitalizing functions and tasks, not only helps to simplify but also helps improve organizational performance. It is considered a strategic weapon to help small and medium-sized hotels compete fairly with chains or large hotel systems in a challenging business environment (DiPietro and Wang, 2010).

Almost all hospitality or organizations operating in the tourism industry must respect the role of digitalization as a public service to survive in the competitive market (Krizaj *et al.* 2014; Spencer *et al.* 2012). Small and medium-sized enterprises (SMEs) make up an overwhelming number of the travel and hospitality industries worldwide today (Alison Morrison, 1998; Alison Morrison and Thomas, 1999). Digitalization has emerged as a tool to bring exciting experiences to customers looking for new experiences with tourism products without touching the actual products (WTO, 2001). Lin (2017) points out that it is currently possible to plan all stages of a trip online; that is, one can buy airline tickets, book accommodation services, purchase attraction tickets, view maps, rent cars, and seek tips and reviews of tours and restaurants. Therefore, digitalization changed the way contracts for tourism services were handled. The modern traveler has become the consumer of a new market, known as the online market, or electronic commerce, and user reviews are a new source of information in the hospitality and tourism industries (Ricaurte, 2012). Digitalization and technology allow small and medium-sized hotels to build their vision and image on a large scale and reach out to customers worldwide. Low operating costs, infrastructure associated with development, creating a completely new product distribution channel, and extensive connectivity are among the essential criteria determining access to the internet and technology for SMEs (Poon and Swatman, 1999).

Previous studies have often focused on determining the effectiveness of digitalization and technology adoption so that companies can devise a specific strategy related to innovation. Experts are aware of the great potential of digitalization for the tourism industry. However, the utilization of digitalization always needs to be addressed by organizations, managers, or internal resources. These barriers often negatively impact digitalization (Cooper and Zmud, 1990). Besides, more research is needed to address the barriers or challenges of the digitalization process for organizations. Besides, the tourism industry is a traditional industry that needs more connection to innovation and the application of technology. In other words, a research gap exists regarding the barriers of digitalization to the hospitality industry. Okumus *et al.* (2010) revealed that approximately 70% of solutions to strategic innovation in organizations fail. Organizational changes such as digitalization or technology adoption are often considered risks. The limited adoption of ICT innovation among SMEs creates significant concerns about their ability and willingness to use ICT and the Internet as a tool of Business. Digitalization has radically changed business methods, customer behavior, and fierce competition in the market (Brunetti *et al.* 2020). These changes significantly affect the tourism and hospitality industries, which depend on business-consumer relationships, digital communication platforms and conduits, and digital technologies (Gössling, 2020). This study aims to focus on small and medium-sized hotels (SMHs) or independent hotels that are not part of a large hotel chain or system. This study uses the Technological - Organizational - environmental (TOE) context framework to evaluate the impact of essential barriers and their cause-and-effect relationships on the digitalization of small and medium-sized hotels (SMH) in Vietnam. The results can clarify the critical role of technological, organizational, and environmental contexts and their essential barriers in digitalization. The study uses a combination of two multi-criteria decision analysis methods, AHP and DEMATEL, to identify the most significant barriers to technology adoption as well as the interrelationships between these barriers. The contribution of this research will help small and medium-sized hotels focus their resources on addressing the most significant barriers to improving efficiency through digitalization or technology adoption. This knowledge is indispensable for digitalization management and research. Without clarifying the role of critical success factors, SMH may be unable to maximize digitalization's economic and social benefits.

1. Literature Review

1.1 Small and Medium - Sized Hotels

There is no exactly accepted precise definition for the term "small and medium-sized enterprises" in the hospitality and tourism industry (Thomas and Thomas, 2005). One solution is for academics to determine the hotel size by the number of rooms and full-time employees. Moutinho (2013) revealed that small-sized hotels will have fewer than 50 rooms, employ less than ten people, and operate in areas that are not major tourist hubs. Ingram *et al.* (2000) have given a precise definition of small businesses operating in the hotel sector as hotels with less than 50 rooms, a medium-sized hotel has about 51-100 rooms, and accommodation from 100 rooms or more will be large hotels, similar to the above but in terms of personnel. Page *et al.* (1999) defined that hotel with large Small scale hotels will have less than nine people will participate in their activities, while medium hotels will have about 10 - 99 people. Therefore, at this stage, it is challenging to have a specific definition of the size of enterprises in the tourism industry compared to other sectors. Atkins and Lowe (1997) indicated that there are at least 40 different definitions of firm size used in the study. Still, there needs to be more consistency in evaluating the criteria for determining firm size. The requirements are many, such as the number of employees, annual sales revenue, value of fixed assets/plant and machinery, and the management structure.

1.2 Innovation Diffusion Theory in an Investigation of Technology Adoption

In recent years, many different types of technologies have been applied, such as the Internet and business administration systems, and many new technology concepts, such as e-commerce, digital transformation, or business. Previous studies have also seen the digitalization of an organization's functions as part of technology adoption. Among the previous studies, several theoretical models are used to identify, predict, and explain the behavior in adopting technology in organizations. Examples of these models include the Theory of Reasoned Action (TRA), the Theory of Planned Behavior, the Technology Acceptance Model (TAM), as well as the Unified Theory of Acceptance and Use of Technology (UTAUT). Despite the critical significance of this model for studying the process and acceptance of technology, the above models are only suitable for research on individual levels (El-Gohary, 2012; Oliveira and Martins, 2011). TAM theory has shown that adoption behavior is influenced by an individual's tendency to use technology, which is determined by the perception and ability to use similar technology. The study of IT adoption models at the organizational level (Oliveira and Martins, 2011) showed that Diffusion Theory (IDT) (Rogers *et al.* 2014) and TOE framework (Tornatzky *et al.* 1990) are two models whose dominant pattern in explaining the use of technology in the organization.

Innovation Diffusion Theory suggests that a firm's adoption and use of innovation are influenced by five innovation characteristics (relative advantage, compatibility, complexity, trialability, and observability) and six organizational characteristics (centralization, complexity, formalization, interconnectedness, slack, and size). However, IDT theory includes the influence of technological and managerial characteristics on technology adoption. However, the TOE framework is more comprehensive and practical because it applies more environmental factors. The TOE framework provides a different perspective when considering technology adoption based on characteristics that can impact the organization (Chau and Tam, 1997). The TOE framework is a perfect fit because it is more powerful and comprehensive than other models. TOE has also been applied in many studies, such as Electronic Data Interchange systems (EDI) (Kuan and Chau, 2001), Enterprise applications (Ramdani *et al.* 2013), radio frequency identification technology (RFID) (DiPietro and Wang, 2010). Based on empirical studies, the TOE framework will continue to be applied in applying technology to research in the hospitality industry.

1.3 Factor Affecting Technology Adoption and Decision Based on TOE Framework

The Technology-Organization-Environment (TOE) framework consists of 3 contexts that influence the process by which a particular organization takes place through technology adoption (Tornatzky *et al.* 1990). The TOE includes the Technological context, Organizational context, and Environmental context. Recently, TOE has also been used as a foundational theory to examine the factors affecting the use of mobile applications for hotel reservations (Y. S. Wang *et al.* 2016). Therefore, the TOE framework explains the adoption of innovation, and many empirical studies have focused on various IS domains by applying it. Research on technology adoption of organizations through the TOE framework is quite popular, but identifying and analyzing challenges or obstacles of technology adoption behavior based on the TOE framework will be a trend for the future. Therefore, as shown in Figure 1, an integrated and multi-faceted framework is suitable for the present study. The barrier factors influencing the adoption of mobile technologies are discussed below.

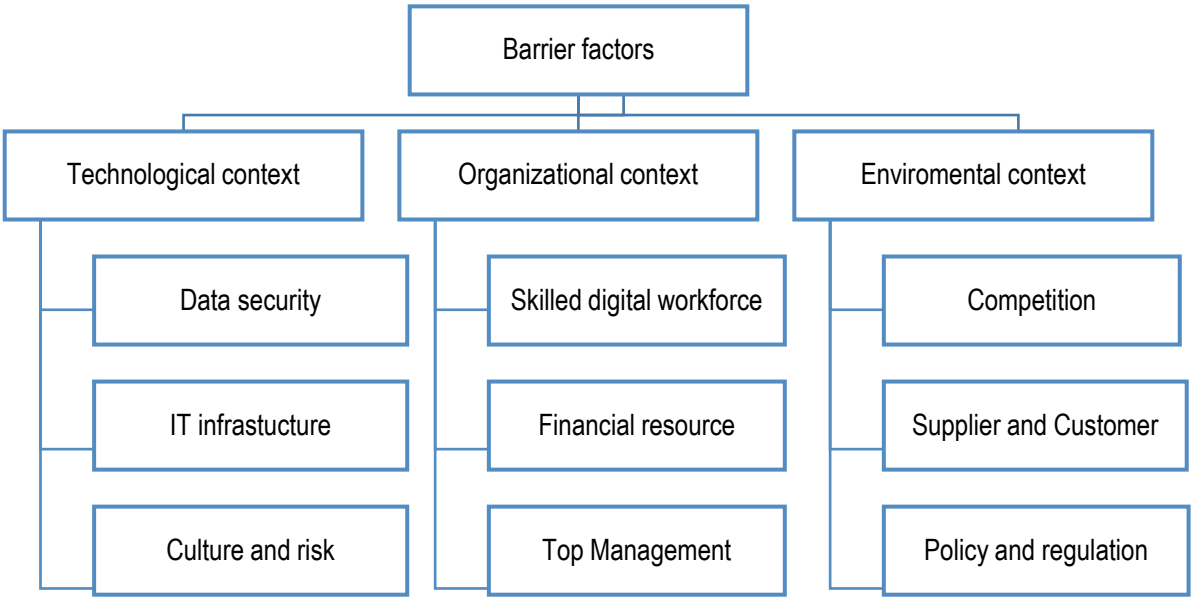
1.4 Technological Context

Technology context includes the internal and external technology characteristics relevant to the organization, including Data security, IT infrastructure, Culture, and risk (Kuan and Chau, 2001; Oliveira *et al.* 2014; Tornatzky *et al.* 1990). Therefore, the characteristics of the danger in the security of customer information, financial information, personnel information and many other information factors are always present alongside technological innovation (Abdullah *et al.* 2018; Al-Weshah and Al-Zubi, 2012; Horváth and Szabó, 2019; Peillon and Dubruc, 2019; Schwertner, 2017; Yadegaridehkordi *et al.* 2020).

Tornatzky and Klein (1982) showed that the organization will get a much higher benefit if it integrates new technologies into existing infrastructure. This is consistent with the view that organizations that need to adapt to technology do so because their IT infrastructure needs to be more robust to accommodate modern technologies (Cooper and Zmud, 1990). Currently, hotel companies, including the Property Management System (PMS), Computer Reservation System (CRS), customer databases, and various systems, are often interrelated; if technologies and applications separate from each other, it will significantly impact operational efficiency. However, for independent hotels or mainly small and medium-sized hotels, resources to innovate or accept technology are always a big challenge. Technology will be the most significant barrier related to cost, labor, and vision of leaders that we will talk about in the Organization context (Abdullah *et al.* 2018; Stockdale and Standing, 2004; Vogelsang *et al.* 2019).

The hospitality industry is often criticized as traditional, and technology is frequently adopted late and quite slowly. Primarily, Small and medium-sized hotels are usually owned by a single person; they are always afraid to change; they want to operate the hotel traditionally, from booking guests, using cash instead of payment methods via bank or mobile or managing and arranging employees face-to-face instead of using specialized management software. They always believe that even the slightest change will lead to customers feeling uncomfortable and will not use more of the hotel's services (Abdullah *et al.* 2018; Stankovska *et al.* 2016; Taylor and Murphy, 2004; Verevka, 2019; Vogelsang *et al.* 2019). Technical barriers have continuously been determining whether small and medium-sized hotels can decide whether to adopt technology or digitalize hotel functions.

Figure 1. Barrier factors of the digitalization process



1.5 Organizational Context

The technology context directly relates to organizational characteristics and decision-making about technology adoption (Kuan and Chau, 2001; Oliveira *et al.* 2014). In today's explosive business environment and fierce competition, the application of technology in the organization will be linked to the leadership and decision-making of the organization. A hotel that can reach customers or enhance the customer experience will depend on the acceptance of innovation within the organization. That's why the hotel's internal and human resource-related characteristics are the most critical factors affecting technology adaptation. Barriers to the adoption of technology within organizations also appear. Based on the above perception in the organizational context, three main barriers will affect technology adoption: Skilled Digital workforces, financial resources, and Top Management.

In addition to the organization's innovation readiness factors, information technology resources, and support from the top management of the organization, here is the small and medium-sized hotel is a factor but also a barrier to technology adoption (DiPietro and Wang, 2010; Racherla and Hu, 2008). Thong (1999) points out that the best leaders can drive change through communication, value enhancement, and a clear vision for the organization. With the same consensus, Lee and Kim (2007) argue that the commitment and vision of the manager will always be an essential barrier to technology adaptation. Previous studies also reveal that small and medium-sized businesses need help implementing innovations to optimize their operations. Besides, shortages of finances are always significant barriers to applying technology for hotels, especially small and medium-sized hotels (Horváth and Szabó, 2019; Vogelsang *et al.* 2019; Yadegaridehkordi *et al.* 2020).

It is clear that in the current context, the need for more personnel who can use IT proficiently to support the hotel in adapting technology and improving customer experience and performance remains a considerable challenge. For the innovation process (Abdullah *et al.* 2018; Al-Weshah and Al-Zubi, 2012; Verevka, 2019; Vogelsang *et al.* 2019), besides that the decisive role of an organization will be very much related to the vision and perception of senior management regarding technology adaptation (Schwertner, 2017).

1.6 Environmental Context

Environmental context represents the field in which the organization operates and does business. These external factors can potentially impact or create challenges for technology adoption (Oliveira *et al.* 2014; Tornatzky *et al.* 1990). Today, when humanity enters a 4.0 revolution, globalization, and competitive pressure from many aspects have made many travel companies and hotels promote innovation in organizations and apply technology to improve and enhance competitiveness. Many studies have shown that environmental factors are a direct barrier affecting decision-making regarding the adoption of technology in an organization (Rothwell, 1994). Therefore, in this environmental context, barriers that can affect a hotel's technological adaptation process include competitors, suppliers and customers, policies and regulation.

In this dynamic business environment, overcoming the competition or building an information technology system that is more efficient than the competition but, at the same time, more economical is always a great challenge for technology adoption. Furthermore, a high degree of competition will promote the adoption of different technological approaches (Li and Ye, 1999). Therefore, competitive pressure in this study is considered a barrier to pressure and perception of competitor technology. Competitive pressure has long formed a difficult barrier for hotels to access technological innovation as they always have to find newer technology to maintain the same competitive pressure on their competitors in the same industry (Ezzaouia and Bulchand-Gidumal, 2020; Horváth and Szabó, 2019; Stankovska *et al.* 2016; Taylor and Murphy, 2004).

Hotel suppliers and sometimes customer needs themselves become barriers to technology adoption. It is very difficult to convince suppliers to disclose the origin and quality of the service provided to the restaurant simply because the supplier's awareness of technology is insufficient. Customers sometimes accept to use a traditional method, and they are afraid to change; for example, paying for services via the Internet or mobile banking will be much more convenient than cash (Abdullah *et al.* 2018; Ezzaouia and Bulchand-Gidumal, 2020; Peillon and Dubruc, 2019; Stockdale and Standing, 2004). Technology adoption is always a strategy, and innovation to be sustainable must always have a clear legal framework to ensure the interests of the hotel or its customers. However, sometimes, technology needs to be faster, leaving the government behind. Government leads to supportive or regulatory frameworks that randomly become a terrible barrier for change-afraid organizations (Abdullah *et al.* 2018; Al-Weshah and Al-Zubi, 2012; Ezzaouia and Bulchand-Gidumal, 2020; Stockdale and Standing, 2004; Vogelsang *et al.* 2019).

2. Research Methodology

According to previous studies, the MCDM methods are appropriate for solving human subjective judgments using multiple decisions (Ghamgosar *et al.* 2011; Lin and Fu, 2012). To enhance the accuracy of the expert's choice evaluation among multiple alternatives, the study is based on the TOE framework and the combination of a qualitative phase of the MCDM method, including the Analytical hierarchy process (AHP) and the Decision-making trial and evaluation laboratory (DEMTEL) method. In addition, the experts selected for the interview in the study include managers with more than five years of experience in operating hotels and engineers with expertise in digitalization functions.

Table 1. A hierarchical framework for technology adoption

Context	Barriers	Literature source
Technological context (TC)	Data Security (TC1)	Horváth and Szabó (2019), Yadegaridehkordi *et al.* (2020), Schwertner (2017), Vogelsang *et al.* (2019), Abdullah *et al.* (2018), Peillon and Dubruc (2019), Taylor and Murphy (2004), Al-Weshah and Al-Zubi (2012)
	IT infrastructure (TC2)	Stockdale and Standing (2004), Schwertner (2017), Vogelsang *et al.* (2019), Jones *et al.* (2003), Abdullah *et al.* (2018), Peillon and Dubruc (2019)
	Culture and Risk (TC3)	Stockdale and Standing (2004), Vogelsang *et al.* (2019), Verevka (2019), Abdullah *et al.* (2018), Stankovska *et al.* (2016), Taylor and Murphy (2004)
Organizational context (OC)	Skilled Digital workforces (OC1)	Horváth and Szabó (2019), Vogelsang *et al.* (2019), Jones *et al.* (2003); Verevka (2019), Abdullah *et al.* (2018), Taylor and Murphy (2004), Al-Weshah and Al-Zubi (2012)

Context	Barriers	Literature source
	Financial resource (OC2)	Horváth and Szabó (2019), Yadegaridehkordi *et al.* (2020), Ezzaouia and Bulchand-Gidumal (2020), Vogelsang *et al.* (2019), Alrawadieh *et al.* (2021), Jones *et al.* (2003), Verevka (2019), Abdullah *et al.* (2018), Stankovska *et al.* (2016), Taylor and Murphy (2004), Abid *et al.* (2011)
	Top Management (OC3)	Schwertner (2017), Vogelsang *et al.* (2019), Jones *et al.* (2003), Verevka (2019), Abdullah *et al.* (2018), Stankovska *et al.* (2016), Abid *et al.* (2011)
Environmental context (EC)	Competition (EC1)	Horváth and Szabó (2019), Ezzaouia and Bulchand-Gidumal (2020), Stankovska *et al.* (2016), Taylor and Murphy (2004)
	Suppliers and Customers (EC2)	Ezzaouia and Bulchand-Gidumal (2020), Stockdale and Standing (2004), Abdullah *et al.* (2018), Peillon and Dubruc (2019)
	Policy and regulation (EC3)	Ezzaouia and Bulchand-Gidumal (2020), Stockdale and Standing (2004), Vogelsang *et al.* (2019), Abdullah *et al.* (2018), Taylor and Murphy (2004), Al-Weshah and Al-Zubi (2012)

2.1 Analytical Hierarchy Process (AHP)

The AHP method developed by Saaty (1991) streamlines complex and unstructured decision-making problems into a concise linear hierarchical structure. It helps to identify essential criteria behind a decision and reach a group consensus. Its main steps are summarized as follows (Chang, 1992; Saaty, 1991).

Step 1. State the goal and construct the decision-making hierarchy. This study evaluates the critical factors for successful SMH digitalization. According to a literature review, expert judgments, and Delphi analysis results, critical factors are identified and used to construct the decision-making system.

Step 2. Construct the reciprocal pairwise comparison matrices. Based on Saaty's 9-point scale from 1 (equal importance) to 9 (extreme importance), group experts recruited are asked to compare the influence of each critical factor with others. Next, expert responses are used to assemble the pairwise comparison matrix G for calculating the relative importance of each factor on digitalization.

$$G = [g_{ij}]_{n\times n} = \begin{bmatrix} 1 & g_{12} & \cdots & g_{1n} \\ 1/g_{12} & 1 & \cdots & g_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/g_{1n} & 1/g_{2n} & \cdots & 1 \end{bmatrix} \quad (1)$$

where g_{ij} is a positive element of matrix G, $i, j = 1, 2, ..., n$, and n is the number of critical factors.

Step 3. Calculate the relative importance of each factor. According to the pairwise comparison matrix G, its eigenvalue (W_i) is calculated by normalizing the geometric mean of the rows to derive the relative importance of all critical factors.

$$W_i = \left(\prod_{j=1}^{n} g_{ij}\right)^{\frac{1}{n}} \left(\sum_{i=1}^{n} \left(\prod_{j=1}^{n} g_{ij}\right)^{\frac{1}{n}}\right)^{-1} \quad (2)$$

Step 4. Check the consistency ratio (CR). A consistency test is examined to test whether the pairwise comparison matrix is consistent.

$$CI = (\lambda_{\max} - n)(n-1)^{-1} \quad (3a)$$

$$CR = CI \times (RI)^{-1} \quad (3b)$$

where CI is the consistency index, $\lambda_{\max}$ represents the maximum eigenvalue, and RI denotes the random consistency index. If $CR \leq 0.1$, the pairwise comparison matrix is consistent (Saaty, 1991). Otherwise, the consistency ratio is not acceptable.

2.2 The DEMATEL Method

The DEMATEL method developed by Fontela and Gabus (1976) is suitable for evaluating the cause-effect relationships among criteria of complex decision problems. It helps to classify the criteria into cause-and-effect groups. Its main steps are described as follows (Fontela and Gabus, 1976; Sara *et al.* 2015).

Step 1: Derive the initial average matrix Y. A group of *m* experts are asked to assess the causal relationship between two factors (i.e., pairwise comparisons) of *n* factors based on a scale from 0 (*no influence*) to 4 (*very high influence*). Matrix Y is then derived by aggregating the judgment of group experts.

$$Y = \sum_{t=1}^{m} X^t \Big/ m = [y_{ij}]_{n \times n} \tag{4}$$

where X^t is the direct matrix judged by the t^{th} ($t = 1, 2, \ldots, m$) respondent, y_{ij} is an element of matrix Y, and $y_{ij} \geq 0$.

Step 2. Compute the normalized direct influence matrix D. Matrix D is defined by normalizing the initial average matrix Y.

$$D = Y \times S \tag{5a}$$

$$S = (\max_{1 \leq i \leq n} \sum_{j=1}^{n} y_{ij})^{-1} \tag{5b}$$

Step 3. Compute the total relation matrix T. Matrix T can be derived as:

$$T = D(I - D)^{-1} = [t_{ij}] \tag{6}$$

where I is an $n \times n$ identity matrix. This matrix reveals direct and indirect influences between each pair of factors.

Step 4: Construct the causal relationship map. Matrix T can be used to identify the cause-effect relationships of factors. The sum of rows (r) and columns (c) of matrix T can be calculated as follows.

$$r = \sum_{j=1}^{n} t_{ij} \tag{7a}$$

$$c = \sum_{i=1}^{n} t_{ij} \tag{7b}$$

The values of $r_i + c_i$ and $r_i - c_i$ represents the influential intensity and direction of factor i, respectively. If $r_i - c_i < 0$, factor i belongs to the effect group, otherwise factor i is a cause if $r_i - c_i > 0$. According to the $(r + c, r - c)$ values of factors, the cause-effect relationship map can be drawn.

3. Empirical Study and Result

This section includes data collection, identifying essential barriers, and mutual interaction in applying technology using AHP and DEMATEL methods.

3.1 Data Collection

In MCDM methods, the selection of the number of experts and the size of the panel of experts is subjective. There needs to be a theoretical basis or empirical studies on whether the analytical results are much better with panel size (Lee and Yang, 2018). Therefore, the size of the expert panel in MCDM studies is usually not limited. The explanatory power of MCDM methods is based on the experience and knowledge of experts and previous studies. In particular, in analyzing AHP methods, the expertise and knowledge of the expert who can interpret and evaluate the relevant criteria plays the most critical role. Accordingly, a group of 5 to 7 experts would be the best fit to produce the overall results for the group (Yetton and Bottger, 1983). Hwang and Lin (2012) revealed that a group of 10 to 15 experts would be suitable for decision-making in the MCDM analysis method. In practice, the size of the panel of experts will usually be more than ten experts (Lee and Yang, 2018). Therefore, in this study, we will focus on researching small and medium-sized hotels in the hotel list of the Vietnam Tourism Association and experts in the Technology and hospitality sectors. Through the author's relationship via email and phone, 10 experts in technology and hospitality agreed to answer the questionnaire; these experts cover two main areas: technology and hotels. Technology experts with seniority in building information technology systems and digitalizing equipment in hotels. Moreover, experts in the hotel industry are those with experience in administration, control, and management, or professors working and doing research at universities. The experts' expertise will be listed in detail in Table 2. An expert questionnaire is constructed for data collection. It is kept as simple as possible to depict the concise structure of motives that drive the technology adoption process. Lastly, after several rounds of questionnaire surveys, the qualified anonymous responses of the group experts were then used in the combined AHP and DEMATEL analysis. In AHP analysis, the criteria selection was based on two primary sources: (1) a literature review and expert

judgment and (2) a pre-survey. Both approaches can provide valid criteria, but careful consideration of the requirements and wrong selection will completely change the analysis results.

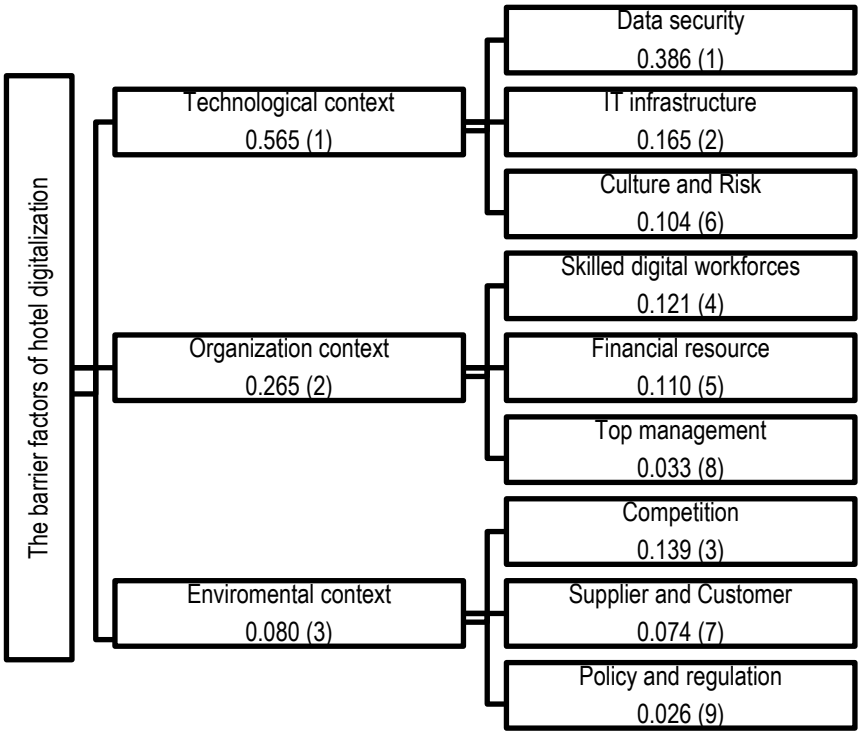
3.2 Evaluate the Relative Important of Barrier Factors: AHP Analysis

AHP analysis identifies the context and factors causing the biggest obstacles to the digitalization process of small and medium-sized hotels in Vietnam. The results are shown in Figure 2, indicating that the Technological Context (0.561) is a more significant barrier than the two Organizational Contexts (0.265) and Environmental contexts (0.080). Figure 2 also reveals that Data security (0.386) has the highest influence weight and is an obstacle to the digitalization process, followed by IT Infrastructure (0.165), Competition (0.139), Skilled digital workforce (0.121), Financial resources (0.110), Culture and risk (0.104), Supplier and customer (0.074), Top management (0.033), Policy and regulation (0.026). In addition, this study sets a threshold (0.11) calculated as an average influence weight to identify obstacles that can impact the digitalization process, which includes: Data security, IT Infrastructure, Skilled digital workforces, Financial resource, Competition.

Table 2. Demographic profile of respondents

The technology experts (*N*=5)					The hotel experts (*N*=5)				
No	Gender	Age	Position	Seniority	No	Gender	Age	Position	Seniority
1	Female	31-40	Engineer	15	1	Male	31-50	Manager	20
2	Female	31-40	Engineer	15	2	Male	31-50	Manager	18
3	Male	41-50	Academic professor	20	3	Female	51-60	General manager	25
4	Male	31-40	Engineer	11	4	Male	51-60	General manager	28
5	Female	31-40	Engineer	13	5	Female	41-50	General manager	21

Figure 2. The influential weight of context and barriers



3.3 Asses the Interaction among Barrier Factors: DEMATEL Analysis

DEMATEL analysis reveals the cause-effect relationship as well as the interaction of barrier factors to the digitalization process. Accordingly, table 3 shows that technological context and organizational context are the causes group because their r-c value is greater than 0. Environmental context belongs to the Effect group because its values in the analysis are less than 0. The results of the DEMATEL analysis method also show up to 5 barrier

factors: the causes group and three factors that belong to the Effect group. These factors all interact with each other.

4. Discussion and Implication

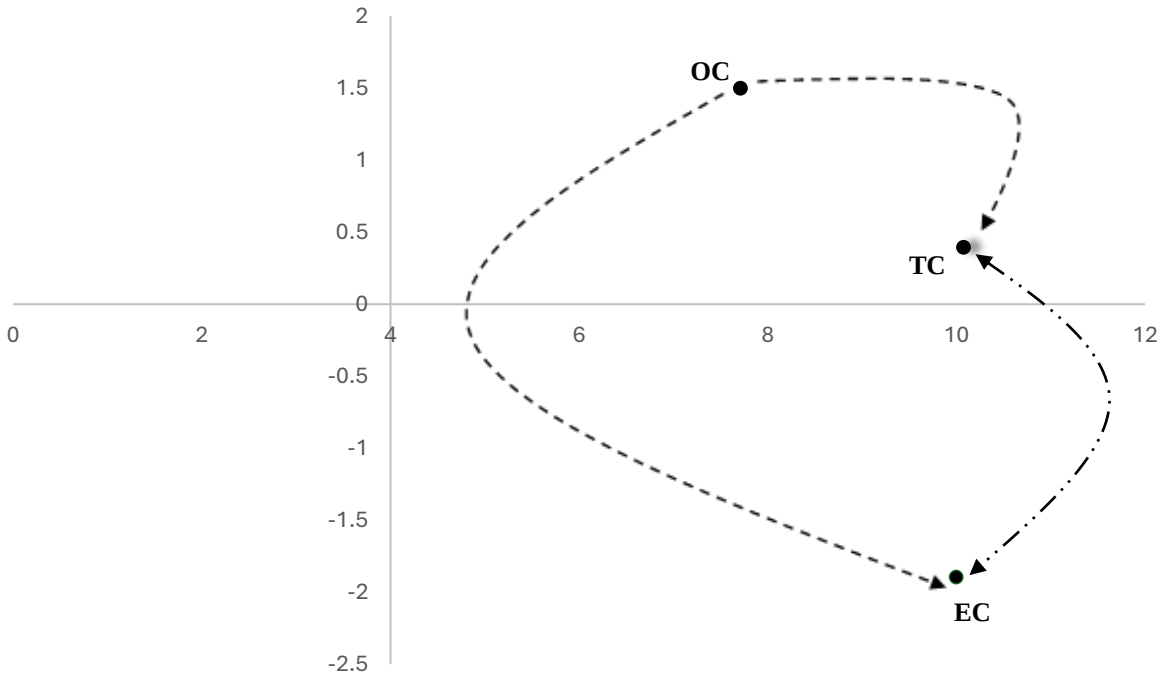
4.1 Discussion

Table 3. Total relation and influence matrix for Context

Context	TC	OC	EC	Sum=r_i	r+c	r-c
TC	1.61	1.26	2.37	5.24	10.08	0.39
OC	1.66	0.89	2.05	4.61	7.71	1.50
EC	1.58	0.95	1.53	4.05	10.00	-1.89
Sum=c	4.84	3.11	5.95	Threshold value = 1.54		

This study shows that the technological context is a much more strategic barrier than the organizational context and environmental context. The results of this study are similar to research showing that the technological context is always a problematic factor when applying mobile technology to tourism companies in Taiwan (Lin, 2017). However, this result contradicts the result that the environmental context is the leading cause of barriers to innovation through technology in small and medium-sized enterprises in India (Nimawat and Gidwani, 2022). The reason for this is that Taiwan is a developed country with abundant financial and technological resources; the government is always interested, so the number of personnel to carry out innovation is always ready, thus becoming the most significant obstacle that makes Taiwanese businesses afraid of the digitalization process comes from environmental and market factors as well as the growing elderly population here. In contrast, in developing countries, factors related to technology and organization are always significant barriers hindering the operating process based on digitalization. In addition, the results of this study also imply that the Technological context is the most important barrier (0.565), followed by barriers coming from the organizational context (0.265) and, finally, the environment context (0.080). Based on the result, managers understand that support from technology and within the organization is necessary to handle this digitalization process.

Figure 3. Cause – effect diagram for criteria



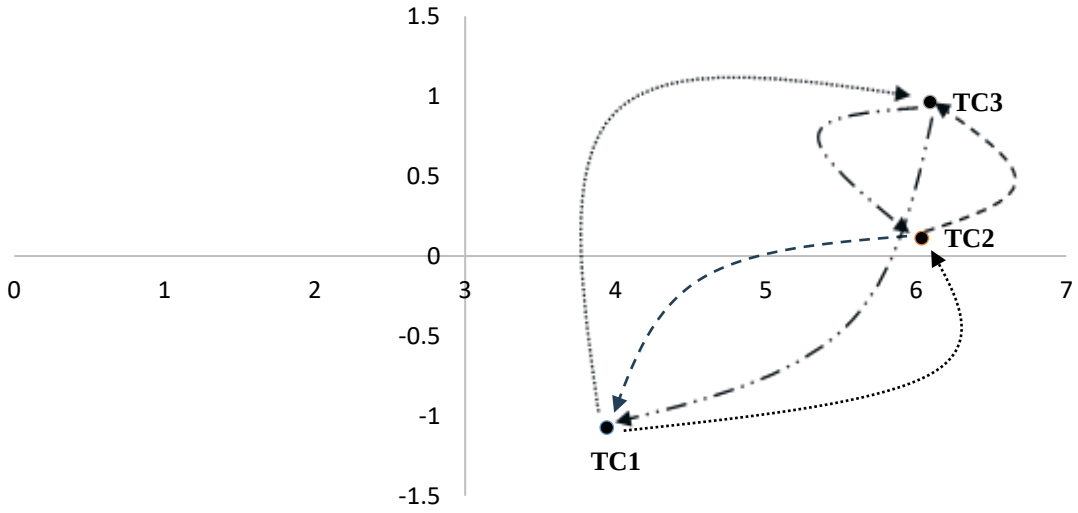
Previous studies have aimed to identify essential factors capable of promoting the digitalization process in the tourism industry (El-Gohary, 2012; Lin, 2017) (34). These studies revealed that the variables in this study are independent. However, the digitalization process in businesses is a multi-dimensional transformation process and requires the support of many stakeholders. Ignoring the interaction between these variables can lead to bias or insufficient precision in the study. As the results of the DEMATEL analysis imply that the contexts of the digitalization

process are interrelationships and impact each other, Figure 3 shows that the technological context and the environmental context are in the group of causes that both have an impact on the environmental context. Meanwhile, the environmental context belongs to the effects group and directly impacts the technological context. According to the results of this study, the digitalization process will have significant barriers coming from the technological context and the organizational context. When these issues are resolved, they will positively affect the environmental context.

Table 6. Total relation and influence matrix for Technology context

Technology context	TC1	TC2	TC3	Sum=r_i	$r+c$	$r-c$
TC1	1.20	1.40	1.60	4.20	8.20	0.20
TC2	1.20	0.90	1.10	3.20	7.20	-0.80
TC3	1.60	1.70	1.30	4.60	8.60	-0.60
Sum=c	4.00	4.00	4.00	Threshold value = 0.89		

Figure 4. Cause – effect diagram for sub-criteria (Technology context)

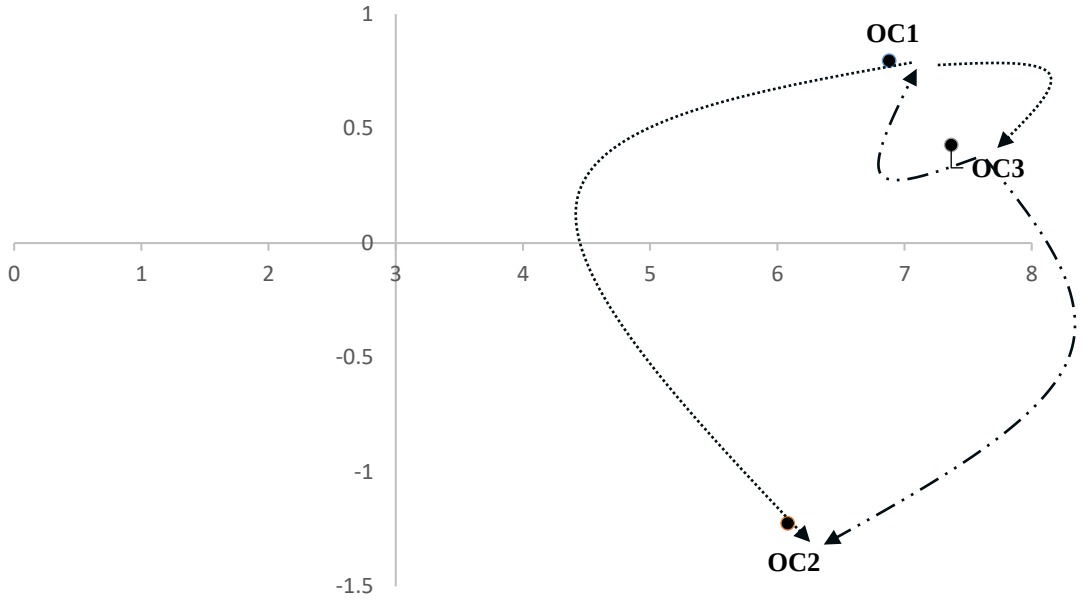


The technology context is considered one of the biggest barriers affecting the digitalization process in small and medium-sized hotels in Vietnam. This result implies that innovation that occurs when organizations overcome barriers from the technological context is an appropriate strategy. The technological context includes Data security (0.386), IT Infrastructure (0.165), Cuture and Risk (0.104). According to the AHP analysis, they are ranked first, second, and sixth out of 9 factors that are barriers to digitalization. Figure 4 also reveals that Data security belongs to the cause group and directly and indirectly impacts the factors in the Effect group, namely IT Infrastructure and Culture and risk. This result shows that the biggest barrier to digitalization is ensuring information security for customers and small and medium-sized hotels in Vietnam. Besides, Technology infrastructure and innovation culture are factors that influence interrelationships.

Table 7. Total relation and influence matrix for Organizational Context

Organizational context	OC1	OC2	OC3	Sum=r_i	$r+c$	$r-c$
OC1	0.22	0.40	0.59	1.20	2.14	0.25
OC2	0.32	0.15	0.27	0.74	1.89	-0.41
OC3	0.41	0.60	0.25	1.26	2.37	0.16
Sum=c	0.95	1.15	1.10	Threshold value = 0.36		

Figure 5. Cause – effect diagram for sub-criteria (Organization context)

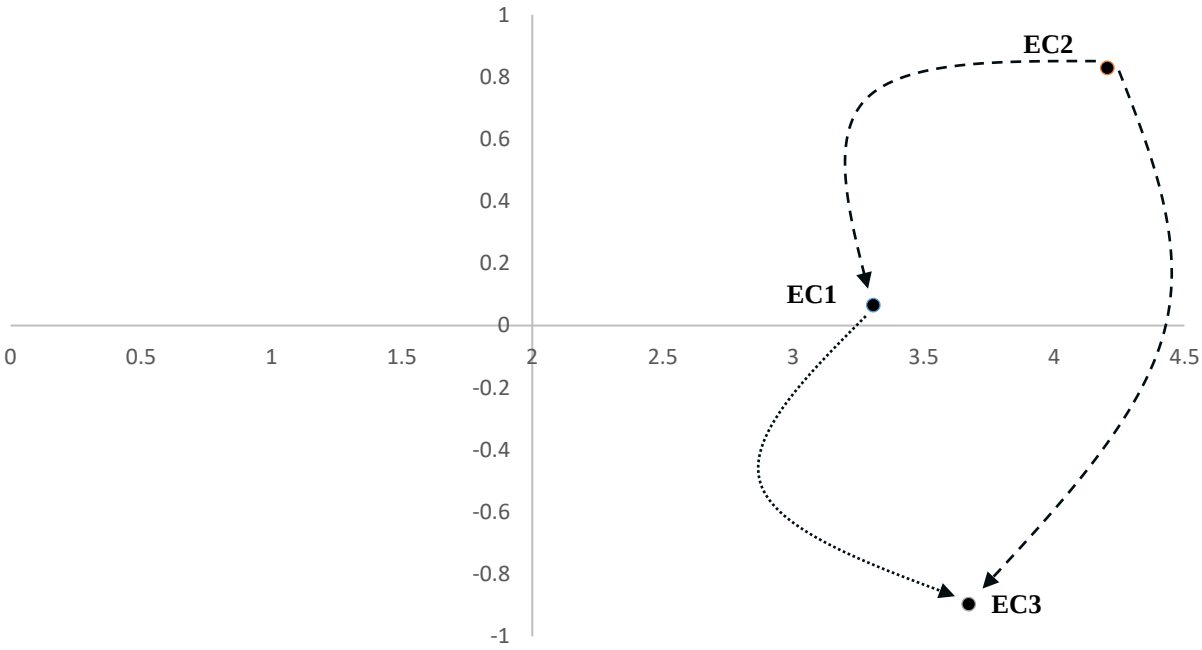


According to experts, the environmental context is the second most significant barrier affecting the digitization process of the hotel industry. The three main factors of the organizational context are Skilled digital workforce (0.121), Financial resource (0.110), and Top management (0.033), which respectively ranked fourth, fifth, and eighth out of 9 factors considered barriers to the digitalization process. As shown in Figure 5, the Skilled digital workforce is regarded as the main factor belonging to the cause group that impacts the effect group, including barriers such as Financial resources or top management. This result is entirely consistent with the empirical evidence of previous studies (Lian *et al.* 2014; Rahayu and Day, 2017) that barriers to meeting IT financial and human resources are barriers are more important than the vision and support of senior leaders in the organization. At the same time, the results of this study are also entirely consistent with previous results that show that human resources that meet technology standards are a significant obstacle in promoting the digitalization of operations and business in major hotels in China and Singapore (Lam and Law, 2019; Molinillo and Japutra, 2017). Financial resources and technology personnel are the core elements with the most significant impact in the organizational context, so prioritizing available financial resources to fund digitalization and finding talented personnel is strategically suitable to improve the effectiveness of the organizational context for SMH digitalization in Vietnam.

Table 8. Total relation and influence matrix for Environment context

Environmental Context	EC1	EC2	EC3	Sum=r_i	$r+c$	$r-c$
EC1	0.36	0.60	0.73	1.69	3.31	0.07
EC2	0.83	0.56	1.13	2.52	4.20	0.83
EC3	0.43	0.53	0.43	1.39	3.67	-0.90
Sum=c	1.62	1.69	2.28	Threshold value = 0.62		

Figure 6. Cause – effect diagram for sub-criteria (Environment context)



The environmental context is a relatively small barrier to the digitalization process of small and medium-sized hotels in Vietnam. As mentioned in Figure 2, Competition (0.139), Supplier and Customer (0.074), and Policy and regulation (0.026) are ranked third, seventh, and ninth, respectively. These factors are arranged in order of weight influence. Also, according to Figure 3, pressure from competitors, customers, and suppliers are factors in the group of causes causing the main obstacles to the digitalization process. This result is consistent with previous studies revealing that consumer influence (Leung *et al.* 2015; Sima *et al.* 2020) or supplier dependence (Okumus *et al.* 2017; Yang *et al.* 2021) is the most challenging factor for digital business. Therefore, the digitalization process is affected by environmental factors such as competitors or product suppliers.

Most previous studies only focused on identifying essential and influential factors in the digitalization process in the hospitality and tourism industry. However, these studies assume that these critical factors are independent. Because business digitalization is a multi-stakeholder and multi-dimensional transformation process that impacts and is influenced by many factors, these factors interact. Policymakers, hoteliers, and researchers should consider the influence and interaction between factors as a theoretical framework for planning, organizing, leading, and controlling hospitality digitalization.

4.2 Implication

After identifying the strategic barriers and interactions of contexts based on the TOE theoretical framework, the result reveals that the priority is to overcome the primary contexts and factors challenging the adoption of digitalization as the most optimal mode of operation. In this study, technological context and organizational context are considered the main barriers, besides factors such as Data security, IT Infrastructure, Competition, Skilled digital workforce, and Financial resources. Therefore, small and medium-sized hotels need to activate digital capabilities to optimize production and business activities, so they should apply a strategy that focuses on overcoming gaps in technology, human resources, and technology infrastructure.

Customers increasingly value a sophisticated digital experience, with younger guests and business travelers, in particular, considering integrating the latest technologies in hotels as essential. These technologies span from artificial intelligence, big data analytics, and cloud computing to flexible property management systems, the Internet of Things, and immersive experiences through virtual and augmented reality. Among the myriad of tech trends, digital channels and online travel agents stand out for small and medium-sized hotels (SMHs), offering a cost-effective way to amplify their marketing efforts. Moreover, hotels can leverage customer-centric technologies like electronic customer relationship management systems to enhance operation outcomes. This includes securing a larger market share, reaching new markets, and boosting customer satisfaction and loyalty. Pursuing these marketing advantages primarily drives the push toward digitalization in SMHs. However, financial limitations pose

a significant barrier to their digital transformation efforts. Government intervention through financial and non-financial support is deemed necessary to overcome this. Tailored funding models and digital support channels that simplify the search for funding instruments are recommended to facilitate more accessible access to resources for SMHs, enabling them to embrace digitalization rapidly. This study also implies emphasizing customer-centricity and ensuring the stable operation of a small and medium-sized hotel, with the necessary priority to improve customer experience. In addition, prioritizing digitalization will help hotels optimize costs and personnel and promote the hospitality's image on tourism platforms to attract more new customers. Small and medium-sized hotels must always focus on several factors to overcome to activate the digitalization process successfully and consider it a suitable strategy to survive in a fiercely competitive market.

Conclusions and Further Research

In conclusion, tourism's significance in developing countries' economic bones cannot be overstated, with the hospitality industry as a critical promotion in this growth process. This industry, predominantly comprised of small and medium-sized hotels, plays a crucial role despite the intense competition posed by more prominent five-star hotels or famous resorts. The emergence of digitalization offers these smaller entities a transformative tool, potentially leveling the playing field by enhancing operational efficiencies and customer service. The findings of this research contribute vitally to the existing literature by providing a stabilized theoretical framework that enriches management and equips top managers with innovative perspectives and appropriate strategies. This framework is designed to aid managers in navigating the complexities of the competitive landscape, ensuring the sustainability and development of small to medium-sized hotels. Emphasizing a harmonious strategy that integrates digital tools with traditional hospitality management, this study underscores the potential for resilience and growth in a sector critical to developing countries.

Digitalization for small and medium hotels helps optimize operational efficiency and save operating costs, and especially customer-centricity will help improve the service experience (Iranmanesh *et al.* 2022). Hotels need to determine a suitable strategy to survive with 5-star hotels and large resorts, so increasing the number of customers and maintaining business growth is essential. However, identifying the main barriers and factors that hinder the digitalization process will help small and medium-sized hotels focus their resources on overcoming them to enable the digitalization process. Based on the TOE framework, this study evaluates and prioritizes the level and direction of influence of the three contexts as well as their essential barriers. Following the combined analysis of AHP and DEMATEL, this study identifies the context, critical factors, and primary causes. Context and primary factors are valuable in identifying barriers to digitalization today, while core causes are relevant for building and implementing a long-term digitalization strategy.

The study's results contribute a new dimension of awareness to the tourism industry; however, it still has some limitations. This study only focuses on identifying barriers to digitalization for small and medium-sized hotels in Vietnam, while large 5-star hotels have financial resources. The barrier factors, human resources, and technology can be completely different. Future research could apply this study's conceptual and analytical framework to large hotels. Such comparative analysis can lead to a deeper and broader understanding of hotel digitalization. In addition, future studies could use other approaches to assess the importance of barriers to digitalization and make more extensive use of interview participants to receive more accurate feedback on research results using MCDM methods.

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Declaration of Competing Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The author declare that he has not used generative AI and AI-assisted technologies during the preparation of this work.

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The Interconnection of Rural Tourism Development with Local SMEs: The Potential of Startup Business Networking in Southern Malang Indonesia

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Abstract: The purpose of this research is to assess the performance of rural tourism destinations and local small and medium enterprises (SMEs) while exploring their potential for integrated tourism destination development in the Southern Malang region. The research employs an action research case study approach where numeric data are generated through the distribution of Likert-scale questionnaires and analyzed using clustering. The results of the clustering are described using SWOT analysis, which aims to identify prospects and the levels of development for tourism destinations and SME performance. The stages involved are as follows: problem or issue identification, action planning, action implementation, data collection during or afteraction implementation, data analysis and result evaluation, reflection and reconsideration of the actions taken, and decision-making regarding subsequent steps based on the evaluation results. The research findings indicate that the level

of rural tourism in the Southern Malang region falls into the pioneering category with a limited variety of destinations. This is attributed to the insufficient infrastructure and the lack of standout rural tourism products, as well as the limited supporting infrastructure such as roads, bridges, information centers, souvenir shops, and weak cellular signal coverage. Additionally, community awareness and support are relatively lacking in contributing to tourism development, and the regional government's support, in terms of institutional establishment and investment actions, is still in its infancy. SME performance shows better progress compared to the advancement of the tourism sector. Thus, if the tourism sector can develop, it has the potential to enhance the performance of local SMEs. The contribution of the rural tourism sector in Southern Malang to economic growth and the development of SMEs is still relatively insignificant. SMEs have grown with limited technology application, and their market areas are predominantly local. The innovation's contribution to increasing income in the Southern Malang region will be evident through increased tourist numbers, sales of SME products, and enhanced competitiveness of the region in the tourism and business markets. In this context, it is essential for the government, businesses, and local communities to collaborate in developing sustainable innovative strategies.

Keywords: rural tourism potential; local SMEs; startups; Southern Malang.

JEL Classification: Z32; O31; O15; O21; O35; R11.

Introduction

In accordance with the Republic of Indonesia Law Number 10 of 2009 concerning the tourism sector ("UU No. 10 Tahun 2009," n.d.), tourism encompasses a wide range of leisure activities supported by diverse facilities and services provided by various stakeholders, including the public, entrepreneurs, government, and local authorities. Many businesses and individuals are enthusiastic about optimizing the development and management of tourism by offering facilities and infrastructure conducive to the tourism sector. Furthermore, the development of tourism critically depends on the active involvement of the local community, requiring meticulous planning to ensure the effective promotion of tourism products and the attraction of tourists.

The development of tourist destination areas is contingent on the existing tourism potential, both physical and non-physical (Desembrianita *et al.* 2021). Several factors can be employed to assess the potential of a tourist area, including climatic conditions, geology/geomorphology, hydrology, land characteristics, flora and fauna, local culture, historical structures, community activities, recreational amenities, human resources, and more. In the context of tourism development, it is vital to consider the geographical and cultural attributes surrounding the tourist location to ensure harmony and sustainable development in the environment. Moreover, development initiatives should actively involve the local community to ensure that the development yields benefits and advantages for them.

The tourism potential in the East Java region, particularly in Southern Malang, Malang Regency, is substantial, primarily in the form of natural attractions. The development of rural tourism potential in Southern Malang is intricately connected to the growth of local Small and Medium Enterprises (SMEs), particularly through a startup business networking model. Rural tourism presents numerous opportunities for local SMEs to collaborate and cultivate products and services that align with the requirements of tourists. Via business networking, startup entrepreneurs can mutually support each other in sourcing raw materials, cooperative marketing, and knowledge sharing. For instance, local food producers can establish partnerships with accommodation providers or travel agencies to offer culinary tourism packages. Conversely, handicraft artisans can collaborate with souvenir shops in the area. Consequently, business networking models of this nature serve to invigorate the local economy, generate employment prospects, and enhance the competitiveness of SMEs in the rapidly expanding tourism sector.

In utilizing local resources, collaboration and synergy between rural areas and local Small and Medium Enterprises (SMEs) are essential. Local SMEs can make use of local resources, while rural areas gain new economic opportunities through SMEs. Such collaboration can also enhance networking and knowledge exchange among various stakeholders. Furthermore, in the utilization of technology, the potential to transform how rural areas and SMEs operate in the digital era can be improved. This can promote the use of digital technology, such as e-commerce, production tracking, and online marketing, to enhance the competitiveness and accessibility of local products. However, activities aimed at empowering local potential and communities require policy support from the government and relevant institutions that facilitate cross-sector cooperation. Approaches and programs to build productive villages integrated with local SMEs are not only about economic growth but also about strengthening the local community, preserving cultural heritage, and promoting inclusivity. Empowering rural areas and local SMEs have the potential to create long-term positive impacts in addressing economic inequality and improving the quality of life for local communities.

According to (Susyanti 2013), tourist villages represent one form of alternative tourism that can drive sustainable development in rural areas. The principles of their management include: (1) using facilities and

infrastructure existing in the local community, (2) providing economic benefits to the local population, (3) maintaining a small scale to allow cooperation with the local community, (4) actively involving the local community's participation, and (5) developing rural tourism products. The development of rural tourism can have a positive impact on the local economy by offering opportunities for local SMEs to develop products and services that cater to the needs of tourists, economic empowerment, cultural preservation, and infrastructure improvement. Collaboration between rural tourism and local SMEs can create mutually beneficial synergy and contribute to economic growth and rural sustainability.

One of the areas in the Malang Regency that assesses the performance of rural tourism and local SMEs, as well as their contribution to increasing local income, is in the Gedangan District. Gedangan District is located in the southern part of Malang Regency, East Java, Indonesia, approximately 29 km from the capital of Malang Regency. Geographically, Gedangan District consists of 40% flat and undulating land and 60% hilly terrain. It is situated at an average elevation of 350 meters above sea level, with temperatures ranging from 22 to 29 degrees Celsius. The annual rainfall is approximately 1,690 mm, and the total area of the district is 20,171 hectares. Gedangan District shares its boundaries directly with Pagelaran District to the north, Sumbermanjing Wetan District to the east, Bantur District to the west, and the Indian Ocean to the south.

The concept of tourist villages is intrinsically linked to the competitiveness of the tourism sector, as emphasized by (Martaleni *et al.* 2021). Tourism competitiveness, defined by (Chin and Hampton 2020), signifies the ability of a tourist destination to compete with other similar destinations, which is a pivotal determinant of a destination's success. The assessment of tourism competitiveness remains a subject of ongoing discourse, encompassing both economic and tourism management perspectives. Various aspects of tourist destinations, which influence their allure, can significantly impact tourists' decisions to visit. Nonetheless, (Martaleni *et al.* 2021) discovered, through a study in a tourist village, that direct accessibility did not exert a noteworthy influence on tourists' motivation. In contrast, the direct relationship between facilities and the destination's appeal substantially influenced visitor decisions. In other words, factors determining accessibility, such as ease of access, road quality, travel duration, and the availability of public transportation within the tourist village, did not affect tourists' motivation to visit.

Tourist village destinations often boast unique key resources and attractions, generating a strong appeal for visitors. The success of these destinations is profoundly influenced by the extent to which tourism attractions can motivate and satisfy visitors. (Schiffman, Clifford, and Buonaguro 2009) indicates that when tourists are captivated by the compelling primary attractions of a tourist village destination, their motivation to visit significantly increases.(Yoon, Gursoy, and Chen 2001) assert that to create a competitive destination, quality service and satisfying experiences are indispensable in capturing tourists' interest. Tourists' motivation frequently arises from their desire to undergo a distinctive tourism experience, acquire insights into local culture and traditions, relish favorable weather and natural landscapes, seek respite from their daily routines, forge social connections, and contribute to the sustainable advancement of the tourist destination. These motivations necessitate effective and coordinated management within tourist village destinations.

The novelty and importance of this study is the clustering and SWOT analysis. The findings from the clustering and the SWOT analysis give a picture of the entire landscape as it depicts strengths, weaknesses, opportunities and threats of rural tourism destinations and SMEs in the region. The assessment provides the understanding of the opportunities rural tourism offers to the economic impact and the SME especially in the Southern Malang which is part of the sustainable development. For the collaborative strategy development can be assumed that the key emphasis of the study is made on the necessity to mobilise the government, enterprises, and local stakeholders to collectively devise effective and environmentally friendly solutions for rural tourism advancement and SMEs support.

The management of tourist destinations within tourist villages encompasses planning, regulation, administration, and oversight of various facets linked to the development and governance of the destination. Evaluations by (Morrison, Cheah, and Kumar 2024) and (Dwyer and Kim 2003) gauge the efficacy of destination management by assessing the destination's capacity to provide a positive tourism experience, preserve the environment, and excel in communication and promotion to tourists. The assessment of a tourist destination is essential for policymakers and planners, destination managers and their teams, researches, as well as business collaborators. This is the case since a tourist destination refers to the heart of tourism, and thus, its development must be compatible with other attractions. To this end, quality place or destination is defined under perception of security, sanitation and health, and respect of the environment and human rights. In sustainable tourism, the evaluation process is very important to show that the tourism development has a positive impact. This calls for an appropriate strategy in the development of human resources in the tourism industry especially the developing world.

A positive image cultivated in this manner can augment the destination's allure, influence tourists' decisions to visit, and create gratifying experiences. Competent and successful management of tourist village destinations can bolster the destination's favorable image. (Sharma and Nayak 2019) identified a substantial correlation between destination image, encompassing cognitive and emotional aspects, and the overall image's influence on behavioral intention. Meanwhile, (Akama and Kieti 2003) contended that the overall image is more prone to influence tourists' decisions than cognitive and emotional images. Nevertheless, research by (Utami *et al.* 2020) suggests that cognitive and emotional images also play a substantial role in shaping the overall image, particularly since the presence of a welcoming environment is a pivotal factor in forming a positive connection with the emotional image.

A tourist destination requires the capacity to attract the interest of tourists, with a focus on primary resources and key attractions as fundamental components shaping the tourist destination, tourism services, public infrastructure, conditions, and supporting factors; and destination management, particularly in rural areas. Therefore, this article aims to examine how the development of rural tourism potential is related to local Small and Medium Enterprises (SMEs) in the Southern Malang region and also explore the business networking models used by startups in that area.

1. Literature Review

1.1 Community-Based Tourism

Community-based tourism plays a crucial role in assisting government authorities in the creation of employment opportunities and the alleviation of poverty within local populations (Pusiran and Xiao 2013). This approach also contributes to income generation within communities. The central concept revolves around empowering communities to develop initiatives that foster sustainable growth and cultivate positive interactions between local residents and tourists. The implementation of such tourism necessitates the amalgamation of attraction management, hotel management, restaurant management, and other facets of facility management, potentially involving local Small and Medium Enterprises (SMEs). Additionally, infrastructure, healthcare, education, and environmental considerations are pivotal elements in this context (Briedenhann and Wickens 2004)

Community-based tourism represents a comprehensive community engagement approach in the development of tourism destinations (Briedenhann and Wickens 2004). This approach is rooted in the recognition that tourism planning exerts a pervasive influence on the entire community. For instance, the local community's sentiments concerning the environment, infrastructure, and events significantly impact the overall tourist experience in Indonesia. Indonesia has a long history of fostering community-based tourism, reflecting a development paradigm that originates "from," is executed "by," and is oriented "to" the people across various dimensions of the nation's life, encompassing political, socio-economic, and cultural facets. In the era of decentralization, local governments have intensified their efforts to oversee development programs geared towards poverty alleviation. These government-initiated programs are disseminated across diverse regions through both short-term and long-term strategies.

One illustrative case is Sumberejo Village, situated in the Gedangan District of Malang Regency, which has emerged as a cornerstone of community-based tourism with a specific focus on preserving its cultural heritage and leveraging the local wisdom inherent in its SME products. Community-based tourism in Sumberejo Village, Gedangan District, Malang Regency, manifests as a variant of tourism that concentrates on safeguarding and harnessing the cultural heritage, traditions, and indigenous knowledge retained by the local community. It encompasses a spectrum of local wisdom aspects, including traditions, artistic expressions, culinary heritage, agricultural practices, and the daily life of the village. Sumberejo Village's community-based tourism encompasses customs like traditional handicrafts, traditional dances, and indigenous music.

The underlying aim of community-based tourism is to empower the local community by actively involving them in the development and management of tourism, the preservation of cultural heritage and traditions, the creation of economic opportunities for the local populace, and the provision of valuable and authentic experiences for tourists seeking to immerse themselves in the local way of life and culture (Aini *et al.* 2023). Moreover, community-based tourism has the potential to play a pivotal role in environmental preservation and the advancement of sustainability in the realm of tourism development within the region.

1.2 The Concept of Community Resilience

In this study, community resilience refers to the capacity of a community to establish and maintain its initiatives effectively. It is crucial for the community to learn how to safeguard and enhance essential aspects of their livelihood. In rural areas associated with rural tourism, communities can transition from precarious employment

situations to more stable ones. They can establish businesses or become involved in the rural tourism industry. Furthermore, individuals within the community play a pivotal role, with experts providing guidance. Every family member or village resident, with their diverse skills, talents, and age groups, can contribute to strengthening the community. Parents bring their experiences and lessons from the past, while the younger generations bring enthusiasm and fresh ideas.

For instance, community resilience tourism in Gajahrejo Village, Gedangan District, Malang Regency, focuses on developing the tourism sector while considering the interests and welfare of the local community. This concept emphasizes the utilization of natural resources and local economic potential to improve the quality of life for the local population while preserving and conserving the existing environment and culture. With its beautiful and captivating beach, the village can harness the tourism potential of the coastal area by training individuals to become tour guides or by managing beachside eateries. Another valuable resource is banana cultivation, which is one of the strengths of the local economy. This type of tourism is categorized as agro-tourism. Tourists can visit banana plantations, learn about the cultivation process, and purchase banana products. This also helps banana farmers increase their income. Another advantage is cattle farming. The community resilience tourism concept may encompass visits to cattle farms, including participating in activities such as feeding the cattle. These concepts aim to support the local economy, create employment opportunities, and strengthen the village community. Furthermore, this approach promotes local environmental and cultural sustainability, thereby ensuring the long-term appeal of Gajahrejo Village to tourists.

1.3 Concept of Sustainable Tourism

The concept of sustainable development entails the idea that regional progress can be achieved without causing harm to the natural environment (Wei *et al.* 2024). The term sustainable development therefore presupposes that regional advancement is possible without compromising on environmental degradation. This concept entails social, economic, and environmental sustainability since they are integrated components of development. It means, thus, that sustainable development is accomplished when the demand of the present fulfills consumption without undermining the possibility of the generations to come to satisfy the same. This approach acknowledges that the natural environment has a carrying capacity as far as human activities are concerned and that taking the natural resource beyond this limit results in negative impacts such as destruction of the natural habitat, loss of species' bio-diversity and effects on the climate.

The concept of sustainable tourism in the South Malang region pertains to the efforts aimed at developing the tourism industry in this area while taking into consideration environmental, economic, and social sustainability. Several critical aspects within this concept encompass environmental preservation, with a focus on biodiversity conservation, natural resource management, and endeavors to mitigate the adverse impacts of tourism on the environment, such as pollution, ecosystem degradation, and global warming. Additionally, the emphasis on empowering the local community involves their engagement in the tourism industry, whether as tour guides, culinary entrepreneurs, or producers of local handicrafts. In this context, it is essential to ensure that the tourism sector provides equitable economic benefits to the local community, including employment opportunities, income enhancement, and the development of small and medium-sized enterprises. The application of the concept of sustainable tourism in the South Malang region is crucial for the long-term growth of the tourism sector while preserving the natural and cultural appeal of this region and improving the well-being of the local population.

1.4 Tourism Components

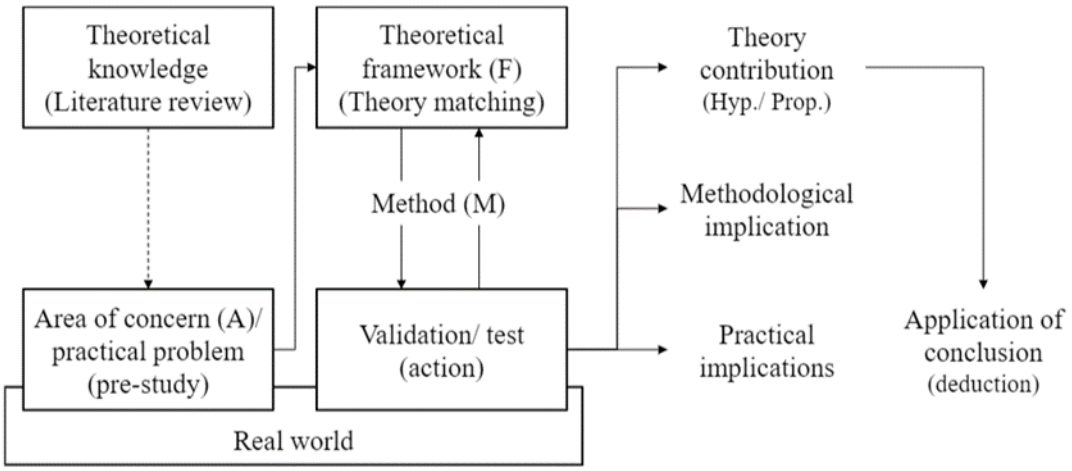
According to (Middleton and Clarke 2001), there are three primary elements that constitute a tourism product. First, tourist attractions, which encompass all the appealing aspects of a place that make people want to visit. These can include various attractions at the destination, such as beaches, mountains, or historical buildings. Second, amenities or facilities, which include all the services and facilities that enhance the comfort of travel, such as information centers, restrooms, or waste disposal facilities. Destinations that have attractions but lack facilities may not attract many tourists, and conversely, destinations with numerous facilities but few attractions may not be bustling. Third, accessibility, which signifies how easy it is to reach a destination. This involves readily available information, good road conditions, and a comfortable end to the journey (Cavlek 2002).

There are also other elements that influence the tourist experience, such as infrastructure (e.g., roads and public transportation), equipment (size and speed of transportation), operational factors (e.g., routes and prices), and government regulations (transportation regulations). All of these elements affect the cost, convenience, and pleasure of a traveler's journey.

2. Method

The research approach employed an action research case study methodology. Numeric data was generated through the distribution of Likert scale questionnaires and analyzed using clustering techniques. The descriptive outcomes were subjected to SWOT analysis to ascertain the position of the tourism destination and the performance of SMEs. The phases involved in the research encompassed the identification of issues or problems requiring resolution, the planning of actions to be undertaken, the execution of these actions, data collection during or after the implementation of actions, data analysis and result evaluation, reflection, and reconsideration of the actions taken, as well as decision-making regarding subsequent steps based on the evaluation outcomes. Field visits to selected villages, such as Sumberejo, Segaran, Gajahrejo, Tumpakrejo, Sidodadi, and Pagelaran, were conducted to observe the current situation and available facilities.

Figure 1. Conceptual Overview of Abductive Approach



Source: (Halecker 2015a)

Figure 1 highlights several significant advantages of the "action research case study" research concept *(Halecker 2015b)*. Firstly, this research approach enables researchers to test theories in real and natural settings, rather than in controlled laboratory environments. Secondly, the research outcomes can provide practical solutions to the issues at hand and contribute to proposed changes in existing theories. Thirdly, this method allows for a deeper information collection due to direct interactions with the people and situations under investigation. Fourthly, the approach permits small-scale changes within organizations through planned interventions. Fifthly, due to its specific issue-oriented focus, this research has a shorter time span. Sixthly, researchers can actively engage in practical projects without having to be the sole decision-makers. Seventhly, stakeholders and participating organizations in this research also gain new insights and can discover solutions to their practical problems.

3. Result and Discussion

The Small and Medium Enterprises (SME) program in South Malang plays a vital role in rural tourism development by fostering interaction between visitors and local communities. Local residents can provide services such as village tours, sell handmade crafts, or offer local cuisine. This creates additional business opportunities for those not directly involved in SMEs. These business operators also play a crucial role in the success of SMEs in the region, although their contributions are not always immediately visible. The income earned by SME operators in South Malang provides financial motivation for them to focus more on their businesses. This additional benefit is not only enjoyed by the operators but also by villagers not directly engaged in SMEs. The local economy is further stimulated, and the benefits are felt more broadly. The SME program in this region is not just about earning extra income but also about the development of entrepreneurial skills (Winarno and Agustina 2022) in the tourism sector. In the tourism industry, exploration and social interaction can motivate communities to engage in interactions with tourists and destination management.

The key success factors for any program in South Malang, such as local SMEs, are leadership, unity, and improved understanding among the community. These conditions enhance ownership and pride. The more motivated local communities are to actively participate in the program, the more prepared they are to engage actively. If local communities are not ready to participate actively, third parties can influence the established

patterns, potentially leading to external dominance in business development, such as SMEs (A. Winarno *et al.* 2018). This indicates that the "grassroot community-based" approach can have a positive impact accepted by the local community, increasing the likelihood of success in rural tourism development programs.

The benefits that local communities in South Malang obtain through programs such as SMEs can vary depending on how they engage in the program and how they respond to economic and business developments in their community. According to (Pusiran and Xiao 2013), the impact of SME programs and rural tourism potential can differ based on factors such as the comparison between business activities and local community activities, economic, social, and environmental conditions around businesses, similarities or differences between local communities and business stakeholders, and effective program management and supervision.

Table 1. Tourism Potential Villages in Gedangan Subdistrict, Malang Regency

No.	Description	Explanation		
1	Number of registered SMEs	Year		
		2021	2022	2023
		203	265	305 (50 are active)
		SMEs – still in the production process (banana chips; tempeh; batik; golden crispy cakes)		
2	Number of Registered Tourist Destinations by Category	Beaches (Ungapan; Bajul Mati; Parang Dowo; Kangen; Batu Bengkung; Ngudel; Nganteb; Wonogoro; Jelangkung) Mountains (Coban Nirwana; Goa Perawan; Susur Sungai)		
3	Tourist Potential Villages (Categories)	In the Gedangan District, there are eight villages, each of which possesses tourism potential: 1. Sumberejo Village (Mount Gede, Cultural Arts, Local Wisdom of SME Products, HomeStay) 2. Segaran Village (Rest Area at Mount Walikukun, Sumber Loo Bathing Spot, Culinary Tourism, Banana Cultivation, Pot Flower Production) 3. Gajahrejo Village (Beach, Banana Cultivation, Shrimp Farming, Cattle Farming, 4. Fertilizer Production) 5. Tumpakrejo Village (Nganteb Beach, Cultural Heritage, Local Wisdom) 6. Sidodadi Village {Virgin Cave, River Trekking) 7. Pagelaran Village (Pottery, Art and Culture) These villages, collectively, offer diverse tourism potentials that encompass natural, cultural, and local elements, contributing to the development of the tourism sector in the region.		
4	The policies of the Gedangan District government related to Village Tourism and Micro, Small, and Medium Enterprises (MSMEs)	- The number of destinations and their categories remains a proposed activity submitted by the sub-district head in the village innovation program. - There has been no tangible realization and limited intensity due to the research participants' human resources not being able to maximize their potential. - A robust cultural organization has been established in one of the villages (Sumberejo Village). - The networks formed are still unidirectional; hence, active mentoring from specific parties is required.		
		PRIORITY PROGRAM Collaboration with the State University of Malang for branding a beach tourism project scheduled for August, with the following activity plan: 1. Cultural performances and local wisdom of the community involving prominent figures and formal and non-formal educational institutions. 2. Empowerment of SMEs through product exhibitions/bazaars as a means of developing and expanding the marketing of community products. 3. The activity plan is in the collaborative phase with government agencies, but a final decision has not been reached (communication and informatics; industry and trade; tourism; cooperatives; agriculture; youth and sports).		

Source: Author's own work

Effective collaboration between the local community and village government contributes to the development of SMEs in South Malang. Village governments need to provide support in improving village infrastructure, which also supports rural tourism. Village governments should also establish teams to expedite the development of village tourism, enabling community involvement in regional development. These activities also help promote the

friendliness of the local community as a rural tourism attraction. By utilizing existing natural and cultural resources, communities can develop tourism products without the need for significant infrastructure investment. Overall, rural tourism programs assist in achieving the government's goals of poverty reduction and job creation through SME development (Lestari *et al.* 2020).

The resilience of the community in the South Malang region depends on the community's ability to adapt to changes in the tourism industry, cultural exchanges, and environmental issues. The ongoing process involves how SMEs and rural communities can collaborate in addressing the challenges and opportunities arising in the tourism sector. The challenges faced include rapid advancements in information systems, community mindsets, and limited infrastructure. The South Malang community has a positive willingness to address issues arising from both within and outside the rural community environment. Those with an understanding of cultural identity and adaptability to environmental changes will be more capable of utilizing external financial programs to develop their regions and support local SMEs (Middleton and Clarke 2001).

Findings from previous research indicate that there are several issues to be addressed for the SME and village tourism programs in South Malang to be sustainable and successful. A study conducted by Nor (2010) identified some challenges, which can be categorized into two groups: internal and external challenges. Internal challenges in the South Malang region refer to issues that arise within the community and village tourism operators, typically addressed through internal discussions. Meanwhile, external challenges for this region pertain to factors beyond the community's control. In the context of SMEs and rural tourism in South Malang, this suggests that efforts to maintain the sustainability of village tourism programs must consider and address various challenges originating from both within the community and external factors (Terziev and Arabska 2017).

Table 2. Integrated Model of Tourism Destination Competitiveness

Dimensions of Tourism Competitiveness and Demand	Indikator
Core resources and Key attractor	1) Natural Resources 2) Historical and Archaeological Sites 3) Artistic and Architectural Features 4) Green Areas 5) Cultural Attractions 6) Leisure Activities 7) Local Products
Tourism Services	1) Accommodation Quality 2) Environmentally Friendly Accommodations 3) Food Service Quality 4) Tourist-Oriented Services
Conditioning and Supporting Factor	1) Destination Accessibility and Proximity to Other Tourist Attractions 2) Value for Money in the Tourism Experience 3) Tourism Company Management Capability 4) The Use of Information Technology by Tourism Companies 5) Professional Skill Level in the Tourism Sector 6) Local Residents' Friendliness towards Tourists 7) Safety and Security
Tourism Policy, Planning and Development	1) An Integrated Approach to Tourism Planning 2) Environmentally Friendly Approach to Tourism Development Planning 3) Public Sector Commitment to Minimize Negative Environmental Impacts of Tourism 4) Public Sector Commitment to Minimize Negative Social Impacts of Tourism on Local Communities 5) Public Sector Commitment to Maximize the Economic Impact of Tourism on Local Communities 6) Emphasis on Community Empowerment 7) Public Sector Commitment to Tourism/Hospitality Education and Training 8) Collaboration between the Public and Private Sectors for Local Tourism Development

Source: (Dwyer and Kim 2003)

Based on the indicators in the above table, the destination competitiveness model identifies four main dimensions that also can be measured as influential contributions to the development of SMEs, which are applicable in the South Malang region. Core resources and key attractors involve unique elements such as nature, culture, history, and society that make rural tourism destinations appealing to tourists. Meanwhile, tourism services encompass the quality and quantity of accommodations and the quality of services offered within the tourist destination. Conditioning and supporting factors include destination accessibility, its relationship to other destinations, the presence of local businesses, environmental quality, safety, and the local population's attitudes toward tourists.

From the field findings, it was determined that the appeal of nature, culture, history, and society is crucial in attracting tourists. However, over-reliance on these attractions leads to the over-exploitation of natural and cultural resources, which, in turn, can harm the environment and damage cultural heritage. Furthermore, the development of accommodation and service infrastructure in the South Malang region requires significant investment, which is a constraint for local SMEs with limited financial resources and influence in infrastructure improvement to remain competitive in this regard. Effective destination management is required for better planning, organization, and good management; however, the knowledge and skills are not always available among local SMEs. The lack of management capacity ultimately hinders the development of SME potential in the South Malang region (Agung Winarno and Nadia 2021). Therefore, these four dimensions can enhance destination competitiveness, but they also pose challenges to the development of local SMEs. In the end, wise efforts and collaboration among relevant parties are required to ensure that SME potential can be realized without harming the existing natural, cultural, and environmental resources.

Conclusion

Based on the findings of this study, it is concluded that the tourism situation in the South Malang region is still in its infancy. This is reflected in the limited number of tourist destinations, which need further diversification. The contribution of the tourism sector to the development of SMEs is not yet significant. SMEs have grown relatively with limited technology applications and predominantly local marketing areas. However, these findings provide opportunities for further development. With the right efforts, the potential of this region can be elevated to become a more attractive destination. Although community support is currently relatively weak, awareness of the local tourism potential can be enhanced through the right approach, such as involving the community in the development and promotion of destinations. With strategic steps, South Malang has the potential to become a more diverse and appealing tourist destination in the future.

This study focused on mapping community-based tourism products in the South Malang region, with an emphasis on the potential development of small and medium-sized enterprises (SMEs) in the local context. The research did not investigate the technical operational aspects of existing business networks but rather emphasized their economic implications and potential social impacts. Furthermore, the study considered the challenges and opportunities that arose during the research period. Therefore, the research results may not encompass all changes and situations in the future.

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Credit Authorship Contribution Statement

Agung Winarno: Writing - original draft, Writing - review and editing, Methodology, Data analysis
Desti Nur Aini: Writing original draft, Writing - review and editing.
Norlida Hanim Mohd. Saleh: Writing - original draft, Writing - review and editing.
M. Aris Ichwanto: Conceptualization, Writing - review and editing, Supervision.
Agus Purnomo : Conceptualization, Writing - review and editing, Supervision.
Amalia A. Rahman: Conceptualization, Data analysis

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Exploring Tourists' Experience in Cinema-Induced Tourism through Sentiment Analysis Approach: Case of Ouarzazate Film Attractions

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Abstract: This research aims to explore tourists' experiences in movie-induced tourism in the region of Ouarzazate, the hub of the cinematographic industry in Morocco and Africa to come up with managerial implications that can improve the tourist experience in this region. A sentiment analysis approach was applied to TripAdvisor reviews in English on the three main filming facilities and attractions: Atlas and CLA studios and the film museum in Ouarzazate. The method combined topic modeling and lexicon-based algorithms; an approach based on Natural Language Processing using a Python toolkit to investigate prevailing sentiment among visitors of these touristic sites. The result of our study showed that tourists generally have a positive sentiment towards the region of Ouarzazate. However, the desert still dominates as the primary aspect that attracts tourists to the region, while cinema is a secondary attraction to the majority of tourists. The study is one of the first studies to reflect on the potential of Cinema Induced Tourism in Ouarzazate, Morocco, one of the attractive destinations for tourists and filmmakers, which, despite its potential, does not figure among cinema-induced tourism destinations in the literature.

Keywords: tourism; cinema-induced tourism; Ouarzazate; sentiment analysis.

JEL Classification: Z32;

Introduction

Ouarzazate is one of the five provinces of the Draa Tafilalet region, Morocco. This region is a well-recognized tourist destination worldwide for its desert tours. Owing to its history and geographical location, this province has distinguishing qualities that make tourism and cinema the main pillars of Ouarzazate's economy. This territory is one of the most attractive destinations for tourists and filmmakers as it affords most of the touristic infrastructure in the region in addition to cinema facilities, which is why Ouarzazate annually attracts foreign and Moroccan movie productions. Due to this reputation, the city was nicknamed the Hollywood of Africa. As a meeting point for tourism and cinema, this city has features of a movie-induced tourism destination.

This paper aims to assess the significance of cinema-induced tourism as a potential niche for innovative cultural tourism practices in Ouarzazate. Using the opinion-mining approach, we explored tourist opinions on their experience in movie-induced tourism in this province. TripAdvisor reviews about the main film attractions were

collected and analyzed through combining topic modeling and lexicon-based algorithm techniques based on Natural Language Processing relying on a Python toolkit.

The originality of our study is in exploring the untapped potential and significance of assessing the reputation of a place as a top film tourism destination through visitors' reviews. Ouarzazate has been widely recognized by national professionals in tourism and culture as a significant hub for film tourism. However, obtaining a deeper understanding of the real experiences and viewpoints of visitors through their assessments provides a nuanced perspective on the efficacy of the location as a film tourism destination. The purpose is to evaluate the extent to which Ouarzazate's identity and appeal as a film tourism destination are validated by the testimonies of its visitors. The findings offer valuable insights for the development of appropriate strategies and suitable marketing activities.

1. Literature Review

1.1 Tourism as an Experience

The shift in modern consumer behavior from focusing on the product and service to focusing on the experience makes this latter an essential driver of the economy (Yang *et al.* 2020). Since its first use by Pine and Gilmore (1998), the "experience economy" has gained ground. Many researchers consider it at the heart of different fields of activities, including the hospitality industry, where experience is the core of the whole operation (Sarmiento-Guede *et al.* 2021), as well as a source of value creation (Sorensen *et al.* 2017). After commodities, goods, and services, experience has emerged as the fourth and last step in the "progression of economic value." For Pine and Filmore (1998, p. 98), experience is "not an amorphous construct; it is as real an offering as any service, good or commodity". It is the most influential antecedent that can affect tourists' intentions to revisit a destination (Chang *et al.* 2014); the reason why a good experience would be the best way to commercialize a destination among potential visitors.

The main focus of tourists' Experience while traveling is " visiting, seeing, and living in a different mode of life" of the destination (Stamboulis and Skayannis, 2003, p. 38). In addition to reasoning abilities during visits, previous experiences help tourists give meaning to the Experience they are living (Oliveira *et al.* 2019). Accumulated experiences help tourists classify and rate destinations according to their level of satisfaction. Experience is not only limited to the instant feelings while visiting a destination but extended to the ability of the service to construct an everlasting memory, for the ultimate purpose of an experience is to "create lasting memories that a visitor will reminisce about and will share in respective social networks," (Andrades and Dimanche, 2014, p. 108). Extensive documentation exists in the literature on defining and specifying the factors that create an exciting and memorable experience. Larsen *et al.* (2019) argue that for a tourist experience to be interesting depends on a combination of familiarity and novelty, while Sthapit *et al.* (2020, p. 549) add that different factors significantly influence the "importance and memorability of a tourist's experience: satisfaction, novelty, refreshment, involvement, and knowledge." Beatriz Gómez-Morales *et al.* (2024) state that research on film fan tourists highlights the psychological and sociological aspects of their experiences, particularly at filming locations, where they experience the narrative, fantasize, and create new memories.

Based on the literature, Gentil *et al.* (2007, p. 397) defined customer experience as "an evolution of the relationship between the company and the customer. The Customer experience originates from interactions between a customer and a product, a company, or part of its organization, which provoke a reaction. This experience is strictly personal and implies the customer's involvement at different levels (rational, emotional, sensorial, physical and spiritual)". Customer experience includes both participation tourism experience perception and opportunity tourism experience perception (Ge, 2022).

1.1 Value Co-Creation in the Era of UGC

By sharing the experience through word-of-mouth with one's social network, family, friends, and colleagues, the visitor creates a circle of potential visitors that would base their traveling decisions on that experience. Disseminating information about an experience guides potential tourists and service providers in the destinations to improve the service and the whole experience. This exchange is the first step to achieving value co-creation, a revolutionary notion that ends the traditional model where the suppliers produce goods and services, and the customer is a passive consumer.

The emergence of Web 2.0 and ICT has considerably boosted these social processes and interactions between different stakeholders. Like most activities, tourism has widely benefited from the proliferation of these tools that add further social dimensions of co-creation and empower the consumer (Neuhofer *et al.* 2014). They have transformed how experiences and value are created (Neuhofer *et al.* 2012) by revolutionizing communication between service providers and their customers and consumers. ICT and Social Media, in particular, have improved

working and communication techniques and brought the concept of peer communication during service processing (Grönroos, 2012). In other words, these tools facilitate vertical communication between the customers and suppliers or service providers and horizontal communication among consumers and users. Potential visitors and media users can access various travel content, opinions, and commentaries produced and shared by other users (Lam *et al.* 2020). According to Assaker (2020), tourists increasingly rely on reviews on social media from previous tourists to make travel decisions (Lam *et al.* 2020). A study by Gretzel and Yoo (2008) confirms that 97% of the participants in a survey admitted consulting previous travelers' reviews while planning their trips (González-Rodríguez *et al.* 2021).

These opinions and reviews are an aspect of what is currently known as User Generated Content (UGC), a creative work produced without a clear commercial interest and published on publicly accessible websites OECD (2007). UGC is related to electronic word-of-mouth, e-WOM marketing (Wang and Rodgers, 2010). It is a horizontal communication built on compassion among peers (tourists) far from the influence of Destination Marketing Organisations (DMOs) and service providers. It is any "positive or negative statement made by potential, actual, or former customers about a product or company, made available to many people and institutions via the Internet" (Hennig-Thurau *et al.* 2004, p. 39). Unlike traditional Business-to-Consumer (B2C) advertising models, e-WOM's main characteristic is the ability of consumers to control and create marketing communication about any given product or service (Wang and Rodgers 2010, 214).

Because UGC and eWOM are increasingly gaining customers' trust, companies work on taking advantage of these tools by getting involved in the process and adopting them as marketing strategies (Wang and Rodgers, 2010), which questions the truthfulness and reliability of UGC information (Lu and Stepchenkova, 2015). Despite some critics, UGC has significantly shifted the power balance between businesses and customers, shifting from Goods-Centered to Service-Centered Dominant Logic Vargo and Lusch (2004). This shift, facilitated by UGC, allows businesses and customers to collaborate and create value.

1.2 Movie-Induced Tourism in Ouarzazate

Ouarzazate is one of the five provinces composing the Draa Tafilalet region with an area of 12464 km², which counts for 14 % of the total regional territory (HCP, 2019). Geographically, it is situated between the High Atlas and Anti-Atlas Mountains. The history and geographical location offered Ouarzazate specific characteristics that make tourism and cinema the first and second pillars of Ouarzazate's economy (Zabadi, 2016). Ouarzazate is considered one of the most attractive regions for both tourists and film producers.

The province affords significant and varied potential in tourist activity, allowing it to be the principal pole of tourist attraction in the Draa Tafilalet region. Tourism is considered the fundamental field of activity in the provincial economy. Up to 31/12/2015, the province had 47.2% of the number of classified tourist establishments, with a proportion of 52.1% of the total rooms and 74.8% of nights spent in the region in 2015. (HCP, 2019). Foreign tourist arrivals in Ouarzazate reached 236 857 in 2018, representing 4.5% of foreign national (HCP, 2019).

Concerning the cinematographic industry, Ouarzazate is internationally known as a destination for many international producers and filmmakers. This reputation granted the city the nickname: "Hollywood of Africa". Earning this privilege was due to its natural, cultural, and human assets. Its unique topography and landscape made it an appealing destination for the cinematographic industry Rutherford and Marshall (2017, p. 25) and its brilliant sun and its quietness (which is conveyed by its Amazigh name 'ouar zazat' which literally means 'that which is without noise') motivated the British producer-director David Lean to "became the first top producer to utilize the site's crystal-clear atmosphere when he shot shimmering desert scenes for Lawrence of Arabia" in 1962 (Rutherford and Marshall 2017 p25). The local architectural style known as Ksur and Kasbahs is also an attraction for many famous producers and directors like Ridley Scott, who transformed the Ksar Ait Benhadou into sets for his blockbuster Gladiator in 2000. The same site was the setting of many famous films, from Sodom and Gomorrah (1963) to Game of Thrones (2017).

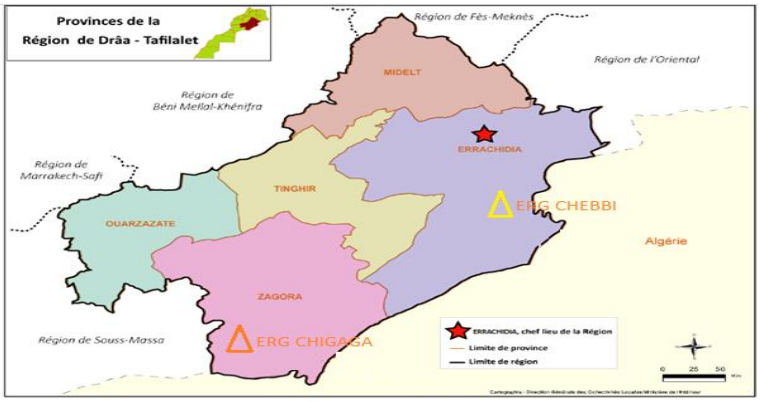
In addition to these traditional and historical buildings transformed into movie sets, Ouarzazate affords three main filming facilities: Atlas1983, CLA 1983, and Kanzaman, 2004 Studios. These facilities offer directors and producers sets used by previous productions with the possibility of modifying them to respond to the requirements of the new films or even building new ones on request. Ouarzazate affords highly experienced extras, and skillful craftsmen who can "fabricate anything anywhere" (Rutherford and Marshall 2017p 27) using materials such as plaster, plastic and polystyrene, wood and metal.

As mentioned earlier, the cinematographic industry constitutes the second pillar of the province's economy. Ouarzazate studios and region increasingly attract movie national and international movie productions (Rutherford and Marshall 2017, p. 28). The general manager of Atlas and CLA studios says that "the increasing number of film

productions in Ouarzazate not only creates new opportunities for Moroccan and Arab-world actors and directors but also boosts income for everyone in the region, from taxi drivers to restaurant owners" and that around 30 percent of the budget is spent locally on everything from hotels and meals to helicopters. (Rutherford and Marshall 2017, p. 26)

Being a meeting point of both tourism and cinema gives Ouarzazate an absolute advantage that has led to the emergence of a specific tourism niche: movie-induced tourism.

Figure 1. Map of Draa Tafilalet Region Provinces, adapted from HCP



Carte 1: Provinces de la Région

1.3 Movie-Induced Tourism

People usually interchange the terms movie-induced tourism, film-induced tourism, and film tourism. They are all used to refer to a worldwide emerging typology of tourism that is "fueled by both the growth of the entertainment industry and the increase in international travel" (Hudson and Richie, 2006, p. 387). The literature defines this phenomenon as the "visitation of a site or a location that is or has been used for or is associated with filming" (Buchmann *et al.* 2010, p.233). Roesch (2009, p. 6) defines it as a "specific pattern of tourism that drives visitors to see screened places during or after the production of a feature film or a television production". For Hudson and Ritchie (2006, p. 387), it is "tourist visits to a destination or attraction as a result of the destination's being featured on television, video, or the cinema screen".

Like all of its precursors, such as art and literary tourism, movie-induced tourism "falls under the umbrella of cultural tourism" (Gjorgievski and Trpkova, 2012, p. 98). Bolan and Kearne (2017) argue that the beginning of cinema-induced tourism was with the John Ford film 'Quiet Man,' 1952 (Bolan and Kearne, 2017), while in a literature review, Taibi and Iflahen 2023 state that the first known form of cinema-induced tourism is associated with Casablanca (1943) by Michael Curtiz, which makes Morocco a pioneering destination of cinema-induced tourism. However, the connection between films and tourism gained ground in the 20th century when cinema and television became principal media (Beeton, 2016). Only until the late 2000s did movie-induced tourism become a widely researched topic among academics (Connel 2012, 1012).

Beeton (2005) explains that film has a vital role in destination imaging and marketing as it reinforces the image of a destination held by potential visitors, builds a new one, or replaces an old one. The effect of films on tourists who seek to "re-live an experience (or even emotion) encountered in the film, reinforce myth, storytelling or fantasies, or for reasons of status (or celebrity)" (Beeton 2010, 2) pushed the advertising industry to adopt it as an effective strategy to reach potential mass markets (Horrigan 2009, 52). Many countries have witnessed increased tourists after being featured in films or television dramas (Hudson and Ritchie, 2006). Hudson and Ritchie (2006, 256) add that Tourism Organizations can use films as "springboards for marketing" if visitors perceive them as appropriate for the destination. Though destinations featured in movies generally attract fans for a visit, Spears *et al.* (2013) specify that destinations featured in Hollywood movies have the most robust attractiveness.

Within movie-induced tourism, Beeton (2005) distinguishes between 'on-location' tourism and 'off-location' tourism. The first refers to the actual physical site of the film shooting, while the second refers to movie sets and locations created in film studios and the film studio to replace the actual site. In the context of Ouarzazate, we are mainly concerned with off-location tourism as the filming facilities on the site that filmmakers use as an alternative for locations worldwide.

Cinema-induced tourism is an essential niche in Ouarzazate regarding its potential in cinema and tourism. However, destination marketers and academia give little importance to this activity. There needs to be more

institutional promotion valorizing the movies filmed in Morocco, and there is a dearth of research in this area (Taibi and Iflahen, 2023).

1.4 Previous Studies Used Sentiment Analysis

The development and affordability of communication tools such as devices, internet connections, and eventually social media raised internet users who share information on the network to express their opinions or vent their emotions (Xu *et al.* 2019). The exponential growth of data on the Internet in various fields has led to the emergence of big data (Shayaa *et al.* 2018), the datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze" (J. Manyika *et al.* 2011, 1). Nowadays, digital data is a tool for both businessmen and their clients (Manyika *et al.* 2011). To exploit it, researchers have developed methodologies to analyze the massive amount of data. Opinion mining, called sentiment analysis, is an emerging method among these tools. It is the extraction of individual viewpoints and emotional responses towards specific entities, phenomena (Pawar *et al.* 2016). This new methodology has been recently used in tourism studies to analyze tourists' opinions vis-à-vis a given destination. Unstructured data retrieved from social media or other platforms is treated using various methods and tools to develop insight into tourists' experiences.

Wang and Kirilenko (2021) researched to confirm that the opinions and feelings expressed by tourists in their reviews through social media on the Grand Canyon, USA, significantly impact other visitors' decisions to visit the park and how sentiments and experiences change according to the origin of the reviewer. The data studied was 27,177 reviews on TripAdvisor from visitors from ten different countries.

Ge (2022) analyzed tourists' experiences and perceptions of tourism experience and explored the characteristics of tourists' behavior to devise managerial suggestions to deal with negative reviews to strengthen the sustainable development of small island tourism. This study used the content analysis method and Ver1.0.1 word frequency analysis software to count the frequency of 120 travel notes retrieved online.

Arianto and Budi (2020) conducted an aspect-based sentiment analysis based on a dataset of 5592 Google Maps reviews of Indonesia's tourist sites Borobudur and Prambanan Temple. The data was retrieved using BotSol's Google Maps review Crawlers, and then data was manually annotated. The researchers applied five machine learning algorithms: Random Forest (RF), Naïve Bayes (NB), Logistic Regression (LR), Decision Tree (DT), and Extra Tree (ET). In addition to words, the researchers also processed emojis.

Garner *et al.* (2022) used topic modeling to interpret and categorize comments and reviews about travel dimensions from Yelp.com. Then, the authors performed a sentiment analysis using machine learning to capture the weight of positive and negative words in each review. R package was used to generate a selection of topics featured by frequent keywords, used correlated topic models, and conducted topic sentiment analysis, with each comment as a single document, to identify the valence of each review. After obtaining frequent keywords from each topic, the researchers investigated the original sentences to determine the content of each topic.

This new method has been applied nationally by a few researchers in tourism. Ali *et al.* (2021) provide a new technique by combining topic modeling and lexicon-based algorithms to explore the destination's negative e-reputation using an aspect-based sentiment analysis approach. The corpus of the study was 39,216 TripAdvisor reviews from different locations and attractions in Marrakech, Morocco. This approach focuses on Latent Dirichlet Allocation (LDA) instead of an R package to extract hidden aspects and dimensions from the visitors' reviews and then conduct Lexicon-based sentiment analysis to reveal the weaknesses in the tourism experience in this city.

Safaa *et al.* (2017) studied how tourists identify the authenticity of a travel experience in Marrakech and its surroundings. The methodology adopted was the semantic analysis of a corpus of 361 reviews collected from different types of tourism establishments on TripAdvisor. The study used the IRAMUTEQ analysis method to identify the dominant ideas and themes in the reviews according to computing frequency and proximity statistics of words in the data.

Concerning cinema and the application of sentiment analysis to movie-induced tourism, Agrusa *et al.* (2018) studied Walt Disney's animated film Frozen and its impact on tourism in Norway. Unlike other studies using sentiment analysis on data retrieved from online platforms, this study was an electronic survey with over 1,000 worldwide participants who shared their opinions about the effect of movie tourism on a destination. The study used open-ended questions, which the researchers analyzed through text mining. The study resorted to dictionaries to classify the comments by uploading the API and then categorizing opinions into positive, negative, and neutral.

2. Research Methodology

This section presents the methods and tools used in this paper to answer the research questions.

2.1 TripAdvisor Platform

With the emergence of Web 2.0, interactive platforms changed the dynamics of relations between consumers and service providers. Founded in 2000, TripAdvisor aims to serve as a travel information and advisory e-channel (Law, 2006). The platform owners claim it to be "the world's largest travel guidance platform with more than 1 billion reviews and opinions of nearly 8 million businesses, available in 43 markets and 22 languages" (TripAdvisor).

TripAdvisor is not a booking agent or tour operator; it acts as a comparison-shopping website to introduce the best offers to potential travelers/tourists based on reviews and ratings by other users. Due to its reputation among travelers and academia, we opted for TripAdvisor to investigate the opinions of tourists of Ouarzazate concerning the significance of film tourism.

2.2 Methods and Tools

This paper utilizes topic modeling with Latent Dirichlet allocation (LDA) to expose latent trends in a corpus of reviews on filming facilities and cinema museums in Ouarzazate collected from TripAdvisor. The collected dataset will display topics that indicate the opinions and sentiments of tourists through reviews. Using a vocabulary-based algorithm, we developed a sentiment analysis model using reviewers' ratings to show to what extent the vocabulary used in reviews reflects the sentiments of tourists.

2.2.1 Latent Dirichlet Allocation

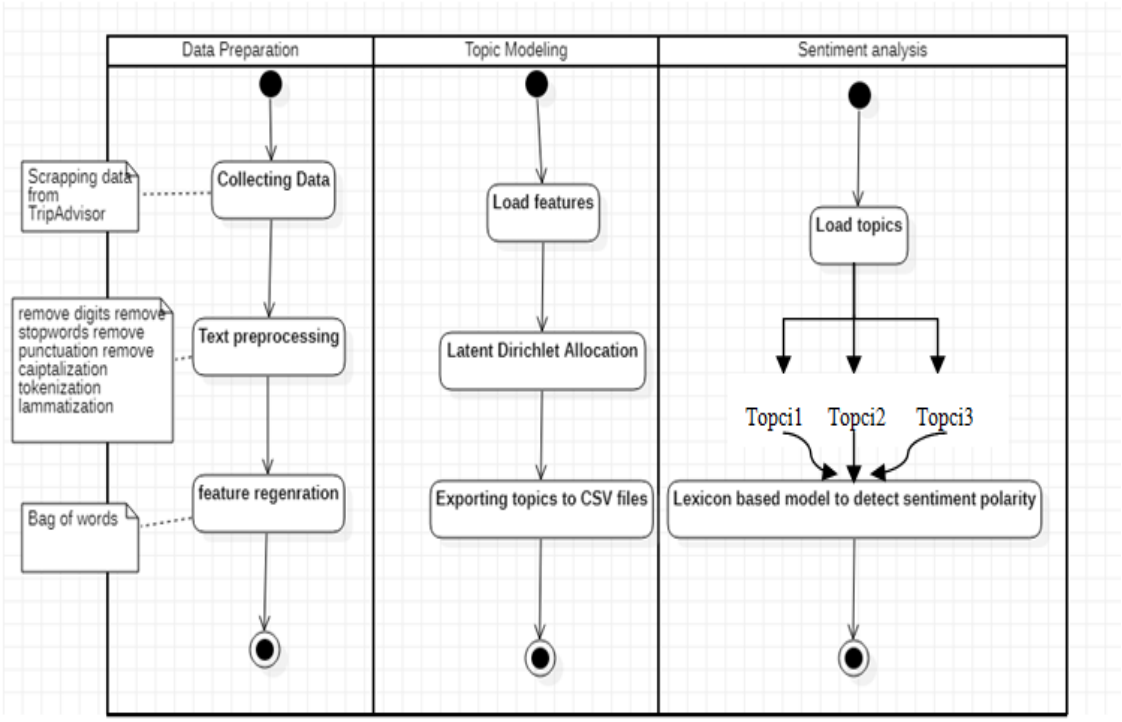
Topic modeling is a type of modeling that assumes that observed variables interact with unobserved or latent parameters in a specific probabilistic relationship, which then generates the data within a dataset (Vayansky and Kumar, 2020). It is one of the most potent techniques in text mining for data mining, latent data discovery, and finding relationships among data and text documents (Jelodar, 2018).

One of the most popular topic modeling methods is Latent Dirichlet Assignment (LDA), an unsupervised generative probabilistic model of a corpus. In brief, it represents documents as random mixtures over latent topics," where all topic's characteristics are via a distribution over words author (Jelodar, 2018, p.3).

Steps and Processes

The following chart illustrates the steps of the processes of our method.

Figure 2. Diagram of research flow



2.3 Experiments and Results

Data were collected, preprocessed then analyzed using basic natural language processing techniques on the studied corpus of reviews.

2.3.1 Data Preparation

2.3.1.1 Data extraction

This study aims to analyze TripAdvisor reviews on Ouarzazate, Morocco. Travelers mostly use the platform to discover future travel destinations or provide feedback on their experiences. This platform is a set of web pages following the same template. Each page contains:

Overviews, more exciting experiences near you, reviews, questions and answers, FAQs. The section considered here is where users provide feedback. Each review consists of the following set of information:

- Reviewer's name.
- Reviewer's location.
- User information: User level, date of joining the community, number of helpful votes, distribution of ratings.
- Bubble rating: User-assigned score to determine user satisfaction.
- Title of the review.
- Review date.
- Date of experience.
- Body of the review.

As stated earlier, we collected all available English reviews up to 2021 using a scraping script developed in Python with the 'Beautifulsoup package,' which allowed us to retrieve the TripAdvisor reviews from HTML code.

The outcome was that 1540 reviews were collected from 2011 Until November 2021 and saved as a CSV file. The four main features identified were the review date, location, rating, and the review text.

Demographics:

We stated earlier that the main features afforded by the platform are the review date, location, rating, and review text. The only demographic detail available is the nationality of the reviewers, which is of paramount importance because, according to studies, nationality has a significant influence on tourist behavior (Pizam and Jeong, 1996), and it can even make a difference in generating satisfaction among tourists (Campo and Garau, 2008). In our research, among all the reviews, only 33,5% mentioned their origin in the review in which the leading nationality of the reviewers is the United States, followed by the United Kingdom (Fig.2)

Figure 3. Word cloud of reviewers according to nationalities

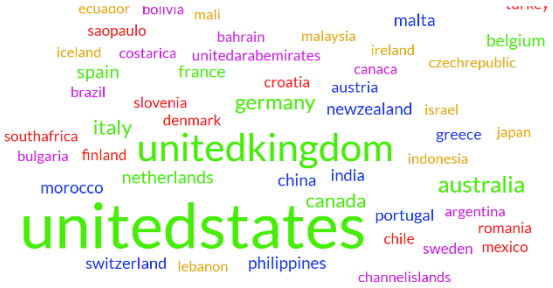


Figure 5. Word cloud of reviewers from the USA according to state

2.3.1.2 Data Analysis

2.3.1.2.1 Text preprocessing

The first step before data evaluation and analysis is data preprocessing. This stage is meant to format and declutter data to produce accurate results properly.

Thus, our data was preprocessed using basic natural language processing techniques. First, it corrects word features such as removing capital letters, removing punctuation, repeating words, and shortening words. The next step is to take the review as input, return a list of tokens (tokenization), and apply stopwords to these tokens to perform proper research processes and facilitate the interpretation of the results. It was to keep only the meaningful elements. The next step was to return each word to its root (lemmatization).

For example, a raw review seemed like this*: « The tour is nice and it will get you through the rather unexpected Morocco's contribution to mainstream cinema. All cool and nice until the guide (official guide of the*

studios) asked us if we wanted to take a picture with a couple of extras in costumes who were chilling in between scenes.

We did and then it turned out they wanted money for it!! Expected in places like Marrakech's Square but NEVER in a place where you think everybody is behaving professionally. »

The review becomes: « tour nice get rather unexpected morocco 's contribution mainstream cinema cool nice guide official guide studio ask want to take picture couple extra costume chill scene turn want money to expect a place like Marrakech square never place think everybody behaves professionally »

Table 1. Techniques of data preprocessing

Technique	Description
Remove upper capitalization	Lower case each letter in the review
Word repetition	Replace word repetition with a single occurrence. 'OOOO' becomes 'OO'.
Punctuation repetition	Remove punctuation.
Word contraction	Replace contractions with their extended forms.
Stop words	Remove stop words from the review
Lemmatization	Return every word to its root.
Tokenization	Take a review as input and return a list of tokens.

After normalizing the text, we assumed that a rating of 1-2 was negative, a rating of 4-5 was positive, and a rating of 3 was neutral. Then convert each rating into sentiment. 1 for positive sentiment, -1 for negative sentiment, 0 for neutral sentiment.

Table 2. Sentiment classification

Review rating	Classification	Polarity	
1 or 2	Negative	-1	
3	Neutral	0	
4 or 5	Positive	1	

2.3.1.2.2 Features regeneration

We have enforced different exploratory data analyses to produce helpful perceptions in our corpus and understand tourists' feedback concerning their experience in Ouarzazate. This part presents the data analysis applied to our dataset.

Word cloud: is a semantic extraction from a text corpus. It is a visual representation of the most common words in a document. It is usually one of the first steps in visualization to develop an overall idea about the subject of the text corpus. Figure1 shows the most commonly used words in negative reviews.

Figure 6. word cloud of negative reviews

Word frequency: Figure 5, Figure 6, Figure 7, and Figure 8 show the most common words and their frequency in positive, negative, and neutral reviews. We can see that desert, tour, trip, and guide are the most frequently used words in positive reviews. In the negative reviews, film, movie, set, and studio are the most frequent words. As for neutral reviews, the most frequent words are film, guide, movie, and tour. This indicates that tourists are more interested in the tour in the desert than the cinema in Ouarzazate.

Then we converted our corpus into two lists, one for the review tokens (X) and one for the review sentiment (y); we used these lists to build a dictionary with the word and sentiment as an index and the count of occurrence as value (Table 3), that allows us to calculate the frequency of each word in positive, negative or neutral review (Table 4).

Figure 6. Word frequency of the top 15 most occurent words in Positive reviews

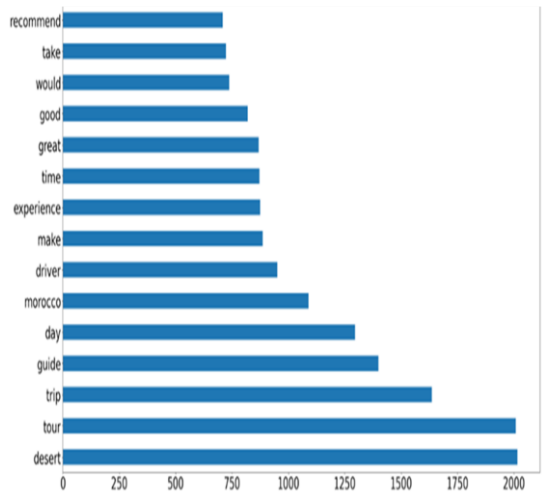


Figure 7. Word frequency of the top 15 most occurent words in Positive reviews

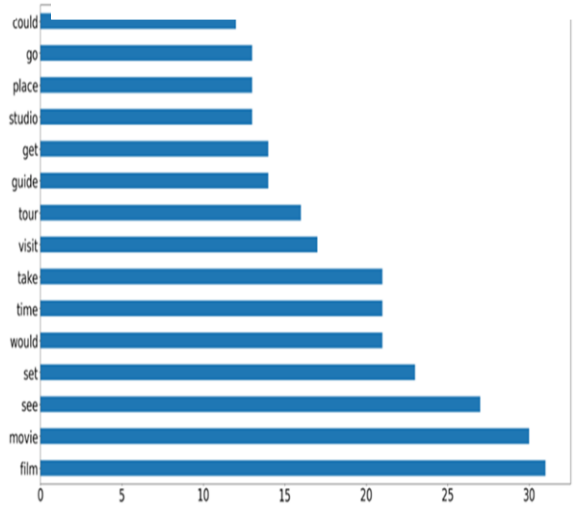


Figure 8. Word frequency of the top 15 most occurent words in Neural reviews

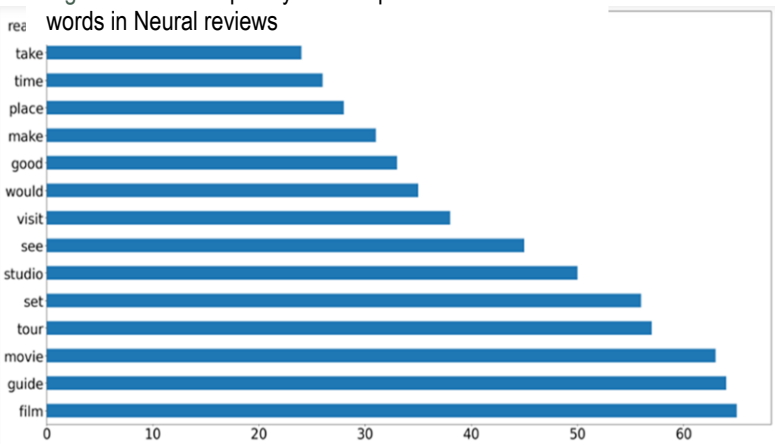


Table 3. Example of a dictionary based on token and sentiment

Word	Positive	Neutral	Negative
Place	Dict[(place,1)]	Dict.[(place,0)]	Dict.[(place,-1)]
Movie	Dict.[(movie,1)]	Dict.[(movie,0)]	Dict.[(movie,-1)]

Table 4. Some word frequency in different reviews

Word	Positive	Neutral	Negative
Tour	1999	56	16
Desert	2007	10	3
Trip	1627	4	6
Guide	1321	64	14
Movie	131	30	62
Studio	121	50	13

3. Results

3.1 LDA Results

The first step was determining the optimal number of topics in our corpus. We used a manual evaluation of topic-document and a manual evaluation of topic-top words. Based on this, the researchers identified three topics.

Through our reading of the results, we identified three dimensions: the movie set, the behavior of the tourism workers, and the travel experience (Table 5). We distinguish movie sets by the terms set, film, movie, and studio. The second dimension is the behavior of the tourism workers, represented by words like guide, driver, and trip. The third dimension is the travel experience, characterized by vocabularies such as tour, desert, Morocco, and experience.

The data set was split into training and testing sets and manually labeled. Each rating in the test set refers to one aspect/sentiment category.

Table 5. Highlighting dimensions and terms of Ouarzazate reviews corpus

Movie set		Behavior of the tourism worker		Travel experience	
Terms	Weight	Terms	Weight	Terms	Weight
Set	0.02439	Desert	0.11081	Tour	0.11328
film	0.02343	trip	0.09638	desert	0.09112
movie	0.02243	tour	0.07822	morocco	0.07745
see	0.01948	day	0.07622	trip	0.0683
guide	0.01933	guide	0.06283	guide	0.06645
Studio	0.01873	driver	0.05332	day	0.05463
Tour	0.01699	great	0.04833	make	0.04864
Visit	0.01535	night	0.0469	experience	0.04796
Place	0.01022	time	0.04201	driver	0.04246
Interesting	0.00883	good	0.03982	time	0.04176

3.1.1 Lexicon-Based Model Results

Lexicon-based approaches use each word's intensity and semantic orientation to represent the phrase's attitude; this suggests using a predetermined dictionary to distinguish between positive and negative expressions. A bag of words often represents a text. Following the distribution of the individual scores for each phrase, a pooling procedure - such as averaging the total sentiments - determines the final sentiment.

Following identifying the fundamental phrases and themes within our corpus, the extracted words are subjected to a sentiment analysis technique to determine the emotions and mood associated with each dimension. Sentiment analysis is the process of looking at data and analyzing it according to the needs of the study, usually through utilizing these feelings to identify different impressions and events caused by the data. In light of this, the authors conducted a comparative analysis of the corpus for each dimension to determine tourists' preferences, needs, and main issues.

3.1.2 Using Topic Modeling for Sentiment Analysis Approach

Topic modeling is a natural language processing (NLP) technique that identifies topics in a collection of texts. LDA is one of the most popular topic modeling techniques. It assumes that documents are mixtures of topics and that each topic is distributed over words. LDA assigns topics to documents and words to topics probabilistically, seeking to find the most likely topics for each document and word based on the observed word frequencies.

3.1.2.1 Sentiment detection using VADER sentiment with LDA

We have also used the Valence Aware Dictionary and Sentiment Reasoner (VADER) to determine reviews' polarity and classify them according to multiclass sentiment analysis. VADER is a lexicon and rule-based sentiment tool for identifying user sentiments shared on social media (Elbagir and Yang, 2019).
TripAdvisor's reviews are mostly positive, indicating that 91.3% are positive, and Vader scores 97.2%.

Table 6. Summary of basic results of Vader sentiments.

		Positive		Neutral		Negative	
Topic	Reviews	Expected	Observed	Expected	Observed	Expected	Observed
1	285	152	245	88	10	45	30
2	670	669	669	1	0	0	1
3	591	590	588	0	2	1	1

3.1.2.2 Sentiment detection using Textblob

TextBlob is a Python library for processing textual data using Natural language Processing. It analyzes sentiments based on polarity and subjectivity.

Results using TextBlob were so close to Vader's results, 97.5% observed positive reviews compared to 91.3% expected positive reviews on TripAdvisor.

Table 7. Summary of basic results of TextBlob

		Positive		Neutral		Negative	
Topic	Reviews	Expected	Observed	Expected	Observed	Expected	Observed
1	285	152	250	88	4	45	31
2	670	669	669	1	0	0	1
3	591	590	588	0	0	1	3

4. Discussion

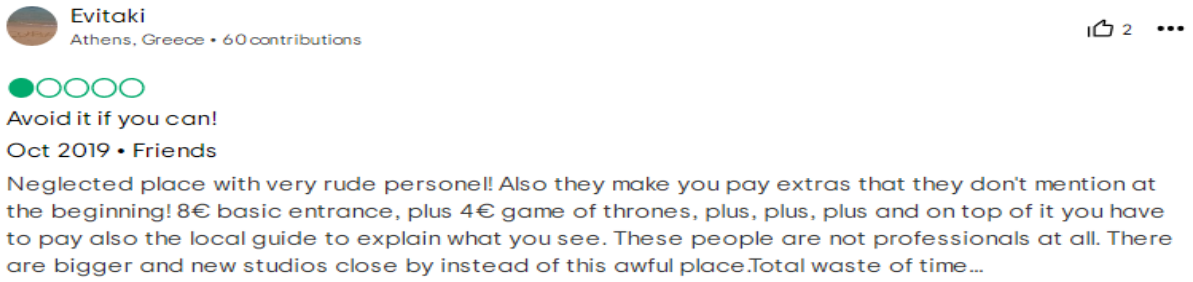
It is worth emphasizing that all reviews are explicitly scraped from the pages of the filming facilities and attractions in Ouarzazate on TripAdvisor and that most of them are positive. However, based on the study of word frequency associated with ratings, we deduce that the top three frequent words associated with positive reviews are, respectively, desert, tour, and trip (fig. 3). In comparison, the three most frequent words in negative reviews are film, movie, and see (fig. 4). Concerning the neutral reviews, the three most frequent words are, respectively, film, guide, and movie (Fig. 5).

The high frequency of positive feedback about the 'desert' in film attractions pages implies that the desert is the primary attraction to Ouarzazate and the region, making cinema-induced tourism a secondary activity on the way. Busby and Klug (2001) discuss this standard practice, confirming the existence of two distinct forms of film-induced tourism: visiting film-related attractions as a primary interest or visiting filming sites as part of a more significant holiday. The genre of movies filmed in Ouarzazate (which are primarily biblical and historical stories that feature the ancient Middle Eastern countries of Jerusalem, Jordan, Egypt, and Yemen) might have contributed to reinforcing the desert image of the region because films significantly reinforce the image held by potential visitors of a destination (Beeton, 2005). This role of film-induced tourism in enhancing the region's image is a testament to the unique potential that Ouarzazate could offer.

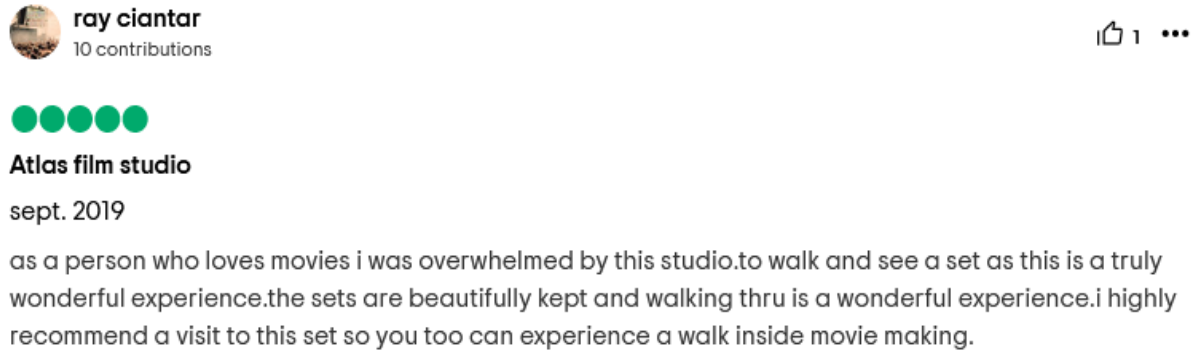
The dissatisfaction with the film attractions might be attributed to the fact that the leading nationality of reviewers is the United States, particularly California, the land of Hollywood and New York, this "actual" location contains iconic places for filming many blockbuster movies (Pomerance, 2007, p.11). Californians who live near Hollywood and New Yorkers who frequent the streets and coffee shops featured in many American films would have elevated expectations and, therefore, might be disappointed when comparing Hollywood studios and the actual locations to those of Ouarzazate. On the other hand, interest in the desert rather than other aspects offered by the region can be explained by the fact that the second most prevalent nationality among reviewers is the British. Tourists seek unique experiences that contrast their previous experiences (Bigné *et al.* 2009). The desert, with all its attributes, is in stark contrast to the usual landscape experienced by the British. Sunny, warm weather, calm atmosphere, unique geological formations, such as dunes, rock formations, canyons, unique flora and fauna, and a distinct array of manufactured landmarks and monuments characterize it. Together, these attributes may seem more exotic and excitement-triggering. Excursions through the desert using quad bikes and camels, spending a night in traditional desert camps, and admiring the sunset and sunrise in the region of Draa Tafilalet, to which Ouarzazate belongs, are the principal activities offered by all tourism agencies operating within this territory. All tour operators in the region propose tours that all end in the desert as the peak achievement of the touring adventure, either in Erg Chebbi dunes (in the east) or Erg Chigaga dunes (to the South) (see Fig. 1).

Additionally, it is noteworthy that Ouarzazate is the gate to Draa Tafilalt, given its border with Marrakech, which is the primary tourist destination in Morocco (MTAESS, 2024; Observatoire Du Tourisme, 2024). Furthermore, Ouarzazate International Airport is the main airport serving the Draa-Tafilalet region (ONDA, 2024). Therefore, it is primarily the departure and the end of one of the famous sightseeing tours known as the classical tour of the desert. Ouarzazate is not a standalone destination but rather a part of a sightseeing tour offered by most agencies operating in the region. These tours typically range from 1 to 3 days and cover the Draa Tafilalet region, an area larger than Belgium, and the Netherlands combined, with no railways, highways, and minimal domestic flights. Therefore, time is an essential resource for tourists who travel on a tight schedule and desire to reconsider priorities to maximum satisfaction in a shorter time. Thus, "time" is consistently used in positive, neutral, and negative reviews (Fig. 3, Fig. 4, Fig. 5).

However, the association of neutral and negative comments with film and cinema attractions suggests that the visitors were not fully satisfied with their visits to film attractions compared with their satisfaction with the desert. This dissatisfaction is primarily related to the archaic nature of the sets that harsh weather wears out, the behavior of some of the staff (who, according to some reviews, ask for extra tips), or the price of the tickets (8 Euros for Atlas Studio and 3 Euros for Cinema Museum). We can summarize the reasons for dislike in the following review.



It is crucial to acknowledge that film tourists have distinct profiles compared to other categories of tourists, mainly nature tourists. Before visiting and appreciating a film-related attraction, they must possess some prerequisites. Film tourists are typically cinephiles who visit locations featured in a movie they have previously watched. Therefore, a serendipitous or incidental tourist (Macionis and Sparks, 2009) who is not interested in cinema or has yet to watch the movie associated with the visited site (possibly by chance) would have a different gaze and perspective than a specific film tourist. The following review illustrates our hypothesis, presenting a contrasting perspective to the preceding one.



The two comments are separated by one month but convey contradictory viewpoints. Therefore, it is necessary to examine further the cause of this discrepancy in perspectives and emotions toward the exact location.

As stated earlier, the topic modeling method demonstrates that one can infer three topics from the global corpus of reviews. The first topic is cinema and movie sets, the second one is the behavior of the tourism workers, and the third is the tourist experience. The first topic seems evident since we are dealing with pages of cinema and film attractions. The second topic emphasizes the crucial role of tourism workers, especially drivers and tour guides, in creating a positive or negative impression in a tourist's mind. Finally, experience seems to be the most important takeaway that tourists focus on in their visit to any destination, and this is a shift in modern consumer behavior from the focus on the product and service to experience, which is considered the core of the whole tourism operation (Sarmiento-Guede *et al.* 2021).

Conclusion and Implications

The study of the 1540 reviews (from 2011 to 2021) on film tourism in Ouarzazate available on TripAdvisor, using sentiment analysis, shows that cinema is related to negative sentiment while desert tourism looks positive, which leads us to conclude that the aspect of a desert destination is the hallmark that eclipses other attributes of the region, especially cinema. The city is nicknamed the Hollywood of Africa and welcomes its visitors with cinematic emblems that stand as city landmarks. However, the cinematic image attributed to the city is still dominated and resisted by the stereotyped image of a sunny desert region inhabited by the Berber nomads. Although cinema is not a significant pull factor for Ouarzazate, it can still play a pivotal role in promoting the region and the country. It is a powerful tool embedded into the destination promotion strategy.

Online reviews on various platforms should be invested as insightful, ready-to-use feedback to improve the service provided by film-related facilities and guarantee a positive reputation among potential tourists. Online reviews, especially negative ones, should be addressed as complaints that offer an opportunity to improve the cinema destination (Heung and Lam 2003, 283). Research shows that consumers will be more likely to consider negative than positive e-WOM reviews in their decision-making process, given that the former is more truthful, influential, helpful, and valuable than the latter (Von Helversen *et al.* 2018). Negative reviews substantially affect potential visitors' attitudes and behaviors (Von Helversen *et al.* 2018). Thus, the increase in negative reviews related to cinema should alarm decision-makers.

The literature recognizes that cinema management's primary purpose in building film sets in Ouarzazate is purely cinematographic. Once the filming is over, filmmakers leave the site (Beeton, 2005), and then the inherited sceneries are exploited as tourist attractions by any right holder. Thus, in this sense, tourism is a side/extra activity that fills the gap between filming periods, which might explain why cinema managers give limited attention to this niche.

All stakeholders should collaborate by establishing a synchronized policy to promote the region and build an attractive destination to face the growing competition from emerging film destinations with similar properties to Ouarzazate, like Jordan, Tunisia, and Saudi Arabia. Tourism and cinema management should cooperate to sustain this niche by encouraging more film productions through practical measures like tax incentives, procedure facilitation, and consideration of the tourism dimension while preparing the movie sets. We also recommend organizing cinema-related events to attract cinephiles and devise instructional and entertaining experiences to satisfy tourists during their visits to cinema-related facilities.

Ultimately, the results also accentuate the role of tour guides and drivers. Thus, it is necessary to provide formal training for cinema tour guides like other specialized tour guides and raise tour drivers' awareness regarding the responsibility they hold vis-à-vis the image and reputation of the destination.

Limitations and Future Research

We acknowledge that analyzing tourists' sentiments based solely on English reviews retrieved from TripAdvisor may have limitations. Using data from a single platform may result in platform bias (Twil *et al.* 2021), as tourists often share their reviews on other platforms like Google Maps or other social media platforms. Furthermore, most tourists do not leave reviews about every visited destination. On top of that, people tend to comment on what they dislike more than what they like because adverse experiences have more impact than positive ones (Baumeister *et al.* 2001). Additionally, we do not disregard the possibility of fraudulent reviews within the corpus. As a result, we recommend conducting a similar study on other platforms, such as Google Maps, in the three main languages used by site reviewers: English, French, and Spanish, and ensuring the genuineness of exploited reviews.

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Credit Authorship Contribution Statement

Moulay Abdellah Taibi: Conceptualization, Investigation, Methodology, Formal analysis, Writing – original draft, Data curation, Validation, Writing – review and editing, Visualization.
Raja Hanbali: Methodology, Software, Formal analysis, Data curation, Validation, Visualization.
Fatima-Zohra Iflahen: Supervision, Validation, Writing – review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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AI in Competitive Intelligence, Traditional and New Techniques for Gathering and Analysing Data

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Abstract: In this paper we explored the relationship between Artificial Intelligence (AI) and Competitive Intelligence (CI), attempting a definition of CI that considers the various dimensions it is defined by. Thus, we delved into data collection, analysis, and how intelligence is generated. We further analysed how advanced tools and technologies such as machine learning algorithms are used to enable real-time monitoring of competitors to derive CI. Applications of AI/CI to tourism are being discussed in the context of the analysis, bringing a practical approach and insights. We completed our analysis with ethical considerations that have an impact on both the quality of the intelligence and the deeper, social implications. We concluded by proposing a practical definition of CI that incorporates the latest technological advancements, including those brought by AI, with the ultimate goal to provide a reference that ensures companies can draw the best and most reliable results from CI.

Keywords: competitive intelligence; artificial intelligence; business intelligence in tourism.

JEL Classification: O14; O21; O31; D24 ; Z32.

Introduction

1. Literature Review

The tourism industry has become ever more reliant upon data to stay competitive and to increase the offer, reaching new markets and developing new products and services, and to identify emerging travel trends. Tailoring to clients in the era or technology relies on how destinations will be able to attract tourists, as the competition with other destinations is turning global, facilitated by the access to information but also a lower cost of traveling especially by air. Predicting tourist behaviors and preferences as tools of business intelligence becomes thus imperative, and the vast amount of – available –data makes it impossible to track and analyse save for the use of AI.

The first use of “business intelligence” term was back in 1865 by the author Richard Devens in his volume "Cyclopaedia of Commercial and Business Anecdotes". Competitive intelligence is absolutely an old concept, but it emerged as a discipline and a standalone process as of 1970.Until then, companies around the world and regardless the industry reached competitive advantage in their areas thanks to strategic decisions supported by CI but, as authors Gilad and Herring wrote, this was made in a less organized way and without the exact function called Business/Competitive Intelligence. (Gilad, Herring, 2001)

By year 1998, it was estimated that in the US, over 80% of companies with annual revenues of over $10 billion had implemented a BI/CI system. Even mid-sized companies that did not have the capacity to build in-house BI/CI teams outsourced project development, analysis and reporting to consultants and intelligence companies

As stated in the paper “Towards a universal definition of competitive intelligence” written by Rene Pellissier and Tshilidzi E. Nenzhelele in the SAJIM paper, there are many definitions of CI in the literature (Weiss and Naylor

2010) and none has achieved worldwide acceptance (Roitner 2008). These definitions differ only by semantic changes in language and emphasis (Brody 2008).

According to author Ben Gilad a more focused definition of competitive intelligence considers the organizational function responsible for the early identification of risks and opportunities in the market, before they become apparent. Experts also call this process early signal analysis and it results in an early warning system.

Haddadi, Dousset, and Berrada (2010) assert that the absence of a universally acknowledged definition of CI contributes to its perceived lack of clear boundaries. CI is frequently conflated with industrial espionage (Colakoglu 2011).

The literature review shows that CI transformed over time in terms of definition and got various interpretations. Some of the definitions of the CI process are:

"A process of monitoring the competitive environment by pulling together data and information from a very large and strategic perspective, to predict or forecast what is going to happen in the competitive environment of an enterprise (Bose 2008)."

"An ongoing, systematic evaluation of the external environment for opportunities, threats and developments that could have an impact on the enterprise and influence reactive decision-making (Strauss and Du Toit 2010)."

"The process of collecting, analysing and applying information about products, clients and competitors to meet the enterprise's long-term and short-term planning needs (Othenin-Girard, Caron and Guillemette 2011)."

Other definitions are built around the sources of CI:

"The purposeful and coordinated monitoring of your competitors, wherever and whoever they may be, within a specific marketplace (Johnson 2005)."

"Any type of activity aimed at monitoring competitors (potential and current) and gathering information of all types, including about human resource practices, sales and marketing, research and development and general strategy (Tarraf and Molz 2006)."

"CI is the process and forward-looking practices used in producing knowledge about the competitive environment to improve organizational performance" (Madureira *et al.* 2021).

2. Method also Called Materials and Methods or Experimental Methods

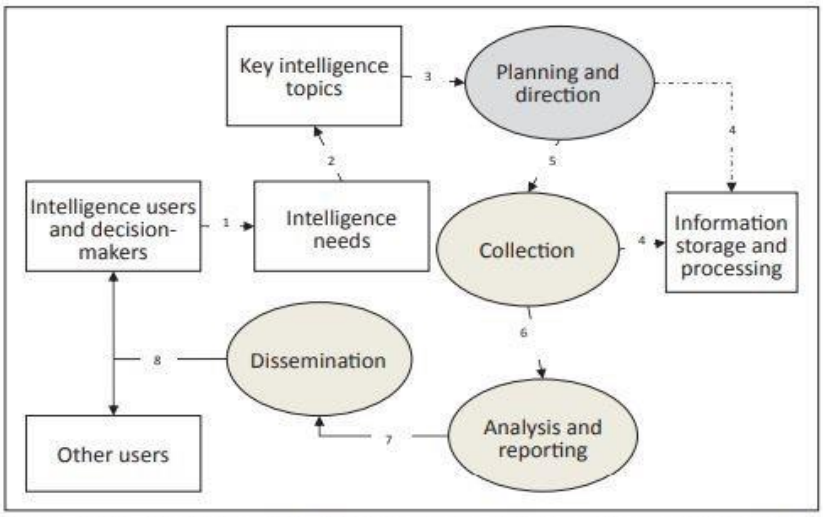
Looking at CI as a process (Figure 1), there are several stages that CI experts build their deliverables on:

Planning: Identifying the purpose and needs of the organization regarding competitive information.

Data collection: Gathering relevant information about competitors, markets, and trends from various sources such as financial reports, press, websites, and other public or private sources of information.

Data analysis: Evaluating and interpreting the collected information to identify patterns, trends, and opportunities relevant to the organization.

Figure 1. Competitive intelligence dimensions



Source: Botha, D.F. & Boon, J.A., 2008, Competitive intelligence in support of strategic training and learning, *South African Journal of Information Management* 10(3), 1–6.

FIGURE 1: The competitive intelligence process.

Source: Madureira et al. (2021)

Generating insights and reports: Developing and presenting reports or analyses that synthesize competitive information and provide relevant insights and recommendations for strategic decisions.

Distribution and use of information: Communicating the analysis results to key decision-makers within the organization and using this information to guide strategic and operational decisions.

Continuous monitoring and updating: Maintaining constant surveillance of the competitive environment to identify relevant changes and developments and updating the information and analyses accordingly.

These recurrent activities can be summarised and categorised under the following four CI processes: planning, collection, analysis and dissemination. (Cavallo *et al.* 2021).

Competitive Intelligence (CI) holds significant importance within the business landscape. There are several factors to be mentioned:

Strategic Decision Making: CI furnishes invaluable insights into market trends, competitor strategies, and industry dynamics, empowering businesses to make strategic decisions based on solid information. By grasping the competitive environment, organizations can pinpoint growth opportunities and pre-empt potential risks.

Risk Mitigation: CI aids businesses in anticipating and managing risks by identifying potential threats and vulnerabilities in the market. This proactive stance enables companies to adjust their strategies and operations, minimizing risks and leveraging emerging opportunities.

Market Position Enhancement: Through the analysis of competitor actions and market shifts, CI assists businesses in spotting market gaps and crafting distinctive value propositions. This enables companies to set themselves apart from competitors and fortify their market stance.

Fostering Innovation: CI delivers insights into emerging technologies, consumer preferences, and industry trends, fueling innovation within organizations. By staying ahead of market advancements, businesses can develop novel products and services that align with evolving customer demands.

Gaining Competitive Edge: By providing timely and relevant information, CI equips businesses with a competitive advantage that competitors may lack. By comprehending competitor strengths and weaknesses, companies can capitalize on opportunities and address threats more effectively.

Optimizing Resource Allocation: CI assists businesses in optimizing resource allocation by pinpointing promising areas and identifying potential risks. By strategically allocating resources based on CI insights, organizations can maximize their returns on investment while minimizing wastage of resources

Overall, CI is indispensable for businesses navigating the intricate and competitive business environment, enabling them to make well-informed decisions, mitigate risks, and seize opportunities for growth and innovation.

However, it is not only businesses but also tourist destinations that can benefit from analysing vast amounts of data that is posted online. As an applied example, AI would be best suited to comb through destination images posted by tourists that reflect in the end their perception of the given destination, while revealing valuable information about the tourist destination. The perception comprises elements of pleasure and sensation, feelings expressed through online platforms where tourists share their experiences, such as Instagram (Blanco-Moreno *et al.* 2024). Understanding the behavior of tourists as reflected in the social media requires an analysis performed using AI techniques, which would ultimately allow destination managers to adjust their goals and strategies, in what we see as an application of CI to tourism that holds significant practical opportunities of expanding from a scientific/past data analysis to a predictive CI model.

3. Research Methodology

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, particularly computer systems. It encompasses various techniques such as machine learning, natural language processing, computer vision, and robotics, among others. AI has gained significant attention and adoption across various industries due to its potential to automate tasks, analyse vast amounts of data and make predictions or decisions. Public perception about AI raises sentiments ranging from total and arguably reckless adoption to a dystopian image (Sheikh *et al.* 2023).

Having said that, we should acknowledge the benefits of AI, while drawing a line to the limitations and the pitfalls of AI, which can lead to negative interpretations and a resistance to change that has no proven basis. However, we deem that an AI governance structure must exist. In fact, several government initiatives have been made in this regard, with Canada becoming in 2017 the first country to implement a national AI strategy (Attard-Frost *et al.* 2024).

In the realm of Competitive Intelligence (CI), AI plays a transformative role in enhancing the effectiveness and efficiency of CI processes. Here are some key aspects of AI's role in CI:

Data Collection and Analysis: AI-powered tools can automate the collection and analysis of data from diverse sources such as websites, social media platforms, news articles, and market reports. These tools can sift through large volumes of data, identify relevant information, and extract actionable insights, thereby streamlining the CI process.

Pattern Recognition and Prediction: AI algorithms excel at recognizing patterns and trends within data, enabling CI professionals to identify emerging market trends, competitor strategies, and consumer preferences. By leveraging predictive analytics, AI can forecast future developments in the competitive landscape, helping businesses stay ahead of the curve.

Natural Language Processing (NLP): NLP technology allows AI systems to understand and process human language, including text data from sources such as customer reviews, forums, and industry reports. NLP enables CI practitioners to extract valuable insights from unstructured data sources, such as sentiment analysis of customer feedback or identification of key market trends from textual data.

Automated Monitoring and Alerts: AI-driven monitoring systems can continuously track changes in the competitive landscape, alerting CI teams to relevant developments in real-time. These automated alerts enable CI professionals to respond swiftly to market shifts, competitor actions, and emerging threats or opportunities.

Enhanced Decision Support: AI-powered analytics tools provide CI professionals with advanced decision support capabilities, enabling them to make data-driven decisions with greater confidence. By integrating AI-driven insights into strategic planning and decision-making processes, businesses can optimize their competitive strategies and resource allocation.

In the tourism industry, ethical considerations and privacy concerns present high stakes, especially since personal data is intrinsically linked to images and videos posted online by tourists. As with any other system, programming biases should be carefully considered to avoid unfair practices. Arguably, the governance structure we referred to above should also consider these practical implications of what should be a responsible use of data.

Overall, AI serves as a powerful enabler of Competitive Intelligence by automating data collection and analysis, facilitating predictive insights, and enhancing decision support capabilities. As AI technologies continue to evolve, their role in CI is expected to expand further, empowering businesses to gain a competitive edge in increasingly dynamic and complex market environments.

4. Research Results

Part of the “process” CI dimension, data analysis implies the information has been gathered via various means – market reports, competitor websites, news articles, social media, and customer feedback – automated or not, and it is used to derive as output meaningful and actionable insights. The quality of the “intelligence”. As Madureira et all (2023) highlighted, the value of intelligence does not reside in it being a factual truth, but rather to provide actionable insights, which would, using the judgement of the analyst, would create more knowledge. This knowledge will then continue to enhance existing data, for a continuation of the cycle that ends with additional information and additional insights that ultimately create more intelligence.

To process vast amounts of datasets and to process that information to derive meaningful and actionable items that would permit the identification of relevant competitive intelligence and insights in terms of threats and opportunities, patterns and trends (Bharadiya, 2023), we need to make us of machine learning algorithms (MLAs). Such MLAs use historical data as data pool from which they draw the relevant conclusions. The sheer amount of data is what makes MLAs essential for the objectives of the tasks to be met, as the volume of information far exceeds human capabilities to process it. Extracting and calculating such volumes of information is nonetheless essential to reveal the hidden potential of the data and to derive competitive intelligence that would advance a company’s competitive edge.

5. Discussions

The link between CI and marketing and the subsequent implications regarding company strategy have been studied for a long time (Calof *et al.* 2008). Strategic management relies on effective CI, especially from a resource planning perspective. As such, AI can be used to maximize CI capabilities and monitor competitor’s activities

CI has been researched in association with Big Data. Characterized by such high volume, speed and variety that makes its transformation into what de facto becomes CI, Big Data is placed at the intersection between information, technology, methods and impact (De Mauro, A. *et al.* 2016). Research also found there is a lack of standardised architecture in the CI process, and that businesses still rely largely on rather basic tools, given the complexity and of maintaining a data warehouse on one hand, and the challenges of the staff and building a big data model that is able to parse through data and identify fake information (Jayanthi R at all, 2021).

Other authors deem that Big Data may not always represent the ideal solution, despite the majority of the firms believing that it will change the competitive landscape and the significant investments in big data (Ghasemaghaei, M. *et al.* 2020).

However, the authors of this paper find fake data to pose one of the most critical challenges to any CI models and any AI models for this matter, whether grouped under the Big Data umbrella or otherwise, since it becomes ever more complex and difficult to identify it correctly and to avoid false positives. Eventually, to overcome these challenges, a final judgement call will require the human intervention of an analyst.

An interesting study on the impact of social media and the challenges to deriving meaningful information for decision making points to the need to identify business events, as observable actions or circumstances, such as a new service or product, that can be further explored in view of drawing a competitive advantage (Yuan, H. *et al.* 2023).

Drawing on events as mentioned above or any similar activity was enabled by the rapid technological advancements. Automating the actions monitor, detect, and analyse competitors' data moved from a manual, labour-intensive and time-consuming exercise to performing AI tools (Forbes, 2024).

Whether regarding data on competitors' prices, various partnerships they enter, customer feedback, or market opportunities, the speed with which a company can analyse all this and mould the information into CI is critical. Time being of the essence, it required 24/7 digital capabilities. We must draw the attention to the aspect we have mentioned above, which is the need to have a final call made by an analyst that, despite human limitations and possible errors, remains a reliable factor when deciding which CI should be used for business purposes that bear financial and strategical implications.

There is a growing concern amongst all stakeholders - whether general public, regulators, or companies - about the ethics around AI in general and its deployment in particular, with a focus on reducing or ideally eliminating biases and discrimination, ensuring a transparent modus operandi, making the results more trustworthy, accessible and better interpretable according to various inputs (Bharadiya *et al.* 2023).

Conclusions and Further Research

Based on the analysis above, we propose as definition of CI the systematic and ethical process through which companies monitor and maximize publicly available information and internal intelligence on competitors using AI and traditional methods to make strategic decisions.

We deem this definition covers the aspects researched already in the doctrine, while offering a clean – and clear – link between the volume of data, type of data, means used to process the information, capabilities necessary, and technology progress needed to move from data to information to competitive intelligence using AI using a balanced approach, which is ethical and provides tangible competitive advantages.

The significant benefits tourism can draw from integrating AI into CI translate into a better planning and an enhanced operational efficiency, built on developing and tailoring products and services using AI insights on travel behavior, preferences, trends, and (new) needs of the travelers that otherwise would be challenging to identify. The success of this approach relies on one hand on how ethical the practices are, and how reliable and accurate the results are on the other hand. These are the two faces of the same coin, since any progress stemming from an enhanced use of CI in the context of large amounts of publicly available data can only be sustained if ethical considerations are addressed.

We acknowledge that some limitations to the present study may stem from the fact that we did not apply the definition to a wide range of cases. Therefore, some additional tests may be conducted to further our research and to strengthen our definition. Nevertheless, the authors of this study are confident that applying the proposed definition fits well with the goal of providing a reference for companies to draw the best and most reliable results from CI, maximizing the benefits from AI, and reinforcing the framework for a practical yet ethical use of information.

Credit Authorship Contribution Statement

Silvia Denisa Taranu: Conceptualization, Investigation, Methodology, Project administration, Formal analysis, Writing – original draft, Writing – review and editing.
Adrian Gabriel Cioranu: Conceptualization, Investigation, Methodology, Project administration, Formal analysis, Writing – original draft, Writing – review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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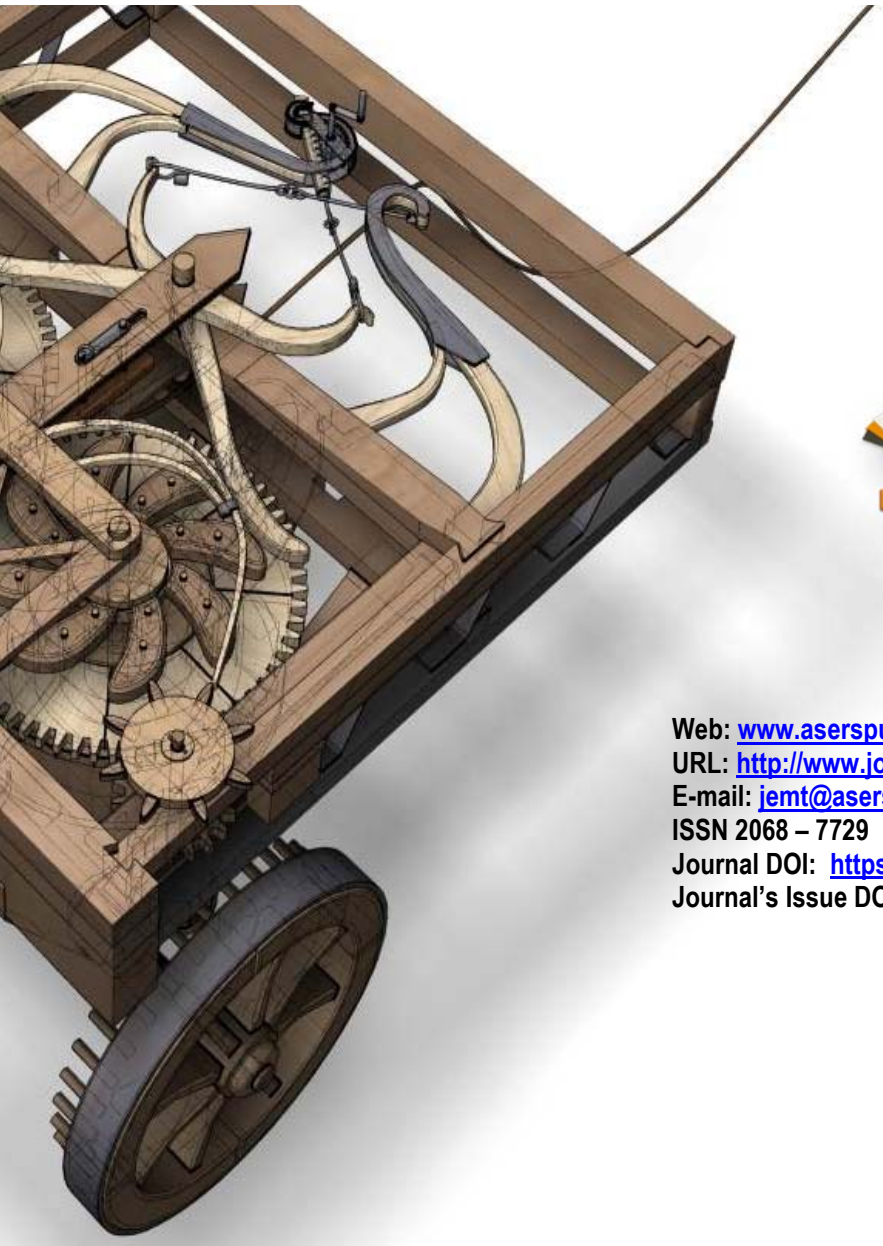

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