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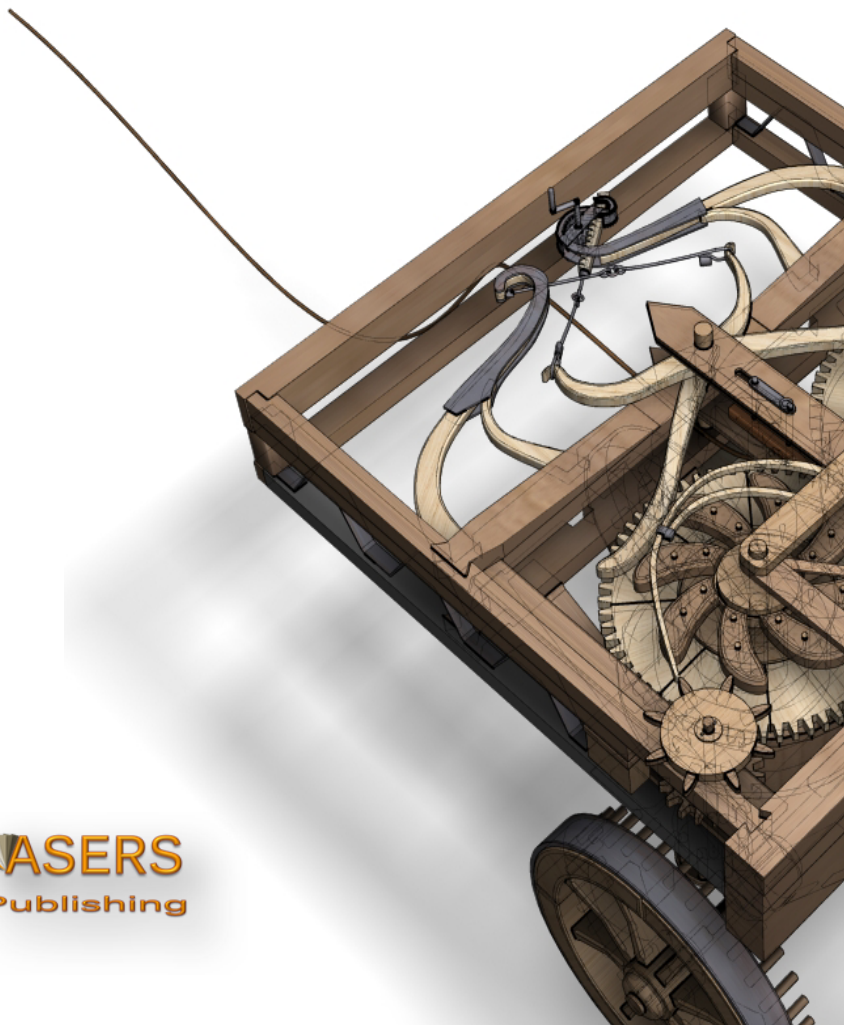

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Table of Contents

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Consumers' Intention to Use Renewable Energy Based on the Behavioral Reasoning Theory

Tessy Fitriyani GOBEL
Management Department, BINUS Business School Master Program,
Bina Nusantara University, Jakarta, Indonesia
tessy.gobel@binus.ac.id

Medya RAMADHAN
Management Department, BINUS Business School Master Program,
Bina Nusantara University, Jakarta, Indonesia
medya.ramadhan@binus.ac.id

Iden Aksana Putra PRATAMA
Management Department, BINUS Business School Master Program,
Bina Nusantara University, Jakarta, Indonesia
iden.pratama@binus.ac.id

Evelyn HENDRIANA
Management Program, BINUS Business School Doctor of Research in Management,
Bina Nusantara University, Jakarta, Indonesia
evelyn.hendriana@binus.ac.id

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Abstract:

Public concerns about climate change and environmental protection have triggered governments and corporations to do research on clean and cost-effective forms of energy. Green energy is relatively new in developing countries, which results in limited market penetration and low consumer acceptance. This study aims to investigate the relationship between global motives and consumer intentions to use renewable energy via the Behavioral Reasoning Theory (BRT). In this research, reasons for supporting the utilization of renewable energy are shown through environmental concerns and perceived benefits, while reasons against it are represented through perceived costs. An online survey obtained 275 valid data responses from Indonesian middle- and upper-class consumers. This data was analyzed using PLS-SEM to maximize the model's predictive value. All hypotheses tested, except for the effect of environmental concern and perceived cost on attitude, were proven to influence customer intentions to use renewable energy. This study found that perceived benefits gave the largest contribution to global motives for using renewable energy. Since this study involved consumers from the middle to upper class in developing countries, perceived behavioral control had the most influence on intention to use renewable energy compared to attitude and subjective norms.

Keywords: behavioral reasoning theory; consumer intention; global motives; perceived benefits; perceived cost; renewable energy.

JEL Classification: M31; Q2; Q40.

Introduction

The frequent use of fossil fuels has resulted in numerous issues with the environment, such as environmental degradation and disruption (Irfan *et al.* 2020). The phenomenon of climate change has the potential to endanger human activities and life (Lin and Zhu 2019). The negative effects of climate change and the depletion of fossil energy reserves trigger governments to invest in clean and cost-effective forms of energy. While many people in

developed countries have been using renewable energy for decades, this is not the case in developing countries, where adoption is low due to their familiarity with fossil fuels and the high investment costs of renewable energy (Cantarero 2020).

Several academic studies have explored and identified consumer intentions to use renewable energy by applying the theory of planned behavior (TPB). The three antecedents in TPB that present the global motives influencing consumer intentions to use renewable energy have been widely researched, but further research on the reasons stimulating the three global motives is needed. Furthermore, energy conservation research has primarily focused on factors explaining the use of renewable energies, while reasons for not adopting renewable energy have been ignored (Irfan *et al.* 2021; Masrahi *et al.* 2021; Nazir and Tian, 2022). While pro-environmental values and favorable attitudes have largely explained consumer decisions to adopt renewable energy (Irfan *et al.* 2020; Saari *et al.* 2021), it does not mean their decision not to adopt it is due to negative attitudes or low pro-environmental values. Price can be a major barrier to adopting renewable energy (Fatima *et al.* 2022), particularly in developing countries. Therefore, the objective of this study is to examine the relationship between global motives and consumer intentions toward renewable energy by employing behavioral reasoning theory (BRT) (Westaby 2005), which helps to distinguish between "reasons for" and "reasons against" and investigates how these reasons influence the connection between global motives and consumer intentions toward renewable energy use.

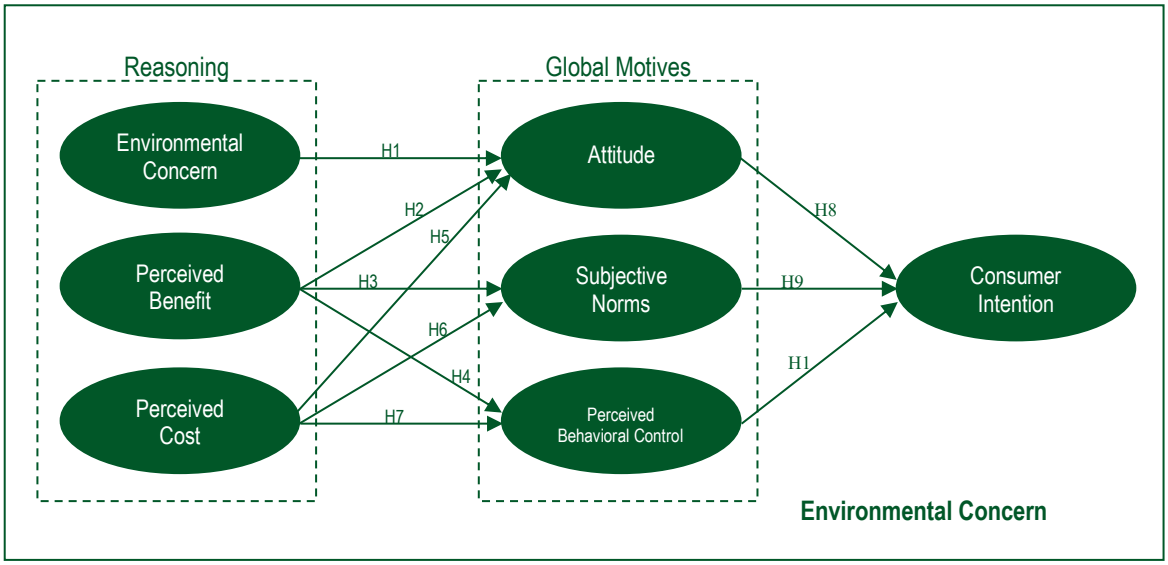
1. Literature Review

1.1 Theoretical Framework

The behavioral reasoning theory (BRT) reveals that reasoning serves as an important link between beliefs, global motives, intentions, and behaviors. This framework's underlying theoretical assumption is that reasons influence global motives and intentions by supporting people in justifying and defending their actions (Westaby 2005). The three sub-constructs related to global motives are: attitude, subjective norms, and perceived behavioral control conveyed in the TPB (Ajzen 1991).

Since its beginning, BRT has been used to determine variables that affect behavior that are not clearly explained by the TPB's global motives (Claudy *et al.* 2013; Wang *et al.* 2021). These key factors are classified as global motives by BRT since they are considered fundamental factors of behavior intentions in various areas. This study employs BRT to identify factors influencing consumer intentions that are not clearly addressed by TPB's global motives. The reasons for using renewable energy are represented through environmental concerns and perceived benefits, while the reasons against it are represented through perceived costs. Both components will influence global motives consisting of attitude toward renewable energy, subjective norms, and perceived behavioral control, which in turn form the intention to use renewable energy, as depicted in Figure 1.

Figure 1. Research Model



Consumers' concern and commitment are increasing to solve environmental issues as global awareness of emerging and existing issues grows. People are beginning to pay more attention to their consumption habits and their environmental impact, which manifests itself in various ways, such as human concern for pollution

levels, green consumption, or sustainable behavior (Gardan *et al.* 2023). The degree of individual awareness of environmental issues and care about solving them is called environmental concern (Tan *et al.* 2017). Milfont and Duckitt (2010) define environmental concern as human awareness or attitude toward environmental protection.

Irfan *et al.* (2021) argue that consumers have grown more mindful of the environmental consequences of their purchasing habits. Environmental concern is thus important in renewable energy adoption, as environmentally conscious consumers are more cautious about energy consumption and have favorable attitudes toward renewable energy use (Jabeen *et al.* 2019). Concerns about the environment play a significant role in consumers' willingness to use renewable energy as well as their willingness to pay for renewable energy (Yue *et al.* 2020). In general, consumers' environmental concern is positively associated with their attitude toward using renewable energy (Liu *et al.* 2013). People's awareness of clean renewable energy sources has been influenced by a sense of responsibility and an ethical obligation to protect the environment (Fornara 2016). When someone has concern for the environment, it can be the reason behind a person's attitude and intention to use renewable energy. The following hypothesis is proposed considering this explanation:

H_1. Environmental concern has a positive effect on attitudes towards renewable energy.

1.2 Perceived Benefits

Perceived benefits are perceptions about the good outcomes of behavior performed in response to an actual or perceived threat (Chandon *et al.* 2005). Consumers are more likely to purchase green products and spread the word about a greener lifestyle when they understand that the long-term benefits outweigh the costs (Huang *et al.* 2014).

Renewable energy is one of the natural resources that can help reduce air pollution and greenhouse gas emissions, thereby improving public health (Basit *et al.* 2020; Irfan *et al.* 2019). Given the importance of climate change, the notion that technologies that reduce CO2 emissions are environmentally beneficial has led to a stronger perception of the advantages of renewable energy resources (Huijts *et al.* 2012). Technological advances and potential cost reductions from renewables outperform non-renewables, making them more affordable and cost-stable in the future (Kaygusuz 2012). Renewable energy generation systems take an important role in the overall electrical energy demand and have gained much attention because they are renewable, environmentally friendly, and flexible to install (Guney and Onat 2008). As such, these benefits will direct an individual's global motives to use renewable energy.

A person's rationality will encourage one to maximize the benefits obtained from a product. Therefore, the benefits of renewable energy will form a positive attitude toward the product, which in turn will motivate people to use the product (Claudy *et al.* 2013). The benefits of renewable energy will indirectly shape the public's view of the product (Alrashoud and Tokimatsu 2020). As an individual desires social acceptance, the person is likely to follow the advice of those around him/her (Schulte *et al.* 2022). In addition, the benefits provided by renewable energy will encourage a person to learn more about it. This knowledge allows the individual to make the most of renewable energy, thus influencing his/her desire to use renewable energy (Alam *et al.* 2014; Fornara *et al.* 2016; Rezaei and Ghofranfarid, 2018). The relationships are shown through the following hypotheses:

H_2. Perceived benefits have a positive effect on attitudes toward renewable energy.

H_3. Perceived benefits have a positive effect on subjective norms for renewable energy.

H_4. Perceived benefits have a positive effect on perceived behavioral control over renewable energy.

1.3 Perceived Costs

Renewable energy refers to a power source that does not pollute the environment. The recent increase in fuel prices has impacted expectations on the cost of renewable energy. Perceived costs refer to the initial capital value incurred at the beginning of renewable energy adoption (Alam *et al.* 2014). An individual's financial background, educational exposure, and social influence may lead one to have a different perspective of perceived costs compared to other people. Although renewable energy was once considered uneconomical, it is now becoming very economical in most countries, which makes it a very promising alternative to oil and coal (Liqun and Zhixin 2009).

Perceived costs are believed to have a negative relationship with consumer behavior, such as willingness to pay or purchase intention (De Medeiros *et al.* 2016). Among the many possible factors influencing users' willingness to adopt new technologies and services, cost-related factors are regarded as one of the most important barriers to a user's sense of wanting to take advantage of emerging technology and services

(Masukujjaman *et al.* 2021). However, when evaluating product costs, individuals must compare them with the benefits that will be obtained from the product purchased (Jayaraman *et al.* 2017). The greater the benefit-cost ratio, the more likely people are to switch to renewable energy (Bandara and Amarasena 2020).

In referring to BRT, the perception of the high cost will be a factor that prevents a person from using renewable energy because the individual will view it as an expensive product, and it will affect his/her attitude toward renewable energy (Claudy *et al.* 2013). Perceived costs also influence public views that form subjective norms (Alrashoud and Tokimatsu 2020) and make a person assume that he/she cannot afford to adopt renewable energy because of one's limited financial condition, and this discourages the individual from using it. The relationships are expressed in the following hypotheses:

H_5. Perceived costs have a negative effect on attitudes toward renewable energy.

H_6. Perceived costs have a negative effect on subjective norms for renewable energy.

H_7. Perceived costs have a negative effect on perceived behavioral control over renewable energy.

1.4 Global Motives and Behavioral Intention

Global motives refer to the intention- and behavior-forming components indicated in TPB. Attitudes toward the behavior, subjective norms, and perceptions about the individual ability to effectively engage in the target behavior shape intentions (Ajzen 1991), including in the context of renewable energy consumption (Almrafee and Akaileh 2023; Kumar and Nayak 2023). In this context, intentions are the intentions to use renewable energy, which demonstrate a person's willingness to try and make efforts to perform this behavior.

Intentions to use renewable energy are influenced by attitudes (Zainudin *et al.* 2014; Zografakis *et al.* 2010), which are a person's positive or negative feelings toward engaging in a target behavior (Ashinze *et al.* 2021). Attitudes are positive or negative perception of an individual that appears as a precursor to an intention to purchase renewable energy technology (Masukujjaman *et al.* 2021). Previous empirical research (Abrahamse and Steg 2011; Ha and Janda 2012; Zainudin *et al.* 2014) shows that the intention to buy energy-efficient products is determined by attitudes towards these products which are formed by the perceived benefits and perceived costs of these products. Consumer intentions increase when a person has a positive attitude towards renewable energy caused by one's understanding that the product will reduce environmental problems (Wustenhagen *et al.* 2007), but it may decline as electricity prices rise (Hansla *et al.* 2008). Almrafee and Akaileh (2023) and Gardan *et al.* (2023) validated the positive relationship between consumer attitudes and intentions to use renewable energy. Guo *et al.* (2021) also discovered a positive effect of attitudes on consumer intentions to purchase renewable energy. The following hypothesis demonstrates the relationship:

H_8. Attitudes have a positive effect on intentions to use renewable energy.

Subjective norms are a social aspect that refers to perceived public pressure to engage in specific behaviors (Ajzen 1991; Yadav and Pathak, 2017). In general, others' actions and opinions have a significant impact on consumers' purchasing intentions. Subjective norms are an important aspect of understanding renewable energy adoption (Masrahi *et al.* 2021) as peer and family pressure plays a role in the development of intentions to use renewable energy (Chowdury *et al.* 2014). Significant positive perceptions of others toward green products have been reported in previous research to have a significant influence on purchase intentions toward green products (Jabeen *et al.* 2019). According to Jayaraman *et al.* (2017), subjective norms positively influence consumer intentions to purchase renewable energy. Therefore, they play a strong role in decision-making which leads to the following hypothesis:

H_9. Subjective norms have a positive effect on intentions to use renewable energy.

Intentions will not be realized if individuals lack the ability to carry out a behavior (Ajzen 2001). The apparent comfort or challenge of completing an activity is defined as perceived behavioral control, which is believed to convey experience as well as expected obstacles and impediments. (Ajzen 1991). Behavioral control operates in two dimensions, namely internal and external behavioral control. Purchase intentions are shaped by beliefs about the item or brand and its characteristics, preceded by a change in attitude toward the purchase itself, and are affected by internal and external factors (Wunder *et al.* 2008). This behavioral control has an immediate impact on individual intentions and an indirect impact on behavior. In terms of using new renewable energy, perceived behavioral control is associated with things that affect consumer confidence in using renewable

energy (Irfan *et al.* 2020). When a consumer believes in his capabilities to use renewable energy, he becomes more likely to adopt it (Ashinze 2021; Fatima *et al.* 2022). The final hypothesis tested is as follows:

H_{10}. Perceived behavioral control has a positive effect on the intention to use renewable energy.

2. Method

This research was a correlational study of the factors that influence consumer intentions to use renewable energy. It was conducted in Indonesia, one of the tropical countries with actual potential to develop and utilize solar energy to overcome the depletion of existing conventional fuel reserves. The renewable energy focused on in this research was in the form of rooftop solar panels or solar cells as new renewable energy to generate electricity. Rooftop solar panels are a power generation system whose energy comes from technology to generate electrical energy using the sun whereas rooftop solar panels operate with a grid aimed at saving electricity consumption (Yadav and Bajpai 2020).

Due to the high installation costs for renewable energy, data was collected from middle- and upper-class Indonesian people selected using a purposive sampling method with the criteria that they already knew about renewable energy and had monthly incomes above IDR 10 million. The minimum sample size was 210 based on the sample-to-item ratio method of 5:1 (Memon *et al.* 2020). Data collection was conducted by distributing questionnaires online through Google Forms. The questionnaires consisted of several sections, namely filter questions, respondent profiles, and items that measured each variable. Specifically, the research instrument consisted of 42 items: 6 items for environmental concerns were adopted from Abdullah *et al.*(2021), Irfan *et al.* (2020), and Wall *et al.* (2021); 7 items for perceived benefits items adopted from Ari and Yilmaz (2021), Masukujjaman *et al.* (2021), and Wall *et al.* (2021); 6 items for perceived costs were adopted from Irfan *et al.* (2020) and Park (2019); 6 items for attitude toward renewable energy were adopted from Abdullah *et al.* (2021), Irfan *et al.* (2020), Masrahi *et al.* (2021), and Wang *et al.* (2021); 6 items for subjective norms were adopted from Hojnik *et al.* (2021), Irfan *et al.* (2020), and Masrahi *et al.* (2021); and 6 items for perceived behavioral control and 5 items for consumer intention were adopted from Irfan *et al.* (2020) and Masrahi *et al.* (2021). A pre-test of 40 respondents resulted in the deletion of one indicator of perceived costs (switching to green electricity is not a cost-effective choice) due to low factor loading.

Due to the complexity of this research model which included many constructs and indicators, PLS-SEM was used to perform data analysis with SmartPLS version 3.3.9. The selection of this data analysis technique was intended to maximize the predictive ability of BRT antecedents in explaining the intention to adopt renewable energy.

3. Results and Discussion

There were 316 people who responded to the survey, but only 275 respondents met the criteria. The univariate and multivariate outlier testing to eliminate outliers by using a Z-score and Mahalanobis Distance resulted in 244 data items that could be used for hypothesis testing. As depicted in Table 1, most of the respondents reside on the island of Java, the most populous and economic center of Indonesia. About 70 percent of the respondents are from the middle and upper-middle classes with monthly incomes between IDR10,000,000 and IDR19,999,999 with monthly electricity bills ranging from IDR500,000 to IDR999,999. Almost all the respondents have an education level up to college level. Of the total 244 respondents, over 70 percent are male, and they are the main decision-makers in the family.

Table 1. Respondents' Profile

Characteristics		Frequency	Percentage
Gender	Male Female	174 70	71.31% 28.69%
Age	20-24 25-34 35-44 45-55	4 119 96 25	1.64% 48.77% 39.34% 10.25%
Domicile	Java island Outside Java Island	220 24	90.16% 9.84%

Characteristics		Frequency	Percentage
Latest Education	High school or equivalent Diploma Undergraduate (S1) Post-Graduate (S2/S3)	5 68 146 25	2.05% 27.87% 59.84% 10.25%
Monthly Income*	IDR10,000,000 – 14,999,999 IDR15,000,000 – 19,999,999 IDR20,000,000 – 24,999,999 IDR25,000,000 and above	96 89 34 25	39.34% 36.48% 13.93% 10.25%
Monthly Electricity Bills	Less than IDR500,000 IDR500,000 – 999,999 IDR1,000,000 – 1,499,999 IDR1,500,000 and above	14 155 63 12	5.74% 63.52% 25.82% 4.92%
The main decision-makers in the family	Yes No	217 27	88.93% 11.07%

*As of 29 March 2023, IDR 1 million equals USD65

The instrument had fulfilled the convergent validity criteria of the factor loading values above 0.7 and an AVE of more than 0.5 as well as the reliability requirements of Cronbach's alpha and composite reliability values above 0.7 (Table 2). The discriminant validity based on the Fornell-Larcker criterion (Table 3) reveals that the square root of the AVE of each latent construct was higher than its correlation with other constructs. Similarly, the discriminant validity requirement based on HTMT was met as all ratios were below 0.9 (Table 4).

Table 2. Convergent Validity and Reliability

	Item	Loading	AVE	Cronbach's Alpha	Composite Reliability
Environmental Concern (EC)	EC1 EC2 EC3 EC4 EC5 EC6	0.902 0.870 0.890 0.851 0.831 0.788	0.733	0.927	0.943
Perceived Benefits (PB)	PB1 PB2 PB3 PB4 PB5 PB6 PB7	0.712 0.758 0.830 0.841 0.856 0.790 0.775	0.634	0.903	0.923
Perceived Costs (PC)	PC1 PC2 PC3 PC4 PC5 PC6	0.966 0.967 0.969 0.976 0.969 0.962	0.937	0.987	0.989
Attitude (AT)	AT1 AT2 AT3 AT4 AT5 AT6	0.812 0.873 0.879 0.864 0.863 0.894	0.748	0.932	0.947

	Item	Loading	AVE	Cronbach's Alpha	Composite Reliability
Subjective Norms (SN)	SN1 SN2 SN3 SN4 SN5 SN6	0.860 0.883 0.892 0.873 0.891 0.913	0.784	0.945	0.956
Perceived Behavioral Control (PBC)	PBC1 PBC2 PBC3 PBC4 PBC5 PBC6	0.895 0.804 0.880 0.857 0.800 0.859	0.722	0.923	0.940
Consumer Intention (CI)	CI1 CI2 CI3 CI4 CI5	0.794 0.865 0.915 0.917 0.888	0.769	0.924	0.943

Table 3. Discriminant Validity based on the Fornell and Larcker Criterion

	AT	CI	EC	PB	PBC	PC	SN
AT	**0.865**						
CI	0.789	**0.877**					
EC	0.453	0.463	**0.856**				
PB	0.614	0.584	0.614	**0.796**			
PBC	0.718	0.821	0.469	0.617	**0.850**		
PC	-0.229	-0.291	-0.289	-0.366	-0.370	**0.968**	
SN	0.743	0.776	0.424	0.659	0.820	-0.342	**0.885**

Table 4. Discriminant Validity based on HTMT

	AT	CI	EC	PB	PBC	PC	SN
AT							
CI	0.849						
EC	0.482	0.495					
PB	0.665	0.635	0.672				
PBC	0.774	0.888	0.498	0.671			
PC	0.237	0.303	0.301	0.392	0.386		
SN	0.782	0.829	0.444	0.706	0.879	0.352	

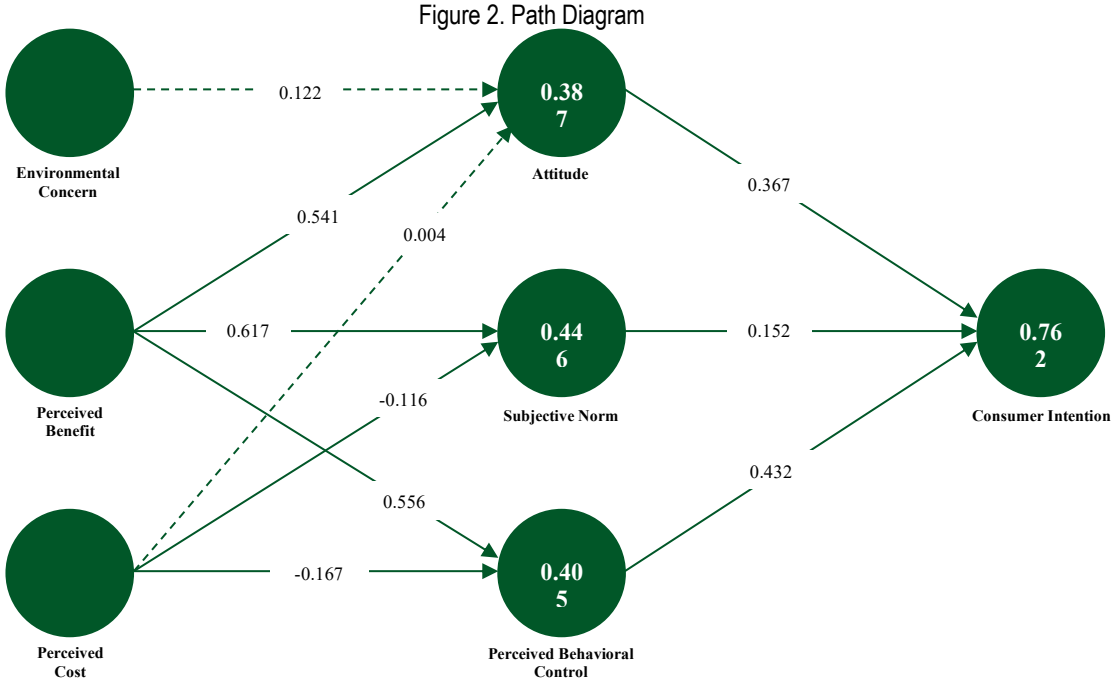
The bootstrapping procedure with 5,000 sub-samples in Table 5 and Figure 2 shows that 8 out of 10 hypotheses were supported. Environmental concern, perceived benefits, and perceived costs were able to predict

the variability of attitudes towards renewable energy use by 38.7 percent. Even though environmental concerns had a statistically significant influence on attitude, their effect was not substantial (β = 0.122, p<0.05, f^2 = 0.015), which led to the rejection of H1. Perceived benefits were the only significant antecedent of attitude either statistically or substantially (β = 0.541, p<0.001, f^2 = 0.279), which supports H2. The effect of perceived costs on attitudes toward renewable energy was insignificant (β = 0.004, p = 0.470, f^2 = 0.000). Perceived benefits and perceived costs were able to predict subjective norms and perceived behavioral control by 44.6 percent and 40.5 percent, respectively. Perceived benefits had a significant and substantial positive effect on subjective norms (β=0.617, p<0.001, f^2 = 0.596) and perceived behavioral control (β = 0.556, p<0.001, f^2 = 0.450). In contrast, perceived costs had a small significant negative influence on subjective norms (β =-0.116, p< 0.05, f^2 = 0.021) and perceived behavioral control (β=-0.167, p<0.001, f^2 = 0.041). In line with TPB, attitudes (β=0.367, p<0.001), subjective norms (β=0.152, p<0.05), and perceived behavioral control (β=0.432, p<0.001) significantly determined consumer intention to use renewable energy and could explain its variability by 76.2 percent.

Table 5. Hypothesis Testing

Path	β	S.E.	t-value	p-value	f^2	Decision
H1: EC → AT	0.122	0.056	2.179	0.015	0.015	Not Supported
H2: PB → AT	0.541	0.069	7.831	0.000	0.279	Supported
H3: PB → SN	0.617	0.050	12.331	0.000	0.596	Supported
H4: PB → PBC	0.556	0.055	10.063	0.000	0.450	Supported
H5: PC → AT	0.004	0.053	0.075	0.470	0.000	Not Supported
H6: PC → SN	-0.116	0.047	2.471	0.007	0.021	Supported
H7: PC → PBC	-0.167	0.051	3.304	0.000	0.041	Supported
H8: AT → CI	0.367	0.066	5.579	0.000	0.238	Supported
H9: SN → CI	0.152	0.070	2.173	0.015	0.027	Supported
H10: PBC → CI	0.432	0.080	5.397	0.000	0.235	Supported

Figure 2. Path Diagram



This study applied the BRT framework to examine factors leading to the intentions of consumers in using renewable energy. In addition to validating the reasons that support global motives and consumer intentions as has been widely researched before, this research also intended to know the opposing reasons that negatively affect the global motives and consumer intentions to use renewable energy. The findings generally validate BRT that behind the global motives that influence consumer intentions, there are reasons that support and are against an individual's global motives.

Perceived benefits and perceived costs are often a consideration in decision-making. This research found that perceived benefits have the greatest influence on global motives. The higher the perceived benefits, the higher the attitudes, subjective norms, and behavioral control felt by someone to use renewable energy will be (Schulte *et al.* 2022). A person will be more interested in utilizing renewable energy and tell others closest to him about the benefits he perceives that using renewable energy has more advantages than disadvantages. Perceived benefits are also one of the important predictors of consumer attitudes (Bozorgparvar *et al.* 2018). This finding is supported by various previous research, where if someone has felt the benefits of technology, they will be more ready to use the technology (Chen *et al.* 2019). Zervas *et al.* (2021) claimed that the perceived benefits can guarantee that a household will replace the previous technology with the latest technology, or in the case of this research, replace conventional energy with renewable energy.

Perceived costs as an opposing reason have no influence on consumer attitudes toward the use of renewable energy, which is not in line with Ashinze (2021) who reported a negative correlation between perceived costs and their attitudes regarding the use of renewable energy. This study involved middle and upper-class consumers who have the financial ability to use renewable energy. It might cause perceived costs of attitudes to use renewable energy to be irrelevant to these segments. This is in line with an argument by Kumar *et al.* (2020) that a customer's impression of the product costs depends on one's finances. On the other hand, perceived cost negatively affects subjective norms and perceived behavioral control. Renewable energy, especially solar panels, is relatively new so many Indonesians are not familiar with it. Indonesian people have less knowledge and lack an understanding of renewable energy compared to those in developed countries. They need evidence and affirmation from those closest to them regarding the use of renewable energy. The belief of individuals or groups to use renewable energy that is driven by those closest to them will affect their subjective norms with little knowledge to adopt renewable energy (Chow and Chan, 2008). When the individuals in their immediate social circle perceive that the costs of using renewable energy are expensive, they will be less likely to advocate for the use of renewable energy. This lack of understanding will affect a person's confidence in his ability to use renewable energy, especially when the costs involved are quite high. However, if consumers have enough money to invest in renewable energy, they will be able to take advantage of these advancements in renewable energy to boost their self-efficacy and confidence (Ashinze *et al.* 2021).

Against the prediction, environmental concerns do not have a significant effect on attitudes toward using renewable energy. This finding contradicts previous research by Wei *et al.* (2021) that environmental concerns affect attitudes, which in turn influence consumer purchase intentions toward green products. The lack of human concern and knowledge of the environment will affect the balance of nature (Khan *et al.* 2019). Therefore, the greater one's knowledge of the environment is, it will lead to greater environmental concern. Individuals who are highly concerned about the environment are more likely to use renewable energy. Nevertheless, cultural values and the social environment may influence the impact of environmental concerns on customer purchasing behavior (Kaufmann *et al.* 2012). As such, even though Indonesians are aware of environmental issues, it does not necessarily direct them to hold a favorable attitude toward renewable energy unless their sociocultural group encourages them to do so.

The global motives that form the basis of TPB, namely attitudes, subjective norms, and perceived behavioral control are found to have a positive effect on consumers' intentions to use renewable energy. These findings confirm research by Vantamay (2018) and Sharifuddin *et al.* (2022), who discovered that perceived behavioral control has the greatest influence, followed by attitudes and subjective norms. Most respondents are the main decision-makers in their families and come from middle- and upper-class segments. Thus, they have confidence in their financial capabilities and power in decision-making, which makes perceived behavioral control becomes the biggest predictor of intentions to use renewable energy. Attitudes also have a strong effect on the intention to use renewable energy. When someone already believes that renewable energy provides positive benefits, the person will be more likely to use renewable energy. As a collectivistic society, Indonesians are also influenced by those who are deemed significant in their social environment. When one's nuclear family and closest relatives support the use of renewable energy, it will affect one's intention to use renewable energy.

Conclusion and Future Research

This research verifies the behavioral reasoning theory proposed by Westaby (2005) that there are reasons that connect global motives and a person's intentions. While previous research has addressed the obstacles to implementing sustainable energy sources, it has not specifically focused on the effects of adopting solar energy technologies. As a result, the instrument set up in this study captures six key factors influencing the adoption of solar energy technology. The new instrument improves guidelines for researchers investigating renewable energy issues and can thus be regarded as a strategic management tool.

All the hypotheses tested, except for the effect of environmental concern and perceived costs on attitudes, are proven to affect consumer intentions to use renewable energy. This research also found that perceived benefits are the reasons that support the three global motives of consumer intentions to use renewable energy. Since this research involved middle- and upper-class consumers in developing countries, perceived behavioral control is found to have the strongest influence compared to attitudes and subjective norms. It was found that perceived costs are the reason that hinders a person's global motive to use renewable energy. These findings improve our knowledge and understanding of consumer behavior towards solar energy use and provide a suggestion for solar energy equipment manufacturers to redesign their products.

This research also helps marketing practitioners comprehend the theoretical underpinnings of decision-making in different contexts. Practitioners can take advantage of BRT to understand the decision-making process because it is more robust and effective than studies that do not rely on theory. Perceived benefits have been shown to have a greater influence on global motives than the perceived costs of renewable energy. For this reason, by further increasing public education regarding the benefits of using renewable energy, people can understand and be more interested in using it. Renewable energy can also be obtained for free, such as solar resources or continuously flowing water. No large investment is required to process these renewable resources into energy that can be used daily. Renewable energy such as solar cells and photovoltaic cells are highly coveted by all countries as it is environmentally friendly and does not cause any pollution compared to other energy sources, such as coal and fossil fuels. The use of renewable energy may also reduce monthly electricity bills. The research and development of renewable energy, especially photovoltaics, should be continuously pursued to lower its installation and maintenance costs and enlarge market opportunities for photovoltaic or solar cells. In addition, the government and renewable energy-related groups should do more campaigns to provide an educational understanding to the public regarding the cost of renewable energy, where the incurred costs of using renewable energy can provide more significant benefits in the long-run. To achieve renewable energy targets, the government also needs to provide intensive support, not only in the form of directives and plans but also in policies and regulations, as well as support from natural resources.

Despite the findings of this study being consistent with the behavioral reasoning theory, this study has limitations. This study only looked at consumer intention, while the actual behavior may be different. Future research may extend the model by examining customer willingness to pay for renewable energy. The use of renewable energy faces several challenges, one of which is the relatively high cost but with significant benefits, especially for the environment. Therefore, future research can consider enriching BRT in the context of renewable energy by including customer characteristics, product purchasing frequency, and price sensitivity in the model. A comparative analysis of renewable energy product models for various other types of benefits is also needed.

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Medya Ramadhan: Writing – original draft, Writing – review and editing.
Iden Aksana Putra Pratama: Writing – original draft, Writing – review and editing.
Evelyn Hendriana: Conceptualization, Writing – review and editing, Supervision.

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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.

References

[1] Abdullah, W. Muhammad Zainuddin B. Wan, Wan Nur Rahini Aznie Bt Zainudin, Waznatol Widad Bt Mohamad Ishak, Farizah Bt Sulong, and Hafiz Muhammad Zia Ul Haq. 2020. Public Participation of Renewable Energy (PPRED) Model in Malaysia: An Instrument Development. *International Journal of Renewable Energy Development* 10(1): 119–137. DOI: https://doi.org/10.14710/ijred.2021.32311

[2] Abrahamse, W., and Steg, L. 2011. Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review*, 18(1): 30–40.

[3] Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. DOI: https://doi.org/10.1016/0749-5978(91)90020-T

[4] Ajzen, I. 2001. Nature and operation of attitudes. *Annual Review of Psychology*, 52(1): 27-58.

[5] Alam, S. S., Hashim, N. H. N., Rashid, M., Omar, N. A., Ahsan, N., and Ismail, M. D. 2014. Small-scale households' renewable energy usage intention: Theoretical development and empirical settings. *Renewable Energy*, 68: 255-263. DOI: https://doi.org/10.1016/j.renene.2014.02.010

[6] Almrafee, M., and Akaileh, M. 2023. Customers' purchase intention of renewable energy in Jordan: the case of solar panel systems using an extended theory of planned behavior (TPB). *International Journal of Energy Sector Management*. Ahead-of-print. DOI: https://doi.org/10.1108/IJESM-01-2023-0002

[7] Alrashoud, K., and Tokimatsu, K. 2020. An exploratory study of the public's views on residential solar photovoltaic systems in oil-rich Saudi Arabia. *Environmental Development,* 35:100526. DOI:https://doi.org/10.1016/j.envdev.2020.100526

[8] Ari, E., and Yilmaz, V. 2021. The effect of environmental concern on renewable energy awareness, perceived benefit and intention to use. *Journal of Fundamental and Applied Sciences,* 13(2): 995-1013. DOI:https://doi.org/10.21203/rs.3.rs-156931/v1

[9] Ashinze, P. C., Tian, J., Ashinze, P. C., Nazir, M., and Shaheen, I. 2021. A multidimensional model of sustainable renewable energy linking purchase intentions, attitude, and user behavior in Nigeria. *Sustainability*, 13(19): 10576. DOI: https://doi.org/10.3390/su131910576

[10] Bandara, U. C., and Amarasena, T. S. M. 2020. Impact of perceived ease of use, awareness, and perceived cost on intention to use solar energy technology in Sri Lanka. *Journal of International Business and Management*, 3(4): 01-13. DOI: https://doi.org/10.37227/jibm-2020-04-61

[11] Basit, M. A., Dilshad, S., Badar, R., and Sami ur Rehman, S. M. 2020. Limitations, challenges, and solution approaches in grid-connected renewable energy systems. *International Journal of Energy Research*, 44(6), 4132-4162. DOI: https://doi.org/10.1002/er.5033

[12] Bozorgparvar, E., Yazdanpanah, M., Forouzani, M., and Khosravipour, B. 2018. Cleaner and greener livestock production: Appraising producers' perceptions regarding renewable energy in Iran. *Journal of Cleaner Production*, 203: 769-776. DOI: https://doi.org/10.1016/j.jclepro.2018.08.280

[13] Cantarero, M. M. V. 2020. Of renewable energy, energy democracy, and sustainable development: A roadmap to accelerate the energy transition in developing countries. *Energy Research and Social Science,* 70: 101716. DOI: https://doi.org/10.1016/j.erss.2020.101716

[14] Chandon, P., Morwitz, V. G., and Reinartz, W. J. 2005. Do intentions really predict behavior? Self-generated validity effects in survey research. *Journal of Marketing,* 69(2): 1–14. DOI:https://doi.org/10.1509/jmkg.69.2.1.60755

[15] Chen, Y., Wang, Z., and Zhong, Z. 2019. CO2 emissions, economic growth, renewable and non-renewable energy production, and foreign trade in China. *Renewable Energy*, 131: 208-216. DOI:https://doi.org/10.1016/j.renene.2018.07.047

[16] Chow, W. S., and Chan, L. S. 2008. Social network, social trust, and shared goals in organizational knowledge sharing. *Information and Management,* 45(7): 458-465. DOI:https://doi.org/10.1016/j.im.2008.06.007

[17] Chowdhury, M. N. M., Uddin, S., and Saleh, S. 2014. Present scenario of renewable and non-renewable resources in Bangladesh: A compact analysis. *International Journal of Sustainable and Green Energy*, 3(6): 164-178.

[18] Claudy, M. C., Peterson, M., and O'Driscoll, A. 2013. Understanding the attitude-behavior gap for renewable energy systems using behavioral reasoning theory. *Journal of Macromarketing,* 33(4): 273-287. DOI:https://doi:10.1177/0276146713481605

[19] De Medeiros, J. F., Ribeiro, J. L. D., and Cortimiglia, M. N. 2016. Influence of perceived value on purchasing decisions of green products in Brazil. *Journal of Cleaner Production*, 110: 158-169. DOI:https://doi.org/10.1016/j.jclepro.2015.07.100

[20] Fatima, N., Li, Y., Li, X., Abbas, W., Jabeen, G., Zahra, T., and Yasir, A. 2022. Households' perception and environmentally friendly technology adoption: Implications for energy efficiency. *Frontiers in Energy Research,* 10: 176-187. DOI: https://doi.org/10.3389/fenrg.2022.830286

[21] Fornara, F., Pattitoni, P., Mura, M., and Strazzera, E. 2016. Predicting intention to improve household energy efficiency: The role of value-belief-norm theory, normative and informational influence, and specific attitude. *Journal of Environmental Psychology*, 45: 1-10. DOI: https://doi.org/10.1016/j.jenvp.2015.11.001

[22] Gârdan, I. P., Micu, A., Paștiu, C. A., Micu, A. E., and Gârdan, D. A. 2023. Consumers' attitude towards renewable energy in the context of the energy crisis. *Energies*, 16(2): 1-31. DOI:https://doi.org/10.3390/en16020676

[23] Guo, J., Zhou, Y., Ali, S., Shahzad, U., and Cui, L. 2021. Exploring the role of green innovation and investment in energy for environmental quality: An empirical appraisal from provincial data of China. *Journal of Environmental Management*, 292: 112779. DOI: https://doi.org/10.1016/j.jenvman.2021.112779

[24] Guney, I., and Onat, N. 2008. Technological status and market trends of photovoltaic cell industry. *WSEAS Transactions on Electronics*, 5(7): 303-312.

[25] Ha, H. Y., and Janda, S. 2012. Predicting consumer intentions to purchase energy-efficient products. *Journal of Consumer Marketing*, 29(7): 461-469. DOI: https://doi.org/10.1108/07363761211274974

[26] Hansla, A., Gamble, A., Juliusson, A., and Gärling, T. 2008. Psychological determinants of attitude towards and willingness to pay for green electricity. *Energy Policy*, 36(2): 768-774. DOI:https://doi.org/10.1016/j.enpol.2007.10.027

[27] Hojnik, J., Ruzzier, M., Fabri, S., and Klopčič, A. L. 2021. What you give is what you get: Willingness to pay for green energy. *Renewable Energy,* 174: 733-746. DOI: https://doi.org/10.1016/j.renene.2021.04.037

[28] Huang, Z. F., Pan, L., Zou, J. J., Zhang, X., and Wang, L. 2014. Nanostructured bismuth vanadate-based materials for solar-energy-driven water oxidation: A review on recent progress. *Nanoscale*, 6(23): 14044-14063.

[29] Huijts, N. M., Molin, E. J., and Steg, L. 2012. Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework. *Renewable and Sustainable Energy Reviews*, 16(1), 525-531. DOI: https://doi.org/10.1016/j.rser.2011.08.018

[30] Irfan, M., Zhao, Z.-Y., Ahmad, M., and Mukeshimana, M. 2019. Solar energy development in Pakistan: Barriers and policy recommendations. *Sustainability*, 11(4): 1206. DOI: https://doi.org/10.3390/su11041206

[31] Irfan, M., Zhao, Z. Y., Li, H., and Rehman, A. 2020. The influence of consumers' intention factors on willingness to pay for renewable energy: A structural equation modeling approach. *Environmental Science and Pollution Research*, 27(17): 21747-21761. DOI:https://doi.org/10.1007/s11356-020-08592-9

[32] Irfan, M., Hao, Y., Ikram, M., Wu, H., Akram, R., and Rauf, A. 2021. Assessment of the public acceptance and utilization of renewable energy in Pakistan. *Sustainable Production and Consumption,* 27: 312-324. DOI:https://doi.org/10.1016/j.spc.2020.10.031

[33] Jabeen, G., Yan, Q., Ahmad, M., Fatima, N., and Qamar, S. 2019. Consumers' intention-based influence factors of renewable power generation technology utilization: A structural equation modeling approach. *Journal of Cleaner Production*, 237: 117737. DOI: https://doi.org/10.1016/j.jclepro.2019.117737

[34] Jayaraman, K., Paramasivan, L., and Kiumarsi, S. 2017. Reasons for low penetration on the purchase of photovoltaic (PV) panel system among Malaysian landed property owners. *Renewable and Sustainable Energy Reviews*, 80: 562-571. DOI: https://doi.org/10.1016/j.rser.2017.05.213

[35] Kaufmann, H. R., Panni, M. F. A. K., and Orphanidou, Y. 2012. Factors affecting consumers' green purchasing behavior: An integrated conceptual framework. *Amfiteatru Economic Journal*, 14(31): 50-69.

[36] Kaygusuz, K. 2012. Energy for sustainable development: A case of developing countries. *Renewable and Sustainable Energy Reviews*, 16(2): 1116-1126. DOI: https://doi.org/10.1016/j.rser.2011.11.013

[37] Khan, M., Lee, H. Y., and Bae, J. H. 2019. The role of transparency in humanitarian logistics. *Sustainability,* 11(7): 2078. DOI: https://doi.org/10.3390/su11072078

[38] Kumar, G., and Nayak, J.K. 2023. A meta-analysis of TPB model in predicting green energy behavior: The moderating role of cross-cultural factors. *Journal of International Consumer Marketing,* 35(2): 147-165. DOI:https://doi.org/10.1080/08961530.2022.2070900

[39] Kumar, V., Syan, A. S., and Kaur, K. 2020. A structural equation modeling analysis of factors driving customer purchase intention towards solar water heater. *Smart and Sustainable Built Environment,* 11(1): 65-78. DOI: https://doi.org/10.1108/SASBE-05-2020-0069

[40] Lin, B., and Zhu, J. 2019. The role of renewable energy technological innovation on climate change: Empirical evidence from China. *Science of the Total Environment*, 659: 1505-1512.

[41] Liqun, L., and Zhixin, W. 2009. A variable voltage MPPT control method for photovoltaic generation system. *WSEAS Transactions on Circuits and Systems*, 8(4): 335-349.

[42] Liu, W., Wang, C., and Mol, A. P. 2013. Rural public acceptance of renewable energy deployment: The case of Shandong in China. *Applied Energy*, 102: 1187-1196.

[43] Masrahi, A., Wang, J. H., and Abudiyah, A. K. 2021. Factors influencing consumers' behavioral intentions to use renewable energy in the United States residential sector. *Energy Reports*, 7: 7333-7344. DOI:https://doi.org/10.1016/j.egyr.2021.10.077

[44] Masukujjaman, M., Alam, S. S., Siwar, C., and Halim, S. A. 2021. Purchase intention of renewable energy technology in rural areas in Bangladesh: Empirical evidence. *Renewable Energy*, 170: 639-651. DOI:https://doi.org/10.1016/j.renene.2021.01.125

[45] Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F., and Cham, T. H. 2020. Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, 4(2): 1-20.

[46] Milfont, T. L., and Duckitt, J. 2010. The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, 30(1): 80-94. DOI:https://doi.org/10.1016/j.jenvp.2009.09.001

[47] Nazir, M., and Tian, J. 2022. The influence of consumers' purchase intention factors on willingness to pay for renewable energy: Mediating effect of attitude. *Frontiers in Energy Research,* 10: 62-74. DOI:https://doi.org/10.3389/fenrg.2022.837007

[48] Park, E. 2019. Social acceptance of green electricity: Evidence from the structural equation modeling method. *Journal of Cleaner Production,* 215: 796-805. DOI: https://doi.org/10.1016/j.jclepro.2019.01.075

[49] Rezaei, R., and Ghofranfarid, M. 2018. Rural households' renewable energy usage intention in Iran: Extending the unified theory of acceptance and use of technology. *Renewable Energy*, 122: 382-391. DOI:https://doi.org/10.1016/j.renene.2018.02.011

[50] Saari, U. A., Damberg, S., Frömbling, L., and Ringle, C. M. 2021. Sustainable consumption behavior of Europeans: The influence of environmental knowledge and risk perception on environmental concern and behavioral intention. *Ecological Economics*, 189: 107155. DOI:https://doi.org/10.1016/j.ecolecon.2021.107155

[51] Schulte, E., Scheller, F., Sloot, D., and Bruckner, T. 2022. A meta-analysis of residential PV adoption: The important role of perceived benefits, intentions, and antecedents in solar energy acceptance. *Energy Research and Social Science,* 84: 102339. DOI: https://doi.org/10.1016/j.erss.2021.102339

[52] Sharifuddin, S. I., Zainudin, N., and Sabr, M. F. 2022. An extended model of the theory of planned behavior to predict households' response to net energy metering program in urban Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 12(1): 1864-1879. DOI:https://doi.org/10.6007/IJARBSS/v12-i1/11853

[53] Tan, H., Jain, A., Voznyy, O., Lan, X., García de Arquer, F. P., Fan, J. Z., and Sargent, E. H. 2017. Efficient and stable solution-processed planar perovskite solar cells via contact passivation. *Science*, 355(6326): 722-726. DOI: https://doi.org/10.1126/science.aai9081

[54] Vantamay, N. 2018. Investigation and recommendations on the promotion of sustainable consumption behavior among young consumers in Thailand. *Kasetsart Journal of Social Sciences*, 39(1): 51-58. DOI:https://doi.org/10.1016/j.kjss.2018.01.007

[55] Wall, W. P., Khalid, B., Urbański, M., and Kot, M. 2021. Factors influencing consumer's adoption of renewable energy. *Energies*, 14(17): 5420. DOI: https://doi.org/10.3390/en14175420

[56] Wang, Q., Wang, S., Zhang, M., Bu, Z., and Liu, J. 2021. Green public procurement as a promoter for green consumption: From the perspective of individual's knowledge. *Cleaner and Responsible Consumption,* 3: 100035. DOI: https://doi.org/10.1016/j.clrc.2021.100035

[57] Wei, J., Zhao, X., and Yang, X. 2021. Measuring purchase intention towards green power certificate in a developing nation: Applying and extending the theory of planned behavior. *Resources, Conservation, and Recycling*, 168: 105363. DOI: https://doi.org/10.1016/j.resconrec.2020.105363

[58] Westaby, J. D. 2005. Behavioral reasoning theory: Identifying new linkages underlying intentions and behavior. *Organizational Behavior and Human Decision Processes*, 98(2): 97-120. DOI:https://doi.org/10.1016/j.obhdp.2005.07.003

[59] Wunder, S., Engel, S., and Pagiola, S. 2008. Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries. *Ecological Economics,* 65(4): 834-852. DOI: https://doi.org/10.1016/j.ecolecon.2008.03.010

[60] Wüstenhagen, R., Wolsink, M., and Bürer, M. J. 2007. Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy*, 35(5): 2683-2691. DOI:https://doi.org/10.1016/j.enpol.2006.12.001

[61] Yadav, R., and Pathak, G. S. 2017. Determinants of consumers' green purchase behavior in a developing nation: Applying and extending the theory of planned behavior. *Ecological Economics*, 134: 114-122. DOI:https://doi.org/10.1016/j.ecolecon.2016.12.019

[62] Yadav, S. K., and Bajpai, U. 2020. Energy, economic and environmental performance of a solar rooftop photovoltaic system in India. *International Journal of Sustainable Energy*, 39(1): 51-66. DOI:https://doi.org/10.1080/14786451.2019.1641499

[63] Yue, B., Sheng, G., She, S., and Xu, J. 2020. Impact of consumer environmental responsibility on green consumption behavior in China: The role of environmental concern and price sensitivity. *Sustainability*, 12(5): 2074. DOI: https://doi.org/10.3390/su12052074

[64] Zainudin, N., Siwar, C., Choy, E. A., and Chamhuri, N. 2014. Evaluating the role of energy efficiency label on consumers' purchasing behaviour. *Apcbee Procedia*, 10: 326-330. DOI:https://doi.org/10.1016/j.apcbee.2014.10.061

[65] Zervas, E., Vatikiotis, L., Gareiou, Z., Manika, S., and Herrero-Martin, R. 2021. Assessment of the Greek national plan of energy and climate change: Critical remarks. *Sustainability*, 13(23): 13143. DOI:https://doi.org/10.3390/su132313143

[66] Zografakis, N., Sifaki, E., Pagalou, M., Nikitaki, G., Psarakis, V., and Tsagarakis, K. P. 2010. Assessment of public acceptance and willingness to pay for renewable energy sources in Crete. *Renewable and Sustainable Energy Reviews*, 14(3): 1088-1095. DOI: https://doi.org/10.1016/j.rser.2009.11.009

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Climate Change Impact Vulnerability Assessment: The Case of Coastal Communities in Central Zambales, Philippines

Shirly C. SERRANO
Faculty of Environment, Kasetsart University, Thailand, and
Institute for Climate Change and Environmental Management,
College of Science, Central Luzon State University, Philippines
sheserrano@clsu.edu.ph;scserrano@yahoo.com

Nipon TANGTHAM
Faculty of Environment, Kasetsart University, Thailand
ffornpt@ku.ac.th

Surat BUALERT
Faculty of Environment, Kasetsart University, Thailand
surat.b@ku.ac.th

Suthee JANYASUTHIWONG
Faculty of Environment, Kasetsart University, Thailand
suthee.ja@ku.th

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Abstract: The Philippines is one of the countries most affected by climate change. As an archipelago country, coastal areas are at high risk of sea level rise due to climate change. This study investigated the vulnerability of coastal areas to sea level rise in selected municipalities in Zambales province, Philippines. The results showed that the coastal barangay of Iba City has a "moderate" to "high" level of vulnerability, while Botolan City has a "high" to "very high" level of vulnerability. Limited areas of nature reserves, such as mangrove, seagrass, and coral reef ecosystems, are one of the key factors contributing to high vulnerability. Concerted efforts of the local government units and the residents play a vital role to mitigate impacts of climate change including regular mangrove tree planting, coastal clean-up drive, and strict implementation of environmental policies. While there are many tools used in vulnerability assessment, a simpler yet reliable is recommended as an appropriate for barangay levels. With the identified vulnerability of the communities in sea level rise, possible mitigation measures to cope with the fast-changing climate could now be established.

Keywords: climate change vulnerability; adaptive capacity; coastal vulnerability; exposure assessment; sea level rise, vulnerability.

JEL Classification: Q53; Q54; R11.

Introduction

As an archipelago nation, the Philippines has one of the longest coastlines in the world (Capili 2005), with an estimated coastal area of 220 million hectares, or approximately 88% of its territory. The World Bank also ranked the country among the 12 countries most at risk from climate change. Droughts, floods, storms, rising sea levels, and growing agricultural instability are the biggest climate change threats facing this country. The country's limited resources and land area make it one of the countries most affected by climate change (Cruz and Jose 1999). Coastal ecosystems are threatened by the effects of climate change (Perez *et al.* 1999). The main causes of sea level rise due to global warming are the melting of ice sheets and glaciers and the expansion of oceans due to global warming (NASA, 2021). Sea level rise caused by climate change has significant impacts on coastal areas (Li *et al.* 2015). Each year, sea levels are rising at a rate of approximately one-eighth of an inch (Nunez 2019; Lindsey 2021), and this scenario is currently evident in this country. From 1980 to 1989, a sea level rise of almost

15 cm was observed in different regions of the country (Hilario 2008). These coastal areas are important areas for commercial, industrial, agricultural, and aquaculture activities in the Philippines, resulting in severe impacts such as loss of coastal structures, displacement of coastal residents, adverse livelihood impacts, and loss of wetlands. It has socio-economic and environmental impacts and loss of species diversity (Perez *et al.* 1999).

Vulnerability and adaptation assessments (VandA) are important for providing information to determine global evidence-based health impacts of climate change (Berry, *et al.* 2018). Therefore, a study was conducted on the vulnerability of the coastal areas of central Zambales in the Philippines to sea level rise.

1. Literature Review

Coastal regions are increasingly threatened by stressors caused by both climate change and anthropogenic factors. Vulnerability assessments are central to implementing climate change adaptation interventions. This will help decision makers prioritize interventions in coastal areas and identify adaptation strategies that target vulnerability factors (Yoo *et al.* 2014; Zhang *et al.* 2020) .Identifying particularly vulnerable coastal areas is critical for the development of coastal management plans. Physical and social vulnerability are important factors (Tragaki *et al.* 2018). Vulnerability to climate change depends on the interrelationship of key factors: exposure, susceptibility, and adaptability (Adger 1999). Vulnerability assessment can be performed using various methods. As suggested by Alberto *et al.* (2018), vulnerability assessments need to identify and quantify the bio geophysical impacts of climate hazards. This puts borders, resources, populations, and capital at risk. The Coastal integrated assessment tool (CIAT) framework can also be used for vulnerability assessment (Paquit *et al.* 2018). Exposure, susceptibility, and adaptability variables are described and evaluated based on community perceptions and biophysical evidence. Changes in precipitation and temperature, mangrove cover, and the occurrence of extreme weather events are used as indicators of exposure. Losses in property and income structures are used as sensitivity indicators, and human, natural, social, financial and physical assets are used as components of adaptive capacity (Evariste *et al.* 2018). Alberto *et al.* (2016) used remote sensing to measure geophysical changes in the coastline and rivers of Zambales Province, Philippines. The results showed that the satellite images used in the study had high positioning accuracy for small datasets.

Climate change affects not only ecosystems but also human health. Vulnerability and adaptation assessments are important for providing information on the scientific health impacts of global climate change (Berry *et al.* 2018). The most vulnerable people in the Philippines are unaware of the relationship between climate and land use (Acosta *et al.* 2016). Global studies have shown the potential of climate change for marine biodiversity, fish distribution, potential fisheries yields (Cheung *et al.* 2009; Stock *et al.* 2017), and the economy (Sumaila *et al.* 2012). It is reported that the impact is expected to be significant. In a study by Perez *et al.* (1999), the development of adaptation plans in the context of setback policies, building regulations, and integrated coastal zone management is needed to address short-term and long-term community participation issues in this region. It is stated that institutional measures such as these are necessary. In addition to technical and scientific contributions, information, education and communication are essential elements to achieve a balanced adaptation plan. Furthermore, Kreslake *et al.* (2016) stated that it is important to develop effective communication materials regarding the health impacts of climate change for vulnerable groups. Based on the study of Munang *et al.* (2013), vulnerable groups are interested in obtaining short-term advice on health care and protective behaviors related to chronic diseases.

Nanlohy *et al.* (2015), emphasized that coastal communities' knowledge of climate change will help them adapt to these environmental conditions, which is supported by the argument of Gomez *et al.* (2020) that alternative livelihoods and psychological education are needed to strengthen household resilience and increase human security in coastal communities. Ecosystem-based adaptation approaches harness nature's ability to protect human communities from the negative effects of climate change through the sustainable rovision of system services (Munang *et al.* 2013).

2. Methodology

A combination of field surveys, focus group discussions, and primary and secondary data collection was conducted to identify hazards as an impact of climate change in the region. The results showed that the main impact of climate change on coastal barangays is sea level rise (SLR).

Vulnerability assessments include the sensitivity or susceptibility of coastal areas to physical changes resulting from climate change, expected socio-economic and ecological impacts, and available adaptation options (Harvey *et al.* 1999). A risk assessment checklist was developed and used to assess sea surface exposure at the study site (Espaldon *et al.* 2016; Paz-Alberto *et al.* 2018).

The vulnerability was then analyzed using the formula:

$$V = \frac{S+E+AC}{3} \quad (1)$$

where: V= vulnerability
S= Sensitivity
E= Exposure
AC = Adaptive capacity

Sensitivity. It was analyzed using seven indicators based on the classification of the wetlands, coral reefs, mangroves capability to migrate landward, capacity to withstand prolonged flooding, dominant seagrass, capacity to withstand wave impacts, and fishery catch (Table 1).

Table1. Sensitivity assessment for sea level rise

INDICATOR	CLASS	RATING	SCALE
a. Coastal wetlands (% of wetlands inundated)	>90	1.0	Very high
	71-90	0.8	High
	51-70	0.6	Moderate
	30-50	0.4	Low
	<30	0.2	Very low
b. coral reefs (% of living corals)	20	1.0	Very high
	21-30	0.8	High
	31-40	0.6	Moderate
	41-50	0.4	Low
	>50	0.2	Very low
c. Mangroves (capacity to migrate landward)	Over 50% of fishponds and other landward developments are active and not available for landward migration	1.0	Very high
	20-50% of fishponds and other landward developments are active and not available for landward migration	0.8	High
	Over 50% of fishponds and other landward developments are idle or abandoned	0.6	Moderate
	Absence of adjacent fishponds and other developments landward	0.2	Very low
d. Capacity to withstand prolonged flooding	*Bruguiera-Ceriops-Xylocarpus* dominated forest	1.0	Avicennia
	Avecennia-Sonneratia-Rhizophora-Aegiceras dominated forest	0.6	Moderate
	Avecennia-Sonneratia dominated forest	0.2	Very low
e. Seagrass (capacity to adapt to SLR)	*Halophila-Halodule* dominated	1.0	Very high
	Thallasia-Cymodecea-Halodule dominated	0.6	Moderate
	Enhalus-Thalassia dominated	0.2	Very low
f. Capacity of the meadow to stand wave impacts	Small-sized species: *Halophila-Halodule* meadow	1.0	Very high
	Thallasia-Cymodecea-Halodule beds	0.6	Moderate
	Root system extensive: *Enhalus acoroides* and *Thalassia* dominated	0.2	Very low
g. Fishes (catch of Tuna and small pelagic in 5 years, reduction of catch in %)	>20	1.0	Very high
	16-20	0.8	High
	11-15	0.6	Moderate
	5-10	0.4	Low
	<5	0.2	Very low

Exposure. Exposure to coastal environments is characterized by vulnerability (or sensitivity), resilience, and resistance. Vulnerability to sea level rise caused by climate change can be defined as the likelihood that a coastal system will be affected by sea level rise and can be assessed using any of the simple physical

susceptibility indices (in Shaw *et al.* 1998 as cited in Koroglu, 2019) or a more integrated approach (*e.g.* IPCC-CZMS). Exposure was assessed by analyzing five factors; Extent of flooded coastal wetlands; range of settlements and population groups affected by flooding; population density; physical assets and infrastructure, including tourist facilities, submerged by floods, as well as affected farmland and coastal areas (Table 2).

Table 2. Exposure assessment for sea level rise

INDICATOR	CLASS	RATING	SCALE
a. Coastal wetlands (% of wetlands inundated)	>50	1.0	Very high
	41-50	0.8	High
	31-40	0.6	Moderate
	20-30	0.4	Low
	≤20	0.2	Very low
b. Extent of populations affected by flooding (% of area located within <1m elevation above MSL)	≥40	1.0	Very high
	31-40	0.8	High
	21-30	0.6	Moderate
	10-20	0.4	Low
	<10	0.2	Very low
c. Population density	≥ 300	1.0	Very high
	101-300	0.8	High
	51-100	0.6	Moderate
	20-50	0.4	Low
	<20	0.2	Very low
d. Physical assets and infrastructure submerged by floods (%), including tourist facilities	>50	1.0	Very high
	41-50	0.8	High
	31-40	0.6	Moderate
	20-30	0.4	Low
	≤20	0.2	Very low
e. Agricultural lands and beach areas affected	>50	1.0	Very high
	41-50	0.8	High
	31-40	0.6	Moderate
	20-30	0.4	Low
	≤20	0.2	Very low

Adaptive Capacity. This is the system's inherent ability to cope with exposure (Smit and Pilifosova 2003). It can be influenced by factors such as management skills, access to financial, technical and information resources, infrastructure, the institutional environment in which adaptation takes place, and political influence, among others (Smit and Wandel 2006). Adaptive capacity reflects resilience, allowing resilient systems to prepare for, avoid, mitigate, and recover from sea level risks and changes. The adaptive capacity of the local communities was analyzed using the parameters indicated in Table 3.

Table 3. Adaptive capacity assessment for sea level rise

INDICATOR	CLASS	RATING	SCALE
a. Mapping of coastal habitats at risk	Fully surveyed, mapped, and zoned	0.2	Very high
	Partially surveyed, mapped, and zoned	0.4	High
	Partially surveyed and mapped but not yet zoned	0.6	Moderate
	Surveyed but not yet mapped and zoned	0.8	Low
	Not surveyed at all	1.0	Very low
b. Relocation of coastal settlements at high-risk areas (%)	>60	0.2	Very high
	41-60	0.4	High
	21-40	0.6	Moderate
	1-20	0.8	Low
	No relocation efforts	1.0	Very low
c. Wetlands protection program	Presence of coastal protection structure	0.2	Very high

INDICATOR	CLASS	RATING	SCALE
	Properly designed and very sturdy constructed and properly placed structures	0.4	High
	Less sturdy but properly placed	0.6	Moderate
	Ill designed and properly placed	0.8	Low
	Without coastal protection structures	1.0	Very low
d. Climate proofing and physical assets and infrastructures	With climate-proofing policy and projects fully implemented	0.2	Very high
	With some investments	0.6	Moderate
	No climate-proofing projects	1.0	Very low

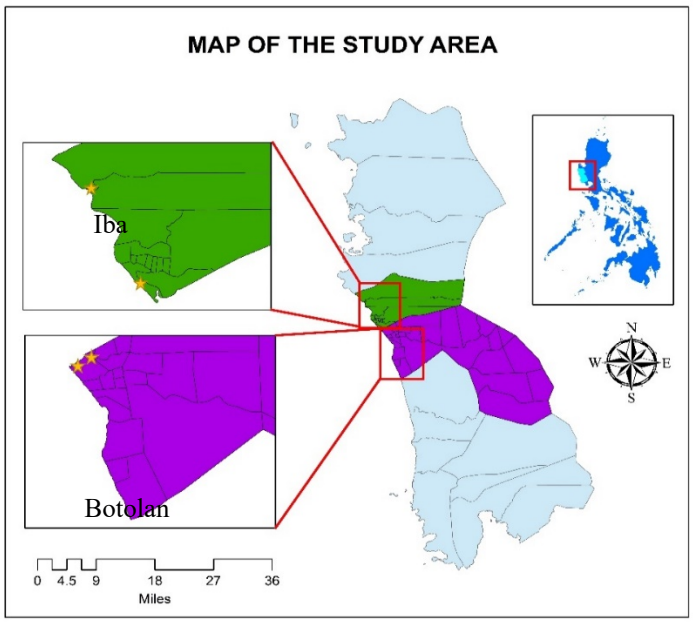
Computed and analysed data were then integrated as attribute data to the respective shapefiles of the different barangays to create the vulnerability map using ArcMap.

3. Results

The Study Area. Zambales is the second largest province in Central Luzon, Philippines. It has approximately 175 kilometers of coastline overlooking the West Philippine Sea. The city of Iba (15°20'N latitude, 119°59'E longitude) in the central part of the state was selected as the research site (Fig.1). The region is characterized by a mixture of the western coastal plain and the Zambales River. It has mountains to the west and east, and has a total area of 153.38 km2 (59.22 sq mi).The total length of its coastline is 12.70 km (Iba CLUP, 2021; Paz-Alberto, *et al.* 2021).The Municipality of Botolan, (15°17'N 120°01'E) home of one of the most active volcanoes in the country has a total area of 735.28 km2 (283.89 sq mi). Its coastline has a span of 14 km.

The province has two distinct seasons. One is the rainy season from May to October, and the other is the dry season. Additionally, the province experiences approximately seven typhoons each year. Iba and Botolan are located at an altitude of 4m and 0m above sea level, respectively, making sea level rise a major concern.

Figure 1. The map shows the locations of the different stations.

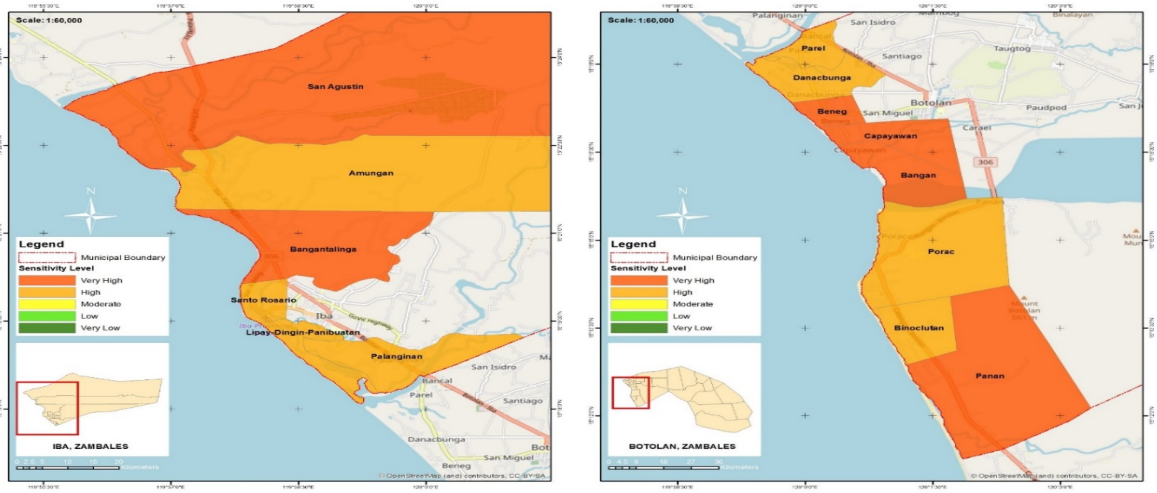


Sensitivity to sea level rise. Sea level rise is one of the indicators of climate change in coastal areas and can pose threats and problems to coastal communities (Nicholls 2015; Kada and Van Schaik 2003). Global mean sea level rise per year is 0.14 in (3.55 mm) (Lindsey 2021) and the province of Zambales is experiencing an increase to about 0.25 in (6.35 mm) per year (Paz-Alberto *et al.* 2021). This corroborates with the study of Taguiam and Quiambao (2020) conducted in Zambales for the cognition of sea level rise affirmed that the coastal municipalities witnessed and experienced the impacts of sea level rise.

Figure 2 depicts the sensitivity levels to sea level rise in the coastal barangays in the municipalities of Iba (left) and Botolan (right), Zambales Philippines. Dark orange represents “very high” and light orange represents “high” sensitivity levels. Of the six coastal barangays in Iba, San Agustin and Bangantalina had “very high

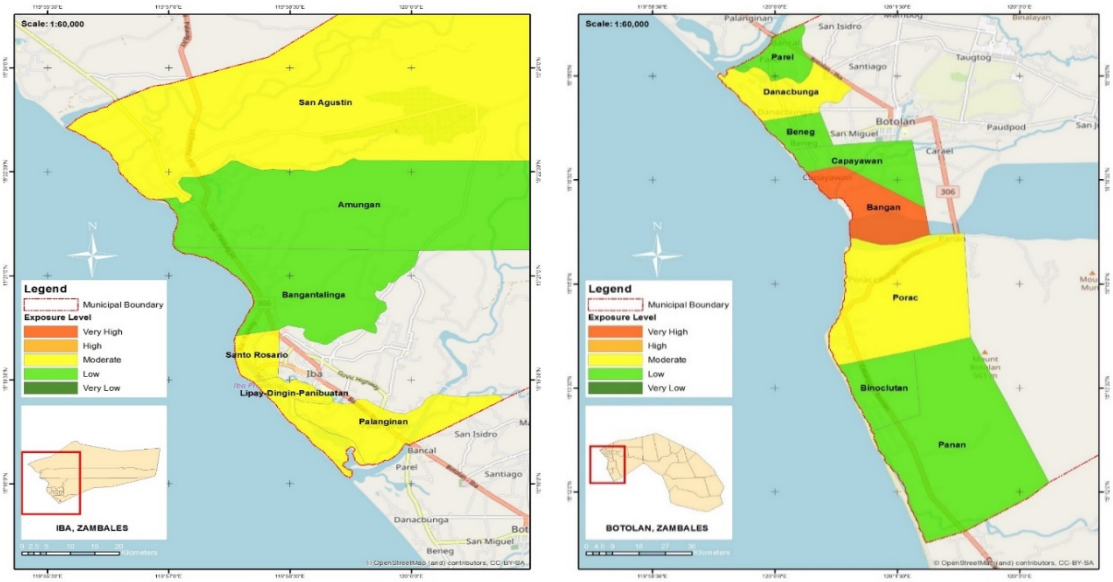
sensitivity levels. These areas are both low lying areas and had sandy beaches which are attributed to their very high sensitivity levels. This corroborates with the study of Abuodha and Woodroffe (2010) that rocky and steep coastal areas are the least sensitive, while sandy beaches with low lying areas are the most sensitive. Barangays Amungan, Sto. Rosario, Lipay Dingin, and Palanginan in the Municipality of Iba had natural barriers like mangroves, coral reefs, and seagrass ecosystems. However, due to its sandy beaches and unregulated use of resources in the different coastal ecosystems, sensitivity is still high. On the other hand, four barangays in Botolan had "very high" sensitivity levels: barangays Beneg, Capayawan, Bangan, and Panan these areas had sandy beaches and without natural barriers.

Figure 2. The maps showing the sensitivity levels to SLR of coastal barangays in Iba (L) and Botolan (R), Zambales, Philippines



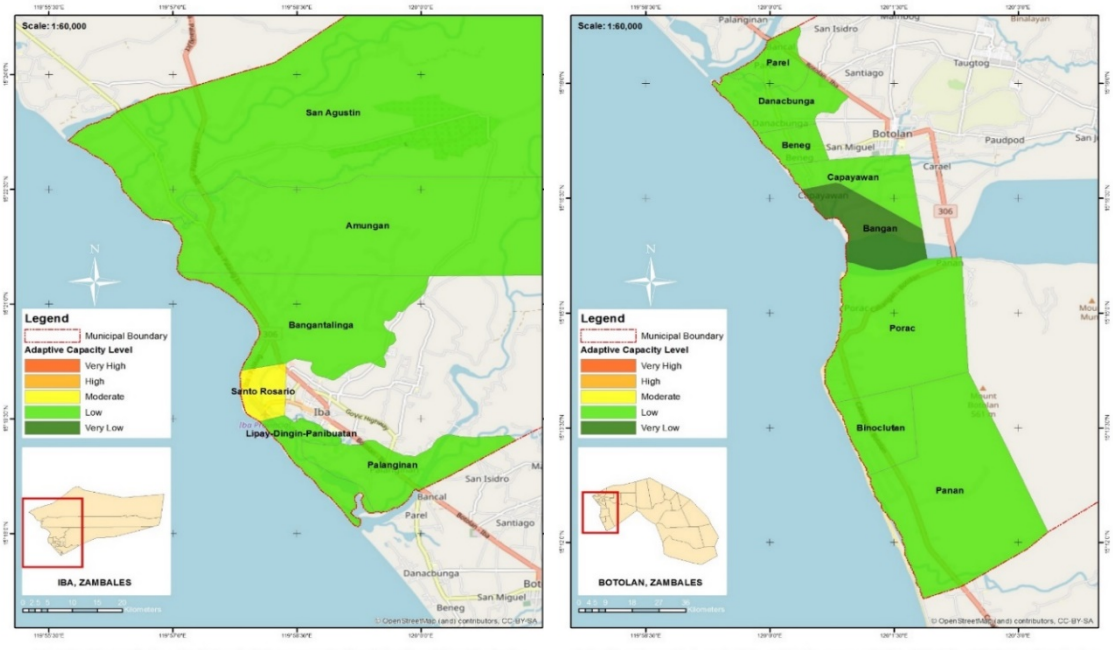
Exposure to sea level rise. Figure 3 presents the exposure levels to sea level rise in the study areas. Based on the assessment conducted, barangays Danacbunga and Porac in Botolan had "moderate" exposure levels. Further, majority (67%) of the coastal barangays in the Municipality of Iba had "moderate" exposure while barangay Bangan in the Municipality of Botolan had a "very high" exposure level to sea-level rise. This was attributed to three factors: physical assets and infrastructure including tourism facilities are highly inundated; a high number of populations affected by coastal flooding and erosion; and a large part of the area were affected during flooding. This conforms with the work of Oppenheimer (2019) that population and physical assets contribute to the severity of exposure to sea-level rise.

Figure 3. The maps showing the exposure levels to SLR of coastal barangays in Iba (L) and Botolan (R) Zambales, Philippines



Adaptive Capacity. In the Municipality of Iba, Barangay Sto. Rosario had “moderate” while the other five barangays had “low” adaptive capacity levels. In the Municipality of Botolan, barangay Banga had a “very low” adaptive capacity level and the seven others had “low” adaptive capacity levels (Fig 4).

Figure 4. The maps showing the adaptive capacity levels to SLR of coastal barangays in Iba (L) and Botolan (R), Zambales, Philippines



To adapt to the rising sea level, barangays Sto. Rosario in Iba and barangay Bangan in Botolan, the construction of sea wall was given priority, however, based on the observation during the field visits, these structures can’t withstand strong waves and erosion. Likewise, both municipalities already mapped and identified areas at risk and those that need to be relocated but, financial concern hinders the full implementation of projects identified.

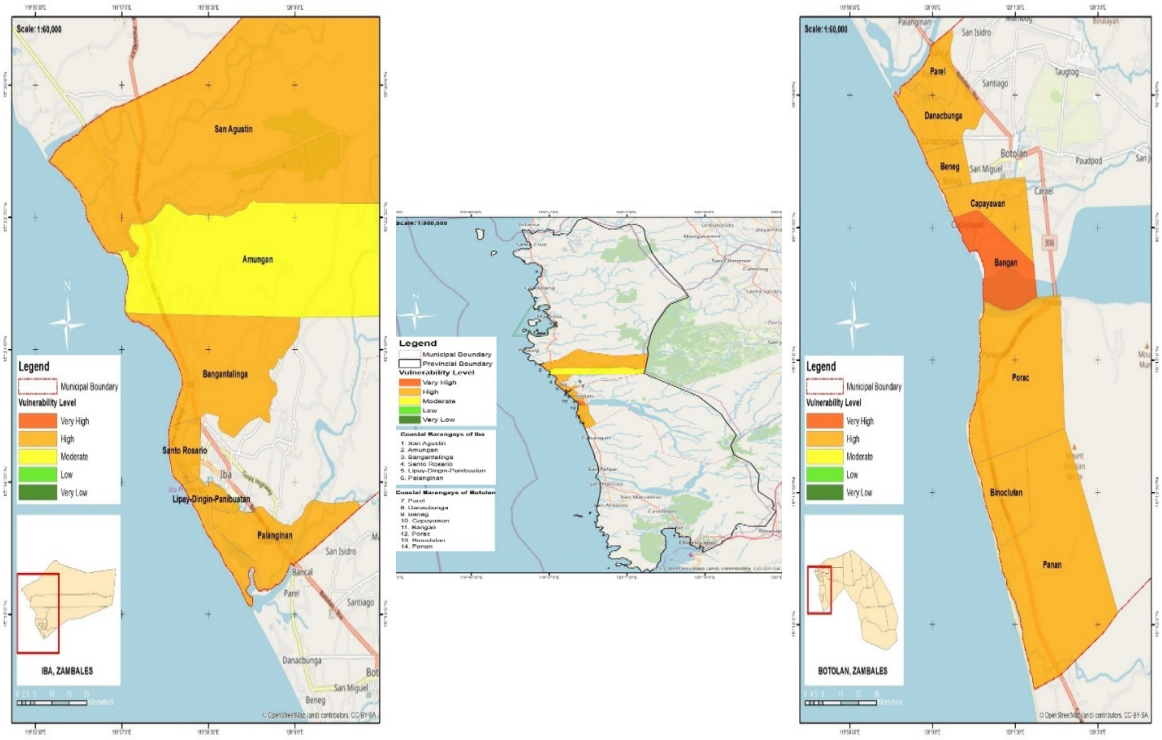
According to Oppenheimer (2019), without mitigation, sea levels will continue to rise for centuries, reaching between 2.3 and 5.4 meters by 2030 and even more beyond that, affecting all low-lying areas. Adaptation on coasts becomes very difficult, and even more so on intensively developed coasts.An urbanized coast is impossible. Local community action is critical in this scenario. Residents had a high level of awareness of the negative effects of sea-level rise in their health as well as to their economic stability. To help the local government in mitigating the impacts of climate change in general, residents with the leadership of barangay officials and youth organizations, a regular mangrove tree planting activities are being carried out in barangays Parel and Danacbunga, both in the municipality of Botolan and at Lipay-Dingin-Pinagbuatan and San Agustin in the municipality of Iba. All coastal barangays are actively participating in the annual coastal clean-up being implemented by the National government.

To maintain the cleanliness of the coastal areas, a regular clean-up drive is being conducted through the initiative of the Youth Leaders and members (Sangguniang Kabataan Federation). These activities increased people’s awareness and encouraged them to help in environmental protection and conservation. More so, strict implementation of the Philippine Clean Air Act, Ecological Solid Waste Management Act was highlighted. The Peoples’ Organization and the “Bantay Dagat” (guardians of the sea) had a significant contribution to safeguarding the coastal resources.

4. Vulnerability to Sea Level Rise

By integrating all collected sensitivity, exposure, and adaptive capacity data, the region's vulnerability to sea level rise was determined (Figure 5). Barangay Bangan in Iba City was at “very high” risk. The remaining seven barangays are at "high" risk. In Iba City, five (83%) of the coastal barangays were at “high” risk and only one barangay (Amungan) was at “moderate” risk.

Figure 5. The maps showing the vulnerability to SLR of coastal barangays in Iba (L) and Botolan (R), Zambales, Philippines.



High vulnerability of the areas was brought about by various conditions such as being low-lying in nature, high exposure to strong waves due to limited natural barriers, and short-term response/adaptive mechanisms. This conforms with Gesch (2018). The report notes that the low elevation, topography, or sea level of many coastal areas makes them vulnerable to negative impacts from rising water levels due to both chronic disease (SLR) and episodic events (storm surges and tide flooding).

Due to the outstanding characteristics of this area, it is now a fast-growing tourist destination. The influx of tourists led to the emergence of resorts, hotels, and other commercial establishments, leading to further destruction of natural resources. Vulnerability assessments are required and adaptation strategies can be programmed. Walker *et al.* 2003 asserted that the "adaptation" part of both governance and management is required at all stages of the adaptation cycle, as the stability landscape is constantly changing. What has received the least attention is the importance of back-loops, especially the flexible management needed to protect important ecological resources (adaptive management) and the rules that influence resilience when self-organizing. The importance of development (adaptive governance) was emphasized.

Conclusion

The study found that the region has moderate to very high vulnerability to the effects of sea level rise. Therefore, it suggests that maintaining a stable system requires only a qualitative ability to absorb and manage uncertain and unexpected changes, rather than aiming for the ability to accurately deal with future scenarios. Future research, such as predictive studies, can help local governments plan and prioritize adaptation and mitigation strategies. Evaluations using the tools used in this study could be adopted by communities to provide evidence-based information for developing local policies that are more beneficial to community health and economic stability. Finally, there should be strategic and comprehensive communication to policy makers and the general public about climate change in general and sea level rise in particular.

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Credit Authorship Contribution Statement:

Shirly C. Serrano: Conceptualization, data gathering and writing - original draft.
Nipon Tangtham, Surat Bualert and **Suthee Janyasuthiwong**: supervising and guiding - original draft.

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.

References

[1] Abuodha, P.A.O. and Woodroffe, C.D 2010. Assessing vulnerability to sea-level rise using a coastal sensitivity index: a case study from southeast Australia. *J Coast Conserv* 14: 189–205. DOI:https://doi.org/10.1007/s11852-010-0097-0\

[2] Acosta, L. A., Eugenio, E. A., Macandog, P. B. M., Magcale-Macandog, D. B., Lin, E. K.-H., Abucay, E. R., Cura, A. L., and Primavera, M. G. 2016. Loss and damage from typhoon-induced floods and landslides in the Philippines: community perceptions on climate impacts and adaptation option. *Int. J. Global Warming, 9*(1): 33–65.

[3] Alberto, A. M. P., Dios, M. J. J. d., Alberto, R. P., and De Guzman, C. H. E. A. 2018. Climate Change Impacts and Vulnerability Assessment of Selected Municipalities and Agroecosystems to Support Development of Resilient Communities and Livelihoods in Nueva Ecija, Philippines. *American Journal of Climate Change,* 07(02): 295-335. DOI: 10.4236/ajcc.2018.72019

[4] Alberto, A. M. P., Sison, M. J. M., Bulaong, E. P., and Pakaigue, M. A. 2016. Remote Sensing Application of the Geophysical Changes in the Coastlines and Rivers of Zambales, Philippines. *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLI-B8*, 379-386. DOI:10.5194/isprsarchives-XLI-B8-379-2016

[5] Berry, P., Enright, P. M., Shumake-Guillemot, J., Villalobos Prats, E., and Campbell Lendrum, D. 2018. Assessing Health Vulnerabilities and Adaptation to Climate Change: A Review of International Progress. *Int J Environ Res Public Health, 15*(12). DOI: 10.3390/ijerph15122626

[6] Berry, P., Paddy, P. M., Guillemot, J.S., Prats, E.V. and Lendrum, D.C. 2018. Assessing Health Vulnerabilities and Adaptation to Climate Change: A Review of International Progress. International Journal of Environmental Research and Public Health. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6313539/pdf/ijerph-15-02626.pdf

[7] Capili, E.B., Ibay, A.C.S. and Villarin, J. R. 2005. Climate change impacts and adaptation on Philippine coasts. Conference: OCEANS, 2005. Proceedings of MTS/IEEE, 2299 - 2306 Vol. 3. DOI:10.1109/OCEANS.2005.1640108

[8] Cheung, W. W. L., Lam, V. W. Y., Sarmiento, J. L., Kearney, K., Watson, R., and Pauly, D. 2009. Projecting global marine biodiversity impacts under climate change scenarios. *Fish and Fisheries, 10*(3): 235-251. DOI:10.1111/j.14672979.2008.00315.x

[9] Cruz, A. N and Jose, A.M. 1999. Climate change impacts and responses in the Philippines: water resources. *Climate Research*, 12: 77-84

[10] Espaldon, M.V., Centeno, H. G. and Tiburan Jr., C. 2016. Vulnerability Indicators. Handout. University of the Philippines, Los Baños, Laguna, Philippines.

[11] Evariste, F. F., Denis Jean, S., Victor, K., and Claudia, M. (2018). Assessing climate change vulnerability and local adaptation strategies in adjacent communities of the Kribi-Campo coastal ecosystems, South Cameroon. *Urban Climate, 24*: 1037-1051. DOI: 10.1016/j.uclim.2017.12.007

[12] Gesch, D.B. 2018. Best Practices for Elevation-Based Assessments of Sea-Level Rise and Coastal Flooding Exposure Front. Earth Sci., 12. Available at: https://www.frontiersin.org/articles/10.3389/feart.2018.00230/full

[13] Gomez, M. L. A., Adelegan, O. J., Ntajal, J., and Trawally, D. 2020. Vulnerability to coastal erosion in The Gambia: Empirical experience from Gunjur. *International Journal of Disaster Risk Reduction, 45*. DOI:10.1016/j.ijdrr.2019.101439

[14] Harvey, N.; Clouston, B. and Carvalho, P. 1999. Improving coastal vulnerability assessment methodologies for integrated coastal zone management: An approach from South Australia. *Australian Geographical Studies*, 37(1): 50-69.

[15] Hilario, F. 2008. Climate Change and Its Potential Impacts in the Philippines. Paper presented at the GEOSS Symposium on Integrated Observation for Sustainable Development in the Asia-Pacific Region Mirai-kan, Tokyo, Japan April 14-16, 2008.

[16] Kada, P. and van Schaik, H. 2003. Climate changes the water rules: how water managers can cope with today's climate variability and tomorrow's climate change. Retrieved from www.waterandclimate.org

[17] Koroglu, A., Ranasinghe, R., Jimenez, J. A. and Dastgheib, A. 2019. Comparison of coastal vulnerability index applications for Barcelona Province. *Ocean and Coastal Management* 178 (2019) 104799. Retrieved from https://www.sciencedirect.com/science/article/pii/S0964569118308779

[18] Kreslake, J. M., Price, K. M., and Sarfaty, M. 2016. Developing effective communication materials on the health effects of climate change for vulnerable groups: a mixed methods study. *BMC Public Health, 16*, 946. DOI: 10.1186/s12889-016-3546-3

[19] Li, S., Meng, X., Ge, Z., and Zhang, L. 2015. Evaluation of the threat from sea-level rise to the mangrove ecosystems in Tieshangang Bay, southern China. *Ocean and Coastal Management, 109*: 1-8. DOI:10.1016/j.ocecoaman.2015.02.00

[20] Lindsey, R. 2021. *Climate Change: Global Sea Level.* Retrieved from https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

[21] Munang, R., Thiaw, I., Alverson, K., Mumba, M., Liu, J., and Rivington, M. 2013. Climate change and Ecosystem-based Adaptation: a new pragmatic approach to buffering climate change impacts. *Current Opinion in Environmental Sustainability, 5*(1): 67-71. DOI: 10.1016/j.cosust.2012.12.00

[22] Nanlohy, H., Bambang, A. N., Ambariyanto, and Hutabarat, S. (2015). Coastal Communities Knowledge Level on Climate Change as a Consideration in Mangrove Ecosystems Management in the Kotania Bay, West Seram Regency. *Procedia Environmental Sciences, 23*: 157-163. DOI: 10.1016/j.proenv.2015.01.024

[23] Nicholls, R. 2015. Adapting to Sea Level Rise. *Coastal and Marine Hazards, Risks, and Disasters*. DOI:10.1016/B978-0-12-396483-0.00009-1.

[24] Nunez, C. 2019. Sea level rise explained. Retrieved from https://www.nationalgeographic.com/environment/article/sea-level-rise-1

[25] Oppenheimer, M., *et al.* 2019: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities. In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* In press. At https://www.ipcc.ch/srocc/chapter/chapter-4-sea-level-rise-and-implications-for-low-lying-islands-coasts-and-communities/

[26] Paquit, J., Salingay, R., and Bruno, A. G. T. 2018. Climate-risk vulnerability assessment of the agriculture sector in the municipalities and cities of Bukidnon, Philippines. *International Journal of Biosciences (IJB), 13*(06): 155-168. DOI: 10.12692/ijb/13.6.155-168

[27] Paz-Alberto, A. M., De Dios, M. J. J., Alberto, R. P., and De Guzman, C. H. E. A. 2018. Climate Change Impacts and Vulnerability Assessment of Selected Municipalities and Agroecosystems to Support Development of Resilient Communities and Livelihoods in Nueva Ecija, Philippines. *American Journal of Climate Change*, 7: 295-335. Retrieved from http://www.scirp.org/journal/ajcc https://doi.org/10.4236/ajcc.2018.72019

[28] Paz-Alberto, A.M., *et al.* 2021. Climate Change Vulnerability and Disaster Risk Assessment Using Remote Sensing Technology and Adaptation Strategies for Resiliency and Disaster Risk Management in Selected Coastal Municipalities of Zambales, Philippines. *American Journal of Climate Change,* 10(1): 85-133. Retrieved from https://m.scirp.org/papers/108153

[29] Perez, R.T., Amadore, L.A. and Feir, R.B. 1999. Climate change impacts and responses in the Philippines coastal sector. *Climate Research*, 12: 97-107.

[30] Shaw J. R.B., Taylor, D.L., Forbes, M., Ruz, H. and Solomon, S. 1998. Sensitivity of the coasts of Canada to sea-level rise Bull. *Geol. Surv. Can.*, 505: 1-79

[31] Smit, B. and Pilifosova., O. 2003. From adaptation to adaptive capacity and vulnerability reduction. In: Dolan, A.H., and Walker, I.J., 2003. Understanding vulnerability of coastal communities to climate change-related risks. Journal of Coastal Research, SI 39 (Proceedings of the 8th International Coastal Symposium), pg – pg. Itajaí, SC – Brazil, ISSN 0749-0208 retrieved from https://www.researchgate.net/publication/228757759

[32] Smit, B. and Wandel, J. 2006. Adaptation, adaptive capacity, and vulnerability. *Global Environmental Change* 16: 282-292.

[33] Spalding M, McIvor, A., Tonneijck, F.H., Tol, S. and van Eijk, P. 2014. Mangroves for coastal defense. Guidelines for coastal managers and policymakers. Published by Wetlands International and The Nature Conservancy. p42

[34] Stock, C. A., *et al.* 2017. Reconciling fisheries catch and ocean productivity. *Proc Natl Acad Sci U S A, 114*(8): E1441-E1449. DOI: 10.1073/pnas.1610238114

[35] Sumaila, U. R., *et al.* 2012. Benefits of rebuilding global marine fisheries outweigh costs. *PLoS One, 7*(7): e40542. DOI: 10.1371/journal.pone.0040542

[36] Taguiam, C.G., and Quaimbao-Marquez, C.B. 2016. *Rural Coastal Households' Cognition of Sea Level Rise: The Case of Zambales, Philippines. 13th National Convention on Statistics.* Retrieved from https://psa.gov.ph/content/rural-coastal-households-cognition-sea-level-rise-case-zambales-philippines

[37] Tragaki, A., Gallousi, C., and Karymbalis, E. 2018. Coastal Hazard Vulnerability Assessment Based on Geomorphic, Oceanographic and Demographic Parameters: The Case of the Peloponnese (Southern Greece). *Land, 7*(2). DOI: 10.3390/land7020056

[38] Walker, B., Holling, C. S., Carpenter, S. R., and Kinzig, A. P. 2004. Resilience, Adaptability and Transformability in Social-ecological Systems. *Ecology and Society, 9*(2). DOI: 10.5751/es-00650-090205

[39] Yoo, G., Kim, A. R., and Hadi, S. 2014. A methodology to assess environmental vulnerability in a coastal city: Application to Jakarta, Indonesia. *Ocean and Coastal Management, 102*: 169-177. DOI:10.1016/j.ocecoaman.2014.09.018

[40] Zhang, Y., *et al.* 2020. Synthetic vulnerability assessment to inform climate-change adaptation along an urbanized coast of Shenzhen, China. *Journal of Environmental Management, 255.* DOI: 10.1016/j.jenvman.2019.109915 Comprehensive Land Use Plan of the Municipality of Iba. (2021). Iba Zambales, Philippines

[41] Comprehensive Land Use Plan of the Municipality of Iba. 2021. Iba Zambales, Philippines

[42] IPCC. Methodological and Technological Issues in Technology Transfer. Retrieved on August 20, 2021, at https://archive.ipcc.ch/ipccreports/sres/tectran/index.php?idp=297

[43] NASA (National Aeronautics and Space Administration) 2021. *Sea Level.* Retrieved from https://climate.nasa.gov/vital-signs/sea-level/

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Design of the Bali Province Food Security Action Plan towards Food Independence

Widhianthini WIDHIANTHINI
Agribusiness Study Program, Faculty of Agriculture, Udayana University, Indonesia
ORCID: 0000-0003-4747-5161; Researcher ID: GOV-5640-2022
widhiantini@unud.ac.id

Ni Made Classia SUKENDAR
Agribusiness Study Program, Faculty of Agriculture, Udayana University, Indonesia
ORCID: 0000-0001-8176-7833; Researcher ID: JFS-1856-2023
classia.sukendar@unud.ac.id

Anak Agung Gede PURANTARA
Information System Study Program, Faculty of Informatics and Computers,
STIKOM Bali Institute of Technology and Business, Indonesia
Researcher ID: JQX-0585-2023
gedepurantara@stikom-bali.ac.id

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Abstract: The problem of hunger is one of the problems that still occur in Indonesia. The problem of hunger is closely related to the problem of staple foods, such as the unmet security of staple food, rice as the community's main food, and the increasing demand for staple foods. This research aims to analyze the challenges faced by Bali Province in maintaining sustainable food security and to design food security action designs in Bali Province towards food independence. The data used in this research are primary data and secondary data with a descriptive analysis method using ISM analysis. The results of the research show that food challenges that occur in Bali Province include reduced agricultural land, unbalanced supply and demand for food commodities, weak use and mastery of technology, lack of farming management and product marketing, the proportion of crop loss and food waste is still quite high, food loss due to inaccuracy in handling food, the area of agricultural land per capita is very limited, the number of young people interested in working in the agricultural sector is still problematic, the age of farmers over 45 years reaches 64.2%, Indonesia is also still facing three times the burden of nutrition, climate change, and hydrometeorological disasters. The Bali Province's food security design towards food independence consists of farmers, government, companies, financial institutions, and agricultural cooperatives who are interconnected with each other.

Keywords: sustainable development; design; resilience; food; challenge.

JEL Classification: Q00; Q01; Q19; R11.

Introduction

The Sustainable Development Goals (SDGs) set a vision for a more sustainable world, to be realized by 2030 (Bennich, *et al.* 2023). Aligning it with the United Nations Sustainable Development Goals (SDGs) is still a significant difficulty (Hsieh, *et al.* 2023). The United Nations (UN) adopted the 2030 Agenda for Sustainable Development in 2015 to address the most urgent issues facing humanity, including poverty, inequality, land degradation, climate change, and biodiversity loss (Wu, *et al.* 2023). This shared agenda provides a framework for all nations to work together on sustainable development projects.

Not all of Indonesia's success in realizing the SDGs can be felt. One of the problems in Indonesia that still occurs today is the problem of hunger. The problem of hunger also occurs in several countries. This is in accordance with research conducted by Medialdea *et al.* (2018), in Spain stating that without a doubt, one of the

most serious issues facing humanity today is hunger. In Belgium, overpopulation is an important issue to consider because it is linked to problems of poverty and hunger (Montagu 2018). In Spain also, hunger is one of the problems experienced by millions of women every day which is not uniformly viewed by the international community as something that is offensive and contrary to human rights (Ponce, *et al.* 2018).

Staple food problems continue to occur in Indonesia, such as the unmet security of staple food, rice as the main food ingredient for society, and the increasing demand for staple food as time goes by. Due to their reliance on rice as their primary source of calories, the expanding populations of emerging nations, particularly Indonesia, are experiencing issues with malnutrition or hunger (Sitaresmi, *et al.* 2023). In Bali, Subak is a community organization that regulates rice irrigation systems in rice fields (Suamba, *et al.* 2023). Furthermore, Ickowitz *et al.* (2023) stated that Indonesia is facing several nutritional challenges.

In Oman, policymakers and governments around the world have paid close attention to food security because of its importance in attaining the Sustainable Development Goals (SDGs) (Saboori *et al.* 2023). Problems like this can be resolved if people are aware of the potential of other staple foods, such as cassava, corn, potatoes, and other staple foods that contain carbohydrates as a substitute for rice. The results of the study indicate that rice, corn, cassava, and sweet potatoes are food commodities that are major sources of carbohydrates that are inelastic (Rozi *et al.* 2023).

Data from the Ministry of Agriculture's Food Security Agency shows that there are four out of 34 provinces in Indonesia that do not yet have regional regulations regarding food security. Provinces that do not yet have regional regulations regarding resilience include North Maluku, DKI Jakarta, Central Sulawesi, and Bali Province (Ministry of Agriculture, 2021). Bali Province GRDP Data According to Business Fields 2017-2021, food crops, horticulture, plantations, and livestock are the main spearheads of priority programs by the Bali Province Agriculture and Food Security Service. The agricultural potential possessed by Bali Province before the pandemic in 2019 experienced a recorded decline of 13.45% compared to 2010 which reached 17.17%. The COVID-19 pandemic has caused the agricultural subsector to contribute 15.11% in 2020 and increase again in 2021 to 15.71% (Statistics of Bali Province, 2021).

Bali Province's Food Security is to realize the Bali Development Vision for 2018-2023 *Nangun Sat Kerti Loka Bali* through the Universal Development Plan towards a New Era of Bali. The development of the agricultural sector is described through the first Mission, namely ensuring that the needs for food, clothing, and shelter are met in adequate quantity and quality for the life of Krama Bali, and the second Mission, namely realizing food independence, increasing added value and agricultural competitiveness, and improving the welfare of farmers. For this sustainability, it is necessary to design a food security action plan in Bali Province towards food independence.

The aim to be achieved in this research is to analyze the challenges faced by Bali Province in maintaining sustainable food security, as well as designing a food security action plan in Bali Province towards food independence.

1. Research Background.

Food security and insecurity can provide information to policymakers at the regional and central levels. Programs related to food security must be oriented to the needs and potential of a region. These programs should aim to protect against land conversion and food crises in the short, medium, and long term. The Food Security and Vulnerability Atlas (FSVA) has created a conceptual framework for food and nutrition security. This concept is based on three pillars of food security, namely availability, access, and utilization of food which is then integrated with nutrition and food safety issues (Suryana 2014).

Food availability is characterized by conditions of food availability from domestic production, food reserves, imports, and food aid. Food assistance is provided if the two main sources cannot meet needs. Regarding food access or affordability, every household must be able to obtain sufficient nutritious food through one or more various sources, for example through production, own supplies, purchases, bartering, gifts, loans, or food aid. For this reason, access is very necessary because food that is available in sufficient quantities in an area cannot all be utilized by the local community due to physical, economic, or social limitations. After gaining access, the next fulfillment is food utilization. Food utilization is related to household food use and the individual's ability to absorb and metabolize nutrients. Food utilization consists of storage, processing, preparation, and safety of food and drinks, hygiene conditions, feeding habits (individuals with special food needs), distribution of food within the household according to individual needs (growth, pregnancy, and breastfeeding), and health status every member of the household.

The Bali Provincial Government has established a development program to improve community welfare in various sectors of life. This development is structured comprehensively and sustainably by taking into account the natural carrying capacity of Bali which is guided by the planned universal development program contained in the program as an implementation of the Nangun Sat Kerthi Loka Bali Vision. With this program, it is hoped that community welfare will be achieved while preserving the surrounding nature as a support for human life in various sectors of life. Food and nutritional security can be achieved through the involvement of all stakeholders in an integrated, measurable and sustainable manner so as to achieve "food hunger free and nutritional hunger free" (Bali Provincial Regional Regulation Number 7, 2022).

This research's novelty resulted in the design of a food security strategy in Bali Province through ISM analysis. From the results of this analysis, strategies can be derived that can be a driving force for the realization of other strategies (diagraph strategy). Then, through level partitioning, strategy implementation can be determined based on activity priorities (time period).

2. Methodology

This research was conducted in Bali Province because Bali Province does not yet have a Regional Food and Nutrition Action Plan Guide for 2020-2024. The data required in this research is primary data and secondary data.

Primary data was collected using the Focus Group Discussion (FGD) method and in-depth interviews. The regional apparatus interviewed at the provincial and district levels consisted of the Department of Agriculture and Food Security, the Department of Maritime Affairs and Fisheries, the Department of Industry and Trade, the Department of Cooperatives, Small and Medium Enterprises, the Department of Social Affairs, Women's Empowerment and Child Protection, the Department of Communication, Informatics and Statistics, Community Development Service, Villages, Population and Civil Registration, Bali Province Transportation Service, Forestry and Environment Service, Public Works Service, Spatial Planning, Housing and Settlement Areas, Education, Youth and Sports Service, Regional Research and Innovation Agency, Denpasar Food and Drug Monitoring Center, Central Statistics Agency, BKKBN, Bulog, and Bali Province PKK Mobilization Team. Meanwhile, secondary data was obtained through a literature study.

The analytical method used for the first objective, namely the challenges faced in maintaining food security, uses descriptive analysis. Descriptive analysis is a type of data research that helps describe, demonstrate, or summarize data points so that patterns can develop that meet all data conditions (Sugiyono 2017).

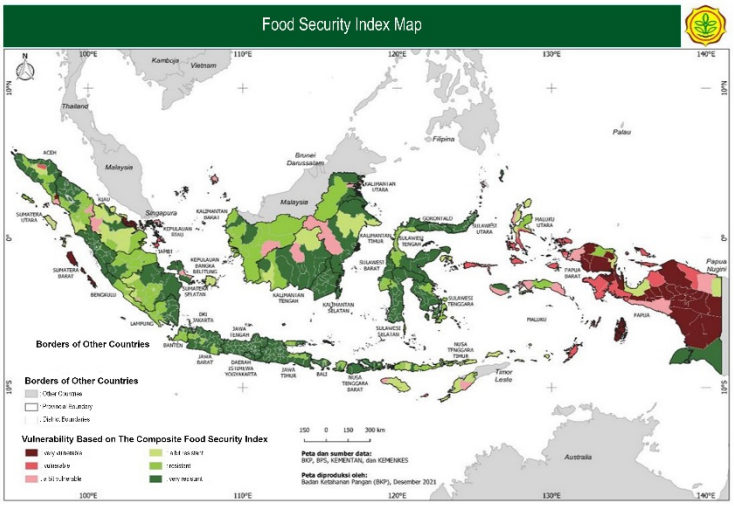
The analytical method used to answer the second objective is to design a food security action plan in Bali Province using ISM (Interpretative Structural Modeling) analysis. The ISM technique is divided into two parts, namely hierarchical arrangement and sub-element classification. The basic principle of this technique is that identification of the structure in a system will provide high benefits for designing the system effectively and for making better decisions. ISM analyzes system elements and solves them in graphical form from direct relationships between elements and hierarchical levels. The elements can be policy objectives, organizational targets, assessment factors, and so on. Direct relationships can be in diverse contexts (related to contextual relationships) (Eriyatno 2012).

3. Research Results and Discussions

Bali Province's Food Security is to realize the vision of Bali Development for 2018-2023 *Nangun Sat Kerti Loka Bali* through the Universal Development Plan towards a New Era of Bali. The development of the agricultural sector is described through the first Mission, namely ensuring that the needs for food, clothing, and shelter are met in adequate quantity and quality for the life of Krama Bali and the second Mission, namely realizing food independence, increasing added value and agricultural competitiveness, and improving the welfare of farmers.

The food security condition of a region is determined using the Food Security Index (IKP) based on the preparation of the Food Security and Vulnerability Atlas (FSVA). The achievement of Bali Province Food Security Index (IKP) by the Food Security Index Book of the Food Security Agency (BKP) of the Ministry of Agriculture of the Republic of Indonesia in 2021 achieved the highest IKP of the 34 existing provinces. The food security condition of a region is determined using the Food Security Index (IKP) based on the preparation of the Food Security and Vulnerability Atlas (FSVA). The achievement of the Bali Province Food Security Index (IKP) by the Food Security Index Book, the Food Security Agency (BKP) of the Ministry of Agriculture of the Republic of Indonesia in 2021 obtained the highest IKP of the 34 Provinces in Indonesia, with an IKP value of 83.82.

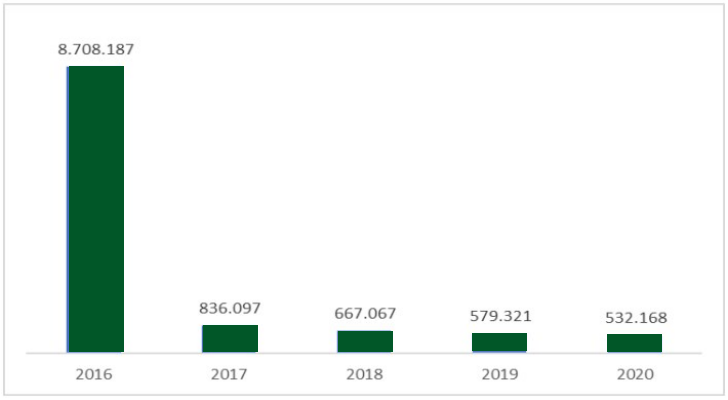
Figure 1. Regency/City Food Security Index Map in 2021



Source: National Food Agency, 2022

Based on the Regency IKP ranking, the five districts with the best scores are Tabanan (90.17), Gianyar (89.46) and Badung (89.38) in Bali Province; Sukoharjo (88.70) and Pati (88.38) in Central Java Province. Meanwhile, the five districts with the lowest scores are in Papua Province, namely Nduga (14.89), Puncak (16.17), Dogiyai (17.56), Yahukimo (18.41) and Deiyai (18.65). Based on the 2018-2023 Semesta Regional Regional Development Plan for Bali Province, the realization of rice availability during the period 2016 to 2020, respectively, is 8,708,187 tons, 836,097 tons, 667,067 tons, 579,321 tons and 532,168 tons in 2020. Realization of availability has exceeded the targets set.

Figure 2. Availability of Main Foods in Bali Province



Source: National Food Agency, 2022

Judging from energy availability, it has increased from 2016, where energy availability was 2,607 kcal/cap/day in 2016 and increased to 2,591 kcal/cap/day in 2017. This realization has exceeded the national energy requirement standard (WNPG), which is equal to 2,400 kcal/cap/day. Of the total energy availability, vegetable food is dominated by 2,108 kcal/cap/day or 79.70%, while animal food is only 537 kcal/cap/day or 20.30%. Likewise, protein availability for Bali has met the protein adequacy figure. Protein availability has increased, with the highest occurring in 2016, namely 76 grcal/cap/day, and then decreasing in 2020 to 64.31 grcal/cap/day. Even though there is a decrease in protein availability, it is sufficient to meet needs.

3.1 Challenges Faced in Maintaining Sustainable Food Security in Bali Province

Rising temperatures, unpredictable rainfall, the frequency of extreme weather, and increased pest and insect attacks are forms of drastic changes that have an impact on food production. The La Niña phenomenon and other forms of extreme weather are proof that the threat of the climate crisis is very real before our eyes. Even the World Meteorological Organization (World Meteorological Organization) estimates that the La Niña situation will last until 2023. Meanwhile, in other places, there is drought. Farmers have difficulty obtaining water for irrigation of agricultural land. A comprehensive solution is needed to mitigate and adapt to the climate crisis for farmers and

food production. The same thing was also said by Suryana (2014), food challenges can be grouped into two, namely challenges from the supply side or supply of food and from the demand side or need and utilization of food.

In terms of supply provision, there are at least five things that need attention. **First,** natural resource constraints. Competition for land use, including waters and waters, will become increasingly sharp due to high economic growth targets and a large increase in population in percentage and number. Currently, the figures for agricultural land conversion that are often presented to the public by officials or academics range from 60,000 ha to 100,000 ha per year. The quality of land and water is also increasingly being degraded due to the impact of the continuous use of chemical fertilizers and pesticides.

The conversion of agricultural land that continues to occur in Bali poses a threat to food security on the Island of the Gods, where the population continues to increase, resulting in increased food needs. Every year, 600 hectares to 1000 hectares of Bali's agricultural land is converted into housing, hotels, restaurants, and other buildings that support the tourism industry and other industries.

Second, the impact of global climate change. In the last three years, extreme climate events in Indonesia have become more real. Researchers at the International Rice Research Institute (IRRI), using data from 1979 to 2003, concluded that the annual average maximum and minimum temperatures had increased by 0.35 and 1.23 degrees Celsius respectively. The researchers further argue that rice productivity can decrease by 10 percent for every 1 degree Celsius increase in minimum temperature at night during the dry season (Peng, *et al.* 2004). Research on rice plants in North Sulawesi concluded the same thing, an increase in air temperature of 1 degree Celsius and rainfall of 5 percent could reduce rice production by around 7.7 percent (Hosang, *et al.* 2012).

Meanwhile, according to Suryana (2014), Agricultural Research and Development Agency in 2011 has conducted a comprehensive review of the negative impact of climate change on the production of various agricultural commodities through several variables, such as changes in rainfall patterns, air temperature, and sea level rise. The results of the review also concluded that global climate change hurts the productivity of various food crops.

Other research conducted by As-syakur, *et al.* (2017) shows that land that is very suitable agro-climatically for rice crops in Bali Province has decreased by 20% between the period 1990-1999 and 2000-2009, which is predominantly caused by changes in rainfall. The results of this study show that the El Nino event in 2015 resulted in a decrease in annual rainfall of 30.39% and caused most districts/cities in Bali Province to experience agricultural drought.

Third, agriculture is characterized or dominated by small-scale farming. Based on 2013 Agricultural Census data from BPS, the number of farming households is 26.14 million with an average land holding of 0.98 ha and around 56 percent or 14.6 million households on average cultivate land under 0.5 ha. These small farmers are faced with classic problems that have not been successfully overcome, such as limited access to markets, capital, information and technology (Suswono, 2013). If there is no social engineering to overcome these problems, it will be very difficult for Indonesia to achieve sustainable food security.

Fourth, there is an imbalance in food production between regions. For almost all commodities, the proportion of food production in Java is more than 50 percent of national food production. This imbalance will increase the problem of food distribution efforts and food distribution costs, making it difficult to provide food spatially evenly across all regions in Indonesia. **Fifth**, the proportion of crop losses and food waste is still quite high. Food losses due to inaccurate food handling from harvest to processing and continuing to marketing are believed to still be around 10 percent to 20 percent, depending on the commodity, season, and technology used.

Some of the food challenges that occur in Bali Province are as follows.

1. Agricultural land is decreasing due to conversion which threatens the sustainability of food production and quality.
2. Supply and demand for food commodities is not balanced. The challenges arise from two sides at once which mutually reinforce the level of difficulty, namely from the supply side (supply, supply) and the demand side (demand, need) which behave very dynamically (Suryana, 2014).
3. Weak use and mastery of technology for smallholders.
4. Lack of farming management and product marketing.
5. The proportion of crop losses and food waste is still quite high.
6. Food losses due to inaccurate food handling from harvest to processing and continuing to marketing are believed to still be around 10 percent to 20 percent, depending on the commodity, season, and technology used.
7. The area of agricultural land per capita is very limited. These small farmers are faced with classic problems that have not been successfully addressed, such as limited access to markets, capital, information and

technology, resulting in domestic agriculture having difficulty achieving efficiency with agricultural equipment and mechanization because the land managed is not concentrated in one large area.

8. The number of young people interested in working in the agricultural sector is another problem.

9. Farmers aged over 45 years reached 64.2%.

10. Indonesia is also still facing three times the nutritional burden. Based on data from the Ministry of Health (2018), the prevalence of stunting among children under five was still high in 2018, namely 30.8%. Meanwhile, other children are obese with a prevalence of 8.0% in 2018. Another burden is that the prevalence of anemia in pregnant women is still very high, namely 48.9% in 2018 due to a lack of micronutrients.

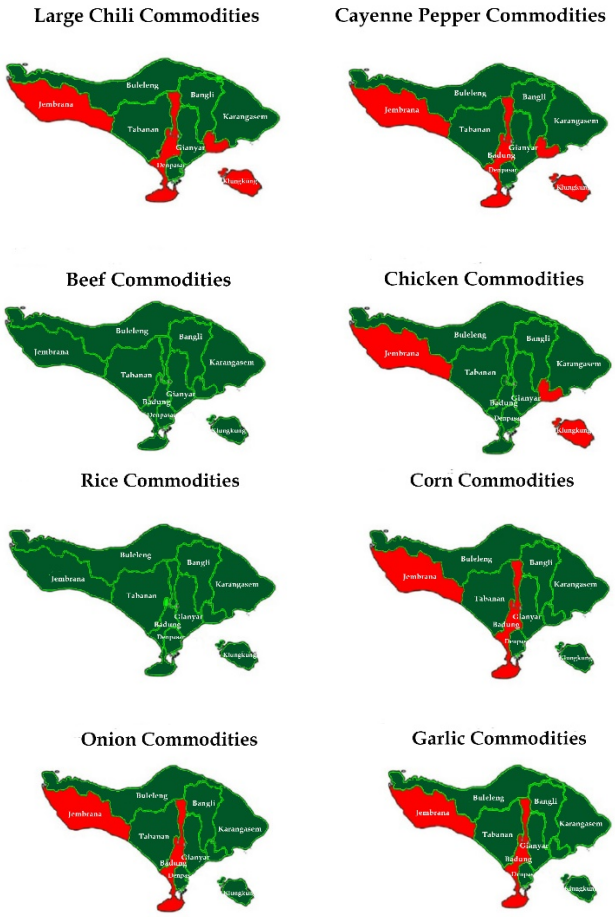
11. Climate change also creates new risks for agricultural productivity.

12. Hydrometeorological disasters such as floods and droughts cause crop failure among farmers.

3.2 Design of a Food Security Action Plan in Bali Province for Food Indepedence

The relationship between food availability and demand will influence the condition of the food balance, whether it is a surplus or deficit. A food balance surplus occurs if availability is greater than food needs, conversely, a food balance deficit occurs if availability is less than food needs. Bali is the province with the best food security in Indonesia in 2021. This is reflected in Bali's Food Security Index (IKP) score of 83.8 points, the highest compared to other provinces.

Figure 3. Potential of Strategic Food Commodities in Bali Province



Source: Bali Province Agriculture and Food Security Service, 2021

The Food Balance Situation of 11 strategic food commodities from January to June (Semester I) 2022 is generally in surplus.

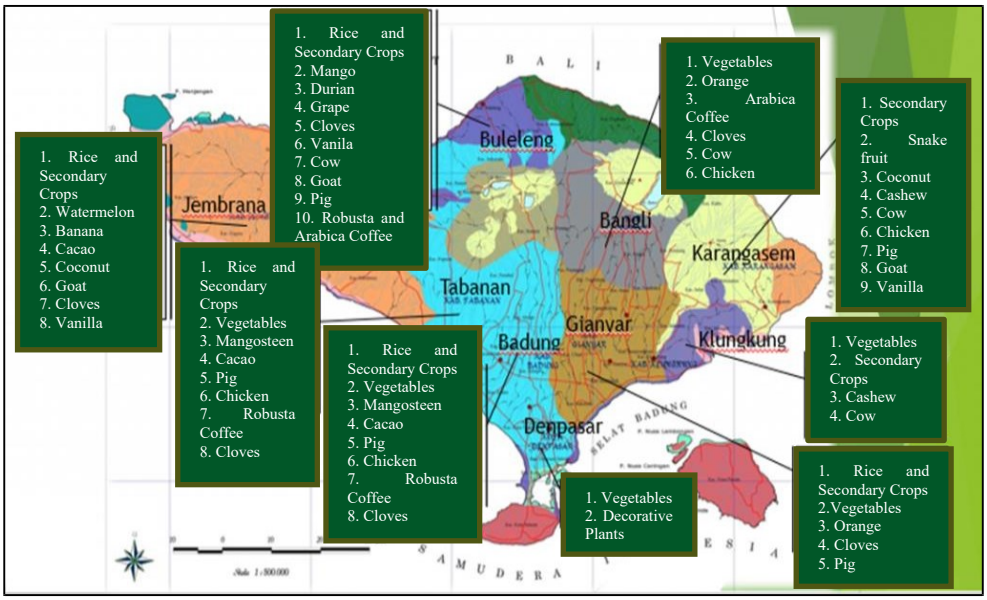
a) Rice and beef commodities in Bali Province have a surplus balance, both districts/cities.

b) In general, the balance of corn, onions, garlic, and granulated sugar in Bali Province is in surplus, but the balance in Jembrana and Badung Regencies is in deficit. To overcome the deficit of corn, shallots, garlic, and granulated sugar, distribution can be carried out from surplus districts, namely Bangli, Karangasem, Tabanan, Buleleng, Denpasar, Klungkung and Gianyar districts.

c) The large chili commodities, cayenne pepper, chicken eggs, in general the balance in Bali Province is in surplus but the balance in Jembrana, Badung and Klungkung Regencies is in deficit. To overcome the deficit of large chilies, cayenne peppers, chicken eggs, distribution can be carried out from surplus districts, namely Bangli, Karangasem, Tabanan, Buleleng, Denpasar and Gianyar districts.

For cooking oil commodities, in general the balance in Bali Province is in surplus but the balance in Jembrana and Klungkung Regencies is in deficit. To overcome the cooking oil deficit, distribution can be carried out from surplus districts, namely Bangli, Karangasem, Tabanan, Buleleng, Denpasar, Badung and Gianyar districts as shown in Figure 3.

Figure 4. Food Potential in Bali Province



Source: Bali Province Agriculture and Food Security Service, 2021

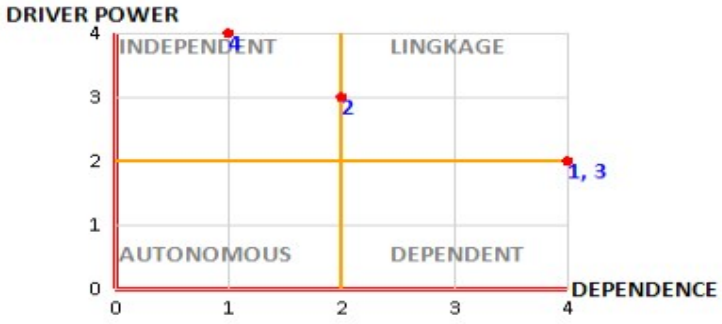
Achieving sustainable food security based on the potential of Bali Province is realized through the use of several strategies, such as the strategy increasing the availability of food that is Diverse, Nutritious, Balanced and Safe (B2SA), the strategy of increasing the affordability of food that is Diverse, Nutritious, Balanced and Safe (B2SA), the strategy of increasing utilization of (essential) food and nutrition services, and strategies for strengthening institutions and governance of food and nutrition. The four strategies are sorted based on priority because not all strategies can be implemented at the same time.

This strategic priority is the basis for forming the design of the Bali Province Food Security Action Plan Towards Food Independence. One of the analytical tools used in determining strategic priorities is the Interpretative Structure Modeling (ISM) method. ISM analysis can describe complex problems so that they can be more structured or plan strategic policies and describe dependency or interconnection relationships and hierarchies between sub-elements which are presented in graphical form. This method is called interpretation, because the justification for how one element influences other elements is carried out by a discussion group that is expert in the problem area being studied. It is called structural because the basis of these relationships will form a structure obtained from a complex set of elements that make up the problem being studied. It is called modeling because from the relationships between the elements and structures obtained a digraph model will be created.

There are four quadrants in this analysis. The Autonomous Factors quadrant is an element that has a weak driving force and dependency. Elements included in this category will later be removed from the existing measurement elements because they do not have a significant influence on the measurement process. Linkage Factors, elements included in this category are elements that have a strong driving force and dependency, or in other words, are the key to success that will significantly influence the measurement. Dependent Factors are elements that have a weak driving force and a strong dependence on other factors. Independent Factors are elements that have a strong driving force and weak dependence on other factors.

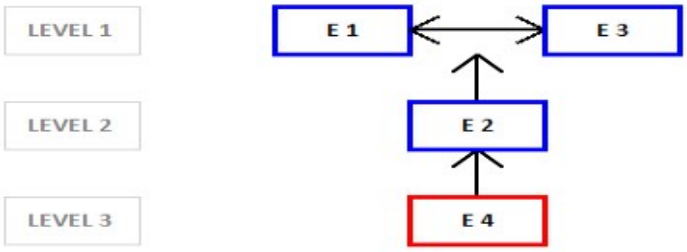
The results of the ISM analysis show that the strategy for Improving Institutions and Food and Nutrition Governance is located in the Independent quadrant. This strategy acts as a driving force/motivator for moving other strategic goals.

Figure 5. Diagraph of Food Security and Nutrition Strategies in Bali Province



Source: Data Processing Results, 2023

Figure 6. Level Partitioning of Food and Nutrition Strategies in Bali Province



Source: Data Processing Results, 2023

Notes:

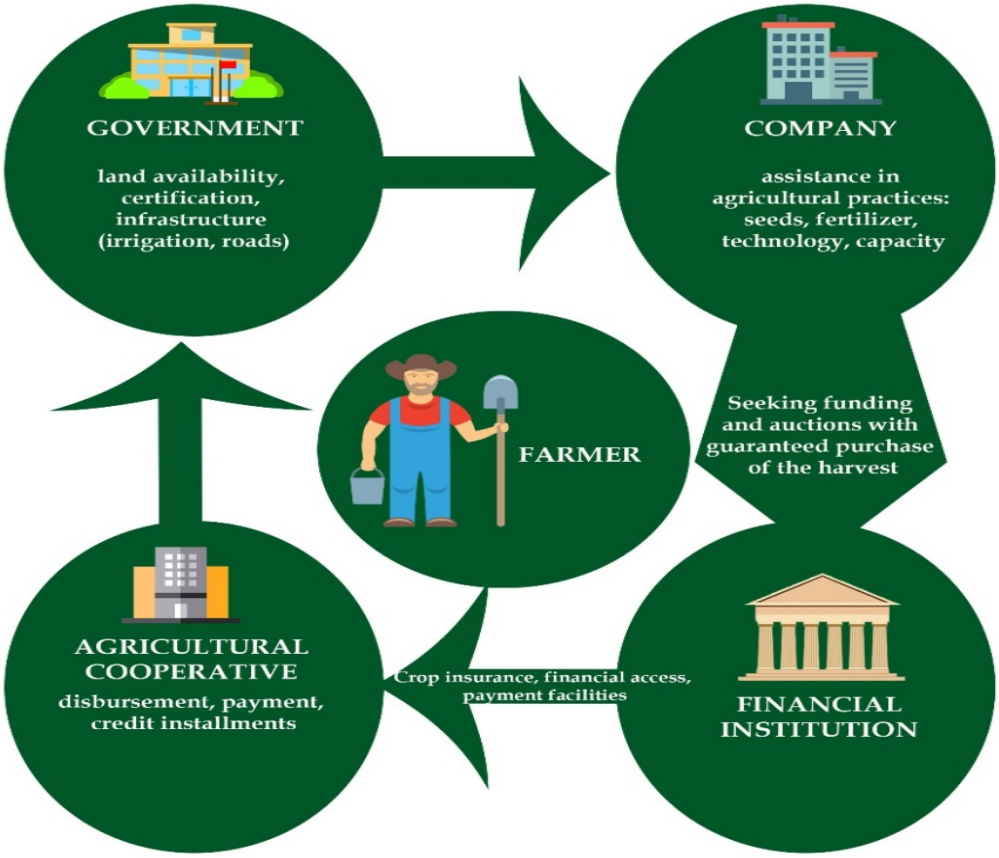
Independent Factors : E4 (Improving Food and Nutrition Institutions and Governance)
Dependent Factors : -
Linkage Factors : E2 (Increasing the Affordability of Diverse, Nutritious, Balanced and Safe Food
E1 (Increased Utilization of Food and Nutrition Services (Essential))
E3 (Increasing Independence/Availability of Diverse, Balanced and Safe Food
Autonomous Factors : -
: Short Term
: Long Term

Improving food and nutrition institutions and governance needs to be carried out collaboratively by the government, private sector (companies), agricultural cooperatives, and financial institutions. This design is one way to realize food independence. The government continues to maintain food availability through the pillars of food security, which consist of the availability of sufficient food in quantity and quality, the affordability of food or having the resources to obtain food, as well as the appropriate use of food based on nutritional knowledge. The government also needs to determine the availability of land for food in the form of LP2B (Sustainable Food Farming Land), provide organic certification, and through infrastructure improvements, such as improving irrigation networks and farming roads. LP2B is an area of agricultural land that is designated to be protected and developed consistently to produce staple food for national food independence, resilience, and sovereignty.

The company has a role in providing seeds, fertilizer, and technology and can accommodate production from farmers. Apart from that, market access to farmers' products is also a priority for the Company. Private companies have a strong commitment to supporting the realization of food security in the region. The support and concern of large companies for the development of agricultural cultivation activities has a very strategic role, especially in supporting the availability of food needs for workers recruited by the Company, so that these companies can work together with the government to support regional and national food security programs.

The existence of food security needs support from financial institutions in providing harvest insurance, financial access, and payment facilities through agricultural cooperatives in the form of disbursement, payments and credit installments. Agricultural insurance is carried out to protect farmers from losses due to crop failure due to natural disasters, attacks by plant pests, outbreaks of infectious animal diseases, the impact of climate change, and/or other types of risks.

Figure 7. Food Security Design for Bali Province Towards Food Independence



Source: Research Result, 2023

To realize a food security system, agribusiness cooperatives need to revitalize their roles and functions. The steps that must be taken by agribusiness cooperatives so that food security can be achieved to create prosperity and welfare for the community (Susilo, 2013):

1. Carry out internal revitalization and consolidation

Currently, public trust in cooperatives is declining, due to inconsistent government policies towards cooperatives and because of the weaknesses of cooperative management itself. Cooperatives need to carry out internal consolidation to improve business management (Corporate Governance). This can be done by:

a) Participate in training for Management, Supervisors, and Cooperative Managers to increase their Capacity Building.

b) Organize the administration by incorporating up-to-date Information Technology, because administration carried out manually is difficult to be accountable for.

c)Improving membership to match the identity of the Cooperative

2. Actively involved in agricultural revitalization

Agribusiness cooperatives need to improve their capabilities in the field of effective and productive farming technology in order to transfer knowledge to members and the community.

3. Create an appropriate financing scheme for the agricultural sector.

The agricultural sector (agribusiness) has different characteristics from other sectors such as trade, services and industry. Agribusiness cooperatives must have the ability to design suitable products and schemes to increase the production of their members because this sector is usually strongly influenced by seasons and high price fluctuations.

4. Not dependent on government assistance funds

If in the past cooperatives operating in the agribusiness sector, especially KUD, were very dependent on government assistance, now the era is no longer the case for agribusiness cooperatives as business entities depending on government assistance. Cooperatives must be able to be independent by exploring the potential in the area where they are domiciled and empowering their members well. If member trust has increased, members will entrust the management of their funds to the cooperative in the form of savings and term savings. Apart from

that, agribusiness cooperatives can collaborate with banks and investors to raise funds, so that services to members are no longer dependent on government assistance. Currently, many have proven that cooperatives can be independent without assistance from both central and regional governments.

5. Explore agribusiness potential by the location where the cooperative is located

Agribusiness cooperatives must be limited commodity cooperatives cultivated by farmers and cover the entire agribusiness system. Cooperative business must be adapted to the local community where the cooperative is located.

Conclusions and Further Research

The conclusions of this research are 1) The challenges in maintaining food security in Bali Province are limited natural resources (land) due to land conversion, the impact of global climate change, small-scale farming, imbalances in food production between districts/cities, food losses, 2) design Food security in Bali Province begins with re-growing partnerships (cooperatives) between farmers, government, companies, agricultural cooperatives and financial institutions. This strategy design for achieving food security encourages the realization of other strategies and is based on activity priorities (time period).

The advice that can be given in the research is that in preparing the RAD-PG (Regional Action Plan for Food and Nutrition), it is hoped that the annual targets to be achieved by the regions and their annual budget allocations can be seen. Regarding food security and nutrition, Bali Province should establish Regional Food Reserve Regulations which are synchronized with the potentials that exist in each district/city.

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Credit Authorship Contribution Statement:

Widhianthini: contributed to creating the concept, as well as going directly into the field for in-depth interviews with respondents, tabulating the data.
Ni Made Classia Sukendar: contributed to the journal manuscript.
Anak Agung Gede Purantara: contributed to data processing.

References

[1] As-syakur, A.R., I Wayan Nuarsa, and Osawa, T. “Impacts of El Ninoon Agricultural Drought in Bali, Indonesia.” Paper presented at the 19th Symposium on Remote Sensing for Environment, Chiba, Japan, February 16, 2017.

[2] Bennich, T., *et al.* 2023. Recurring Patterns of SDG Interlinkages and How They Can Advance The 2030 Agenda. *One Earth* 6 (November 17, 2023). DOI: https://doi.org/10.1016/j.oneear.2023.10.008

[3] Eriyatno. 2012. *Systems* Science. Guna Widya Publishing.

[4] Hosang, P.R., Tatuh, J. and Johammes, E. X. R. 2012. Analysis of the Climate Change Impact on Rice Production of The Province of North Sulawesi in 2013-2030. *Eugenia* 18(3). DOI:https://doi.org/10.35791/eug.18.3.2012.4101

[5] Hsieh, S., *et al.* 2023. Assessing The Contribution of Semiconductors to The Sustainable Development Goals (SDGs) from 2017 to 2022. *Heliyon* 9. DOI: https://doi.org/10.1016/j.heliyon.2023.e21306

[6] Ickowitz, A., *et al.* 2023. Quantifying the Contribution of Mangroves to Local Fish Consumption in Indonesia: a Cross-Sectional Spatial Analysis. *Lancet Planet Health.* DOI:https://doi.org/10.1016/S2542-5196(23)00196-1

[7] Medialdea, J.T., *et al.* 2018. Potential of Science to Address the Hunger Issue: Ecology, Biotechnology, Cattle Breeding and the Large Pantry of The Sea. *Journal of Innovation and Knowledge.* DOI:https://doi.org/10.1016/j.jik.2017.12.007

[8] Montagu, M/ V. 2018. Science, Ideology and Daily Life. *Journal of Innovation and Knowledge*. DOI:https://doi.org/10.1016/j.jik.2018.03.005

[9] Peng, S., *et al.* 2004. Rice Yields Decline with Higher Night Temperature from Global Warming. *PNAS* 101(27). DOI: https://doi.org/10.1073/pnas.0403720101

[10] Ponce, R. S., Peris Cancio, J. A. and Escámez J.S. 2018. The Capabilities Approach and Values of Sustainability: Towards an Inclusive Pedagogy. *Journal of Innovation and Knowledge.* DOI:https://doi.org/10.1016/j.jik.2017.12.008

[11] Rozi, F., *et al.* 2023. Indonesian Market Demand Patterns for Food Commodity Sources of Carbohydrates in Facing the Global Food Crisis. *Heliyon* 9(6). DOI: https://doi.org/10.1016/j.heliyon.2023.e16809

[12] Saboori, B., Noor Alhuda, Tarig, G. 2023. Agricultural Products Diversification-Food Security Nexus in The GCC Countries: Introducing a New Index. *Journal of Agriculture and Food Research*. DOI:https://doi.org/10.1016/j.jafr.2023.100592

[13] Sitaresmi, T., *et al.* 2023. Ádvances in the Development of Rice Varieties with Better Nutritional Quality in Indonesia. *Journal of Agriculture and Food Research*. DOI: https://doi.org/10.1016/j.jafr.2023.100602

[14] Suamba, I K., *et al.* 2023. The Subak-Based Agro-tourism Management Model in The World Cultural Heritage Area of Catur Angga Batukaru Tabanan Regency, Bali Province, Indonesia. *African Journal of Food, Agriculture. Nutrition and Development* 23(2). DOI: https://doi.org/10.18697/ajfand.117.21970

[15] Sugiyono. *Quantitative and Qualitative Research Methods*. Alfabeta Publishing, 2017.

[16] Suryana, A. 2014. Food Security Challenges Faced by Developing Asian Countries and Responses toward 2025: The Case of Indonesia. Paper presented at the 2nd International Conference on Asia Food Security, Nanyang, Singapore, August 21-22, 2014.

[17] Suryana, A. 2014. Toward Sustainable Indonesian Food Security 2025: Challenges and Its Responses. *Forum Penelitian Agro Ekonom,* 32(2). Available at: https://media.neliti.com/media/publications/56153-ID-menuju-ketahanan-pangan-indonesia-berkel.pdf (in Indonesian)

[18] Susilo, E. 2013. The Role of Agribusiness Cooperatives in Food Security in Indonesia. *Jurnal Dinamika Ekonomi dan Bisnis* 10(1). Available at: https://ejournal.unisnu.ac.id/JDEB/article/view/28/39

[19] Suswono. 2013. Small Farmer Institutional Development to Support Agricultural and Rural Development. Paper presented at the Ambassador Forum: Improving Institution of Smallholder Agriculture, Bogor, Indonesia, December 16, 2013.

[20] Wu, X., *et al.* 2023. Three Main Dimensions Reflected by National SDG Performance. *The Innovation* 6(6). DOI: https://doi.org/10.1016/j.xinn.2023.100507

[21] Bali Province Agriculture and Food Security Service, "Food Balance Development Strategy for Semester I 2022 Bali Province." Bali Province Agriculture and Food Security Service. Available at: https://distanpangan.baliprov.go.id/perkembangan-neraca-pangan-strategis-semester-i-tahun-2022-provinsi-bali/.

[22] Bali Provincial Regional Regulation Number 7 of 2022 concerning Amendments to Regional Regulation Number 3 of 2019 concerning "Universe Regional Medium Term Development Plan for the Province of Bali for 2018-2023.", Bali Provincial Government Documentation and Legal Information Network. Available at: https://jdih.baliprov.go.id/produk-hukum/peraturan-perundang-undangan/perda/28922

[23] Ministry of Health, "Decree of The Minister of Health of The Republic of Indonesia Number HK.01.07/MENKES/1928/2022 Concerning National Guidelines for Medical Services for Stunting Procedure." Ministry of Health of The Republic of Indonesia. Available at: https://yankes.kemkes.go.id/unduhan/fileunduhan_1673400525_335399.pdf.

[24] National Food Agency, "Food Security Index 2022," National Food Agency, https://badanpangan.go.id/storage/app/media/2023/Buku%20Digital/Buku%20Indeks%20Ketahanan%20Pangan%202022%20Signed.pdf

[25] Statistics of Bali Province, "Bali Province in Figures 2021," Statistics of Bali Province, https://bali.bps.go.id/publication/2021/02/26/4ae96914ff22e9b79d8d6551/provinsi-bali-dalam-angka-2021.html

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Rapid Bathymetry Mapping Based on Shallow Water Cloud Computing in Small Bay Waters: Pilot Project in Pacitan-Indonesia

Nurul KHAKHIM
Department of Geography Information Science, Faculty of Geography,
Universitas Gadjah Mada, Indonesia
nurulk@ugm.ac.id

Agung KURNIAWAN
Coastal and Watershed Management, Postgraduate Geography,
Faculty of Geography, Universitas Gadjah Mada, Indonesia
ORCID: https://orcid.org/0000-0002-2441-8706
agung.kurniawan.16@mail.ugm.ac.id

Pramaditya WICAKSONO
Department of Geography Information Science, Faculty of Geography,
Universitas Gadjah Mada, Indonesia
prama.wicaksono@ugm.ac.id

Ahmad HASRUL
Coastal and Watershed Management, Postgraduate Geography,
Faculty of Geography, Universitas Gadjah Mada, Indonesia
ahmad.hasrul@mail.ugm.ac.id

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Abstract: Mapping coastal areas generally requires large data constellations in time series and requires analysis using complex mathematical and modeling approaches. In shallow-water bathymetric mapping, remote sensing plays an important role in supporting conventional bathymetric mapping, especially in areas that are difficult to access. This method called Satellite Derived Bathymetry (SDB). The cloud computing approach is a solution for mapping shallow water bathymetry rapid and effectively. This study using Google Earth Engine (GEE) to compute remote sensing data for produce near-shore bathymetry. The method of Li *et al.* (2021) performs bathymetric extraction without using depth samples but uses chlorophyll-A as input for depth extraction parameter calculations. This study examines a small bay in the waters of Pacitan, Anakan Bay, and the waters of Kemujan Island in the Karimunjawa Islands. Within this study area, significant differences in resulting depth are very limited, ranging from 0 to -17.8. The developed model, based on the algorithm proposed by Li *et al.* (2021), is estimated to be able to provide accurate predictions of up to around 90% in the waters studied, with a root mean error rate (RMSE) of 1.1 meters.

Keywords: SDB; cloud computing; GEE; bathymetry.

JEL Classification: Q57; Q25; R11.

1. Research Background

Monitoring environmental issues, especially in the coastal areas will require access to large volumes of geospatial data and time series (Rumson, Hallett, and Brewer 2017; Bousquin 2021; Ghosh and Mistri 2022; Putman *et al.* 2023), in addition, using raster geospatial data makes it possible to carry out complex mathematical modeling operations with the support of Geographic Information Systems (Zhang *et al.* 2021) The natural and non-natural phenomena on the coast have become very dynamic (Bhargava, Sarkar and Friess 2020), in the other side can be mapped rapid and efficiently using the cloud computing approach (Goldberg, *et al.* 2014; Xu *et al.* 2022). Cloud computing can play a significant role in the process of accelerating coastal area mapping, especially

shallow water bathymetry mapping, which has the benefit of supporting navigation safety in coastal areas. The bathymetry which is able to describe the depth of waters is the key to making in-depth observations in the marine environment. On the other hand, information regarding shallow water bathymetry is crucial when faced with the need for management and monitoring of coral reefs and ecosystem protection (Zhang, Ma, and Zhang 2020). Conventionally, bathymetric mapping using single or multibeam instrument requires complex equipment, limited area coverage, high operational costs and relatively long processing time, so it is less effective when used to map shallow waters which are usually close to coastal areas (Arief *et al.* 2013; Kurniawan, *et al.* 2021; Salameh *et al.* 2019). The use of bathymetry obtained through multispectral imagery taken by satellites has become a major focus in research over the last few decades because it is an efficient tool for evaluating the depth of waters, especially shallow waters (Lyzenga 1985; Philpot 1989; Bierwirth, Lee, and Burne 1993; Stumpf, Holderied, and Sinclair 2003; Lyzenga, Malinas, and Tanis 2006; Pe'eri, *et al.* 2014).

The remote sensing approach is the key to carrying out bathymetric mapping in shallow waters quickly and efficiently (Knudby, Ahmad, and Ilori 2016; Casal *et al.* 2020; Hodúl *et al.* 2020; Susa 2022), but in its implementation, shallow water bathymetric mapping based on remote sensing satellite data is a process with high complexity and challenges (Chen, Ma, and Zhang 2021; Alevizos, Le Bas, and Alexakis 2022; Wang *et al.* 2023) because generally there are atmospheric distortions in the optical band in the process of penetration into the bottom of the waters (short waves are generally better at penetrating waters), so that one satellite image system and another can produce different results (Marcello, Eugenio, Martín, and Marqués 2018). Bathymetric mapping of shallow waters using a remote sensing approach is known as "Satellite Derived Bathymetry (SDB)". Today's SDB can be used to map depth in shallow waters as far as the ability of solar radiation to penetrate the bottom of the water (Jégat, *et al.* 2016), with various algorithms that have been developed, including by (Lyzenga 1978; Van Hengel and Spltzer 1991; Bierwirth, Lee, and Burne 1993; Stumpf, Holderied, and Sinclair 2003; Li *et al.* 2021; Vinayaraj, Raghavan, and Masumoto 2016). SDB is technically capable of providing much more significant data processing speed compared to conventional surveys, however, with the development of cloud-based computing technology, the SDB process can be carried out more efficiently and optimally. Nowadays remote sensing images are increasingly varied (Landsat 9, SPOT 7, IKONOS, WorldView, Sentinel, PlanetScope, Rapid eye, etc.) making SDB data input increasingly diverse with accuracy at each level of spatial and temporal resolution of the image.

In the last decade, a variety of research and shallow water mapping projects based on remote sensing imagery have been developed. Vinayaraj, Raghavan, and Masumoto (2016) developed an SDB algorithm that determines regression coefficients by taking into account local factors in the Adaptive-Geographically Weighted Regression (A-GWR) framework. Then Chybicki (2018) utilized the 3-dimensional geographical weighted regression (3GWR) technique which combines the geographical weighted regression (GWR) model, with inverse optimization which considers depth. Lumban-Gaol, Ohori, and Peters (2022) using Convolutional Neural Networks (CNN) in machine learning approach. Generally, the implementation of SDB utilizes software based on remote sensing and GIS, but recently a more efficient approach using cloud computing has begun to be developed, namely by applying cloud computing on Google Earth Engine with a combination of Sentinel-2 data using the Lyzenga algorithm (1985) and Stumpf (2003) (Traganos *et al.* 2018). Furthermore Li *et al.* (2021) uses clean water Mosaic with minimal water column attenuation, thereby enabling automatic bathymetry estimation algorithms to reduce uncertainties caused by water column attenuation. Mudiyanselage *et al.* (2022) also utilizes machine learning algorithms through a cloud-based random forest approach to extract shallow water bathymetry information.

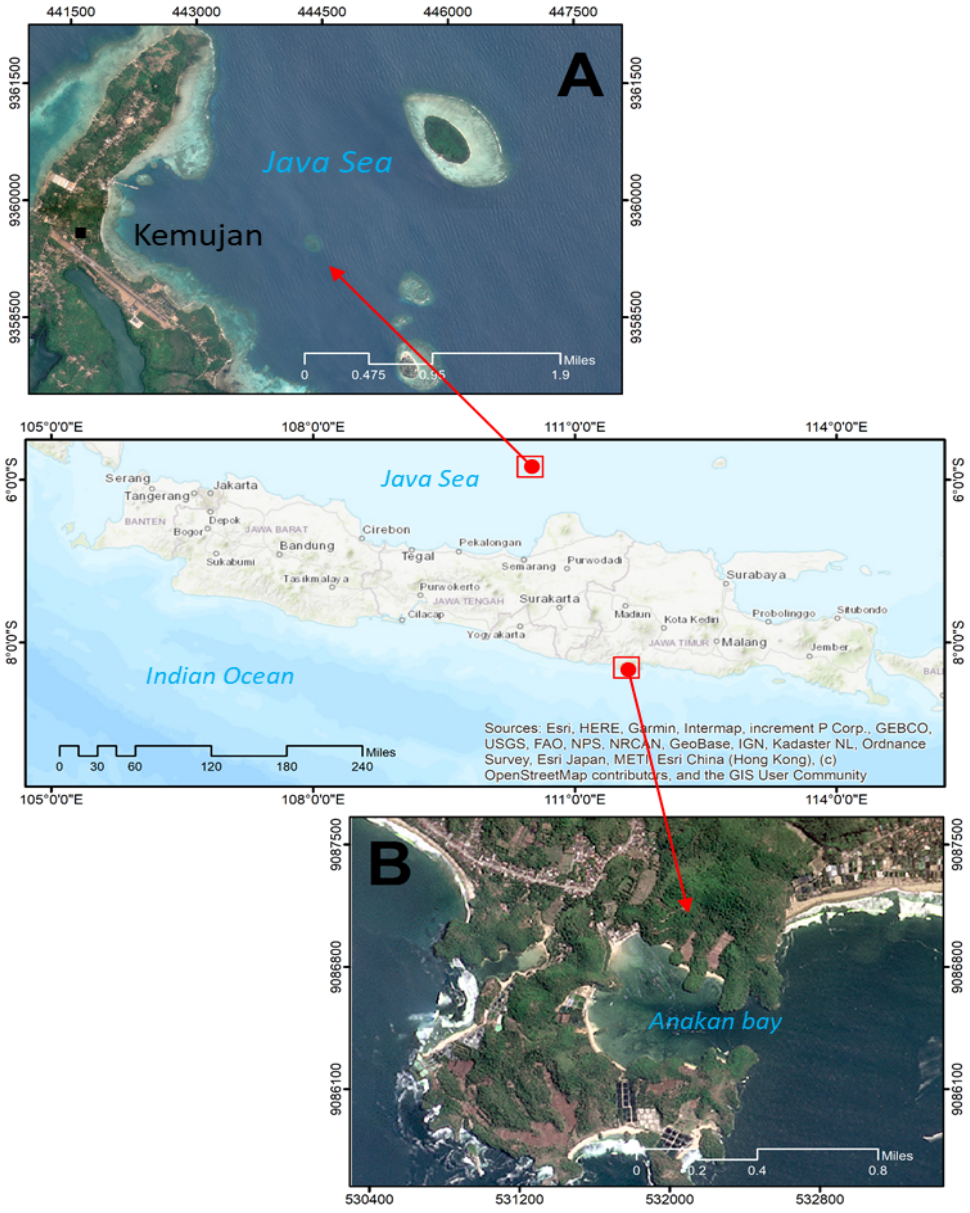
Based on this background, as a relatively new technology in geospatial data processing, cloud computing, which is generally used to carry out massive big data analysis, can also be used to obtain shallow water bathymetry information more effectively and optimally in terms of processing time. However, evaluation is still needed to monitor and control the quality of the data produced. In line with this statement, this research aims to applying Li *et al.* (2021) algorithm processing framework from upstream to downstream in one process frame on the cloud.

2. Site Study

This study was conducted in two optically shallow water areas that are geographically separated by the island of Java. The shallow water location used as a pilot project in this research is Small bay – Anakan Bay in Pacitan, then to be able to run the model that has been created it will also be tried for other areas including the Kemujan island which part of Karimun Jawa archipelago (Central Java Province) (see figure 1). The constellation of two research areas was chosen by considering the availability of datasets with clear water conditions around the bay.

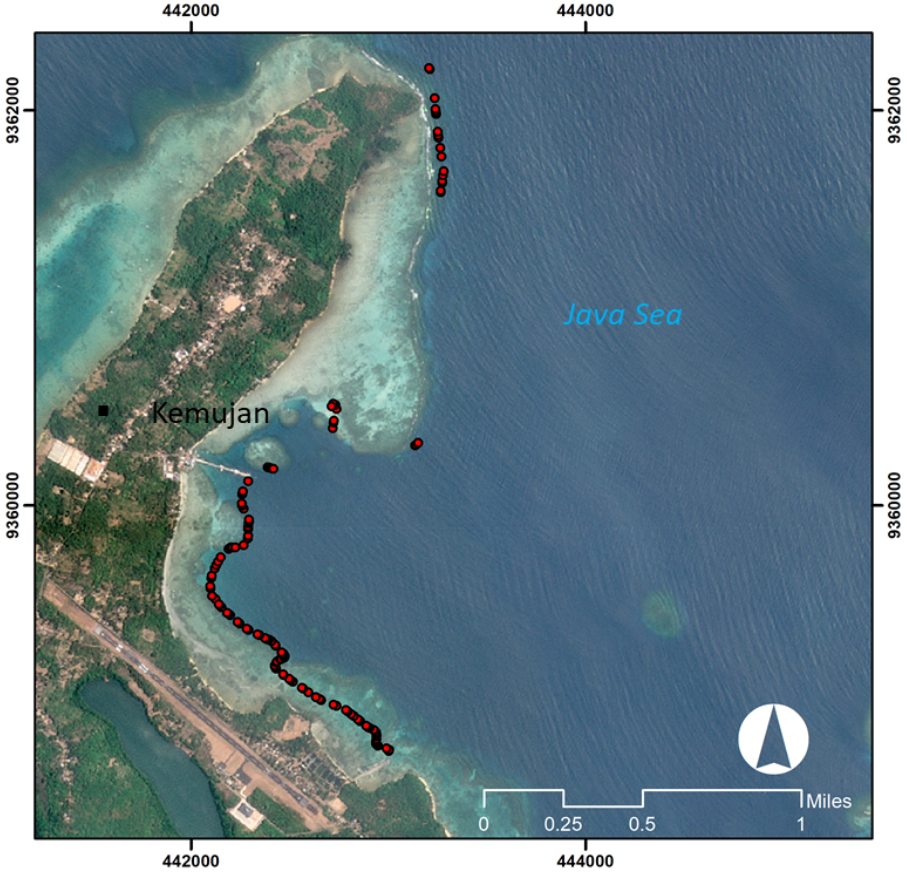
Water conditions are measured visually by separating shallow and deep water optically based on passive system remote sensing images. Geographically, the island of Java separates these two areas, but astronomically both are still included in the Southern Hemisphere and are included in the UTM Zone 49 M grid system. The astronomical position of Anakan Bay - Pacitan Regency is 08°15'48.26" LS, 111°17'20.43" E, while the Kemujan Island astronomically located at 5°47'8.98" N, and 110°28'46.21" E. In general, based on data that has been carried out by previous research by the constellation of two research areas was chosen by considering the availability of datasets with clear water conditions around the bay. Water conditions are measured visually by separating shallow sea and deep sea optically based on passive system remote sensing images. Geographically, the island of Java separates these two areas, but astronomically both are still included in the Southern Hemisphere and are included in the UTM Zone 49 M grid system. The astronomical position of Anakan Bay - Pacitan Regency is 08°15'48.26" LS, 111°17'20.43" E, while the research location on Kemujan Island – Karimunjawa Islands is astronomically located at 5°47'8.98" N, and 110°28'46.21" E. In general, based on data that has been carried out by previous research by Wicaksono (2015) on Kemujan Island, the dominant benthic habitats seen are macro algae, coral reef, seagrass and bare substratum.

Figure 1. The study location, where (A) is the location of Kemujan Island in the Karimunjawa Islands, and (B) Anakan Bay in Pacitan Regency.



The validation data used in this research comes from direct measurements in the field (in-situ). Due to limited data, validation was carried out in around Kemujan Island waters. Figure 2 provides an illustration of the location for in-situ data collection in 2016.

Figure 2. Depth sample points obtained through in-situ measurements in 2016 were used as validation reference data.



3. Solar Radiation Infiltration Process and Li *et al.* (2021) SDB Method

Shallow water is optically a unique area because sunlight can still penetrate to the bottom of the water. In practice, shallow waters only with clear water and not covered by organisms or other solid loads can be processed to SDB. Sunlight that penetrates the water surface is scattered and absorbed by water molecules and components, then the sensor will receive energy through reflected radiation from the shallow seabed layers. Furthermore, light entering the water layer is also absorbed and re-scattered by the water body and its substrate (see figure 3) (Lyzenga 1985). The physical aspect underlying the water depth prediction model from multispectral images is the attenuation of light in the water column. This is related to wavelength, where shorter wavelengths in the electromagnetic spectrum will dampen more minimally compared to longer wavelengths (Vinayaraj, Raghavan, and Masumoto 2016).

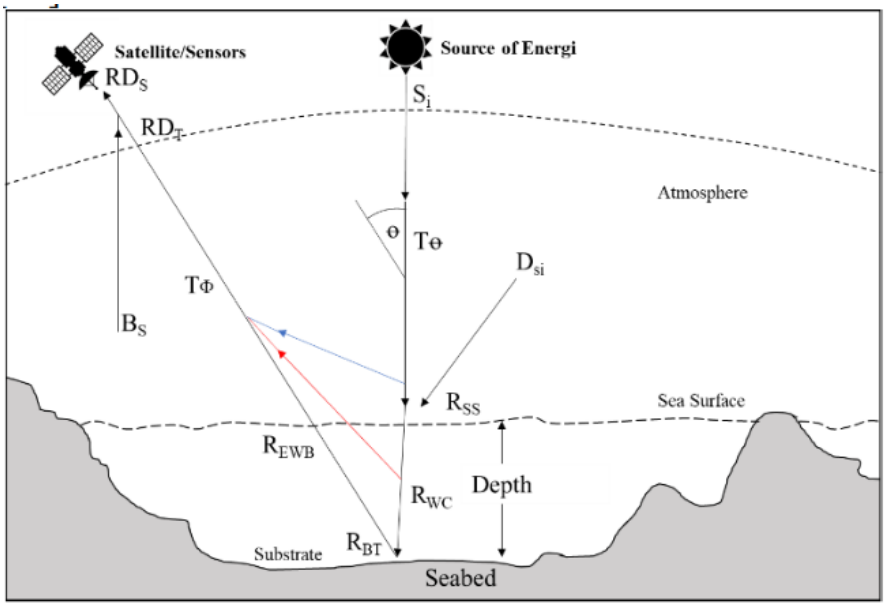
The method for automatically obtaining shallow water bathymetry was developed by Li *et al.* (2021) which specifically uses cloud-based computing via Google Earth Engine (GEE). The PlanetScope satellite image used is an image with minimum cloud cover, sunglint and turbidity in a certain period. Non-aquatic and aquatic objects in this study are separated with the help of NDWI (Normalized difference water index). The NDWI formulation is as follows:

$$NDWI = \frac{\rho(Green) - \rho(NIR)}{\rho(Green) + \rho(NIR)}$$

Li *et al.* (2021) developed an automatic bathymetric mapping method using cloud computing platform – google earth engine. Remote sensing reflectance (Rrs) is calculated from the mosaic surface reflectance ρ(λ) based on the equation constructed from as:

$$R_{rs}(\lambda) = \rho_m(\lambda)/\pi$$

Figure 3. Solar radiation enters the water column through various charges and water molecules before reaching the bottom of the water. The molecules and solid charge will influence the values reflected to the sensor, and become the basis for depth model predictions in the SDB (by Kurniawan *et al.* 2021 modified from Bierwirth, Lee, and Burne 1993)



Furthermore, the value of the calculation results of R_{rs} then used as a basis for carrying out r_{rs} as follows:

$$r_{rs}(\lambda) = \frac{R_{rs}(\lambda)}{0.52 + 1.7\,R_{rs}(\lambda)}$$

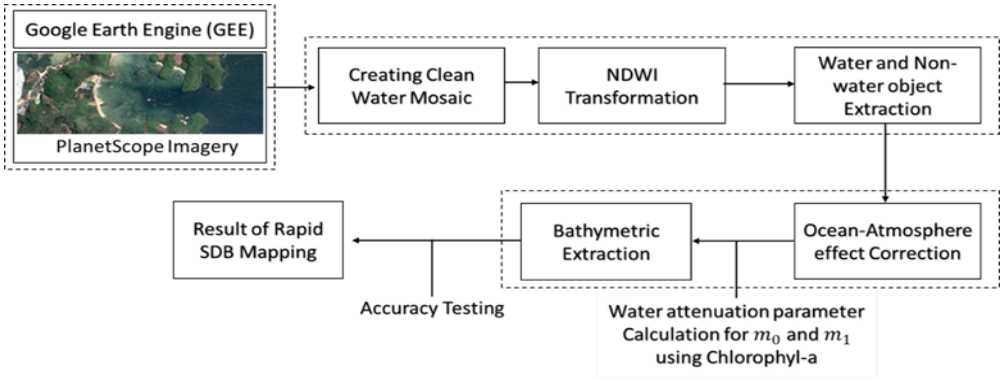
Li *et al.* (2021) estimating shallow water bathymetry by calculating different levels of attenuation from the blue and green bands. The basic difference used is that the parameters m_0 and m_1 are calculated using Chlorophyll-a (Chl-a) concentrations as a representation of clean offshore waters. Chlorophyll-a (Chl-a) concentration based on observations via marine copernicus (see: *https://marine.copernicus.eu/access-data/myocean-viewer*)

$$Depth = m_0 \frac{ln(1000 * r_{rs}blue)}{ln(1000 * r_{rs}green)} - m_1$$
$$m_0 = 52.073 * e^{(0.957 * Chl_a)}$$
$$m_1 = 50.156 * e^{(0.957 * Chl_a)}$$

4. Research Methodology

Google Earth Engine (GEE) is used as a workspace in a whole series of computing activities.

Figure 4. Schematic diagram of bathymetry extraction based on Li *et al.* (2021) method in Anakan Bay – Pacitan and Kemujan Island – Karimunjawa Archipelago



PlanetScope Satellite are fully processed using GEE. The image chosen is the image with the clear visibility without cloud or water sediment content. The method developed by Li *et al.* (2021) for extracting water depth uses a chlorophyll value approach that remains constant over time. (Chl-a = 0.29 mg/m^3) as input to calculate the values of m_0 and m_1. Land and water are separated using the NDWI transformation scheme. The depth predictions obtained were then tested for accuracy to determine SDB capabilities using the method developed by Li *et al.* (2021) around the waters of Anakan Bay - Pacitan, and Kemujan Island - Kep. Karimunjawa. The accuracy test was carried out using R^2 and RMSE value calculations.

5. Accuracy Assessment

Accuracy assesment were carried out to determine the capabilities of the method developed by Li *et al.* (2021) using the R2 and RMSE approaches. The sample points used to carry out accuracy tests are on Kemujan Island.

$$R^2 = 1 - \sum_1 \left(h_i - h'_i\right)^2 / \sum_i \left(h_i - h''_i\right)^2$$

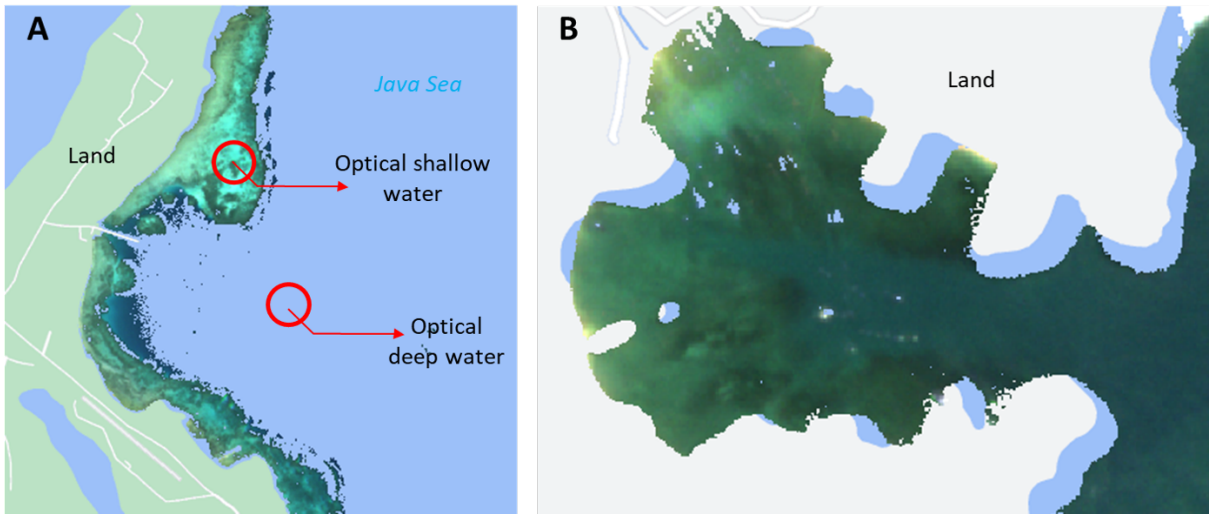
$$RMSE = \left(\sum_{i=1}^{n} \left(h_i - h'_i\right)^2 / n\right)^{0.5}$$

6. Research Result and Discussions

6.1 Clean Water Extraction of Shallow Water

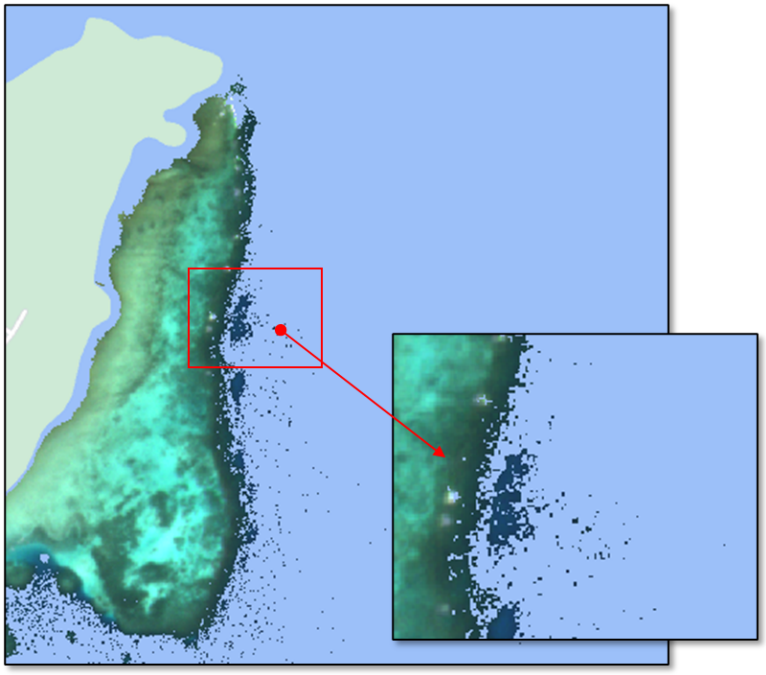
The clean water mosaic was selected based on the best image by manually selected with the minimum cloud content, and the absence of breaking waves and sunglints, during eastern season (june to august 2023), which is the season closest to when this paper was written. Image acquisition with a mosaic of clean water at both locations is shown in Figure 5. In both images, it appears that the shallow waters are free from various kinds of disturbances (*i.e.* clouds, waves and sunglints). From figure 5 it can be seen that the entire land has been systematically separated from the water area.

Figure 5. Results of separating land and water using NDWI transformation



In contrast to the clean water mosaic developed by Li *et al.* (2021) which still maintains the optical deep sea, in this study the optical deep water is completely removed using NDWI transformation. Through optically shallow waters, Wicaksono, (2015) stated that the spectral reflectance value can reduce bathymetric information based on passive system remote sensing images. NDWI computation via GEE will produce negative values for land and positive values for waters. However, specifically, shallow water in the NDWI results is limited by a pixel value of 0.27, so pixel values above this value are considered shallow water, while values below 0.27 are automatically considered deep sea and are removed in the calculation. The imagery then cropped using NDWI with a pixel value of > 0.27 for Kemujan Island and > 0.2 for Anakan Bay. The value are produce from manually trial and error. Unlike cutting using polygon geometry, NDWI-based deep water filtering produces residues in deep water that are not completely cut (see figure 6). In this research, the residue was retained and no further filtering was carried out, and produced a mosaic of clean water for the waters on Kemujan Island and Anakan Bay in Pacitan.

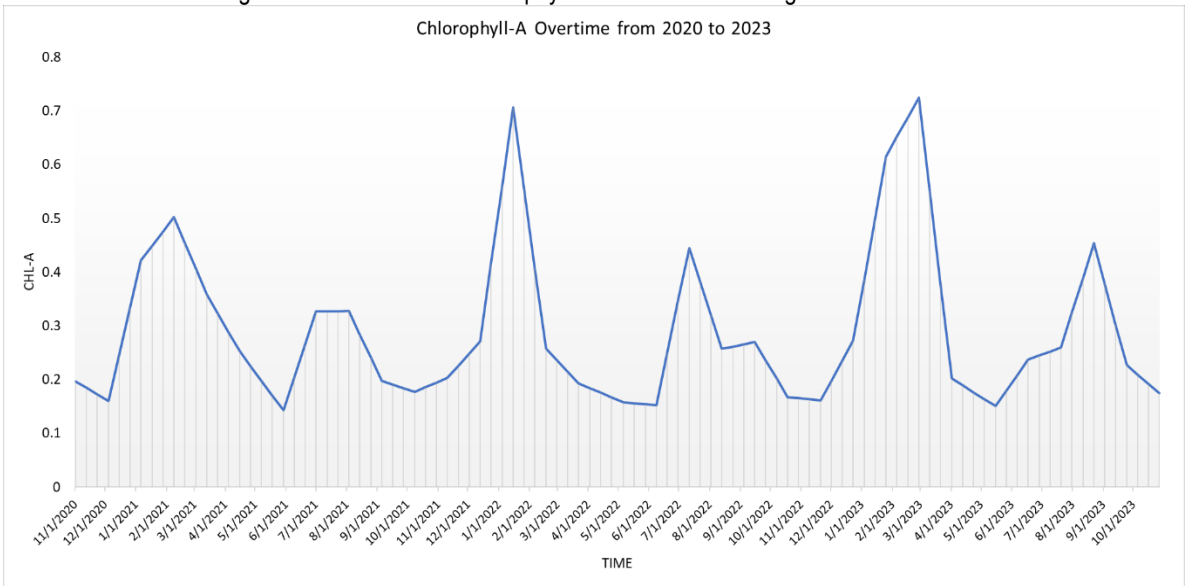
Figure 6. The residue produced by filtering between deep sea and shallow sea optically uses NDWI



6.2 Bathymetry Extraction Result Analysis

The shallow water bathymetric extraction developed by Li *et al.* (2021) uses Chlorophyll-A as input to calculate the parameters m_0 and m_1. Chlorophyll-A around the study area, especially in the Kemujan Islands region throughout 2020 - 2023 has an average of 0.29 mg/m^3 with the following fluctuations:

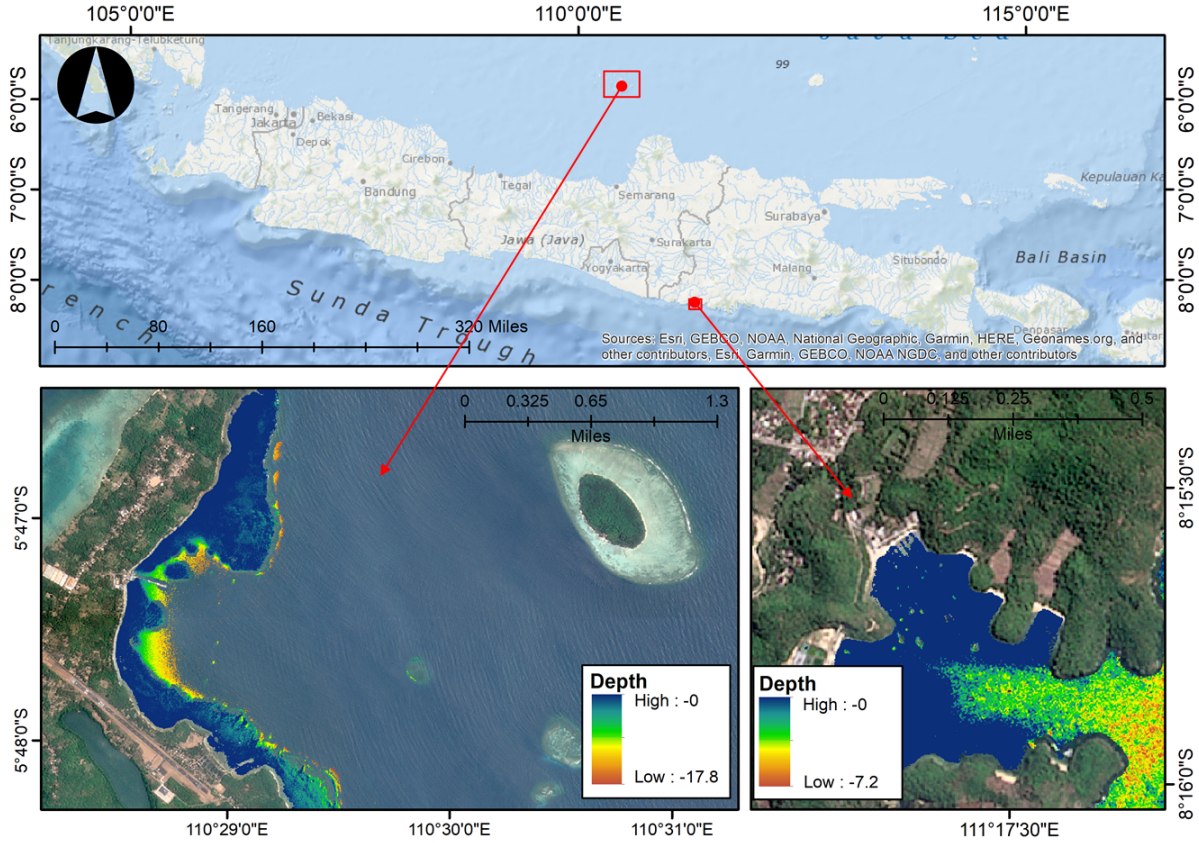
Figure 7. Fluctuations in Chlorophyll-A concentration throughout 2020 – 2023



Source: Processed from https://data.marine.copernicus.eu/

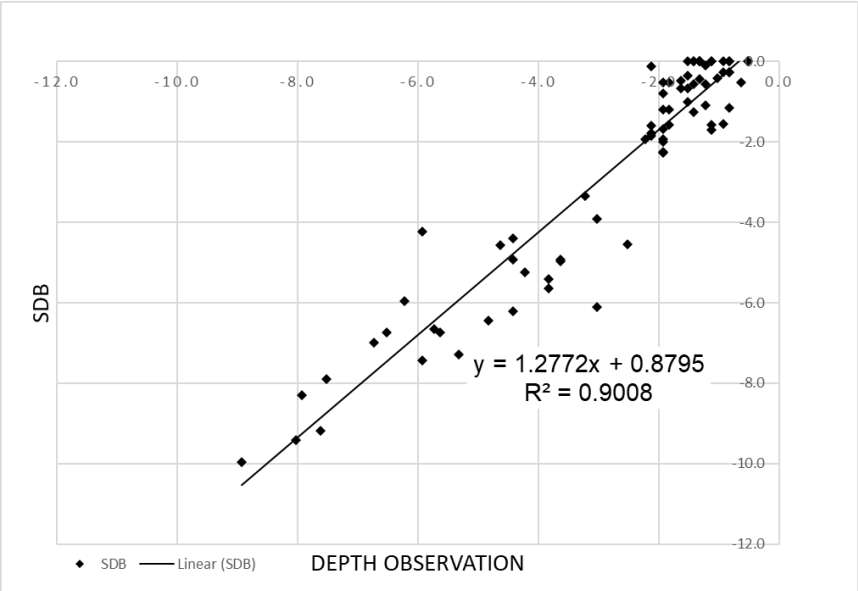
The graph shows fluctuations in the concentration of Chlorophyll-A over time, it can be seen that at some moments the concentration of Chlorophyll-A is much higher than in other months, so the average value is a reasonable consensus that can be used. By using a cloud-based computing platform - Google Earth Engine (GEE), computing processing time can be reduced more efficiently to less than one minute (depending on the network used). The depth value produced through SDB processing in the waters of Kemujan Island ranges from 0 to -17.8 meters, while in the waters around Anakan Bay - Pacitan the depth that can be obtained is in the range 0 to -7.2 meters (see Figure 8).

Figure 8. Shallow water bathymetry on Kemujan Island (left), and Anakan Bay in Pacitan (right).



Based on the validation points in Figure 2, we carry out accuracy tests using the R^2 and RMSE formulations. Calculation of the R^2 value shows that the value obtained is 0.9 (see Figure 9). This value shows that the model was built using an algorithm Li *et al.* (2021) could represent depth variation around 90%. Furthermore, based on RMSE calculations, the accuracy obtained reached 1.1 meters. Through the R^2 and RMSE results, it can be seen that the accuracy is still adequate. Even though that the SDB results in the waters of the study area cannot yet be fully used for maritime applications that require precise accuracy. In general, the SDB results can be used as academic study material and regional overviews, because until now the only bathymetry data that is freely available is the National Bathymetry (BATNAS) from the Geospatial Information Agency (BIG) and global bathymetry data from GEBCO.

Figure 9. Validation of the bathymetry model with depth measurements in the field



These two independent bathymetry sources are still unable to describe shallow waters optimally because they have 6-arcsecond and 15 arcsecond resolutions, so the method developed by Li *et al.* (2021) can be a solution to fill the gaps in shallow water bathymetry data in the study area. The advantage of this method is that it does not require a depth sample as is often used by other methods as an input predictor for making shallow water bathymetry models.

Conclusions and Further Research

The shallow water bathymetry mapping method with the algorithm developed by Li *et al.* (2021) is able to extract shallow water bathymetry without using depth samples as is done by other empirical methods. Our research provides the computational framework in a cloud platform using the Li *et al.* (2021) SDB algorithm and produce adequate accuracy with an SDB result of 90% that can represent the optical shallow water in the area, and the RMSE result is 1.1 meters.

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Credit Authorship Contribution Statement:

Nurul Khakhim: Conceptualization, Investigation, Methodology, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Visualization, Funding acquisition
Agung Kurniawan: Methodology, Project administration, Software, Writing – original draft, Data curation, Validation, Writing – review and editing, Visualization.
Pramaditya Wicaksono: Methodology, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.
Ahmad Hasrul: Project administration, Software, Data curation, Validation, 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.

References

[1] Alevizos, E., Le Bas, T. and Alexakis, D. D. 2022. Assessment of PRISMA Level-2 Hyperspectral Imagery for Large Scale Satellite-Derived Bathymetry Retrieval. *Mar. Geod.*, 45(3): 251–273. DOI:10.1080/01490419.2022.2032497

[2] Arief *et al.* 2013. Pengembangan Metode Pendugaan Kedalaman Perairan Dangkal Menggunakan Data Satelit Spot-4 Studi Kasus: Teluk Ratai, Kabupaten Pesawaran (Methode Development for Shallow Water Depth Bathymetric Estimation Using Spot-4 Satellite Data, a Case Study: Ratai Bay. *J. Penginderaan Jauh*, 10(1): 1–14. (in Indonesian)

[3] Bhargava, R. Sarkar, D. and Friess, D. A. 2021. A cloud computing-based approach to mapping mangrove erosion and progradation: Case studies from the Sundarbans and French Guiana. *Estuar. Coast. Shelf Sci.*, 248: 106798. DOI: 10.1016/j.ecss.2020.106798

[4] Bierwirth, P. N., Lee, T.J. and Burne, R.V. 1993. Shallow sea-floor reflectance and water depth derived by unmixing multispectral imagery. *Photogramm. Eng. Remote Sens.*, 59(3): 331–338.

[5] Bousquin, J. 2021. Discrete Global Grid Systems as scalable geospatial frameworks for characterizing coastal environments. *Environ. Model. Softw.*, 146: 105210. DOI: 10.1016/j.envsoft.2021.105210

[6] Casal, G. *et al.* 2020. Understanding satellite-derived bathymetry using Sentinel 2 imagery and spatial prediction models. *GIScience Remote Sens.*, 57(3): 271–286. DOI: 10.1080/15481603.2019.1685198

[7] Chen, A. Ma, Y. and Zhang, J. 2021. Partition satellite derived bathymetry for coral reefs based on spatial residual information. *Int. J. Remote Sens.*, 42(8): 2807–2826. DOI: 10.1080/01431161.2020.1809738

[8] Chybicki, A. 2018. Three-Dimensional Geographically Weighted Inverse Regression (3GWR) Model for Satellite Derived Bathymetry Using Sentinel-2 Observations. *Mar. Geod.*, 41(1): 1–23. DOI:10.1080/01490419.2017.1373173

[9] Gabr, B. Ahmed, M. and Marmoush, Y. 2020. PlanetScope and Landsat 8 Imageries for Bathymetry Mapping. *J. Mar. Sci. Eng.*, 8(143). Available at: www.mdpi.com/journal/jmse

[10] Ghosh, S. and Mistri, B. 2022. Analyzing the multi-hazard coastal vulnerability of Matla–Bidya inter-estuarine area of Indian Sundarbans using analytical hierarchy process and geospatial techniques. *Estuar. Coast. Shelf Sci.*, 279: 108144. DOI: 10.1016/j.ecss.2022.108144

[11] Goldberg, D., Olivares, M., Li, Z. and Klein, A. G. 2014. Maps and GIS data libraries in the era of big data and cloud computing. *J. Map Geogr. Libr.*, 10(1): 100–122. DOI: 10.1080/15420353.2014.893944

[12] Hodúl, M. *et al.* 2020. Photogrammetric Bathymetry for the Canadian Arctic. *Mar. Geod.*, 43(1): 23–43. DOI:10.1080/01490419.2019.1685030

[13] Jégat, V. *et al.* 2016. Satellite-Derived Bathymetry: Performance and Production. *Can. Hydrogr. Conf.*, no. May: 1–8.

[14] Knudby, A. Ahmad, S. K. and Ilori, C. 2016. The Potential for Landsat-Based Bathymetry in Canada. *Can. J. Remote Sens.*, 42(4): 367–378. DOI: 10.1080/07038992.2016.1177452

[15] Kurniawan, A. *et al.* 2021. Challenges of Acquisition Bathymetry Information on PlanetScope Data and Nautical Chart : Experiment Based on IHO S-44 Total Vertical Uncertainty in Multi-Method *J. Hunan Univ. Natural Sci.*, 48(12): 331–345.

[16] Li J. *et al.* 2021. Automated global shallowwater bathymetry mapping using google earth engine. *Remote Sens.*, 13(8). DOI: 10.3390/rs13081469

[17] Lumban-Gaol, Y. Ohori, K. A. and Peters, R. 2022. Extracting Coastal Water Depths from Multi-Temporal Sentinel-2 Images Using Convolutional Neural Networks. *Mar. Geod.*, 45(6): 615–644. DOI:10.1080/01490419.2022.2091696

[18] Lyzenga, D. R. 1978. Passive remote sensing techniques for mapping water depth and bottom features. *Appl. Opt.*, 17(3): 379. DOI: 10.1364/ao.17.000379

[19] Lyzenga, D. R. 1985. Shallow-water bathymetry using combined lidar and passive multispectral scanner data," *Int. J. Remote Sens.*, 6(1): 115–125. DOI: 10.1080/01431168508948428

[20] Lyzenga, D. R. Malinas, N. P. and Tanis, F. J. 2006. Multispectral Bathymetry Using a Simple Physically Based Algorithm, 44(8): 2251–2259.

[21] Marcello, J. Eugenio, F. Martín, J. and Marqués, F. 2018. Seabed mapping in coastal shallow waters using high resolution multispectral and hyperspectral imagery. *Remote Sens.*, 10(8). DOI: 10.3390/rs10081208

[22] Mudiyanselage, S. S. J. D., Abd-Elrahman, A. Wilkinson, B. and Lecours, V. 2022. Satellite-derived bathymetry using machine learning and optimal Sentinel-2 imagery in South-West Florida coastal waters. *GIScience Remote Sens.*, 59(1): 1143–1158. DOI: 10.1080/15481603.2022.2100597

[23] Pe'eri, S. *et al.* 2014. Satellite Remote Sensing as a Reconnaissance Tool for Assessing Nautical Chart Adequacy and Completeness. *Mar. Geod.*, 37(3): 293–314. DOI: 10.1080/01490419.2014.902880

[24] Philpot, W. D. 1989. Bathymetric mapping with passive multispectral imagery. *Appl. Opt.*, 28(8): 1569. DOI:10.1364/ao.28.001569

[25] Putman N. F. *et al.* 2023. Improving satellite monitoring of coastal inundations of pelagic Sargassum algae with wind and citizen science data. *Aquat. Bot.*, 188: 1–10, 2023. DOI: 10.1016/j.aquabot.2023.103672

[26] Rumson, A. G., Hallett, S. H. and Brewer, T. R. 2017. Coastal risk adaptation: the potential role of accessible geospatial Big Data. *Mar. Policy*, 83: 100–110. DOI: 10.1016/j.marpol.2017.05.032

[27] Salameh E. *et al.* 2019. Monitoring Beach Topography and Nearshore Bathymetry Using Spaceborne Remote Sensing: A Review. *Remote Sens.*, 11(19). DOI: 10.3390/rs11192212

[28] Stumpf, R. P. Holderied, K. and Sinclair, M. 2003. Determination of water depth with high-resolution satellite imagery over variable bottom types. *Limnol. Oceanogr.*, 48(1) II: 547–556. DOI:10.4319/lo.2003.48.1_part_2.0547

[29] Susa, T. 2022. Satellite Derived Bathymetry with Sentinel-2 Imagery: Comparing Traditional Techniques with Advanced Methods and Machine Learning Ensemble Models. *Mar. Geod.*, 45(5): 435–461. DOI:10.1080/01490419.2022.2064572

[30] Traganos, D. *et at*. 2018. Estimating satellite-derived bathymetry (SDB) with the Google Earth Engine and sentinel-2. *Remote Sens.*, 10(6): 1–18. DOI: 10.3390/rs10060859

[31] Van Hengel, W. and Spltzer, D. 1991. Multi-temporal water depth mapping by means of landsat TM. *Int. J. Remote Sens.*, 12(4): 703–712. DOI: 10.1080/01431169108929687

[32] Vinayaraj, P. Raghavan, V. and Masumoto, S. 2016. Satellite-Derived Bathymetry using Adaptive Geographically Weighted Regression Model Satellite-Derived Bathymetry using Adaptive Geographically, *Mar. Geod.*, 39(6): 458–478. DOI: 10.1080/01490419.2016.1245227

[33] Wang, Y. Chen, Y. Feng, Y. Dong, Z. and Liu, X. 2023. Multispectral Satellite-Derived Bathymetry Based on Sparse Prior Measured Data. *Mar. Geod.*, 46(5): 426–440. DOI: 10.1080/01490419.2023.2213840

[34] Wicaksono and Pramaditya 2014.The Use of Image Rotations on Multispectral- Based Benthic Habitats Mapping, no. November, pp. 4–7. DOI: 10.13140/2.1.3877.6006

[35] Wicaksono, P. 2015. Perbandingan Akurasi Metode Band Tunggal Dan Band Rasio Untuk Pemetaan Batimetri Pada Laut Dangkal Optis. *Simp. Nas. Sains Geoinformasi*, IV(March): 792. DOI:10.13140/RG.2.1.1340.3286

[36] Xu C. *et al.* 2022. Cloud-based storage and computing for remote sensing big data: a technical review. *Int. J. Digit. Earth*, 15(1): 1417–1445. DOI: 10.1080/17538947.2022.2115567

[37] Zhang, C. Yin, K. Shi, X. and Yan, X. 2021. Risk assessment for typhoon storm surges using geospatial techniques for the coastal areas of Guangdong, China. *Ocean Coast. Manag.*, 213(238) 105880. DOI:10.1016/j.ocecoaman.2021.105880

[38] Zhang, X. Ma, Y. and Zhang, J. 2020. Shallow water bathymetry based on inherent optical properties using high spatial resolution multispectral imagery. *Remote Sens.*, 12(18). DOI: 10.3390/RS12183027

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Results of Two Non-Market Valuation Methods Used to Estimate Recreational Fishing in the Lakes Prespa Watershed

Dorina GRAZHDANI
Department of Agribusiness Management, Faculty of Economy, and Agribusiness,
Agricultural University of Tirana, Albania
d.grazhdani@yahoo.com

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Abstract: Using both the travel cost and contingent valuation methods, a case study of Lakes Prespa was utilized to assess the demand functions for carp and non-carp angling separately. An on-site survey questionnaire was used to collect the data, which was completed in 2019. The results showed that when travel costs and bid amounts are higher or when anglers are traveling in larger groups, they travel less frequently. On the other hand, the number of trips is positively correlated with income, angling experience, the use of a motorized boat, the number of trips taken to other sites, and retirement. The mean daily consumer surplus values for carp and non-carp anglers were calculated to be €7.24 and €4.33, respectively, using the trip cost method, and €7.83 and €4.61 using the contingent valuation method. Regardless of the method of valuation utilized, carp anglers' consumer surplus was more than 1.7 times that of non-carp anglers, demonstrating that ordering in fish species values is robust to valuation methods. Furthermore, the convergent validity of the two techniques was identified. The results will help fisheries managers make more successful and resource-efficient fishing decisions, as well as policymakers justify funding initiatives targeted at managing and protecting this resource.

Keywords: consumer surplus; contingent valuation method; count data models; recreation angling; travel cost model; truncation and endogenous stratification.

JEL Classification: C51; Q57; R11.

Introduction

Natural resources for recreation are non-market products and services, which means that their pricing cannot be determined because they are not directly exchanged in the market. Recreational angling is one of the ecosystem services that nature provides humans at little or no cost. In this study, non-market valuation methods like the contingent valuation method (CVM) and the travel cost method (TCM) are utilized as the main goal of separate analyses to examine the consistency of estimations of angling trip/day consumer surplus (CS) values in Lakes Prespa in 2019.

According to Grantham and Rudd (2015), Lothrop *et al.* (2014), du Preez and Hosking (2011), and Hanley and Barbier (2009), the travel cost method is one of the most well-documented and commonly used approaches for modeling the benefits of angling fisheries. An on-site intercept survey at angling locations was used to collect data, which according to Curtis and Breen (2016), introduces three issues that need to be taken into account during model estimation: over-dispersion (Hilbe 2011), truncation (Shaw 1988; Grogger and Carson 1991; Shrestha *et al.* 2002), and endogenous stratification (Shaw 1988). A careful look at the angling literature shows that in the past few years, new types of count data models have emerged to deal with the problems listed above related to the travel cost method. In this study, a truncated, endogenously stratified negative binomial model was used.

A variety of models based on the CVM method were also used to establish a link between a monetary tradeoff, site characteristics, and the likelihood that an angler will express a preference for a specific fishing site (Haab and McConnell 2002). There are several formats in which the tradeoffs can be presented in CVM, as well as several approaches to performing the statistical analysis (Mitchell and Carson 1989; Haab and McConnell

2002). Keeping this in mind, in this study, a dichotomous choice Logit model with a follow-up approach was developed and employed.

An intriguing question is whether anglers' consumer surplus varies depending on the species of target fish (species-specific effect), *i.e.*, whether anglers should be analyzed as a single group or divided into sub-groups. Another question is whether different CS values are assigned to the same resource using different non-market methods. This study addressed both of these concerns. First, the study's data set was divided into two anglers' sub-groups: carp anglers and non-carp anglers. Second, CS were estimated for two groups of fish species (carp and non-carp) in a single study using two valuation techniques—TCM and CVM models—and then compared. In this study, all estimations were done separately for carp anglers and non-carp anglers.

The first step in the angling demand analysis is to create a trip generation function that links angling trip rates to travel costs for TCM, an increase in trip costs for CVM, and other independent variables. The best demand function form in studies that used both CVM and TCM methods is a double log model, and the only independent variable in the models with any real explanatory power is the travel cost for the TCM method and an increase in trip costs that the angler was asked to pay for the CVM method. As Betz *et al.* (2003) point out, the most arbitrary and debatable aspect of non-market modeling is the selection of independent variables for model estimation. Therefore, another goal of this research was to identify and investigate the variables that affect the demand for recreational angling trips in the Lakes Prespa watershed case study.

In light of the foregoing, the following hypotheses were developed and tested in order to address the issues in this study:

H1: The demand for trips to fish for both carp and non-carp fish species depends on a number of variables.

H2: Regardless of the chosen method of valuation, anglers' CS values for carp and non-carp angling are not equal.

H3: The CS values from the TCM model and the CVM's are comparatively close for the same species of fish.

1. Literature Review

In recreational literature, there is a growing interest in estimating the recreational value of a leisure activity like angling in order to better manage it over other productive uses (Shrestha *et al.* 2002; Hunt *et al.* 2005) and make better decisions about how to manage recreational fisheries (Chizinski *et al.* 2005; Arlinghaus and Mehner 2005; Ferrer *et al.* 2005). In numerous studies (Carson *et al.* 1996; Shrestha and Loomis 2001; Loomis 2006; Rolfe and Dyack 2010; Ng 2011; Loomis and Ng 2012; Khan 2014), variants of the travel cost method, the contingent valuation method, or both methods are the two most commonly used methods for valuing angling. In accordance with this, both CVM and TCM methods were used in separate analyses to evaluate and examine the consistency of estimates of angling values in this study.

In several papers (Garrod and Willis 1999; Ward and Beal 2000; Haab and McConnell 2002; Dorison 2012; Czajkowski *et al.* 2014; He 2014; Khan 2014; Ezebilo 2016; Bertram and Larondelle 2017; Curtis and Breen 2017), based on on-site sampling data, travel cost count-data models were applied in order to estimate the economic values of angling. Because the number of angler trips is recorded as non-negative integers and assumes a semi-log demand functional form, which is very common in the literature, many researchers (Zawacki *et al.* 2000; Curtis 2002; Prado 2006; Bowker *et al.* 2007; Ojumu *et al.* 2009; Loomis and Ng 2012; Lew and Larson 2012; Raguragavan *et al.* 2013; Pascoe *et al.* 2014; Curtis and Stanley 2016; Curtis and Breen 2017; Hynes *et al.* 2017) have used count-data models, such as Poisson and negative binomial models, to evaluate the demand for and value of recreational angling. This is the reason why an on-site intercept survey at angling locations was used to collect data.

The on-site sampling data may show overdispersion in count-data models, which means the variance is higher than the mean because a small number of visitors make many trips while the majority only make a few. Chizinski *et al.* (2005) showed that negative binomial models are often used to deal with overdispersion, which means the variance is higher than the mean, which is not possible with the Poisson model.

During the on-site survey, visitors are contacted on-site, so their number of trips is always at least one and never zero. This is referred to as "truncation." The truncation occurs in count-data models as well because on-site sampling does not target non-visitors; that is, all observed visitors have taken at least the current trip, and non-visitors are not observed. The sample is therefore truncated at zero trips. As a result, Fletcher *et al.* (1990) noted that welfare estimates have an upward bias since individuals who took no trips during the period are not

represented. Shrestha *et al.* (2002) highlighted that to address this problem, truncated Poisson or truncated negative binomial regression models can be used. Meanwhile, to address truncation and overdispersion simultaneously, a lot of studies (Kerkvleit *et al.* 2002; Oh *et al.* 2005; Arismendi and Nahuelhual 2007; Prayaga *et al.* 2010; Cameron and Trivedi 2013) have used a truncated negative binomial count-data model.

Shaw (1988) first observed, and this was later confirmed by Parsons (2003) and Hindsley *et al.* (2011), that an on-site survey typically employs a stratified sampling scheme in addition to truncation. Frequent anglers are more likely to be sampled than are anglers who make few visits, thereby biasing the sample in favor of this group. This is known as endogenous stratification. On-site sampling frequently produces endogenously stratified data, implying that frequent visitors are oversampled compared to infrequent visitors. Endogenous stratification is a third problem that happens when on-site sampling makes it more likely to meet people who come back often. Therefore, unmodified Poisson and negative binomial models are no longer suitable for this type of data. As a result, both models were corrected for all the above issues before determining which one performed better in the specific conditions of Lakes Prespa.

Recent recreational angling literature (Curtis 2002; Prado 2006; Martínez-Espiñeira and Amoako-Tuffour, 2008; Ojumu *et al.* 2009; Hynes and Greene 2013; Grilli *et al.* 2017) has recognized and addressed all of the issues raised above by using an endogenously stratified Poisson, or endogenously stratified truncated negative binomial model. Maximum likelihood (Hellerstain 1993) techniques were used in this study to estimate truncated and endogenously stratified Poisson and truncated and endogenously stratified negative binomial count data regressions. The preliminary analysis done in this study revealed that the corrected negative binomial count-data model for truncation and endogenous stratification fits the collected data better than the corrected Poisson model.

A wide range of studies (Mitchell and Carson 1989; Hanemann 1994; Navrud and Mungatana 1994; Alberini and Cooper 2000; Roach *et al.* 2002; Alberini *et al.* 2003; Genius *et al.* 2003; Urama and Hodge 2006) have also used the CVM method as one of the most widely used stated preference methods. It is also widely used as a substitute method for estimating recreational angling demand (Wheeler and Damania 2001; Williams and Bettoli 2003; Whitehead 2006; Prayaga *et al.* 2010).

There is a global discussion about whether the revealed preference (travel cost) method produces more or less accurate estimates than the stated preference (continent valuation) methods, which is problematic. In several studies dealing with angling (Loomis *et al.* 1986; Adamowicz *et al.* 1994; Azevedo *et al.* 2003; Gillig *et al.* 2003; Williams and Bettoli 2003; Brander *et al.* 2006; Loomis 2006; Brander *et al.* 2007; Whitehead *et al.* 2009; Rolfe and Dyack 2010), there was also evidence of some disagreement about whether count-data models based on the travel cost approach give more or less accurate estimates than contingent valuation methods for the same resource. For example, a comparative study conducted by Williams and Bettoli (2003) for trout fishing in eight Tennessee tail-waters concluded that values estimated from CVM exceeded those estimated from TCM. Gillig *et al.* (2003) and Brander *et al.* (2007) also found the same result. The opposite has been discovered by other important papers. Brander *et al.* (2006), Loomis (2006), Whitehead (2006), Whitehead *et al.* (2009), and Rolfe and Dyack (2010) showed that TCM estimates were different and higher than CVM estimates. Loomis and Ng (2012) estimated angling in Colorado State in 2009, and He (2014) estimated it in New York State for 1988 data and found that the values estimated from the CVM and TCM methods were not significantly different. Comparing the consumer surplus values obtained from TCM and CVM for carp and non-carp angling was one of the main goals of this study.

A large number of research studies, on the other hand, have found that anglers' consumer surplus or WTP, as estimated by the same evaluation method, vary depending on the target species of fish. Some studies (Johnston *et al.* 2006) claim that, compared to other fish species, trout has a lower marginal value for anglers. Other researchers (Loomis and Ng 2012) have discovered that trout have a higher marginal value to anglers than other species. In order to determine whether any ordering in species values is robust to the valuation method, the values of carp and non-carp angling were compared in this study using two different valuation methods (travel cost and contingent valuation methods).

According to Rolfe and Dyack (2010), Ng (2011) and Khan (2014), the studies that use both CVM and TCM enable the convergence validity of such non-market valuation techniques to be tested. To accomplish this, it can be assumed that the WTP for access from the CVM and the CS from the TCM will be equal. Calculation in terms of an angler's day of CS and WTP separately was required to test this hypothesis in this study. The WTP was calculated using the dichotomous choice Logit model with a fellow up approach, and the CS was calculated using the truncated and endogenously stratified negative binomial model. These models are more recent when compared to earlier ones.

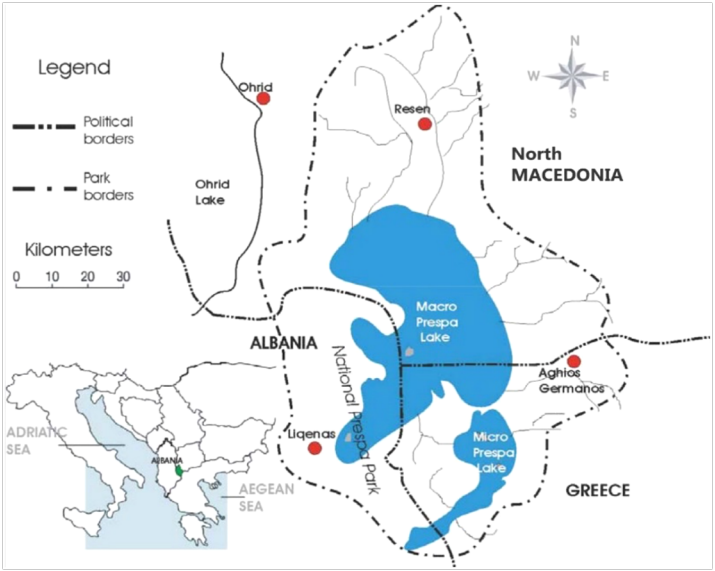
2. Methodology

2.1. An Overview of the Case Study

The Lakes Prespa watershed is located on the border between eastern Albania, Greece, and North Macedonia (Fig. 1). Because it is a wetland area with rich biodiversity and a long human history, the Lakes Prespa watershed is an excellent case study (Grazhdani 2014a). Macro Prespa and Micro Prespa, two interconnected lakes, and mountains surround this high-altitude basin. They are the highest tectonic lakes in the Balkans, standing at an elevation of 853 meters. The three countries share Lake Macro Prespa, which covers 253.6 km^2, while Albania and Greece share Lake Micro Prespa, which covers 47 km^2 (Grazhdani 2021a). On Greek territory, a 4 km long and 500 meter wide isthmus separates the two lakes.

On February 2, 2000, which is World Wetlands Day, the three prime ministers signed the Prespa Park Declaration. This marked the end of years of work to raise awareness about the need to protect the Prespa area, which is the first transboundary protected area in the area. The Ohrid-Prespa Transboundary Reserve, which links Albania and North Macedonia, was added to UNESCO's World Network of Biosphere Reserves in 2014 (Grazhdani 2023).

Figure 1. Lakes Prespa watershed



The Lakes Prespa contain 25 species of fish, 13 of which are native and 8 of which are exotic. Prespa spirlin, Prespa bleak, Prespa barbel, Prespa nase, Prespa minnow, Prespa roach, Prespa trout, and Prespa chub are the eight native species that are peculiar to the area (Spirkovksi *et al.* 2012; Grazhdani 2009). These lakes are unusual in every way because of their high levels of biodiversity and endemism.

Fishing is the most well-liked wildlife-related activity in the Lakes Prespa basin, and both locals and tourists of all ages take pleasure in it. Prespa bleak accounts for approximately 60% of the total fish stock, according to Grazhdani (2009), followed by carp (Cyprinus carpio) (25%), Prespa roach (6%), Prussian carp (Carassius gibelio) (5%), and other species like Prespa barbel and Prespa chub (4%). On the lakes, both recreational and commercial fishing are permitted, but in the rivers, only recreational fishing is permitted.

As a result of its long history in Lakes Prespa, common carp is regarded by locals and anglers as a native species. It is a crucial component of local culture and has significant economic and recreational significance. Currently, recreational fishing is one of the most popular tourism activities in this region. Anglers in the area primarily target carp, bleak, chub, barbell, and other species. Carp are a popular target for anglers in the Lakes Prespa watershed.

The dynamics and growth of recreational fishing in Lakes Prespa, as well as the potential economic benefits, are currently unknown. To our knowledge, no previous research has been done to evaluate the economic value of recreational angling in the Prespa Lakes. Due to these factors, the main objective of this study was to characterize recreational fishing in the Prespa Lakes and calculate its economic benefits. In the case study of the Lakes Prespa watershed, three specific goals were established: 1) to investigate the factors influencing the demand for carp and non-carp recreational angling trips using two non-market valuation methods

(travel cost and contingent valuation); 2) to estimate the anglers' consumer surplus for two angler groups: carp and non-carp; and 3) to test the convergent validity of the two methods in the context of recreational angling.

2.2. Data Collection and Analysis

The data was gathered on-site using a self-reported survey questionnaire. The survey was carried out from June to October of 2019 in order to obtain a more accurate picture of angler visitation. To obtain the most representative sample possible, approximately ten days per month and on different days of the week were sampled.

The Dillman *et al.* (2007) mail-back method was used to administer the survey in this study. The questionnaire was created in accordance with the research objectives. Randomly intercepting shoreline and boat anglers at parking lots and boat ramp inspection points yielded the questionnaire respondents. Each angler/group received only one survey packet and was asked to fill it out by one adult angler. The questionnaire, a contact letter, a survey booklet, and a pre-addressed and stamped return envelope were all included in the packet that was distributed to the respondents. The questionnaires were to be returned within 5-7 days. At Lakes Prespa, 485 questionnaires were distributed, and 272 completed and usable surveys were returned, yielding a 56.3% response rate. The respondents were not given any monetary incentives.

Questions of the initial questionnaire were developed using previous travel cost and contingent valuation model literature (Ahn *et al.* 2000; Zawacki *et al.* 2000; Bowker *et al.* 2007; Ng 2011). The survey's design included questions about the demographics of Lakes Prespa carp anglers, travel and angling costs, their preferences, and a wide range of participation and attitude-related characteristics. After several revisions to check the content and construct validity (including expert judgments and recommendations) and his pre-testing to clarify the questionnaire's comprehensiveness and potential areas of ambiguity (Fink 2013; Nardi 2013), 30 anglers were chosen to provide feedback on the questionnaire's clarity and ease of use. Questions were made to be reliable and valid. Using Cronbach's alpha coefficient, reliability estimates were calculated for each respondent. The closer the correlation is to 1.0, the more reliable the estimate (Nardi 2013). Acceptable Cronbach's alpha coefficients were those greater than 0.7 (Kline 1999). The Cronbach's alpha for this study was 0.81.

Dummy variables were generated as necessary, calculations and formatting improvements were made, and all data was entered into a database file. The database file was then put into STATA version 12.1 (StataCorp 2011) so that descriptive statistics could be calculated and all estimation procedures could be done.

2.3. Variables Description and Multicollinearity Analysis

To investigate the effects of various angler and participation characteristics on angling in Lakes Prespa and to evaluate the economic value of angling, the dependent and independent variables were first chosen. The variables were selected in accordance with economic theory and earlier research on recreation travel that employed comparable modeling methods. The fishing and recreation literature is fairly consistent in how the dependent variable is defined for the TMC method. Du Preez and Hosking (2011) used the individual's number of trips to the Rhodes site in the previous year. The dependent variable in Kerkvliet and Nowell's (2000) and Curtis's (2002) models was defined as the number of days the angler spent fishing in the specified location. The number of trips an individual made to Lakes Prespa in the previous 12 months for the sole purpose of carp angling served as the dependent variable for the TMC model used in this study. Anglers' decision to pay or not to pay a predetermined amount toward the cost of their trip to go angling in the Lakes Prespa served as the dependent variable for the CVM model.

Several independent factors from the following groups were the focus of this study: *sociodemographic*, which is required to account for individual differences in preferences, interests, and opportunities in a demand model, such as an angler's age, gender, retired status, number of people per household, angler per household, number of people sharing trip expenses, angler's education level, and years of angling experience; *economic*: annual household income, travel cost; *participation characteristics*: number of individuals in an angler's group, use or non-use of a motorized boat for fishing, hourly catch rate, days per trip, number of trips to other fishing sites in the previous year, number of hours spent fishing on trip, travel distance, and other factors: perceived weather and water quality index, as well as membership in a fishing club.

By screening and deleting some of the independent factors based on practical tests, multicollinearity is avoided in this study. This was accomplished using Pearson's product moment correlation coefficient (r) and the variance inflation factor (VIF). VIF was used to find multivariate associations, while r was utilized to find bivariate correlations. In order to ensure independence between the independent factors that would be utilized in regression models, the independent variables in this study were eliminated using a threshold value of 0.60 for r

(good correlations between variables when r is over 0.60) (AcaStat 2014; Grazhdani 2016) and a VIF value greater than 4 (Park 2003; Grazhdani 2016). The reader can find more details about the procedure used for analyzing variables' multicollinearity in Grazhdani (2016). The definitions of the final variables chosen are shown in Table 1, along with the corresponding VIF values.

Table 1. Independent variables definitions and VIF values

Variable	Definition	VIF value
Age	Respondent's age in years	2.21
Gender	If respondent is male = 1, otherwise = 0	3.01
Retired status	If respondent is retired = 1, otherwise = 0	2.37
Education	Highest level of formal education obtained (1 = elementary, 6 = graduate school)	2.57
Income	Annual angler's income (€/year)	2.04
TravelCost	Euro amount spent per person to make a trip (€/person)	2.65
MotoboatUse	If angler uses a motorized boat for fishing = 1, and if not = 0	2.62
GroupSize	Number of people in angler's travel party	2.91
YearsExp	Years of carp angling experience of each individual	2.01
ContributePaying	Determine the number of household members who contribute to the angler's household expenses	2.67
ElsewhereTrip	Number of trips to other fishing sites in last 12 months	3.54
ExpenseShare	Number of people sharing trip expenses	2.07
DayPerTrip	Number of days spent on trip	1.83
BidAmount	Angler's willingness to pay a pre-determined increase (in €) in the cost of his trip	2.04
Conditions	Perceived weather and water conditions (1 to 5, excellent = 5, terrible = 1)	3.01
FishClubMemb	If respondent is fishing club member = 1, otherwise = 0	3.21

2.4. Non-Market Valuation Models Used in this Study

In the next two sub-sections, are briefly describe the non-market valuation models that were used in this study.

2.4.1. Model 1: Truncated and Endogenously Stratified Negative Binomial (TES-NB) Model

The Poisson model is the basic count data model that satisfies the discrete probability density function and non-negative integers (Hellerstein 1991; Perman *et al.* 2003). The probability density function for an angler *i* making a given number of trips n_i is given by (Grilli *et al.* 2017; Greene 2007):

$$\text{Prob}\,(y = n_i) = \frac{\exp(-\lambda_i)\,\lambda_i^{n_i}}{n_i!} \quad (1)$$

where i = 1,..., N denotes the number of observations, and parameter λ is a function of travel, site and respondent characteristics, including travel cost (TC). The trip demand function can then be expressed as follows:

$$\ln(\lambda) = \beta_0 + \beta_{TC} X_{TC} + \ldots + \beta_n X_n \quad (2)$$

where β_{TC} is the travel cost coefficient.

The traditional Poisson model is recognized for assuming equidispersion, which means that the distribution's mean and variance are equal (Cameron and Trivedi 2013). This assumption isn't true in the real world because, for many data sets from recreational demand models, the variance is higher than the conditional mean, leading to overdispersion. Due to this, the overdispersion problem can be addressed using the negative binomial model (Shrestha *et al.* 2002; Bin *et al.* 2005; Martnez-Espieira and Amoako-Tuffour 2008). The likelihood function for this model is provided by Englin and Shonkwiler (1995). Cameron and Trivedi (2013) suggested the following negative binomial distribution with an additional parameter α to control the level of overdispersion in the population:

$$\text{Prob}\,(y = n_i) = \frac{\Gamma(1/\alpha + n_i)}{\Gamma(1/\alpha)\Gamma(n_i + 1)}\left(\frac{1}{1+\alpha\lambda_i}\right)^{1/\alpha}\left(\frac{\alpha\lambda_i}{1+\alpha\lambda_i}\right)^{n_i} \quad (3)$$

where Γ is the gamma function.

Truncation and endogenous stratification are two additional potentially serious problems with on-site sampled data that need to be corrected (Nakatani and Sato 2010; Shaw 1988). Welfare estimates will be biased if truncation and endogenous stratification are not considered.

Shaw (1988) explained how to correct the Poisson model for truncation and endogenous stratification by adjusting the dependent variable in equation (1) by subtracting 1 from each of its values. By revising equation 3 as shown below, the NB model is adjusted for truncation and endogenous stratification (Grilli *et al.* 2017; Martínez-Espiñeira and Amoako-Tuffour 2008):

$$\text{Prob}\,(y = n_i) = \frac{\Gamma(\alpha_i^{-1} + n_i)}{\Gamma(\alpha_i^{-1})\,\Gamma\,(n_i + 1)}\ \alpha_i^{n_i}\ \lambda_i^{n_i}\ (1 + \alpha_i\ \lambda_i)^{n_i} \quad (4)$$

In order to determine which type - Poisson or negative binomial - is a better fit for the data gathered, the performance of both corrected models was estimated in this study. The following goodness-of-fit metrics were used for comparison: log-likelihood value (the larger the value, the better the fit), Akaike Information Criteria (AIC), and Bayesian Schwartz Criteria (BSC) (the smaller the AIC and BIC value, the better the model is). Only a brief summary of the results is given in order to save space. All coefficients in both models were estimated to have the same sign and nearly identical magnitudes. Only the goodness of fit and statistical significance metrics varied slightly. The NB model performs better than the Poisson model, as evidenced by the fact that the NB model's log-likelihood value (-394.839) was greater than the Poisson model's (-409.643). The AIC and BIC statistics for the NB model were lower (514.7 and 555.4, respectively) than for the Poisson model (530.5 and 568.1, respectively), indicating that this model fits the data better. Additionally, the over-dispersion parameter ln (α), which was statistically significant, showed that the data is over-dispersed and should be simulated using an NB distribution. Our results show that the corrected NB model performs better than the corrected Poisson model. The results are in agreement with Curtis and Stanley's (2013) findings. The NB corrected for truncation and endogenous stratification (TES-NB) was hence chosen for further analysis.

The following econometric model function was estimated to perform the individual TES-NB analysis:

$$\text{NumberTrips} = \exp\,(\beta_0 + \beta_{TC}\text{TravelCost} + \beta_2\ \text{Income} + \beta_3\text{Age} + \beta_4\text{MotoboatUse} + \beta_5\ \text{GroupSize} + \beta_6\ \text{YearsExp} + \beta_7\ \text{ElsewhereTrip} + \beta_8\ \text{Education} + \beta_9\ \text{ContributePaying} + \varepsilon_i \quad (5)$$

where *NumberTrips*, the dependent variable, represents the self-reported number of trips the angler took to Lakes Prespa during the previous year (year 2018).

The main independent variable, travel cost (*TravelCost*), was calculated as a continuous variable that represented the sum of the four financial components listed below: the amount of money spent per person on the trip (including lodging), the amount of money spent per person on gas if the angler uses a motorized boat, anglers' opportunity costs of time, and the amount of money spent per person on fishing costs. Additional dependent variables are: *Income*, the annual household income; *Age*, the anglers' ages in years; *MotorboatUse* is a dummy variable that indicates whether or not the anglers used a motorized boat on their fishing trip. The total number of adults and children traveling in the group is referred to as the *GroupSize variable*. *YearsExp*, the number of years spent angling; ElsewhereTrip - the number of trips made to all fishing locations other than the one where the anglers were surveyed during the previous year; *Education*, the angler's level of education*;* The number of household members who contribute to the angler's household expenses is referred to as ContributePaying variable.

After estimating the function's setting parameters and assuming that the coefficient on *TravelCost* represents cost trade-offs (Rolfe and Gregg 2012), the consumer's surplus (CS) can be calculated as follows (Ward and Beal 2000; Haab and McConnell 2002; Gillespie *et al.* 2017):

$$CS = -1/\ \beta_{TC} \quad (6)$$

Using the travel cost coefficient β_{TC} and its standard error (SD β_{TC}), the confidence intervals (CI) for the 95% confidence level were calculated as follows (Lansdell and Gangadharan 2003):

$$CS_L = -1/\ [\beta_{TC} + 1.96\ (SD\ \beta_{TC})];\ CS_U = -1/\ [\beta_{TC} - 1.96\ (SD\ \beta_{TC})] \quad (7)$$

2.4.2. Model 2: Logit Contingent Valuation Model (LM-CVM)

The contingent valuation method comes in a variety of formats, including the linear probability model, the logit model, and the probit model. As for elicitation techniques, there are several options, including the bidding game, the payment card, the discrete choice (take it or leave it) offer, the discrete choice with follow-up approaches, and

the modified dichotomous approach. The dichotomous choice Logit model (LM) with a follow-up approach was used in this study.

The dichotomous choice format asked, "Would you be willing to pay or would you not be willing to pay a pre-determined amount toward the cost of your trip for angling in the Lakes Prespa?" The relationship between anglers' willingness to pay and their sociodemographic, economic, and participation characteristics was investigated using a Logit model in this question. If the respondent says yes, another question is asked with a higher bid amount chosen at random from a pre-determined list. If the respondent says no, the follow-up question uses a lower bid amount chosen at random from another pre-specified list.

The statistical Logit regression model used to calculate demand for carp and non-carp fishing in Lakes Prespa looks like this:

$$\ln \{P(BidChoice = 1)/[1 - P(BidChoice = 1]\} = \beta_0 + \beta_1 BidAmount + \beta_2 Conditions + \beta_3 Gender + \beta_4 Retired + \beta_5 FishClubMemb + \varepsilon_i \quad (8)$$

where *BidChoice* is the dependent variable and indicates whether or not an angler was willing to pay the amount requested during the survey. The number 1 represents a yes vote, and the number 0 represents a no vote. The independent variable "*BidAmount*" specifies the increase in trip cost that the angler was asked to pay. *Conditions*, the second independent variable in the model, measures the perceived weather and water quality conditions (1 to 5, excellent = 5, terrible = 1). Additionally, survey questions were made to gather data on the gender of anglers, their status as retirees, and their membership in fishing clubs.

The sample means of the independent variables are used to calculate the mean WTP values (Loomis and Ng 2012):

$$WTP = \ln\{1 + \exp[\beta_0 + \sum(\beta_n \ Z_n)]\}/\beta_1 \quad (9)$$

where β_n denotes the vector of coefficients, and Z_n denotes the sample means of the independent variables.

3. Results and Discussion

3.1. Sampling Results

The sample size for the TES-NB and LM-CVM analyses was 272, with 141 anglers targeting carp and 131 targeting non-carp fish on their angling trip. In Table 2, a summary of the descriptive statistics for the variables used in the regression models is shown.

Table 2. Mean and standard errors (in parentheses) of variables

Variable	Carp angler	Non-carp angler
Income (in €/year)	6542 (45.8)	6478 (76.4)
Age	56.6 (4.2)	59.7 (6.4)
Gender	0.71 (0.38)	0.78 (0.32)
Retied status	0.24 (0.16)	0.19 (0.11)
Education	4.76 (0.28)	4.43 (0.36)
TravelCost	€15.39 (1.43)	€10.28 (1.38)
MotoboatUse	0.48 (0.18)	0.64 (0.12)
GroupSize	3.26 (0.28)	3.02 (0.31)
YearsExp	17.4 (4.32)	16.6 (5.31)
ElsewhereTrip	6.05 (0.29)	11.66 (0.38)
ContributePaying	1.54 (0.12)	1.44 (0.22)
Conditions	3.59 (0.31)	3.27 (0.46)
FishClubMemb	0.78 (0.32)	0.68 (0.31)
AnnualTrip	4.16 (0.34)	5.93 (0.44)
DayPerTrip	1.74 (0.32)	2.01 (0.34)
ExpenseShare	2.04 (0.42)	1.81 (0.37)
CatchPerHour	0.78 (0.12)	0.73 (0.21)
FishHourTrip	8.97 (0.42)	9.55 (0.49)

The following conclusion may be drawn from Table 2's results: compared to non-carp anglers, carp anglers made fewer annual travel trips, fished for fewer days and hours per trip, visited fewer other sites, and caught fewer fish per trip. Additionally, they were less willing to go boat fishing. Carp anglers, on the other hand, arrived in a larger group with more people sharing trip costs.

Figure 2 depicts more details on the differences between the two angler groups. A 5-point Likert scale (from 1 = not important to 5 = extremely important) was used in the survey to ask respondents to rank the importance of several trip-related characteristics.

Figure 2. Ten most important characteristicts of angler trip

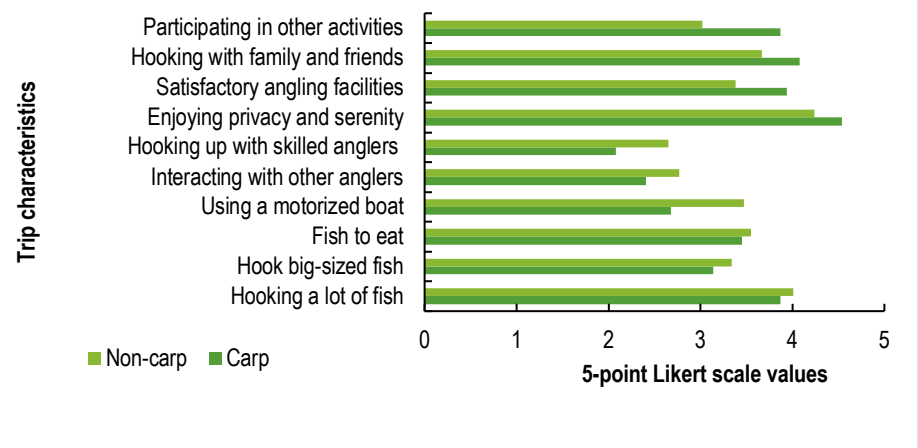


Figure 2 shows that hooking a lot of fish, hooking big-sized fish, and having fish to eat are trip characteristics that carp anglers place a lower value on. Furthermore, carp anglers thought that using a motorized boat, interacting with other anglers, and hooking up with skilled anglers were less important. Carp anglers, on the other hand, stated that enjoying privacy and serenity, having satisfactory angling facilities (clean and adequate angling sites, restrooms, and parking, etc.), hooking up with family and friends, as well as the ability to participate in other activities like wildlife viewing, camping, horseback riding, hiking, backpacking, photography were more important while on their trips. In other words, those who fish for carp can be described as "generalists," who include angling in their overall recreational activities, whereas those who fish for other species are "specialists," who go on angling trips more frequently each year (and stay on them for longer periods of time) and who place a higher value on the act of catching fish.

3.2. Analysis of the Factors Affecting the Demand for Recreational Angling Trips for Carp and Non-Carp Fish in Lakes Prespa

3.2.1. Results of TES-NB Models Estimation

The number of angling trips taken by the angler to Lakes Prespa in the previous year was the dependent variable in this study. It was hypothesized to be explained by travel cost, income, sociodemographic characteristics, participation characteristics, and other independent variables. Table 3 summarizes the estimation results for the TES-NB models for carp and non-carp, separately. Every variable in the TES-NB models was 10% or more significant.

At the 0.01 level, the coefficient of the independent variable travel cost was negative and highly significant. This was expected and consistent with TCM theory, as an increase in travel costs to the fishing site reduces the number of trips an angler would make to fish at Lakes Prespa.

The household income coefficient was significant and positive, which is consistent with our expectations that anglers with higher household incomes have more financial freedom to travel. This result is consistent with findings by Bin *et al.* (2005) and Martínez-Espiñeira and Amoako-Tuffour (2008). Other studies on the cost of travel have discovered that income has a negative or insignificant coefficient (Sohngen *et al.* 2000; Zawacki *et al.* 2000; Loomis 2003; du Preez *et al.* 2011; Hynes *et al.* 2015; 2017).

As expected, the coefficient for the variable labeled age was significant at the 0.05 level and had a negative sign, indicating that as the angler gets older, the number of trips to lakes decreases. This result indicates that as anglers get older, they may become less energetic and thus demand fewer trips. The findings agree with those of Ojumu *et al.* (2009) and Ng (2011) but not with those of Prayaga *et al.* (2010) and Ready *et al.* (2012).

The motorboat usage variable's coefficient was positive and statistically significant at the 0.05 level. This finding suggests that, when other factors are held constant, anglers who use motorboats tend to go angling more frequently than those who do not. The latter study's finding concurs with that made by Loomis and Ng (2012).

Table 3. Results of TES-NB models estimation

Variable	Carp anglers	Non-carp anglers
Constant	1.1542 (0.3057)**	1.3541 (0.4321)**
TravelCost	-0.0772 (0.008)***	-0.1120 (0.015)***
Income	0.0345 (0.002)*	0.0268 (0.003)*
Age	-0.0007 (0.00004)**	-0.0009 (0.00005)**
MotoboatUse	0.4091 (0.1025)**	0.5762 (0.1481)**
GroupSize	-0.0892 (0.0039)**	-0.0625 (0.0107)**
YearsExp	0.0246 (0.005) ***	0.0319 (0.006)***
ElsewhereTrip	0.3621 (0.098)***	0.0587 (0.007)***
Education	-0.2356 (0.0678)***	0.1159 (0.0521)***
ContributePaying	0.3874 (0.0762)*	-0.2053 (0.0672)*
N	141	131
McFadden's R^2:	0.1954	0.1637

*** = 1% level of significance, ** = 5 % level of significance, * = 10 % level of significance. Numbers in parentheses are standard errors.

The group size variable coefficient was negative and significant at the 0.05 level, indicating that as the number of participants in the group increased, the demand for trips decreased, all else being equal. Because fishing is typically a lone sport, and even though some degree of companionship may be desired, many anglers are assumed to seek solitude, away from crowds, when going on an angling trip, which may be one explanation for this result. The group size coefficient was also reported to be negative and significant by Taylor and Gratton (2000) and Loomis and Ng (2012). However, according to Hynes *et al.* (2015), the number of angling trips does not seem to be impacted by group size.

The coefficient for the years of experience variable was positive and statistically significant at the 0.01 level, demonstrating that the years of experience in fishing is a predictor of interest in or preference for fishing: the longer an angler has been involved in angling, the more fishing trips the angler would take, holding other variables constant. Ojumu *et al.* (2009) also found the same outcome.

If all other variables remained constant, it would appear that anglers made more trips to other fishing sites in the past 12 months based on the estimated coefficient, which was positive and statistically significant at the 0.01 level. This is consistent with Ng's (2011) outcome.

At the 0.01 level, the coefficient of the education variable was found to be negative and significant for carp. This finding implies that anglers with a higher level of education are more likely to take fewer trips. The effect of education was expected to be negative because many studies in the literature found that anglers with higher education levels were less likely to go angling than those with lower education levels (Lupi *et al.* 1998; Ojumu *et al.* 2009). In this study, however, the sign for education was positive for non-crap.

The number of household members contributing to the angler's household expenses was another important factor influencing the number of trips in Prespa Park. The sign for the number of people paying household expenses varied across both types of anglers.

3.2.2. Results of LM-CVM Regressions' Estimation

Table 4 provides a summary of the estimation results from LM-CVM regressions, where the estimated coefficient values and standard errors (in parentheses) are given.

Table 4 shows that the variable "*BidAmount*" was statistically significant at the 0.01 level, while the rest of the variables were significant at the 0.05 or 0.10 level. According to the Logit model results, an increase in trip costs (*BidAmount*) was highly significant and negatively correlated with anglers' decisions. The fact that this variable has a negative sign is in line with economic theory, which says that as the bid goes up, the probability of a yes answer goes down.

Table 4. Results of LM-CVM models estimation

Variable	Carp anglers	Non-carp anglers
Constant	2.145 (0.5497)**	1.098 (0.3781)*
BidAmount	-0.2524 (0.018)***	-0.2329 (0.013)***
Conditions	0.209 (0.0952)*	0.131 (0.0098)
Retired	0.406 (0.123)**	0.425 (079)**
Gender	0.528 (0.138)*	0.398 (0.092)
FishClubMemb	0.032 (0.087)*	0.028 (0.065)
N	141	131
Pseudo R-squared	0.2743	0.2988

*** = 1% level of significance, ** = 5 % level of significance, and * = 10 % level of significance. Numbers in parentheses are standard errors.

The effects of "perceived weather and water conditions" on trip frequency are less pronounced. For carp anglers, it was discovered to be significant, but not for non-carp anglers.

All else being equal, retired status may be regarded as an indicator of time availability; thus, retired anglers tend to take more fishing trips. It was positive and statistically significant at the 0.05 level in this study.

Gender was also included in this model to see if there was a link between demand for carp and non-carp angling trips. Gender was only positive and significant for carp anglers, implying that men spent more time angling than women did. In other studies (Prado 2006; du Preez and Hosking 2011) on how much it costs to travel for fishing, gender was not found to make a difference.

The coefficient for the variable "fishing club membership" was also positive and significant only for carp anglers. This means that an angler who purchase a membership is more likely to fish often.

3.3. Analyzing Estimates of Consumer Surpluses

The results of the consumer surplus analysis are presented in this section of the paper. The estimated coefficients of the travel cost variable for each group of anglers were used to calculate the average consumer surplus using the regression results from the TES-NB model. Using equation (6), the average consumer surplus value for carp and non-carp anglers per trip was €12.95 and €8.93, respectively (Table 5). Equation (9) and the regression results from the LM-CVM model showed that the average consumer surplus value per angler per trip for carp and non-carp anglers was €14.01 and €9.14, respectively (Table 5).

Because the TES-NB model's travel costs and the LM-CVM regression's increase in expenses were per angler trip, the angler per day consumer surplus was calculated by dividing the mean CS/trip values by the average number of days per trip values (from Table 2). Table 5 displays the CSs per angler day for both carp and non-carp anglers using the TES-NB and LM-CVM models. The mean consumer surplus value per day estimated from the TES-NB model was €7.24, with a 95% confidence interval of €5.75 to €8.71 for carp anglers, and €4.33, with a 95% confidence interval of €3.06 to €4.81 for non-carp anglers. For carp and non-carp anglers, the mean CS/day estimated from the LM-CVM model was, respectively, €7.83 and €4.61.

Table 5. Angler consumer surpluses estimates for both carp and non-carp anglers

Variable	TES-NB		LM-CVM	
	Carp	Non-carp	Carp	Non-carp
Mean CS/trip	€12.95	€8.93	€14.01	€9.14
Mean CS/day	€7.24	€4.33	€7.83	€4.61
95% CI	(€5.75 - €8.71)	(€3.06 - €4.81)		

First, Table 5's findings demonstrate that both non-market valuation methods consistently showed that angler-day consumer surplus for carp angling was at the same ratio (about 1.7 times) higher than non-carp's for the TES-NB and LM-CVM models, respectively. This finding suggests that the relative values of angling for carp versus other species are robust to non-market valuation methods.

Second, the TES-NB models' 95% CI for the angler-day value estimates for both carp and non-carp species did not overlap. So, the hypothesis that the consumer surplus values of two different fish species are not the same, no matter what method of valuation is used, was proven to be true.

Third, the mean angler day values from TES-NB were only marginally lower than those from LM-CVM for both carp and non-carp anglers (by €0.59 and €0.28, respectively) (Table 5). As a result, the estimates from CVM

and TCM are fairly close. These estimation results allow for the conclusion that the two valuation techniques show convergent validity. Therefore, the hypothesis that consumer surplus values from TES-NB are reasonably similar to LM-CVM's was also accepted. Because the same anglers were asked to provide data for both methods in the same survey, it's possible that this is one reason why the study found such close agreement between TCM and CVM consumer surplus values. Future research could assist clarify the findings of this study.

Conclusion

In this study, the values of carp versus non-carp anglers were estimated using both travel cost (truncated, endogenously stratified negative binomial, TES-NB) and contingent valuation (dichotomous-choice with follow-up approach, LM-CVM) methods using data from a 2019 angler survey sampled at Lakes Prespa. The findings enabled three major conclusions to be drawn.

The first is that the demand for carp and non-carp angling trips is influenced by various household, angler, and participation characteristics. Travel cost, angler group size, and age were found to be statistically significant variables that have a negative impact on the annual number of trips, while income, use of a motorized boat for fishing, years of experience, retired status, and number of trips to other fishing sites have a positive impact. Both types of anglers saw different signs about education, the number of people contributing to household expenses, and perceived weather and water conditions.

Second, the findings offered convincing proof that the daily mean of angler consumer surpluses differs between two different groups of anglers (carp and non-carp). The TES-NB model estimated anglers' daily consumer surpluses at €7.24 (carp) and €4.33 (non-carp). The LM-CVM model's mean values were €7.83 (carp) and €4.61 (non-carp). As a result, for two different fish species (carp and non-carp), the consumer surplus values calculated by both models are different. Regardless of the method of valuation used, carp anglers have a consumer surplus that is about 1.7 times greater than non-carp anglers. This might be made clearer by examining in the future some of the differences between the two types of anglers.

The third conclusion is that the TES-NB consumer surplus values are reasonably similar to those of the LM-CVM. The values calculated using the stated preference technique are largely comparable to the values calculated using revealed preference techniques. Both models gave equivalent sets of CS for two groups of species, demonstrating the convergent validity of the two valuation methods.

This study is an initial pertinent attempt to calculate the economic value of recreational angling in the case of Lakes Prespa. The gathered data will be helpful in developing carp stocking programs, encouraging the expansion of angling activity in the region while maintaining sustainability as a goal, and may also be helpful in the decision-making process for managing resources sustainably in Lakes Prespa and other similar areas.

It is important to emphasize the need to avoid oversimplifying the management decision-making process by relying solely on economic values. Economic values are an important source of information, but they are only one component of sustainable fishery management. In particular, the benefits to anglers are just one of the factors considered when formulating a sustainable resource management strategy. Along with economic objectives, a balance should be struck between social and ecological goals.

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.

References

[1] Adamowicz, W., Louviere, J., and Williams, M. 1994. Combining revealed and stated preference methods for valuing environmental amenities. *Journal of Environmental Economics and Management*, 26: 271–292. DOI:https://doi.org/10.1006/jeem

[2] Ahn, S., Steiguer, J.E., Palmquist, R.B., and Holmes T.P. 2000. Economic analysis of the potential impact of climate change on recreational trout fishing in the southern Appalachian Mountains: An application of a nested multinomial logit model. *Climatic Change*, 45: 493-509. DOI:https://doi.org/10.1023/A:1005511627247

[3] Alberini, A., and Cooper, J. 2000. *Applications of the contingent valuation method in developing countries—a survey*. FAO economic and social development paper 146. Rome, Italy: UN FAO, 68 pp.

[4] Alberini, A., Boyle, K., and Welsh, M. 2003. Analysis of contingent valuation data with multiple bids and response options allowing respondents to express uncertainty. *Journal of Environmental Economics and Management,* 45: 40–62. Available at: http://www.sciencedirect.com/science/article/pii/S0095-0696(02)00010-4

[5] Arismendi, I., and Nahuelhual, I. 2007. Non-native salmon and carp recreational fishing in Lake Llanquihue, southern Chile: economic benefits and management implications. *Reviews in Fisheries Science,* 15: 311–325. DOI: https://doi.org/10.1080/10641260701484655

[6] Arlinghaus, R., and Mehner, T. 2005. Determinants of management preferences of recreational anglers in Germany: Habitat management versus fish stocking. *Limnologica*, 35: 2–17. DOI:https://doi.org/10.1016/j.limno.2004.10.001

[7] Azevedo, C.D., Herriges, J.A., and Kling, C.L. 2003. Combining revealed and stated preferences: Consistency tests and their interpretations. *American Journal of Agricultural Economics*, 85(3): 525–537. DOI: https://doi.org/10.1111/1467-8276.00453

[8] Bertram, C., and Larondelle, N. 2017. Going to the woods is going home: Recreational benefits of a larger urban forest site –a travel cost analysis for Berlin, Germany. *Ecological Economics*, 132: 255–263. DOI:https://doi.org/10.1016/j.ecolecon.2016.10.017

[9] Besedin, E., Mazzotta, M., Cacela, D., and Tudor, L. 2004. *Combining ecological and economic analysis: an application to valuation of power plant impacts on great lakes recreational fishing*. Paper presented at American fisheries society meeting symposium: socio-economics and extension: empowering people in fisheries conservation, Madison, WI.

[10] Betz, C.J., Bergstrom, J.C., and Bowker, J.M. 2003. A Contingent Trip Model for Estimating Rail-trail Demand. *Journal of Environmental Planning and Management*, 46(1): 79–96. DOI: 10.1080/713676704

[11] Bin, O., Landry, C.E., Ellis, C.L., and Vogelsong, H. 2005. Some consumer surplus estimates for North Carolina beaches. *Marine Resource Economics*, 20(2): 145–161. DOI:https://doi.org/10.1086/mre.20.2.42629466

[12] Bowker, J.M., Bergstrom, J.C., and Gill, J. 2007. Estimating the Economic Value and Impacts of Recreation Trails: A Case Study of the Virginia Creeper Rail Trail. *Tourism Economics*, 13(2): 241–260.

[13] Brander, L.M., Florax, J.G.M. Raymond, and Vermaat, E. Jan. 2006. The empirics of wetland valuation: a comprehensive summary and meta-analysis of the literature. *Environmental and Resource Economics*, 33(2): 223–250. DOI: 10.1007/s10640-005-3104-4

[14] Brander, L.M., van Beukering, P., and Cesar, H.S. 2007. The recreational value of coral reefs: a meta-analysis. *Ecological Economics*, 63: 209–218. DOI: https://doi.org/10.1016/j.ecolecon.2006.11.002

[15] Cameron, A. Colin, and Trivedi, P.K. 2013. *Regression analysis of count data* (2nd Edition). Cambridge university press, Cambridge, 567. DOI: https://doi.org/10.1017/CBO9781139013567

[16] Chizinski, C.J., Pope, K.L., Willis, D.B., Wilde, G.R., and Rossman, E.J. 2005. Economic value of angling at a reservoir with low visitation. *North American Journal of Fisheries Management,* 25: 98–104. DOI:https://doi.org/10.1577/M03-102.1

[17] Curtis, J.A. 2002. Estimating the Demand for Salmon Angling in Ireland. *The Economic and Social Review*, 33(3): 319–332. Available at: http://hdl.handle.net/2262/59840

[18] Curtis, J.A., and Breen, B. 2016. *Fisheries management for different angler types*, ESRI Working Paper, No. 529. Dublin: The Economic and Social Research Institute (ESRI), 18 pp.

[19] Curtis, J.A., and Breen, B. 2017. Irish coarse and game anglers' preferences for fishing site attributes. *Fisheries Research*, 190: 103–112. DOI: https://doi.org/10.1016/j.fishres.2017.01.016

[20] Curtis, J.A., and Stanley, B. 2016. Water quality and recreational angling demand in Ireland. *Journal of Outdoor Recreation and Tourism*, 14: 27–34. DOI: https://doi.org/10.1016/j.jort.2016.04.005

[21] Czajkowski, M., Giergiczny, M., Kronenberg, J., and Tryjanowski, P. 2014. The economic recreational value of a white stork nesting colony: A case of 'stork village' in Poland. *Tourism Management*, 40: 352–360. DOI:10.1016/j.tourman.2013.07.009

[22] Dillman, D.A., Smyth, J.D., and Christian, L.M. 2007. *Mail and Internet Survey – The Tailored Design Method* (second ed). New York: John Wiley and Sons Inc., 512 pp.

[23] Dorison, A.M. 2012. *Estimating the economic value of trout angling in Georgia: A travel cost model approach*. Master of Science Thesis. University of Georgia, Athens, Georgia, 149 pp.

[24] du Preez, M., and Hosking, S.G. 2011. The value of the trout fishery at Rhodes, North Eastern Cape, South Africa: A travel cost analysis using count data models. *Journal of Environmental Planning and Management*, 54(2): 267–282. DOI: https://doi.org/10.1080/09640568.2010.505837

[25] Englin, J., and Shonkwiler, J.S. 1995. Estimating social welfare using count data models: an application to long-run recreation demand under conditions of endogenous stratification and truncation. *The Review of Economics and Statistics*, 77(1): 104–112. DOI: https://doi.org/10.2307/2109996

[26] Ezebilo, E.E. 2016. Economic value of a non-market ecosystem service: an application of the travel cost method to nature recreation in Sweden. *International Journal of Biodiversity Science, Ecosystem Services and Management*, 12(4): 314–327. DOI: https://doi.org/10.1080/21513732.2016.1202322

[27] Ferrer, O., Dibble, E.D., Jackson, D.C., and Rundle, K.R. 2005. Angling assessment of the fisheries of Humacao Natural Reserve lagoon system, Puerto Rico. *Fisheries Research*, 76: 81–90. DOI:10.1016/j.fishres.2005.05.010

[28] Fink, A. 2013. *How to Conduct Surveys: A Step-by-Step Guide* (sixth ed.). Thousand Oaks, CA: Sage Publications Inc., 224 pp.

[29] Fletcher, J.J., Adamowicz, W.L., and Graham-Tomasi, T. 1990. The travel cost model of recreation demand: theoretical and empirical issues. *Leisure Sciences*, 12(1): 119–147. DOI:https://doi.org/10.1080/01490409009513093

[30] Fremuth, W., and Shumka, S. 2013. *Management Plan of the Prespa National Park in Albania (2014–2024)*. Tirana, Albania: NewPolitics, 159 pp.

[31] Garrod, G., and Willis, G.K. 1999. *Economic Valuation of the Environment*. Cheltenham, UK: Edward Elgar, 400 pp.

[32] Genius, M., Strazzera, E., Scarpa, R., and Hutchinson, G.W. 2003. The effect of protest votes on the estimates of WTP for use values of recreational sites. *Environmental and Resource Economics*, 25: 461–476. DOI: 10.1023/A: 1025098431440

[33] Gillespie, R., Collins, D., and Bennett, J. 2017. Adapting the travel cost method to estimate changes in recreation benefits in the Hawkesbury–Nepean River. *Australasian Journal of Environmental Management*, 24(4): 375–391. DOI: https://doi.org/10.1080/14486563.2017.1354236

[34] Gillig, D., Woodward, R.T., Ozuna, T.Jr., and Griffin, W.L. 2003. Joint Estimation of Revealed and Stated Preference Data: An application to recreational red snapper valuation. *Agricultural and Resource Economics Review*, 32(2): 209–221. DOI: https://doi.org/10.1017/S1068280500005980

[35] Grantham, R., and Rudd, Mu. 2015. Current status and future needs of economics research of inland fisheries. *Fisheries management and ecology*, 22(6): 458–471. DOI: https://doi.org/10.1111/fme.12144

[36] Grazhdani, D. 2009. Social Economic Aspects of Fishery and Fishing Activities in Albanian Part of Prespa Lakes. *J. Int. Environmental Application and Science*, 4 (3): 253–259.

[37] Grazhdani, D. 2014a. An approach for assessing ecosystem services with application in a protected area case study: Al-Prespa. *Bulgarian Journal of Agricultural Sciences*, 20: 118–124.

[38] Grazhdani, D. 2014b. Integrating ecosystem services into assessment of different management options in a protected area: a deliberate multi-criteria decision analysis approach. *Bulgarian Journal of Agricultural Science*, 20(6): 1311–1319.

[39] Grazhdani, D. 2015. Contingent valuation of residents' attitudes and willingness to pay for non-point source pollution control: A case study in AL–Prespa, southeastern Albania. *Environment Management*, 56(1): 81–93. DOI: 10.1007/s00267-015-0480-6

[40] Grazhdani, D. 2016. Assessing the variables affecting on the rate of solid waste generation and recycling: An empirical analysis in Prespa Park. *Waste management*, 48: 3–13. DOI:https://doi.org/10.1016/j.wasman.2015.09.028

[41] Grazhdani, D. 2021a. *Residents' willingness to pay for entrance fee in Albanian part of Prespa Park (AL-Prespa): A contingent valuation approach*. In proceedings of 2nd International Conference "The Holistic Approach to Environment", Sisak Croatia, May 28th, 2021 (Virtual conference), pp. 183–194.

[42] Grazhdani, D. 2021b. *Assessing the impacts of non-point source pollution affected by human activities in lakes water quality in AL-Prespa watershed*. In proceedings of 2nd INTERNATIONAL CONFERENCE "The Holistic Approach to Environment", Sisak Croatia, May 28th, 2021 (Virtual conference), pp. 167–182.

[43] Grazhdani, D. 2023. An Approach for Managing Landscapes for a Variety of Ecosystem Services in Prespa Lakes Watershed. *Hydrobiology*, 2(1): 134–149. DOI: https://doi.org/10.3390/hydrobiology2010008

[44] Greene, H.W. 2007. *Econometric Analysis* (Sixth Ed.). New York: Pearson Prentice Hall Publishing, 1239 pp.

[45] Grilli, G., Landgraf, G., Curtis, J., and Hynes, S. 2017. *The: A travel cost method estimation of demand for two destination salmon rivers in Ireland*. ESRI Working Paper, No. 570. Dublin: The Economic and Social Research Institute (ESRI), 14 pp.

[46] Grogger, J. T., and Carson, R.T. 1991. Models for truncated counts. *Journal of Applied Econometrics*, 6(3): 225–238.

[47] Haab, T, and McConnell, K. 2002. *Valuing Environmental and Natural Resources: Econometrics of Non-Market Valuation*. Cheltenham, UK: Edward Elgar, 355 pp.

[48] Hanemann, W.M. 1994. Valuing the Environment through Contingent Valuation. *Journal of Economic Perspectives*, 8(4): 19–43. DOI: 10.1257/jep.8.4.19

[49] Hanley, N., and Barbier, E.B. 2009. *Pricing nature: cost-benefit analysis and environmental policy*. Cheltenham, UK: Edward Elgar Publishing, 360 pp.

[50] He, X. 2014. *The convergence of welfare estimates employing travel cost and contingent valuation methods: Evidence from New York state anglers*. Master of Science Thesis. Faculty of the Graduate School of Cornell University, 110 pp.

[51] Hellerstein, D.M. 1991. Using count data models in travel cost analysis with aggregate data. *American journal of agricultural economics*, 73(3): 860–866. DOI: https://doi.org/10.2307/1242838

[52] Hellerstein, D.M., and Mendelsohn, R. 1993. A theoretical foundation for count data models. *American Journal of Agricultural Economics*, 75(3): 604–611. DOI:10.2307/1243567

[53] Hilbe, J.M. 2011. *Negative binomial regression* (2nd edition). Cambridge, UK: Cambridge University Press, 570 pp.

[54] Hindsley, P., Landry, C.E., and Gentner, B. 2011. Addressing onsite sampling in recreation site choice models. *Journal of Environmental Economics and Management*, 62(1): 95–110. Available at: http://www.sciencedirect.com/science/article/pii/S0095069611000271

[55] Hunt, L.M., Boxall, P., Englin, J., and Haider, W. 2005. Forest harvesting, resource-based tourism, and remoteness: An analysis of northern Ontario's sport fishing tourism. *Canadian Journal of Forest Resources*, 35: 401–409. DOI: 10.1139/x04-184

[56] Hynes, S., and Greene, W. 2013. A panel travel cost model accounting for endogenous stratification and truncation: A latent class approach. *Land Economics*, 89(1): 177–192. Available at: http://hdl.handle.net/20.500.11937/53353

[57] Hynes, S., Gaeven, R., and O'Reilly, P. 2017. Estimating a total demand function for sea angling pursuits. *Ecological Economics*, 134: 73–81. DOI: 10.1016/j.ecolecon.2016.12.024

[58] Hynes, S., O'Reilly, P., and Corless, R. 2015. An on-site versus a household survey approach to modelling the demand for recreational angling: Do welfare estimates differ? *Ecosystem Services*, 16: 136–145. DOI:10.1016/j.ecoser.2015.10.013

[59] Johnston, R.J., Ranson, M.H., Besedin, E.Y., and Helm, E.C. 2006. What determines willingness to pay per fish? A meta-analysis of recreational fishing values. *Marine Resource Economics*, 21: 1–32. DOI: 10.1086/mre.21.1.42629492

[60] Kerkvliet, J., and Nowell, C. 2000. Tools for recreation management in parks: the case of the greater Yellowstone's blue-ribbon fishery. *Ecological Economics*, *34*: 89–100. DOI: 10.1016/S0921-8009(00)00139-7

[61] Khan, M.J. 2014. Testing *the convergent validity of contingent valuation and travel cost methods for valuing the recreational fisheries in New Your state*. Master of Science thesis. Faculty of the Graduate School of Cornell University, 97 pp.

[62] Kline, P. 1999. *The handbook of psychological testing* (2nd ed.). London: Routledge, 744 pp.

[63] Lansdell, N., and Gangadharan, L. 2003. Comparing travel cost models and the precision of their consumer surplus estimates: Albert Park and Maroondah Reservoir. *Australian Economic Papers*, 42(4): 399–417. DOI:https://doi.org/10.1111/1467-8454.00207

[64] Lew, D.K., and Larson, D.M. 2012. Economic values for saltwater sport fishing in Alaska: A stated preference analysis. *North American journal of fisheries management*, 32(4): 745–759. DOI:10.1080/02755947.2012.681012

[65] Loomis, J.B, and Ng, K. 2012. Comparing economic values of trout anglers and non-trout anglers in Colorado's stocked public reservoirs. *North American Journal of Fisheries Management*, 32(2): 202–210. DOI: 10.1080/02755947.2012.662089

[66] Loomis, J.B. 2003. Travel cost demand model based river recreation benefit estimates with on-site and household surveys: Comparative results and a correction procedure. *Water Resources Research*, 39(4): 1105. DOI: https://doi.org/10.1029/2002WR001832

[67] Loomis, J.B. 2006. A comparison of the effect of multiple destination trips on recreation benefits as estimated by travel cost and contingent valuation methods. *Journal of Leisure Research*, 38(1): 46–62. DOI:https://doi.org/10.1080/00222216.2006.11950068

[68] Loomis, J.B., Sorg, C.F., and Donnelly, D.M. 1986. Evaluating regional demand models for estimating recreation use and economic benefits: A case study. *Water Resources Research*, 22(4): 431–438. DOI:https://doi.org/10.1029/WR022i004p00431

[69] Lothrop, L.R, Hanson, T.R., Sammons, S.M., Hite, D., and Maceina, M.J. 2014. Economic impact of a recreational Striped Bass fishery. *North American Journal of Fisheries Management*, 34(2): 301–310.

[70] Lupi, F., Hoehn, J.P., Chen, H.Z., and Tomasi, D.T. 1998. *The Michigan recreational angling demand model*. Michigan State University and the Michigan Department of Natural Resources and Department of Environmental Quality. Michigan: East Lansing, 10 pp.

[71] Martínez-Espiñeira, R., and Amoako-Tuffour, J. 2008. Recreation demand analysis under truncation, overdispersion, and endogenous stratification: An application to Gros Morne National Park. *Journal of Environmental Management*, 88(4): 1320–1332. DOI: https://doi.org/10.1016/j.jenvman.2007.07.006

[72] Mitchell, R.C., and Carson, R.T. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington DC: Resources for the Future, 484 pp.

[73] Nakatani, T., and Sato, K. 2010. Truncation and endogenous stratification in various count data models for recreation demand analysis. *Journal of Development and Agricultural Economics*, 2(1): 293–303.

[74] Nardi, P.M. 2013. *Doing Survey Research: A Guide to Quantitative Methods* (third ed.). New York: Routledge, 274 pp.

[75] Navrud, S., and Mungatana, E.D. 1994. Environmental valuation in developing countries: the recreational value of wildlife viewing. *Ecological Economics*, 11: 135–151. DOI: 10.1016/0921-8009(94)90024-8

[76] Ng, K. 2011. *Valuing economic benefits of water's ecosystem services with non-market valuation methods and regional input-output model*. Doctoral dissertation. Colorado State University, 196 pp.

[77] Oh, C., Ditton, R.B., Anderson, D.K., Scott, D., and Stoll, J.R. 2005. Understanding differences in non-market valuation by angler specialization level. *Leisure Sciences,* 27: 263–277. DOI:https://doi.org/10.1080/01490400590930899

[78] Ojumu, O., Hite, D., and Fields, D. 2009. *Estimating Demand for Recreational Fishing in Alabama Using Travel Cost Model*. Southern Agricultural Economics Association Annual Meeting; AgEcon Publication. Available at: http://ageconsearch.umn.edu/

[79] Park, H.M. 2003. *Multicollinearity in Regression Models*. Jeeshim and KUCC625. Available at: http://www.masil.org/documents/multicollinearity.pdf

[80] Parsons, G.R. 2003. The travel cost model. In Champ, Patricia A., Boyle, Kevin J., and Brown, Thomas C., editors, *A primer on nonmarket valuation*. New York: Springer Science+Business Media, pp. 269–329.

[81] Pascoe, S., Doshi, A., Dell, Q., Tonks, M., and Kenyon, R. 2014. Economic value of recreational fishing in Moreton Bay and the potential impact of the marine park rezoning. *Tourism Management*, 41: 53–63. DOI:http://dx.doi.org/10.1016/j.tourman.2013.08.015

[82] Perman, R., Ma, Y., McGilvraym J., and Common, M. 2003. *Natural resource and environmental economics*. New York: Pearson Education Ltd, 699 pp.

[83] Prado, B. 2006. *Economic valuation of the lower Illinois carp fishery in Oklahoma under current and hypothetical management plans*. Doctoral dissertation. Oklahoma State University, 252 pp.

[84] Prayaga, P., Rolfe, J., and Stoeckl, N. 2010. The value of recreational fishing in the Great Barrier Reef, Australia: a pooled revealed preference and contingent behaviour model. Marine Policy, 34(2): 244–251. DOI: https://doi.org/10.1016/j.marpol.2009.07.002

[85] Raguragavan, J., Hailu, A., and Burton, M. 2013. Economic valuation of recreational fishing in Western Australia: statewide random utility modelling of fishing site choice behaviour. *Australian Journal of Agricultural and Resource Economics,* 57(4). Available at: http://ordering.onli1111/(ISSN)1467-8489

[86] Ready, R.C., *et al.* 2012. *Net Benefits of Recreational Fishing in the Great Lakes, Upper Mississippi River, and Ohio River Basins*. NY: HDRU, Department of Natural Resources, Bruckner Hall, Cornell University, Ithaca, 122 pp.

[87] Roach, B., Boyle, K.J., and Welsh, M. 2002. Testing bid design effects in multiple-bounded contingent valuation. *Land Economics*, 78(1): 121–131. DOI: 10.2307/3146927

[88] Rolfe, J., and Dyack, B. 2010. Testing for convergent validity between travel cost and contingent valuation estimates of recreation values in the Coorong, Australia. *Australian Journal of Agricultural and Resource Economics*, 54(4): 583–599. DOI: https://doi.org/10.4217/OPR.2008.30.2.141

[89] Rolfe, J., and Gregg, D. 2012. Valuing beach recreation across a regional area: The Great Barrier Reef in Australia. *Ocean and Coastal Management*, 69: 282–290. DOI:10.1016/J.OCECOAMAN.2012.08.019

[90] Shaw, D. 1988. On-site sample regression: Problems of non-negative integers, truncation, and endogenous stratification. *Journal of Econometrics*, 37: 211–223. DOI: https://doi.org/10.1016/0304-4076(88)90003-6

[91] Shrestha, R.K., Seidl, A.F., and Moraes, A.S. 2002. Value of recreational fishing in the Brazilian Pantanal: a travel cost analysis using count data models. *Ecological Economics*, 42. DOI:10.1016/S0921-8009(02)106-4

[92] Sohngen, B., Lichtkoppler, F., and Bielen, M. 2000. *The value of day trips to Lake Erie beaches. Technical Report*. Technical Bulletin TB-039. Columbus, OH: *Ohio Sea Grant Extension,* 30 pp.

[93] Spirkovski, Z., Ilik-Boeva, D., Talevski, T., Paluqi, A., and Kapedani, E. 2012. *The fishes of Prespa*. UNDP.

[94] StataCorp. 2011. *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP.

[95] Taylor, P., and Gratton, C. 2000. The Economics of Sport and Recreation: an Economic Analysis. New York: Routledge, 234 pp.

[96] Urama, K.C., and Hodge, I. 2006. Participatory environmental education and willingness to pay for river basin management: empirical evidence from Nigeria. *Land Economics*, 82(4): 542–561. DOI: 10.3368/le.82.4.542

[97] Ward, F.A., and Beal, D. 2000. *Valuing Nature with Travel Cost Models*. Cheltenham, UK: Edward Elgar Publishing, 264 pp.

[98] Wheeler, S., and Damania, R. 2001. Valuing New Zealand recreational fishing and an assessment of the validity of the contingent valuation estimates. *Australian Journal of Agricultural and Resource Economics*, 45: 599–621. DOI: https://doi.org/10.1111/1467-8489.00159

[99] Whitehead, J.C, Grotius, P.A., Southwick, R., and Foster-Turley, P. 2009. Measuring the economic benefits of Saginaw Bay coastal marsh with revealed and stated preference methods. *Journal of Great Lakes Research*, 35(3): 430–437. DOI: https://doi.org/10.1016/j.jglr.2009.03.005

[100] Whitehead, J.C. 2006. A comparison of contingent valuation method and random utility model estimates of the value of avoiding reductions in king mackerel bag limits. *Applied Economics*, 38(15): 1725–1735. DOI:https://doi.org/10.1080/00036840500427130

[101] Williams, J.S., and Bettoli, P.W. 2003. *Net value of trout fishing opportunities in Tennessee tailwaters*. Fisheries Report 03-21. Nashville, Tennessee: Tennessee Wildlife Resource Agency.

[102] Zawacki, W.T., Marsinko, A., and Bowker, J. 2000. A travel cost analysis of nonconsumptive wildlife-associated recreation in the United States. *Forest Science*, 46(4): 496–506.

[103] AcaStat, Software. 2014. *Pearson Correlation. AcaStat Software: Research Tools and Instructional Aids*. Retrieved April 2014, from http://www.acastat.com/Statbook/correlation.htm

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Green Competence Building, Green Employee Involvement and Green Work-Life Balance to Improve Environmental Performance through Green Organizational Culture

Deni Widyo PRASETYO
Faculty of Economics and Business,
Universitas 17 Agustus 1945 Surabaya, Indonesia
ORCID: 0009-0003-9171-6679
deni.stiedw@gmail.com

Amiartuti KUSMANINGTYAS
Faculty of Economics and Business,
Universitas 17 Agustus 1945 Surabaya, Indonesia
ORCID: 0000-0002-9978-1841
amiartuti@untag-sby.ac.id

Siti MUJANAH
Faculty of Economics and Business,
Universitas 17 Agustus 1945 Surabaya, Indonesia
ORCID: 0000-0002-7946-2202
siti_mujanah2003@yahoo.com

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Abstract: This research is motivated by environmental performance. The aim of this study is to determine the influence of the relationship between green competence building, green employee involvement, and green work-life balance on environmental performance, mediated by the green organizational culture of the Head of Study Program at PGRI Higher Education Institutions in East Java. The grand theory of this research is the AMO theory (Ability, Motivation, Opportunity). The sampling technique uses a saturated or census sample. The sample in this study consists of 185 respondents, the Head of Study Program at PGRI Higher Education Institutions in East Java, through a self-administered survey. The research instrument uses a questionnaire and is analyzed using SEM analysis, employing the Warp PLS Version 7.0 analysis tool to analyze the outer model, inner model, and hypothesis testing using p-value. The results show a significant direct influence of green competence building and green employee involvement on green organizational culture. Subsequently, green organizational culture significantly influences environmental performance. The relationship with green work-life balance does not significantly affect green organizational culture.

This research indicates that there is an intervening variable effect, namely green organizational culture, on the relationship between green competence building, green employee involvement, and environmental performance. However, green organizational culture cannot act as an intervening variable in the relationship between green work-life balance and environmental performance. This study demonstrates that the practices of green competence building, green employee involvement, and green organizational culture play a crucial role in the implementation of environmental policies to promote environmental performance at PGRI Higher Education Institutions in East Java.

Keywords: green competence building; green employee involvement; green work life balance; green organizational culture; environmental performance.

JEL Classification: Q56; I23; R11.

Introduction

Globally, researchers, along with environmental policymakers, agree that the causes of environmental degradation, including resource deficits, rising pollution, and biodiversity loss, are fundamentally linked to human behavior (Hui, Chan and Pun 2001). In response, many organizations implement an Environmental Management System (EMS) to ensure that their daily operations do not have adverse effects. Therefore, it is essential to comprehend how employee behavior is influenced to minimize the negative environmental impact of organizational activities.

According to Nogueira *et al.* (2013), employee work performance is a function (f) of the interaction between ability (A) and motivation (M), expressed as work performance = (A x M). Inadequacies negatively affect work performance. Robbins additionally proposed incorporating an opportunity factor, modifying the equation to work performance = f (A x M x O). As indicated by Wijoyo and Mashuri (2020), the fundamental assumption of the AMO theory is that an employee's performance is determined by a function of ability, motivation, and existing opportunities.

According to Muisyo and Qin (2021), culture is an internal element of the organization. Green Organizational Culture (GOC) ensures that organizational activities are pro-environmental and support the natural environment through a collection of artifacts, assumptions, and values reflecting the company's commitment to environmentally friendly or sustainable operations (Aggarwal and Agarwala 2021). From a GOC perspective, it is insufficient to merely prevent pollution and produce environmentally friendly products. Companies must actively think, seek, and act in a green manner (Muisyo and Qin 2021).

Research conducted by Saadatian *et al.* (2009), based in one of the universities in Malaysia, asserts that responsibility for shared environmental sustainability involves adopting green practices on university campuses. Several comprehensive studies are underway in national higher education institutions, highlighting the current state of potential efforts. Rayner and Morgan (2018) state that while universities have relatively lower pollution emissions than the corporate sector, they bear significant responsibility for environmental awareness, research, and education of current and future generations about the importance of pro-environmental behavior. Additionally, the need for environmental sustainability in the campus environment has gained attention because activities and operations have direct or indirect impacts on the environment. Examples include material consumption, waste generation, circulation of people, excessive vehicles in the campus environment, and electricity use (Alshuwaikhat and Abubakar 2008).

Increasing environmental pressures, coupled with rising costs of resource consumption, have prompted universities to advocate for pro-environmental behavior and sustainable resource use, aligning with the views of (Mtutu and Thondhlana 2016). Recognizing their environmental responsibilities, more universities are integrating environmental management aspects into their policies, educational curricula, research projects, building design, technology, and other campus activities (Mikulik and Babina 2009). However, progress toward environmental sustainability remains slow (Watson *et al.* 2013).

According to Watson *et al.* (2013), most university leaders and faculty members globally are unaware of the concept of sustainable development and its application in universities. There has been little effort to incorporate sustainability principles into courses, research, and outreach programs. Watson *et al.* (2013) highlighted key stakeholders in universities, including academic directors, professors, and students. Ideally, sustainable development concepts should be included in the policies, processes, and learning of all these stakeholder members. In practice, this is almost impossible in the early stages of integrating environmental sustainability into the university system.

In the literature on campus environments, some researchers focus on top-down management transformation, while others emphasize bottom-up student-led green initiatives. However, in this case, the consideration of mid-level participants in the institution, such as directors of degree programs and their role in campus sustainability, is overlooked. Brinkhurst *et al.* (2011) stated that the joint commitment of the academic community involvement in higher education is an important factor for institutionalizing environmental sustainability practices. Environmental sustainability in higher education institutions requires adjustments in joint teaching courses and is highly dependent on the ability of Study Program Heads and their willingness to support these initiatives (Alfikalia, Haryanto, and Widyaningsih 2022). The role of the head of the study program is crucial to the process of developing campus sustainability, based on knowledge, technical skills, and direct relationships with superiors (managers) and subordinates (students). The head of the study program has a potentially impactful but often unrecognized role in sustainability. There is a need to support and encourage pro-environmental behaviors

of course leaders to achieve lasting progress towards campus environmental performance (Brinkhurst *et al.* 2011).

1. Literature Review

1.1. Ability-Motivation-Opportunity (AMO) Grand Theory

Robbins (2001) argues that employee performance is symbolized as a function (f) of the relationship between ability (A) and motivation (M), so that, in a formula, work performance = (A x M). If anyone has a value below the standard, it will negatively affect the work performance itself. Then, Robbins (2001) suggests adding the opportunity factor (O) so that the equation becomes: work performance = f (A x M x O).

In line with Robbins's (2001) suggestion of adding the opportunity (O) factor in work performance, research by Mia *et al.* (2022) states that the Ability, Motivation, and Opportunity (AMO) Theory, originally proposed by Malinski *et al.* (1993) and developed by Boxall and MacKy (2009), has become a generally accepted framework for explaining how Human Resources (HR) policies can work and impact performance. It is very helpful in deciding which HR policies should be developed and implemented. According to research conducted by Boxall and Macky (2009), most studies on high-performance work practices use the AMO (Ability, Motivation, Opportunities) framework, either explicitly or implicitly. The model proposes that Human Resource (HR) practices contribute to improved employee performance by developing employees' abilities and skills to do their jobs, increasing employees' work motivation, and providing opportunities for employees to fully utilize their skills and be motivated.

1.2. Green Competence Building

According to Waqass (2021), green competence building is the set of skills needed to adapt products, services, and processes to climate change and related environmental and regulatory requirements. This type of competence is crucial for all sectors and at all levels within the workforce. Green skills will be required across various sectors and at all workforce levels.

As described by Anwar *et al.* (2020), green competence is the ability of individuals to interact with their immediate environment in a constructive way that reflects extraordinary enthusiasm. Research and development (RandD) along with green knowledge sharing, as emphasized by Borsanyi *et al.* (2021), are crucial for innovation within companies. Organizations utilize these technologies to create new products and processes, as well as enhance existing ones, thereby improving organizational performance economically, environmentally, and socially. According to Li *et al.* (2013), indicators of green competence building encompass green knowledge, green skills, green abilities, green attitudes, green behavior, and green awareness. The following are specific indicators of green competence building:

- Green knowledge: This involves understanding environmentally protective practices that individuals possess, influencing the decision-making process.
- Green skills: These are abilities possessed by individuals or employees pertaining to a job that contributes to environmental protection.
- Green abilities: This refers to the competence and attitude of employees in performing their work properly to ensure environmental sustainability in the workplace.
- Green attitude: It involves efforts to increase environmental awareness, manifested through important actions and attitudes, enabling individuals to contribute to environmental protection by choosing products that do not harm the environment.
- Green behavior: This represents efforts to choose green products over non-green ones, assuming they possess the same quality. This activity serves as an alternative solution to address environmental problems.
- Green awareness: This is the environmental value that employees prioritize, actively increasing their environmental knowledge in the operational processes of their work.

1.3. Green Employee Involvement

According to Lanatri Danirmala (2022), employee green involvement is defined as an opportunity for employees to engage in learning environmentally friendly strategies. These strategies aim to prevent current environmental problems. Further, it is suggested that the more employees are involved in activities to prevent environmental problems, the more aware they become of their commitment to protecting the environment. As stated by Putra (2015), higher employee interest in participating in such activities directly contributes to the development of

environmental management. This employee involvement has a positive impact on both the workplace and the surrounding environment.

The participation of employees can also contribute to improving the current environment. From the results of the previous explanation, it can be concluded that employee green involvement is an environmentally friendly action that encourages employees to participate in maintaining the sustainability of the surrounding environment and fosters personal awareness in saving the world. According to Mahn and Poblete (2023), the implementation of environmentally friendly human resource management practices in the workplace can extend the impact on a person's personal life, stimulating them to adopt environmentally friendly living behaviors and reinforcing these behaviors. According to Eva *et al.* (2023), several indicators are related to employee green involvement, including:

- Environmentally friendly paper printing and recycling which involves the processing and reusing or recycling of paper from unused sources, creating high-value paper with economic and ecological benefits.
- Environmentally friendly social responsibility which signifies a commitment to building environmental awareness in the organization to enhance the quality of life and the environment, benefiting both the organization and the local community.
- Environmental education and training which refers to an ongoing environmental training program aimed at improving the abilities of human resources with awareness in protecting the environment.
- Eco-teams which are an important way to increase employee engagement in efforts to actively participate in maintaining the sustainability of the work environment and encouraging others to practice eco-awareness.

1.4.Green Work Life Balance

The definition of green work-life balance at work implies that an employee must be able to balance time spent at work with time before and after work. According to Akpa *et al.* (2022), green work-life balance is a person's ability to balance the demands of work and personal needs, including those related to their family. Consistent with the theory mentioned, green work-life balance is defined as an individual's ability to fulfill work commitments along with family and other non-work commitments Sandiford and Green (2021). Work-Life Balance is a broad concept involving work priorities (career and ambitions) and life aspects (happiness, leisure, family, and spiritual development).

Abdulai Sawaneh and Kanko Kamara (2019) provide a more specific explanation of green work-life balance as the effective management of work alongside other essential activities such as family, community activities, volunteer work, self-development, travel, and recreation. Indicators to measure green work-life balance, according to Johnson *et al.* (2013), include:

- Time balance: the amount of time individuals can allocate to both their work and activities outside of work.
- Involvement balance: the quantity and level of psychological involvement a person has with their commitments in both work and activities outside of work.
- Satisfaction balance: the level of satisfaction a person experiences with their work activities and activities outside of work.

1.5.Green Organizational Culture

The definition of green organizational culture can be proposed as an integration of basic assumptions with the understanding that the organization must go beyond considerations of mutual benefit to adopt a broader perspective on itself and the sustainable development of the social environment, along with nature. According to Yodsuban *et al.* (2023), green organizational culture is broadly outlined as the extent to which the assumptions, values, symbols, and artifacts of the organization reflect the desire and need to operate in an environmentally sustainable manner. Green organizational culture is a set of shared beliefs, values, perspectives, norms, and practices that guide organizational members to behave responsibly toward the external environment during economic business processes (Fodor *et al.* 2021). This involves the environment and humans, making it necessary to cultivate a green culture because it promotes ecological development and sustainable economic growth based on politics, science, and aesthetics. According to Tahir *et al.* (2019), the indicators of green organizational culture consist of:

- Environmental problems are natural occurrences, events that happen as part of natural processes. These natural processes occur without causing significant consequences for the environmental system

itself and can naturally recover later (homeostasis). However, environmental problems can no longer be considered solely natural because humans play a very significant role as a causal factor for environmental events.

- Environmental improvement by the organization is persistent, consistent, and regular, involving all elements of the organization at different levels. This is done as a means to reduce the level of waste and diversity, facilitating business processes, improving quality, and enhancing organizational performance. The goal is to create a safe environment that fosters innovation, increases creativity, and achieves excellence in competition.
- Environmental awareness is expressed as the awareness felt by consumers that consuming green products contributes positively to the environment.

1.6. Environmental Performance

According to Sturge *et al.* (2021), environmental performance can be interpreted as forces that influence, either directly or indirectly, the performance of organizations and companies. It can be concluded that environmental performance is a work process in which the environment interacts with each other according to a certain pattern, with each having characteristics and certain values regarding the organization that will not be separated from the environment in which the organization is located, along with its people.

Another understanding of environmental performance is expressed by Todd and Todd (2021), which defines the overall achievement of the company in managing environmental problems as a result of the implementation of the company's operational activities. According to Seebens *et al.* (2018), environmental performance is the company's efforts to create a good environment and carry out joint activities using materials that do not damage the environment. According to Teerawattana and Yang (2019), nine indicators in environmental performance are proposed. These indicators can be considered in the development of sustainable business, which is briefly described as:

1. Gaining a deeper comprehension of sustainability involves incorporating simple practices such as using containers, recycling, and printing on both sides of paper into all office activities.
2. Employees play a significant role in a sustainable strategy, with companies having the opportunity to engage them by assigning tasks like crafting and displaying the company's environmental vision. Empowering workers with clear goals and strategies can capitalize on their knowledge and commitment to the company.
3. Establishing ongoing two-way communication ensures that the company effectively communicates its sustainable strategies to stakeholders while also understanding and meeting public expectations.
4. Recognizing that the company's impact extends beyond the office necessitates a comprehensive understanding of the product life cycle, from design and materials to production, sales, consumer use, and post-use treatment, including recycling and repurposing.
5. A commitment to sustainability involves getting to know and visiting all suppliers, emphasizing the importance of understanding the entire supply chain to develop a more sustainable business.
6. Embracing sustainability requires collaboration not only within the company but also with competitors, other industries, NGOs, and the government. Transparency is increasingly essential, and businesses must operate openly to meet the growing demand for sustainability.
7. The business case for sustainability encompasses a broad spectrum of strategies, starting from employees and customers to suppliers. This continuous process of development and expansion is crucial for sustained success.
8. Recruiting new employees with a shared concern for sustainability, in addition to strong business knowledge, is a key step in making the company more sustainable.
9. Finding joy in sustainability involves innovating in line with the company's sustainability goals. This approach fosters a culture of happiness, encouraging creativity, innovation, and a willingness to experiment without fear.

2. Research Hypothesis Development

Based on the conceptual framework picture, the hypotheses used in this study are as follows:

H1: Green Competence Building affects the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H2: Green Employee Involvement affects the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H3: Green Work Life Balance affects the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

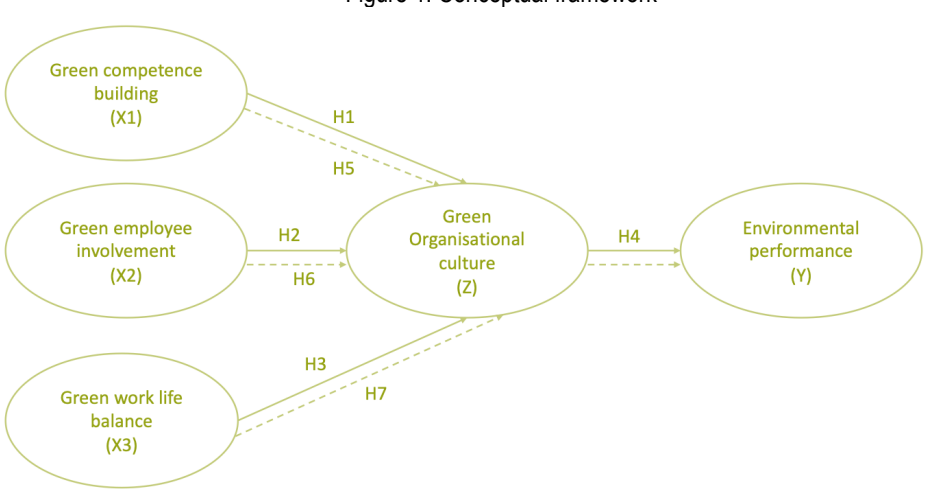
H4: Green Organizational Culture affects the Environmental Performance of the Head of the PGRI Higher Education Study Program in East Java.

H5: Green Competence Building has a significant effect on Environmental Performance mediated by Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H6: Green Employee Involvement has a significant effect on Environmental Performance, which is mediated by Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H7: Green Work Life Balance has a significant effect on Environmental Performance, which is mediated by Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

Figure 1. Conceptual framework



3. Research Methodology

This study employs three independent variables: Green Competence Building, Green Employee Involvement, and Green Work Life Balance. Additionally, it includes one mediating variable, Green Organizational Culture, and one dependent variable, Environmental Performance.

The measurement of Green Competence Building is based on the research by Li *et al.* (2013), comprising 6 indicators. Green Employee Involvement is measured according to the research of Eva *et al.* (2023), encompassing 4 indicators. Green Work Life Balance is measured using the research of Johnson *et al.* (2013), which includes 3 indicators. The measurement of Green Organizational Culture adopts the research by Tahir *et al.* (2019), consisting of 3 indicators. Finally, the measurement of Environmental Performance is based on Teerawattana and Yang (2019), comprising 9 indicators. All indicator items are rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

The sampling technique utilizes a saturated sample or census, encompassing all Heads of PGRI Higher Education Study Programs in East Java, totaling 185 individuals. Data collection methods include questionnaires, interviews, and literature from various sources. The data analysis method employed is SEM PLS, utilizing the Warp PLS 7.0 tool, and testing involves the outer model, inner model, and hypothesis testing using P-Value.

The Head of the PGRI Higher Education Study Program in East Java is described as follows: there are 185 respondents, comprising 107 men and 78 women. The majority of respondents are above 50 years of age, with 4 respondents, and those aged 20-30 years. The highest level of education among respondents is at the S2 level, with 149 respondents, while S3 has 36 respondents, and S1 has 0 respondents. Based on length of service, the majority have a working period of 21-30 years (80 respondents), followed by 11-20 years (44 respondents) and 0-10 years (9 respondents).

4. Research Results

This study utilizes the Partial Least Squares (PLS) approach to path modeling for estimating measurement and structural parameters within the Structural Equation Model (SEM) (Chin 1998).

4.1. Outer Model

In PLS, a procedure similar to the method of Kleijnen *et al.* (2007) is employed to assess the psychometric properties of the measurement instruments, using reflective indicators for all research constructs. An initial null model, devoid of structural relationships, is estimated. Reliability is then evaluated using Composite Scale Reliability (CR) and Average Variance Extracted (AVE) (Fornell dan Larcker 1981), or Cronbach's Alpha (Malhotra *et al.* 1996). The criteria for CR are met if the value exceeds the cutoff of 0.700, and for AVE, the criterion is a value surpassing the cutoff of 0.500 (Fornell and Larcker 1981).

Meanwhile, the criterion for meeting Cronbach's Alpha is exceeding the cutoff value of 0.600 (Malhotra, Agarwal, and Peterson 1996). Convergent validity is evaluated by examining standardized loadings on each construct (Chin 1998), with the criterion for fulfillment being standardized loadings exceeding 0.500. From Table 1, it is evident that all measures exhibit standardized loadings surpassing 0.500, implying that all variables meet the requirements of convergent validity.

The subsequent step involves assessing discriminant validity. Following the guidelines of Fornell and Larcker (1981), the AVE for each construct should be greater than the squared latent factor correlation between pairs of constructs, confirming satisfactory validity for all constructs. Table 1 illustrates that for all constructs, the CR value exceeds 0.700, Cronbach's Alpha value exceeds 0.600, and from Table 2, the AVE value surpasses 0.500. Consequently, it can be affirmed that all constructs demonstrate satisfactory discriminant validity and fulfill the reliability requirements.

Table 1. Validity and reliability measurement results

Variable	Indicator	Outer Loadings	Root Of AVE	Composite Reliability	Cronbach's Alpha
Green Competence Building	GCB1	0.926	0.933	0.976	0.970
	GCB2	0.932			
	GCB3	0.925			
	GCB4	0.945			
	GCB5	0.926			
	GCB6	0.942			
Green Employee Involvement	GEI1	0.942	0.935	0.965	0.952
	GEI2	0.944			
	GEI3	0.909			
	GEI4	0.944			
Green Work Life Balance	GWB1	0.857	0.876	0.908	0.848
	GWB2	0.862			
	GWB3	0.908			
Green Organizational Culture	GOC1	0.928	0.920	0.943	0.909
	GOC2	0.908			
	GOC3	0.924			
Environmental Performance	EP1	0.776	0.737	0.914	0.894
	EP2	0.788			
	EP3	0.733			
	EP4	0.762			
	EP5	0.787			
	EP6	0.724			
	EP7	0.689			
	EP8	0.731			
	EP9	0.633			

Source: Data processed by WarpPLS 7.0, 2023

From Table 1, the results of data processing show combined loadings, indicating that all factor loadings in measuring each research variable have values above 0.6 and are statistically significant ($p < 0.001$) or have a P value < 0.05, confirming the validity of all indicators. The processing of the root value of AVE reveals that for the four variables, the root value of AVE exceeds the correlation value between latent variables. Consequently, all indicators serving as construct measures for the four research variables demonstrate valid discriminant validity.

Further analysis of the data processing involves examining the composite reliability coefficient and Cronbach's alpha coefficient. The test results indicate that all composite reliability values exceed 0.7, and all Cronbach's alpha values are greater than 0.6. Therefore, it can be concluded that the indicators for all variables

have met both composite reliability and internal consistency reliability criteria, demonstrating the acceptance of internal consistency reliability.

4.2. Inner Model

The processing of model fit and quality indices reveals the results of three fit indicators: Average Path Coefficient (APC), Average R-Squared (ARS), and Average Variance Inflation Factor (AVIF). P-values for APC and ARS indicators are calculated through resampling estimation and Bonferroni-like correlation. The P-values for APC, ARS, and AARS are all below 0.05, signifying significance. The AVIF value of 1.785, an indicator of multicollinearity, is less than 3.3, indicating that the data is considered ideal. Similarly, the AFVIF value of 1.724, also indicating multicollinearity, is less than 2.087, reinforcing the ideal nature of the data.

The Tenenhous Goodness of Fit (GoF) displays a value of 0.547, falling into the large category. Additionally, Sympson's Paradox Ratio (SPR) and R-Squared Contribution Ratio (RSCR) have a value of 0.997, categorizing them as good. The Statistical Suppression Ratio (SSR) and Nonlinear Bivariate Causality Direction Ratio (NLBCDR) have a value of 1, which is deemed acceptable.

4.3. Hypothesis Test

Table 2. P Values

Direct Influences	Path Coefficient	P-value	Conclusion
Green Competence Building -> Green Organizational Culture	0.535	<0.001	Highly significant
Green Employee Involvement -> Green Organizational Culture	0.284	<0.001	Highly significant
Green Work Life Balance -> Green Organizational Culture	-0.016	0.412	Not Significant
Green Organizational Culture -> Environmental Performance	0.422	<0.001	Highly significant

Source: Data processed by WarpPLS 7.0

Based on the hypothesis testing conducted on 185 respondents as outlined in Table 2, the following hypotheses can be deduced:

H1: Green Competence Building has a significant effect on the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H2: Green Employee Involvement has a significant effect on the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H3: Green Work-Life Balance does not significantly affect the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H4: Green Organizational Culture has a significant effect on the Environmental Performance of the Head of the PGRI Higher Education Study Program in East Java.

4.4. Mediation Test

To identify mediation in the model, it can be determined by examining the P values of indirect effects for paths with two segments, where a P value ≤ 0.05 (Alpha 5%) indicates significance.

Table 3. P values of indirect effects for paths with two segments

Relationship between Variables			P-Value	Description
Independent Variable	Mediating Variable	Dependent Variable		
Green Competence Building	Green Organizational Culture	Environmental Performance	<0.001	Mediation
Green Employee Involvement	Green Organizational Culture	Environmental Performance	0.010	Mediation
Green Work Life Balance	Green Organizational Culture	Environmental Performance	0.447	Non-mediation

Source: Data processed by WarpPLS 7.0

Based on the P values of indirect effects for paths with two segments presented in Table 3, the following hypotheses can be inferred:

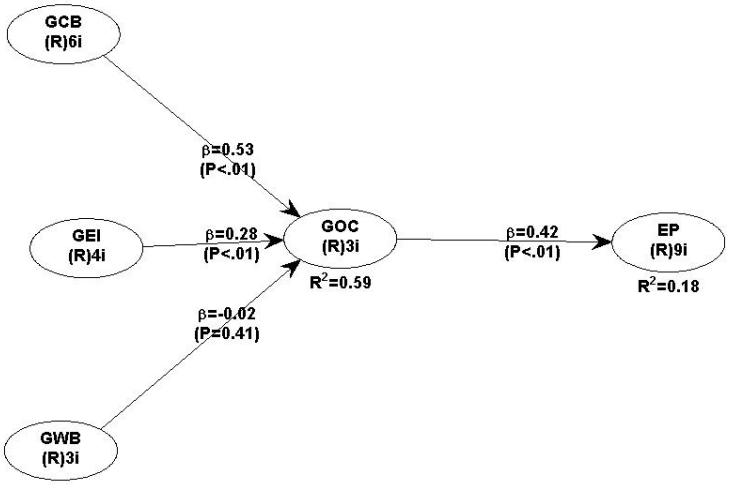
H5: Green Competence Building has a significant effect on Environmental Performance, which is mediated by the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H6: Green Employee Involvement has a significant effect on Environmental Performance, which is mediated by the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

H7: Green Work-Life Balance has a significant effect on Environmental Performance, not mediated by the Green Organizational Culture of the Head of the PGRI Higher Education Study Program in East Java.

To determine whether the model exhibits full or partial mediation, one can examine the P-value values for both direct and indirect effects, as indicated by the data processing results:

Figure 2. Research model results



5. Discussions

The chairman of the PGRI Higher Education Study Program in the East Java region is generally knowledgeable about environmental protection to enhance environmental awareness. All study program leaders are required to prioritize the surrounding environment for sustainable environmental improvement. In the current scope of work, the chairman of the study program, according to their abilities, consistently completes tasks with attention to environmental considerations. Elevating environmental awareness within the higher education environment is deemed crucial. The head of the study program must opt for green products when they are of equal quality to non-green alternatives, underscoring the environment as a primary concern for promoting sustainable practices. Furthermore, the head of study program in the PGRI Higher Education East Java is obligated to establish environmental goals for each academic community, fostering environmental consciousness among all members. Neglecting the environment can disrupt the delicate balance of nature. The research findings indicate that green competence building positively influences the green organizational culture held by the Head of the PGRI Higher Education Study Program in the East Java region.

Study program leaders play a pivotal role by inspiring and mobilizing all stakeholders within the college environment to actively participate in sustainable environmental conservation initiatives. They can foster a collective commitment by instilling a sense of belonging to the sustainability of the university environment. The engagement of program leaders is critical in achieving the college's environmental goals, leading to increased commitment and motivation. Integrating sustainable environmental practices into the daily work culture goes beyond mere adoption, ensuring that these practices become a natural part of how study program leaders operate in higher education. In light of this description, it becomes evident that green employee involvement serves as a crucial catalyst for generating and reinforcing a green organizational culture. The results demonstrate that green employee involvement significantly influences the green organizational culture of the Head of the PGRI Higher Education Study Program in the East Java region.

The Head of the PGRI Higher Education Study Program in the East Java region should allocate more attention and focus to fulfill his duties. This is crucial to ensure he does not overlook the importance of maintaining a green work-life balance, which, in turn, could affect the development of a green organizational culture. Any disparity in perception regarding the significance of a green work-life balance among the Head of the Study Program and other campus stakeholders may impede the formation of an optimal green organizational culture. Failure to strike a balance between these two aspects might not immediately manifest consequences, but over time, it could have a negative impact.

Efforts to establish a green work-life balance must be integrated with initiatives to cultivate a green organizational culture that aligns with environmental sustainability. Separating these endeavors or neglecting one over the other could hinder the desired outcomes. Insufficient information or understanding about these efforts within the internal campus community may further challenge the Head of the Study Program in achieving an effective balance, resulting in suboptimal results. The study's findings indicate that green work-life balance had an insignificant effect on the green organizational culture of the Head of the PGRI College Study Program in the East Java region.

Conclusions and Further Research

Notably, a positive and significant correlation exists between a green organizational culture and the environmental performance of the Head of the PGRI Higher Education Study Program in the East Java region. Policies established by the Head of the Study Program regarding green organizational culture play a pivotal role in enhancing environmental performance. A green organizational culture encompasses a set of beliefs, values, and norms that shape the Head of the Study Program's perspective on the importance of managing and empowering a culture that prioritizes environmental stewardship around the campus. The research results affirm that a green organizational culture significantly influences the environmental performance of the Head of the PGRI College Study Program in the East Java region.

The interpretation of a green organizational culture that is environmentally friendly serves as a mediator for the impact of green competence building, emphasizing environmental care, on environmental performance. This suggests that the Head of the PGRI Higher Education Study Program in the East Java region is making efforts to enhance the capacity of internal campus parties (by increasing their environmental care capabilities). The practice of green competence building has a positive impact on improving environmental performance, and this relationship can be influenced or mediated by focusing on the sustainability of the green organizational culture. The study's findings indicate that green competence building significantly affects environmental performance, and this impact is mediated by the green organizational culture of the Head of the PGRI Higher Education Study Program in East Java.

Similarly, green organizational culture acts as a mediator for the influence of green employee involvement on environmental performance. This implies that the effect of green employee involvement on environmental performance operates through the mechanism of green organizational culture. Green employee involvement is defined as the extent to which study program leaders engage in initiatives and activities related to efforts aimed at ensuring the sustainability of the college environment. Green organizational culture involves establishing policies that promote and support work activities aligning with environmental care. Environmental performance refers to the success of the study program leader in managing the environment for preservation. The research results show that green employee involvement significantly affects environmental performance, and this effect is mediated by the green organizational culture of the Head of the PGRI Higher Education Study Program in the East Java region.

However, green organizational culture cannot mediate the effect of green employee involvement on environmental performance. In this context, green employee involvement still pertains to the extent to which study program leaders participate in initiatives related to the sustainability of college environmental preservation. Green organizational culture, involving policies that encourage environmentally conscious work activities, does not play a mediating role in this relationship. The study's results indicate that green work-life balance has a significant effect on environmental performance, and this effect is not mediated by the green organizational culture of the Head of the PGRI Higher Education Study Program in the East Java region.

Credit Authorship Contribution Statement:

Deni Widyo Prasetyo: Contributed to conceptualization, investigation, methodology, project administration, software development, formal analysis, and original draft writing.
Amiartuti Kusmaningtyas: Involved in investigation, methodology, supervision, data curation, validation, and contributed to writing through review and editing.
Siti Mujanah: Contributed to investigation, methodology, supervision, data curation, validation, and played a role in writing through 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.

References

[1] Abdulai Sawaneh, I., and Kanko Kamara, F. 2019. An Effective Employee Retention Policies as a Way to Boost Organizational Performance. *Journal of Human Resource Management*, 7(2): 41. DOI:https://doi.org/10.11648/j.jhrm.20190702.12

[2] Aggarwal, Priyanka, and Tanuja Agarwala. 2021. Green Organizational Culture: An Exploration of Dimensions. *Global Business Review*. DOI: https://doi.org/10.1177/09721509211049890

[3] Akpa, O. M., *et al.* 2022. Frequent Vegetable Consumption is Inversely Associated with Hypertension among Indigenous Africans. *European Journal of Preventive Cardiology*, 29(18): 2359–71. DOI:https://doi.org/10.1093/eurjpc/zwac208

[4] Alfikalia, A., Haryanto, H. C. and Widyaningsih, A. 2022. Dinamika Pengelolaan Program Merdeka Belajar - Kampus Merdeka Pada Kampus Swasta. *Jurnal Studi Guru Dan Pembelajaran*, 5(1): 111–23. DOI:https://doi.org/10.30605/jsgp.5.1.2022.1557 (in Indonesian)

[5] Alshuwaikhat, H., and Abubakar, I. 2008. Higher Education for Sustainable Development An Integrated Approach to Achieving Campus Sustainability: Assessment of the Current Campus Environmental Management Practices. *Proceedings of the 4th International Barcelona Conference on Higher Education 7.*

[6] Anwar, A., Malik, M., Raees, V. and Anwar, A. 2020. Role of Mass Media and Public Health Communications in the COVID-19 Pandemic, *Cureus*, 12(9). DOI: https://doi.org/10.7759/cureus.10453

[7] Borsanyi, S., *et al.* 2021. Leading Hadronic Contribution to the Muon Magnetic Moment from Lattice QCD. *Nature*, 593(7857): 51–55. DOI: https://doi.org/10.1038/s41586-021-03418-1

[8] Boxall, P., and MacKy, K. 2009. Research and Theory on High-Performance Work Systems: Progressing the High-Involvement Stream. *Human Resource Management Journal,* 19(1): 3–23. DOI:https://doi.org/10.1111/j.1748-8583.2008.00082.x

[9] Brinkhurst, M., Rose, P., Maurice, G. and Ackerman, J. D.. 2011. "Achieving Campus Sustainability: Top-down, Bottom-up, or Neither?, *International Journal of Sustainability in Higher Education,* 12(4): 338–54. DOI: https://doi.org/10.1108/14676371111168269

[10] Chin, Wynne W. 1998. Issues and Opinion on Structural Equation Modeling, *MIS Quarterly: Management Information Systems*, 22(1)

[11] Fodor, É., Gregor, A., Koltai, J. and Kováts, E. 2021. The Impact of COVID-19 on the Gender Division of Childcare Work in Hungary, *European Societies,* 23(S1): S95–110. DOI:https://doi.org/10.1080/14616696.2020.1817522

[12] Hui, I. K., Alan H.S. Chan, and K. F. Pun. 2001. Study of the Environmental Management System Implementation Practices. *Journal of Cleaner Production*, 9(3): 269–76. DOI: https://doi.org/10.1016/S0959-6526(00)00061-5

[13] Johnson, P. J., *et al.* 2013. Brivanib versus Sorafenib as First-Line Therapy in Patients with Unresectable, Advanced Hepatocellular Carcinoma: Results from the Randomized Phase III BRISK-FL Study. *Journal of Clinical Oncology*, 31(28): 3517–24. DOI: https://doi.org/10.1200/JCO.2012.48.4410

[14] Kleijnen, M., de Ruyter, K. and Wetzels, M. 2007. An Assessment of Value Creation in Mobile Service Delivery and the Moderating Role of Time Consciousness. *Journal of Retailing*, 83(1): 33–46. DOI:https://doi.org/10.1016/j.jretai.2006.10.004

[15] Lanatri D. 2022. The Mediating Role of Green Training To the Influence of Green Organizational Culture To Green Organizational Citizenship Behavior and Green Employee Involvement, *International Journal of Human Capital Management,* 6(1): 66–75. DOI: https://doi.org/10.21009/ijhcm.06.01.6

[16] Li, Yuan Yuan, *et al.* 2013. Project Management Factors Affecting Green Building Projects: Case Study of Singapore, *Applied Mechanics and Materials,* 357–360: 2346–52. DOI:https://doi.org/10.4028/www.scientific.net/AMM.357-360.2346

[17] Mahn, D., and Poblete, C. 2023. Contextualizing the Knowledge Spillover Theory of Entrepreneurship: The Chilean Paradox, *Entrepreneurship and Regional Development*, 35(1–2): 209–39. DOI:https://doi.org/10.1080/08985626.2022.2117418

[18] Malhotra, N. K., Agarwal, J. and Peterson, M. 1996. Methodological Issues in Cross-Cultural Marketing Research: A State-of-the-Art Review, *International Marketing Review,* 13(5): 7–43. DOI:https://doi.org/10.1108/02651339610131379

[19] Malinski, T., Bailey, F., Zhang, Z. G. and Chopp, M. 1993. Nitric Oxide Measured by a Porphyrinic Microsensor in Rat Brain after Transient Middle Cerebral Artery Occlusion, *Journal of Cerebral Blood Flow and Metabolism* 13 (3): 355–58. DOI: https://doi.org/10.1038/jcbfm.1993.48

[20] Mia, M. M., *et al.* 2022. The Impact of Green Entrepreneurship on Social Change and Factors Influencing AMO Theory, *Systems*, 10(5). DOI: https://doi.org/10.3390/systems10050132

[21] Mikulik, J., and Babina, M. 2009. The Role of Universities in Environmental Management. *Polish Journal of Environmental Studies,* 18(4): 527–31

[22] Mtutu, P., and Thondhlana, G. 2016. Encouraging Pro-Environmental Behaviour: Energy Use and Recycling at Rhodes University, South Africa, *Habitat International*, 53: 142–50. DOI:https://doi.org/10.1016/j.habitatint.2015.11.031

[23] Muisyo, P. K., and Su Qin. 2021. Enhancing the FIRM'S Green Performance through Green HRM: The Moderating Role of Green Innovation Culture, *Journal of Cleaner Production,* 289: 125720. DOI:https://doi.org/10.1016/j.jclepro.2020.125720

[24] Nogueira, R. C., Keim, B. D., Brown, D.P. and Robbins, K. D. 2013. Variability of Rainfall from Tropical Cyclones in the Eastern USA and Its Association to the AMO and ENSO, *Theoretical and Applied Climatology*, 112(1–2): 273–83. DOI: https://doi.org/10.1007/s00704-012-0722-y

[25] Putra, S. W. 2015. Pengaruh Komitmen Organisasi, Budaya Organisasi, Gaya Kepemimpinan Dan Lingkungan Terhadap Kinerja Karyawan Pada Industri Kecil, *Jurnal Ekonomi Modernisasi*, 11(1): 62. DOI:https://doi.org/10.21067/jem.v11i1.869 (in Indonesian)

[26] Rayner, J., and Morgan, D.2018. An Empirical Study of 'Green' Workplace Behaviours: Ability, Motivation and Opportunity, *Asia Pacific Journal of Human Resources*, 56(1): 56–78. DOI: https://doi.org/10.1111/1744-7941.12151

[27] Saadatian, O., Salleh, E. I., Tahir, O. M. and Dola, K. 2009. Observations of Sustainability Practices in Malaysian Research Universities: Highlighting Particular Strengths, *Pertanika Journal of Social Science and Humanities*, 17(2): 225–44

[28] Sandiford, Peter John, and Sally Green. 2021. It's My Passion and Not Really Like Work': Balancing Precarity with the Work–Life of a Volunteer Team Leader in the Conservation Sector, *Work, Employment and Society*, 35(3): 595–605. DOI: https://doi.org/10.1177/0950017020942052

[29] Seebens, Hanno, Tim M. Blackburn, Ellie E. Dyer, Piero Genovesi, Philip E. Hulme, Jonathan M. Jeschke, Shyama Pagad, *et al.* 2018. Global Rise in Emerging Alien Species Results from Increased Accessibility of New Source Pools, *Proceedings of the National Academy of Sciences of the United States of America*, 115(10): E2264–73. DOI: https://doi.org/10.1073/pnas.1719429115

[30] Sturge, Jodi, Mirjam Klaassens, Debbie Lager, Gerd Weitkamp, Daan Vegter, and Louise Meijering. 2021. Using the Concept of Activity Space to Understand the Social Health of Older Adults Living with Memory Problems and Dementia at Home, *Social Science and Medicine,* 288: 113208. DOI:https://doi.org/10.1016/j.socscimed.2020.113208

[31] Tahir, R., *et al.* 2019. Green Organizational Culture: A Review of Literature and Future Research Agenda, *Annals of Contemporary Developments in Management and HR*, 1(1): 23–38. DOI:https://doi.org/10.33166/acdmhr.2019.01.004

[32] Teerawattana, R., and Yi Chih Yang. 2019. Environmental Performance Indicators for Green Port Policy Evaluation: Case Study of Laem Chabang Port, *Asian Journal of Shipping and Logistics,* 35(1): 63–69. DOI:https://doi.org/10.1016/j.ajsl.2019.03.009

[33] Todd, H., and Todd, D. 2021. Poverty, Climate Change and Disaster Risk Reduction: Too Complex to Evaluate? *Evaluating Environment in International Development*. DOI:https://doi.org/10.4324/9781003094821-5

[34] Watson, M. K., Lozano, R., Noyes, C. and Rodgers, M. 2013. Assessing Curricula Contribution to Sustainability More Holistically: Experiences from the Integration of Curricula Assessment and Students' Perceptions at the Georgia Institute of Technology, *Journal of Cleaner Production*, 61: 106–16. DOI:https://doi.org/10.1016/j.jclepro.2013.09.010

[35] Wijoyo, S., and Mashuri, M. A. 2020. Amo Development Strategy in Improving the Performance of BUMD In East Java Province, *Palarch's Journal of Archaeology*, 17. DOI:/10.13140/RG.2.2.28620.23689

[36] Yodsuban, P., *et al.* 2023. The Roles of Community Health Nurses for Older Adults during the COVID-19 Pandemic in Northeastern Thailand: A Qualitative Study, *International Journal of Nursing Sciences*, 10(1): 53–63. DOI: https://doi.org/10.1016/j.ijnss.2022.12.014

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Sustainability of the Sumedang Larang Palace as a Tourism Attraction of the Kingdom of Sunda Heritage in West Java

Rahmat INGKADIJAYA
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0000-0002-5404-8670; Researcher ID: AAD-1207-2021
rahmatingka@iptrisakti.ac.id

Fetty ASMANIATI
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0000-0002-8806-8813; Researcher ID: GLU-0220-2022
fettyasmaniati@iptrisakti.ac.id

Heny RATNANINGTYAS
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0009-0006-1947-5278; Researcher ID: GLU-0203-2022
heny.ratnaningtyas@iptrisakti.ac.id

Myrza RAHMANITA
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0000-0001-5774-6311; Researcher ID: AEG-6207-2022
myrzarahmanita@iptrisakti.ac.id

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Abstract: Sumedang Larang Palace is the last Sunda Kingdom Palace in West Java today. This study aims to explore the supporting elements of the Sumedang Larang Palace as a tourist attraction for the Sunda Kingdom heritage in West Java. This type of research is descriptive qualitative research. The place of this research is the Sumedang Larang Royal Palace, located in the city of Sumedang. The primary data used in this study were obtained by interview, observation, and documentation. The results showed that the Nazir Waqf Foundation of Sumedang Prince mandated the Sumedang Larang Palace. In managing the Palace as a heritage tourism destination, it has been regulated in the organizational structure of the Foundation. Employee management is carried out by human resource management, who records, directs, supervises, and performs operations. Furthermore, through its management, the Foundation also maintains and adequately manages the collection of historical artifacts of the Sumedang Kingdom at the Geusan Ulun Museum. Resources are collected independently by managing palace assets. The Foundation also cooperates with external parties to organize and manage the Palace by involving the government, academia, the private sector, and the media.

Keywords: Heritage Tourism; Museum Geusan Ulun; Sumedang Larang Palace.

JEL Classification: L83; Q56; R11; Z11.

Introduction

This kingdom's historic cultural tour offers an immersive experience that combines the charm of historic architecture, art, and rich traditions. Visitors can feel the atmosphere of the splendor and glory of the past through visits to historical places such as palaces, temples, or forts, which were once the center of royal power (Priyomarsono 2023). Museum exhibitions depicting valuable artifacts, paintings, and traditional art objects help bring the kingdom's history to life (Franceschini *et al.* 2016). Royal cultural tourism allows tourists to watch cultural performances that present dance, music, and traditional ceremonies that inherit the royal cultural heritage. Thus, royal historical cultural tourism provides insight into the past, allows for exciting educational experiences, and preserves valuable cultural treasures for future generations (Richards 2018).

Sumedang has a very long history. Based on historical data, before Indonesia's independence, the Sumedang region had experienced prehistoric times, ancient Sumedang historical times, the Kingdom of Sumedang Larang (1580-1620), the era of Mataram influence (1620–1677), the Company era (1677-1799), the Dutch East Indies government (1808-1942), and the Japanese Occupation period (1942-1945). The rulers, both kings and regents, left traces of their history, both in the form of artifacts (facts in the form of objects) and mentions (mental attributes), as well as social facts (social facts). From time to time, these facts accumulate into a collective memory and simultaneously become the local community's pride. One of the famous kings known in Sumedang and throughout West Java, Prince Geusan Ulun (1580–1601), was a king in the Sumedang Larang era (Priyomarsono, 2023).

The Sumedang Larang Royal Palace has been exhibited in national and international events, including the Court Arts of Indonesia exhibition in Rotterdam, the Netherlands, the United States Indonesian Culture exhibition (KIAS), an exhibition of palace objects every two years at the Nusantara Palace Festival, The Islamic World Exhibition in Australia, and the History Exhibition in Bogor. This custom is one of the conservation efforts carried out by the Sumedang Larang Palace to preserve Sundanese traditions, as well as other functions, namely historical research, and research conducted to examine the histories of the Sumedang Larang Kingdom (Hermawan *et al.* 2017).

Sumedang Regency is one of Indonesia's regions, which still has a lot of evidence of its past work's historical and cultural heritage. At first, Sumedang Regency was a kingdom under the rule of King Galuh, founded by Prabu Geusan Ulun Adji Putih on the orders of King Suryadewata before the Galuh Palace moved to Padjadjaran, Bogor. Along with the changing times and leadership, the name Sumedang underwent several changes. The first is the Kingdom of Tembong Agung (Tembong means visible, and Agung means sublime). Prabu Guru Adji Putih led in the XII century. Then during the time of Prabu Tadjimalela, it became Himbar Buana, which determined nature, and later became Sumedang Larang (Sumedang comes from Insun Medal and Insun Medangan, which means I was born, and prohibit means something incomparable). Sumedang Larang experienced a heyday under the leadership of Pangeran Angka Wijaya or Prabu Geusan Ulun around 1578. He was widely known to remote parts of West Java, with its territory covering the southern region to the Indian Ocean, the northern region to the Java Sea, and the western region to the Cisadane River. , and the eastern part up to the Cipamali River (Tubagus *et al.* 2020).

Now, Sumedang still leaves various historical evidence of what has happened. To see the historical heritage of the kingdoms in the city of Sumedang in the form of historical artifacts such as heirlooms, royal attributes, royal equipment, and ancient manuscripts from the Sumedang Kingdom, which can be seen in general at the Geusan Ulun Museum. This Museum contains various heirlooms and many historically valuable objects, including tools used during the Sumedang kingdom when Dalem Sumedang (Prince Geusan Ulun) was in power. Other relics include traditional music equipment and pictures/paintings of the Sumedang Regent from the early years of Sumedang's existence (Gantina *et al.* 2021).

The tourism potential in Sumedang Regency is dominated by natural and historical tourism. This is supported by most of the Sumedang Regency, a highland. One of the mountains that are well known is Mount Tampomas in North Sumedang (Hardy *et al.* 2021). However, the potential for historical and cultural tourism exists in the Sumedang Larang Royal Palace. Sumedang Regency has a palace called the Sumedang Larang Royal Palace. This place is a destination for tourists who want historical tours of the Sumedang Regency. The Sumedang Larang Royal Palace is fascinating because it has assets from the heritage of historical objects and heirlooms of the Sumedang Ancestors, since the Kings of the Sumedang Larang Kingdom and the Regents who ruled Sumedang Regency first. This collection of objects has been stored at the Prince Sumedang Foundation since 1955. At this time, the Sumedang Larang Royal Palace has improved placing historical objects and building designs (Hermawan *et al.* 2017).

The Museum is a permanent body; it does not depend on who owns it but must continue to exist. The Museum is not only a place of pleasure but also for study and research. The Museum is open to the public, and the presence and functions of the Museum are for the benefit and progress of the community. The museum directorate explained that the Museum is a business entity that helps advance the community (Baskoro *et al.* 2014). Several palaces in Indonesia have museums. The Museum is represented by a foundation, which is also the family of the Palace; the Foundation is tasked with managing museums related to cultural heritage, namely as an institution, storage, maintenance, security, and utilization of material evidence (Sellato 2015). The product of royal culture and nature and the environment to support efforts to protect and preserve the nation's cultural wealth. However, the Museum owned by the Palace is always related to the science of the history of the Palace, and the culture of the Palace generally has a comprehensive meaning. Museum collections owned by the Palace

are materials or objects of scientific research (Xiao *et al.* 2018). The Foundation that manages the Museum is in charge of organizing, completing, and developing the availability of scientific research objects for anyone in need (Gao and Yu 2024). Foundations as museum managers are also tasked with providing facilities for research activities for anyone; besides that, museums are tasked with carrying out research activities and disseminating the research results to develop general knowledge (Baskoro *et al.* 2014).

The Sumedang Larang Royal Palace is a heritage tourist attraction and an excellent educational facility. Various historical pieces of evidence are fascinating to study. The number of visitors who come to the Palace every year is increasing, especially from students around the area, from elementary schools to universities. Apart from students and college students, there have been visits from domestic and foreign tourists. However, the increasing number of tourists is demanding more professional management. This study aims to explore the supporting elements of the Sumedang Larang Palace as a tourist attraction of the Sunda Kingdom heritage, namely aspects of governance, human resource development, maintenance of historical artifacts, funds, and cooperation with outside parties or stakeholders.

This research contributes significantly by presenting an in-depth understanding of the management and development potential of the Sumedang Larang Palace as a historical tourist attraction. Involving supporting elements such as governance, human resource development, maintenance of historical artifacts, funding, and collaboration with external parties, this research focuses on holistic analysis that has yet to be fully explored. The novelty of this primary research lies in its interdisciplinary approach that combines historical data, museum documentation, and visitor surveys. This approach provides a more comprehensive picture of the dynamics of the Sumedang Larang Palace as a historical tourist destination. The integration of these data allows researchers to understand the challenges and opportunities in management while at the same time generating a broader understanding of visitor preferences and perceptions of this tourist attraction.

Apart from that, the main difference is the focus on the Sumedang Larang Palace as the center of the rich culture and history of the Sunda Kingdom. The combination of cultural and historical aspects and an innovative approach to analyzing tourism potential makes this research a valuable contribution to the literary academy and managing historical tourist destinations in Indonesia. The progress of this research also lies in the emphasis on termination in managing tourist attractions. Careful analysis of enablers and constraints in management, human resources, artifact maintenance, and funding provides a solid foundation for designing more effective desirability strategies. Thus, this research includes understanding and practical guidance for decision-making to advance and preserve the Sumedang Larang Palace as a dynamic historical tourist destination.

1. Literature Review

1.1. Heritage Tourism

Heritage tourism is a form of tourism that focuses on the cultural and historical heritage of a place. The main aim of heritage tourism is to understand, appreciate, and celebrate the cultural heritage of a region. This includes visits to historic sites, museums, and historic buildings and participating in activities promoting an understanding of local cultural values, traditions, and history. Heritage tourism also involves preserving and sustaining the heritage so that future generations can continue to enjoy and learn from the heritage (Arumugam *et al.* 2023). Heritage tourism experiences can include various aspects, such as exploring archaeological sites, taking historical tours, participating in cultural festivals, or interacting with local communities to understand their cultural values better. By combining educational, recreational, and conservation approaches, heritage tourism plays a role in strengthening cultural identity, increasing awareness of historical heritage, and encouraging respect for cultural diversity in various parts of the world (Abouelmagd 2023).

1.2. Royal Museum

Royal historical culture refers to the cultural heritage associated with a particular kingdom or empire in a historical context. It covers various aspects, ranging from government systems, social structures, art, and beliefs to historical events that were integral to the kingdom's journey. Understanding the cultural history of the kingdom provides deep insight into how societies in the past organized themselves, developed their cultural identity, and formed the values that became the basis of everyday life (Priyomarsono 2023).

In exploring the cultural history of the kingdom, archaeological research, historical documentation, and artistic interpretation are the keys to uncovering this cultural heritage. This includes searching for artifacts, historical objects, and ancient manuscripts that provide an overview of life and events during the kingdom's era. Studying the kingdom's cultural history allows us to respect and appreciate its historical heritage and helps preserve the story of a civilization that has existed since ancient times (Estrada Cruz 2019).

Royal Museums are in museums or groups of museums that have a direct or historical relationship with a country's royal family or monarchy. The Museum was initially dedicated to exhibiting and preserving artifacts, art, and cultural heritage related to the history and life of the kingdom. Royal Museums often house valuable collections, including royal clothing, jewelry, art objects, and historical documentation that provide deep insight into the running of a kingdom or monarchy (Viejo-Rose 2015). The importance of the Royal Museum lies not only in the function of its collections and exhibitions but also as a center for education and cultural heritage preservation. The Museum frequently hosts educational programs, tours, and special events to broaden the public's knowledge of the kingdom's history, traditions, and cultural values contained within. Through these preservation and educational efforts, the Royal Museums contribute to a better understanding of national history and cultural identity while honoring and celebrating the kingdom's unique heritage (Green *et al.* 2023).

1.3. Previous Research

Peleggi (1996) shows that the tourist attraction of royal heritage includes in-depth analysis of historical sites related to the kingdom or monarchy. This research aims to identify, understand, and evaluate the tourist attractions of royal heritage. This research includes collecting historical data regarding various aspects of the kingdom, such as important events, royal figures, and government structure. Historical sources such as archives, ancient manuscripts, and official records are often the main focus. Boboc *et al.* (2023) research includes an analysis of physical sites related to the kingdom, such as palaces, castles, and other historical places. This may involve archaeological surveys, visual documentation, and mapping to understand the physical and architectural aspects of the royal heritage tourist attraction. This research may also involve field research to collect data directly from these sites.

The research by Buzon (2021) involves tourism market analysis to evaluate tourist interest and demand for the Royal Heritage Tourist Attraction. This involves researching tourists' preferences, travel motivations, and other factors influencing their decisions to visit these historical sites. This data can help develop marketing and destination management strategies to increase tourism attractiveness. Research on royal heritage tourist attractions conducted by Fino *et al.* (2023) investigated tourism's economic and social impacts on local communities around these historical sites. This involves understanding the contribution of tourism to local income, employment, and other economic development. In addition, this research can also consider tourism's social and cultural impacts on local communities, including cultural preservation and education efforts.

Research by Luo *et al.* (2019) can provide recommendations for sustainable management and development of royal heritage tourist attractions, suggestions for preserving historical sites, managing tourist visits, developing tourism infrastructure, and other efforts to ensure the kingdom's heritage can be preserved and enjoyed by future generations. Overall, this research is essential to support sustainable tourism development and careful management of cultural heritage.

2. Research Methodology

This type of research is descriptive qualitative research, a problem-solving process described by clearly describing the research variables and explaining what causes a symptom or social reality. This study aims to obtain information on the current state and its relation to the variables that drive a sign or social reality. The place of this research is the Keraton Prabu Geusan Ulun, a museum in the city of Sumedang. The writer chose this location as a research location because the writer found the problems that arose in the Prabu Geusan Ulun Palace related to how the management of the Prabu Geusan Ulun Palace in Sumedang City. Hence, the authors were interested in researching it. The management of the Prabu Geusan Ulun Palace has yet to be managed based on the existing authority. The research period starts from July 2022 to September 2022.

The primary data in this study was obtained by free structured interviews, namely by asking questions orally, without a structured question arrangement prepared in advance. However, it still has guidelines that refer to and are relevant to the research framework and objectives. This is done to obtain as much information as possible and maintain the purpose of seeking research on the Management of the Prabu Geusan Ulun Palace in Sumedang City. Secondary data is data obtained indirectly from intermediary research subjects. The data obtained through information and information from the relevant agencies in this research problem are needed to complement the research foundation. This data is in the form of data about the research area, archives, written reports, books, and so on issued by government agencies that support the representation of this research.

The stages in this research are as follows: (1) Data reduction involves editing, grouping, and summarizing the data. Then, compose codes and notes on several things, including those relating to activities and processes, so that researchers can find themes, groups, and data patterns; (2) The presentation of data includes grouping

one data with other data groups so that all the data analyzed are involved in one unit, then describing the existing data in a simple, detailed, intact, and integrative manner that is used to determine the next step in concluding existing data; (3) Concluding, namely the researcher confirms, sharpens, or maybe revises the conclusions that have been made to conclude in the form of scientific propositions about the phenomenon or reality being studied.

To collect the required data, the authors use the following collection tools: (1) Observation, in this study to collect data in the field by observing directly how the work process carried out in the management of the Prabu Geusan Ulun Palace in Sumedang City; (2) Interviews to ask questions verbally from the Sumedang Palace family and the Nazir Waqf Foundation of Sumedang Prince, which resulted in interview transcript data; (3) Documentation looks for data on things or variables in the form of notes, transcripts, books, newspapers, magazines, archives, minutes of meetings, agendas, and so on. Analysis of the data used in this research uses the descriptive qualitative method. The data obtained will be discussed thoroughly based on facts in the Sumedang Larang Palace. The place where this research is applied is compared with the concepts and theories that support the discussion of the problems in this research and the generally accepted conclusions. The qualitative descriptive method analyzes and formulates arguments by comparing the facts found in the field in written words from the observed people and actors.

3. Result and Discussion

3.1. History of the Sumedang Larang Royal Palace

Sumedang has long historical roots, namely the prehistoric period, the period of the Ancient Kingdom of Sumedang Larang (900 to 1601), the Wedana Regent (1601 to 1706), the VOC Regent (1706 to 1799), the Regent period of the Dutch East Indies Government (1800 to 1942), during the Regents of the Japanese Occupation Period (1942 s.d. 1945), and regents during the independence period. This also means that Sumedang has a long history of government (Muhsin 2008). The forerunner of the Sumedang Larang Kingdom was the Tembong Agung Kingdom, centered in Leuwihideung, a village now in Darmaraja District. This kingdom was led by Prabu Guru Haji Aji Putih, who ruled around 1500 and died and was buried in Astana Cipeueut, Cipaku Village, Darmaraja District. Prabu Aji Putih, the king of the Tembong Agung Kingdom, is the brother of King Sri Baduga Maharaja, who is also known as Prabu Silihwangi; Prabu Aji Putih has a son named Prabu Tajimalela as the founder of the Sumedang Larang Kingdom whose central government is in Leuwihideung, Darmaraja Regency now (Luthfiatin and Abdillah 2022).

King Tajimalela had twins, namely Prabu Lembu Agung and Prabu Gajah Agung. After King Tajimalela died, the Sumedang Larang Kingdom was led by King Lembu Agung or King Peteng Aji. Then, because he chose to become a sage, the Sumedang Larang Kingdom was led by Prabu Gajah Agung. After the death of King Gajah Agung, royal power was led by his son, Sunan Guling. Furthermore, after Sunan Guling died, his position was replaced by his son, Sunan Tuakan, who died and was buried in Heubeul Isak, Cinanggerang Village, South Sumedang Regency. Then, after the death of Sunan Tuakan, the kingdom was led by his daughter, Nyi Mas Ratu Patuakan. After Nyi Mas Ratu Patuakan died, he was succeeded by his daughter, Nyi Mas Ratu Inten Dewata, who, after becoming the ruler of Sumedang Larang Kingdom, had the title Ratu Pucuk Umun (Muhsin, 2008).

After Queen Pucuk Umun and Prince Santri died (estimated in 1579), the nexSt k Sumedang Larang Kingdom ing was his eldest son named, Raden Angkawijaya, who had the title Prabu Geusan Ulun and ruled Sumedang Larang from 1579-1601. Prabu Geusan Ulun was the last king of the Sumedang Larang Kingdom Dynasty. King Geusan Ulun was the previous king and the end of the Sumedang Larang Kingdom. Furthermore, the government in Sumedang is in the form of a district led by a regent. In addition, during the Geusan Ulun period, a monumental event was embedded in the community's collective memory, which became a hereditary story, namely the conflict with Cirebon (Muhsin 2008). With such a long history of the Sumedang Larang Kingdom, the Sundanese kingdom still leaves its history and cultural heritage, which are most found in the Geusan Ulun Museum, namely historical artifacts such as war heirlooms, royal attributes, equipment of kings and ancient manuscripts from the Sumedang Kingdom which can be seen visually. Familiar with various heirlooms and many objects of historical value, including tools used during the Sumedang kingdom (Thresnawaty 2011).

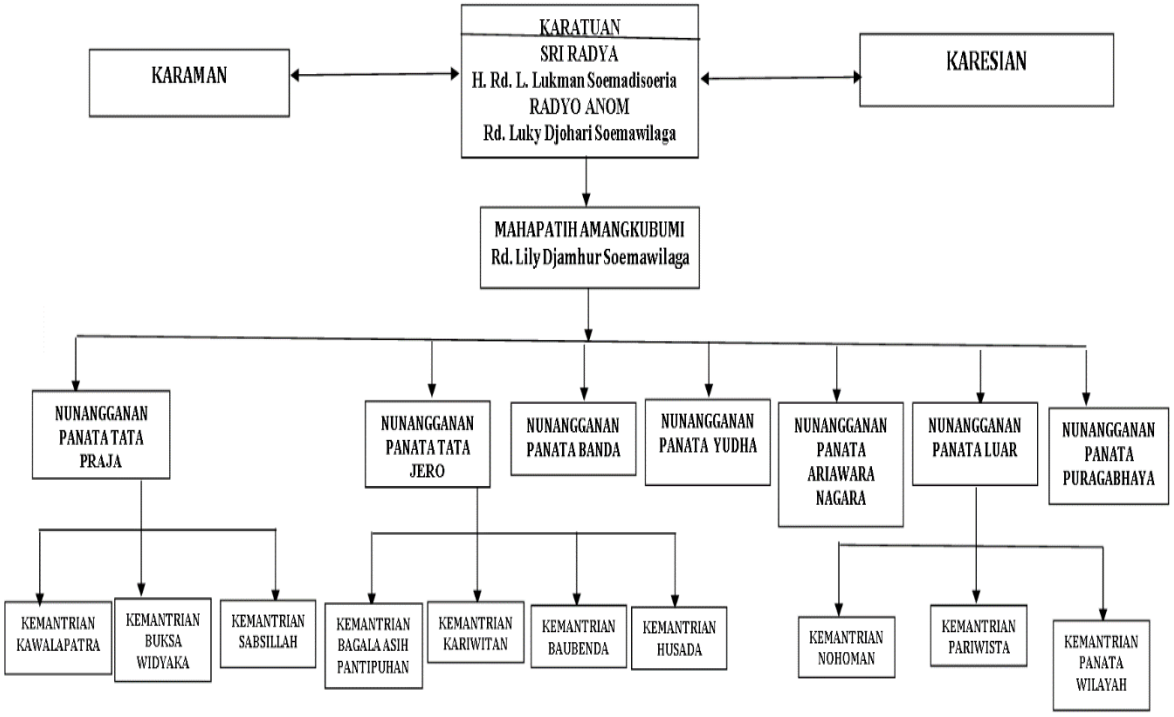
3.2. Sumedang Larang Palace Management

In managing the Palace as a heritage tourism destination, it has been regulated in the organizational structure of the Foundation. The Nazir Wakf Foundation of Sumedang Prince in the historical heritage of Sundanese culture in the form of collection, documentation, maintenance, and the need for Sundanese cultural history in sustainable management, human resource management is needed to manage the Geusan Ulun Museum; it is necessary to

have several employees who needed to care for and maintain this Sundanese history and culture museum to continue to develop and remain sustainable.

The Geusan Ulun Museum is managed by the Nazir Waqf Foundation of Sumedang Prince, which the Sumedang Larang Palace is in. The Palace and the Foundation must be connected because, at first, the Palace came from a foundation, a waqf that had been notified in advance. This must be a productive waqf derived from cultural heritage so that a system is created to rebuild culture and revitalize the Palace. So far, the Museum is a place to see an artifact or historical relic so that the Palace will develop its value from that historical value. The Foundation will also develop cultural and religious values. Currently, the position of the Palace is independent or separate from the Foundation. This Palace uses assets from waqf even though they are used for the Palace. After the palace reconstruction, a pattern formed because the key was in the management system.

Figure 2. The Organizational Structure of the Sumedang Palace



Source: Nazir Waqf Foundation of Sumedang Prince (2022)

3.3. Optimization of Human Resources of the Geusan Ulun Museum by the Nazir Waqf Foundation of Sumedang Prince

The following is the management of human resources at the Geusan Ulun Museum carried out by the the Nazir Waqf Foundation of Sumedang Prince: (1) Organizing; the Foundation must be able to regulate the organization by determining the division of labor, work relations, delegation of authority, integration and coordination, in the form of a chart that will help realize the goals effectively; (2) Guidance, carried out by the leader with his leadership will give direction to employees to do all the work competently; (3) Control, the Foundation must be able to control employees who follow the organization and work according to the plan if there are deviations, corrective actions, and improvements. Control employee attendance, discipline, cooperative behavior, and work environment. (4) Operational Function: the Foundation must be able to perform operational functions in human resource management, which is the basis for effective and efficient HRM implementation in the organization's or company's goals.

The Foundation regulates human resource management functionally, having several interrelated functions and operations carried out by human resource management by the functions they have. The Foundation also carries out human resource management functions: (1) Procurement, the procurement function relates to obtaining the type and number of workers that are important to achieve organizational goals; (2) Development, after the workforce is obtained, they must experience developments related to increasing skills through training which is very important and will continue to grow due to changes in technology, readjustment of positions, and managerial tasks; (3) Compensation, this function is defined as providing adequate and reasonable rewards for

employees for their contributions/services towards organizational goals; (4) Integration, in terms of individual employees changing their views, habits, and other attitudes that have been unfavorable for the company so that they are adjusted to the wishes and objectives of the Geusan Ulun Museum; (5) Maintenance, trying to maintain and improve existing conditions. Separation / Release / Retirement if the first function of HR management is to protect employees, logistics if the last function must end.

3.4. The Historical Relics of the Sumedang Larang Kingdom from being in the Guesun Ulun Museum

The existence of Geusan Ulun Museum has the task of utilizing it as a historical relic of the Sumedang Larang Kingdom. The Sumedang Larang Palace taught the Sumedang Prince Nazir Waqf Foundation lessons in managing the Geusan Ulun Museum, among others, and completing and developing scientific research available to anyone who needs it. In addition, the Geusan Ulun Museum can also provide facilities for these research activities; in addition to the Geusan Ulun Museum, it also conducts its research activities to disseminate new knowledge obtained from the research results (Laksmi *et al.* 2023).

The Foundation was given the task of the Sumedang Larang Palace to maintain and care for the Geusan Ulun Museum, namely as follows: (1) Collection tasks, objects stored in the Geusan Ulun Museum cannot be stored; the collection task also depends on the type of collection you want to store and exhibit in museums; (2) Maintenance tasks, in this task, involve two aspects, namely technical aspects, and administrative aspects; technical aspects are tasks that maintain and preserve collections so that their durability is maintained and prevent any possibility of destruction or loss; (3) Exhibition tasks, objects that are exhibited to visitors here to transmit knowledge and enjoy art for objects of art collections; (4) Investigation Tasks, Geusan Ulun Museum, can also work as a center for scientific investigations.

The collection of objects in the Museum can become a research center; (5) The task of distributing knowledge, this task is more socio-educative so that it makes more use of the collection of the Geusan Ulun Museum by providing information that various types of visitors can receive; (6) Another task is to organize lectures, performances, and screenings of films related to the collection of objects from the Geusan Ulun Museum.

3.5. Geusan Ulun History Museum as a Relic of the Sumedang Larang Kingdom

The Museum of the Origin of Geusan Ulun comes from waqf, a waqf given by Prince Aria Suriatmadja, widely known as the Prince of Makkah. This waqf was pledged on September 22, 1912, with its title, "Ieu so that it is a sign of strength" (this is to be a sign of strength). The waqf items come from the Prince's personal belongings from his parents and business. The parents, known as Prince Sugih, inherited the primary goods because Prince Makkah was the eldest son of Prince Sugih. The goods donated are also in the form of goods originating from the Sumedang Larang Kingdom (his ancestors), including heirlooms, binokasih crowns, king weapons, and some manuscripts or buildings donated; there are also rice fields. Waqf is given to optimize utilization for the public interest.

In 1973, due to the many types of waqf relics, the management initiated building a museum so that the public could see it. In ancient times, these items could not be shown to the public; they were only used as educational tools and stored in the Gendang building. When the Museum was built, its name was taken from the Sumedang Larang figure, namely Prabu Geusan Ulun, so on November 11, 1973, the Geusan Ulun Museum was officially established. The manager of waqf goods is a foundation that refers to the Act. RI NO. Forty-one the YEAR 2004 and the mandate of the contents of Indonesian waqf, the Nazir Waqf Foundation of Sumedang Prince. Because it was nazir (the recipient of the waqf), it was given to the Regent then. Nazir 2017 changed his name from an individual to a legal nazir. Nazir consists of family members from outside the Ministry of Religion and KUA. The direct Prince also chairs a management organ; there is a supervisory organ, namely the chairman, Mr. Azis, and Mr. Feddy (from the family element), who manage waqf through a legal entity. This refers to the applicable laws and certificates. For the board of directors, the term of office is five years, one period, and they can hold positions for two periods of the current year; Mr. Raden Luki is already in the first period and will be completed in 2024.

Efforts to improve the functional program of the Geusan Ulun Museum carried out by the Sumedang Prince Nazir Waqf Foundation from the Sumedang Larang Palace, namely carrying out administrative activities, inventory collections, curatorial activities from the collection, handling, and presentation of collections in exhibitions, collection studies, maintenance/conservation, and educative Museum of Culture Geusan Ulun and Geusan Ulun Museum publication activities include: (1) Visitor exhibition services, both permanent and temporary; (2) Make lectures/socialization; (3) Create a sketch/composing competition; (4) Creating a folklore

stage; (5) Writing collections of manuscripts for student and community reading materials; (6) Provide a library for employees.

The above is part of the functionalization program of the Geusan Ulun Museum to the community, especially the younger generation and students, so that they gain additional knowledge outside of the learning activities at school. Geusan Ulun Museum is directed to foster and develop Sundanese cultural heritage, which is oriented towards the results of human civilization. It is well realized that the program that the Geusan Ulun Museum must visit must be part of the cultural heritage preservation process as well as the acceleration and innovation of competency-based education for us now and in the future as an institution that provides an image for the preservation of cultural heritage, education, and recreation in the Sumedang area.

3.6. Preservation of Artifacts in the King Geusan Ulun Museum

Presentation and Storage of Geusan Ulun Museum's collections must be stored and exhibited to the general public. There is a need for a good collection arrangement so that the Geusan Ulun Museum can attract visitors. If there is a collection that cannot be exhibited, then the collection must be stored correctly in a particular storage room. The Geusan Ulun Management Museum must also change the layout regularly, so visitors don't feel bored. The collections of the Geusan Ulun Museum, both in the exhibition room and in the storage room, must be adequately protected from hazardous materials, vandalism, and also from natural disasters. The Geusan Ulun Management Museum must also establish procedures for handling emergencies such as fires or natural disasters.

Collection Reproduction of the Geusan Ulun Museum collection is in the form of making replicas that can be done if the collection of the Geusan Ulun Museum is exciting and rare. This activity is handled by a dangerous curator with a reproduction section. It is better for the collection of masterpieces to be made replicas and the originals stored in a safe place that meets the requirements. It must be kept secret by the Geusan Ulun Museum concerned. The existence of a replica of the Geusan Ulun Museum collection is helpful for educational purposes; visitors can hold the Geusan Ulun Museum collection without worrying about the collection. The technique of making replicas needs to be chosen correctly so as not to damage the collection and so that the replica results are similar to praise.

Information on the Geusan Ulun Museum collection can be disseminated in various ways. First, the curator can research the collections of the Geusan Ulun Museum and publish the results of his research so that the public can access the study results. In this case, the Geusan Ulun Museum can view the library to gain access to supporting literature, scientific writing, and publications. Libraries can also act as managers of research results carried out by the curators of the Geusan Ulun Museum. Second, curators can take advantage of technological advances by creating catalogs, website pages, and social media so that information about the Geusan Ulun Museum collection can be widely disseminated to the public. The curator must provide complete and systematic data for collections exhibited in the showroom.

Geusan Ulun Museum collections can sometimes be loaned to outside parties for specific needs, such as research. Therefore, the manager of the Geusan Ulun Museum needs to make a standard collection loan containing a detailed agreement to avoid unwanted things and ensure the safety of the collection of the Geusan Ulun Museum. In terms of a standard contract, the borrower and owner must agree on the standard that has been set. If the collection is quite rare and has a high value, usually the manager of the Geusan Ulun Museum wants a sure guarantee. Usually, the Geusan Ulun Museum lends collections only to the same institution; this is due to the assumption that the collections on loan will be well protected, its security is guaranteed, the opportunity to conduct research, and the opportunity for the public to see the collection and prevent the use of the collection for other purposes. Personal.

The reduction in the collection of the Geusan Ulun Museum is due to several things, including (1) The object/collection of the Geusan Ulun Museum has no use value in museum activities; (2) The inability of the Geusan Ulun Museum manager in collecting collections, causing danger to the object/collection; (3) Damaged collection conditions; (4) There is doubt about the object that cannot be used in the future; (5) Museums no longer have storage capacity due to too many collections; (6) There is an exchange of collections of the Geusan Ulun Museum to complete the collection; (7) Consider the public's attention and reaction to the collection.

3.7. Museum of Historical Values of Geusan Ulun Artifacts

The Bumi Kaler building contains heirlooms in the form of two pepetan or small chests that function as jewelry, which have existed since the Regent Prince Soegih (1836-1882), a set of Jepara furniture made around 1900, consisting of a work table, chairs, guest table, cupboard, and sketch, a gift from R.A. Kartini's father, R.M.

Sosroningrat, to R. Adipati Aria Soeriaatmadja when he received the title of Prince, three well-preserved tigers, Prince Kornel's marble table which was built around 1791-1828, Prince Kornel's bed and bed cover, painting of Prince Kornel shaking hands with Daendels by Racmansjah S Djajasoebrata (created in December 1977) whose statue is in Cadas Pangeran, and others.

The Gendeng building contains heirlooms such as gamelan miniatures, gamelan players, sinden and dancers, souvenirs made of silver-transport equipment (delman, horses), agricultural tools, bread making, pakinangan or betel holders and candle holders, Keris Gayaman and Ladrangan (there are around 100 thousand), transaction facilities or money from Bank Indonesia, Chinese jars, skulls, bear skulls, stirrups for horses, sticks, hats of Prince Aria Soeriaatmadja (1882-1919), telescopes, ink and kalam inks, ink and harupat containers, decorations walls from Europe, and others.

The Gendeng Building contains heirlooms such as gamelan miniatures, gamelan players, sinden and dancers, souvenirs made of silver-transport equipment (delman, horses), agricultural tools, bread making, pakinangan or betel holders and candle holders, kris Gayaman and Ladrangan (there are around 100 thousand), transaction facilities or money from Bank Indonesia, Chinese jars, tiger skulls, bear skulls, stirrups for horses, sticks, Prince Aria Soeriaatmadja's hat (1882-1919), telescope, ink and kalam ink, ink and harupat containers, wall hangings from Europe, and others.

The Heritage Building contains relics such as Binokasih's crown, crown, betern (belt), necklace, bracelet, lightning shoulder, gold inlaid hat, comb, trident spear (15th century), spear for ceremony, spearhead, and triangular claws. , kris (15th century), gobang (sword) (15th century), machete, (one of King Tadjimalela's ki Mastak swords (14th century), Ki Dukun's kris belonging to Prabu Gajah Agung (14th century), Panunggul Naga kris belonging to Prabu Geusan Ulun, two Curuk Aul daggers belonging to Mbah Jaya Perkasa, two Nagasasra kris), Ny. R.Hj. Ratjih Natawidjaja family heirloom, Kartasasmita family heirloom, gobang is, a set of silver utensils from the Netherlands made of silver (1836-1882), renting (Aceh dagger), and others.

The Gamelan building houses heirlooms such as the Sangling gamelan, Manggu gamelan, Talun gamelan, Sekar Oneng gamelan, made around 1656–1706 by Prince Panembahan in Sumedang, Sekar Manis gamelan, Panglipur gamelan made around 1625–1633 by Prince Rangga Gede in Sumedang as mourning for the death of his favorite son, Gamelan Sari Oneng Mataram was made around 1656–1706) in Mataram, as a gift from the Mataram Kingdom for the victory of the candlenut (candle tree) match of Senapati Sumedang versus Senapati Mataram in Mataram during the reign of the Mataram Kingdom. The Regent of Pangeran Panembahan (Prince Rangga Gempol III), the gamelan Sari Oneng Parakansalak was made in 1825 in Sumedang when Sumedang was still a Cultural Center in West Java; puppet; painting of the Regent of Sukabumi, and others. Karta Building. In 1996, the Kareta Building was built, which was used to store the collection of the Kareta Regency named Kereta Kencana Naga Paksi.

3.8. Sources of Funding

Resources are managed independently by managing palace assets. When this Foundation is engaged in social, humanitarian, and religious fields, it has carried out such as providing allowances to people who cannot afford including families, providing allowances to Islamic boarding schools, and also for museum maintenance and operational costs as well as employee salaries sourced from rice fields. The area of rice fields is 150 hectares, the most significant income. Perimeter land rent of Rp.1,000 is used for the surrounding community. Management of the Geusan Ulun Museum from the Sumedang Larang Palace to the Nazir Wakaf Foundation of Sumedang Prince.

The Nazir Waqf Foundation of Sumedang Prince is still funding the improvement of Geusan Ulun Supporting Museum Facilities. The Geusan Ulun Museum facilities include bathrooms, prayer rooms, parking lots, and security guards. The Geusan Ulun Museum still needs food stalls or lodging in the Geusan Ulun Museum. Therefore, the supporting facilities at the Geusan Ulun Museum must be improved, such as the eye center and cafeteria room, ticket sales room and goods storage, lobby room, toilet room, parking and garden space, and guard post room. So, if the Geusan Ulun Museum has many supporting facilities, it will be an attraction for visitors as a historical and cultural tourist attraction.

The construction of supporting facilities at the Geusan Ulun Museum must be adjusted to the needs of tourists both quantitatively and qualitatively. Tourism facilities quantitatively refer to the number of tourist facilities that must be provided and qualitatively indicate the quality of services offered and tourist satisfaction. The requirements for a good Geusan Ulun Museum facility are as follows: (1) The form of the facility must be recognizable; (2) Its utilization must be by its function; (3) Facilities should be strategic, where visitors can find them easily; (4) The quality of the facility itself must comply with the applicable standards in tourism.

3.9. Improved Cooperation between Prince Sumedang's Nazhir Waqf Foundation and Outside Parties

The strength of developing the management of the Gesun Ulun Museum needs to be supported by all elements. The development and management of the Gesun Ulun Museum can be done by more than one thing. Commitment and synergy between one element and another is the primary key. So, the concept of Penta helix or multi-stakeholder where there is no doubt that the government, academia, the private sector, and the media are united and are committed to developing the management of the Gesun Ulun Museum.

The collaboration between the Foundation and the Sumedang Regency Government is that not having an understanding of the movement has real benefits for the community even to maintain the culture, including in the social field, it can build the character of the cultured Sumedang community, for example, the holding of the Royal Nusantara Traditional Festival (FAKN) every year, namely the arrival of the kings and empresses from 44 Kingdoms throughout the archipelago that still exists in Indonesia come to the Sumedang Larang Palace to celebrate this festival, this will attract tourists to visit the Sumedang Larang Palace.

The collaboration between the Foundation and academics is the Faculty of Fine Arts and Design IKJ (Jakarta Arts Institute). The partnership is for the field of research and community service. Community service was carried out by IKJ lecturers in the form of workshops with the Foundation, making accessories and decorations from resin, stage make-up for children, making accessories from used buttons, Making Brooch Accessories from Recycled Materials, Recycled Plastic Crackles which were attended by students kindergarten, elementary school, middle school, homemakers to the general public. While in the research, IKJ students can do their final assignments, and IKJ lecturers can research the theme of the Relics of the Sumedang Larang Kingdom.

The collaboration between the Foundation and the private sector, namely with The Lodge Group, regarding the Management of the Geusan Ulun Museum. The Director of The Lodge Group, Heni Smith, and the Chairman of the Foundation, Prince Sumedang Lucky Djohari Soemawilaga, carried out the signing. The Regent Dony welcomed the cooperation, led by the Vision of the Sumedang Regency for the Advancement of the Region through culture and tourism. The point of this collaboration is how to organize and manage the Geusan Ulun Museum to attract people to the Museum with a new look while still maintaining the old values.

The Sumedang community hopes the Museum can go global with the collaboration between The Lodge and the Foundation. It is hoped that many will come to know the cultural richness of Sumedang and the values of the existing ancestral heritage. Hopefully, it will remain sustainable, and the public will know more about the glorious history of Sumedang Regency so that it can inspire. The Lodge Group explained the management plan of the Geusan Ulun Museum for availability. Technically, The Lodge Group will co-manage the Museum. However, the Museum still has a place in the Palace and has the unique authority to become an icon. The Lodge Group only manages tickets and events. The chairman of the Nazir Waqf Foundation of Sumedang Prince, R Lucky Djohari Soemawilaga, hopes that the Museum can improve in terms of professionalism and management of broader tourism targets and the Geusan Ulun Museum of the Sumedang Larang Palace to become a leading tourist destination for Sumedang Regency.

Conclusions and Further Research

In making the Sumedang Larang Palace a heritage tourism destination, the Nazir Wakaf Foundation, which manages the organizational structure, and the Geusan Ulun Museum, which contains the Sumedang Larang Palace, have a vital role. The unity between the Palace and the Foundation is realized because the Palace originates from the Foundation as a waqf for the interests of the Palace. Optimizing human resources at the Sumedang Larang Palace is handled by the Nazir Waqf Sumedang Foundation, which regulates labor procurement, skills development, compensation, employee integration, maintenance, and improvement of working conditions. The Palace's close relationship with the Foundation creates harmony in the management and development of this historic tourist destination.

The Prabu Geusan Ulun Museum ensures the preservation of its artifacts through well-exhibited and stored collections, regular layout changes to maintain visitor interest, and exciting reproductions of collections by curators. Funds for maintenance come from the the Nazir Waqf Sumedang Foundation and are also used to pay the salaries of human resources at the Museum. Even though there is a collaboration with the Sumedang Regency Government and private parties such as The Lodge Group, understanding of the real benefits for the community needs to be improved, especially in the context of cultural activities and building a cultured community character. Collaboration with academics and private parties such as the IKJ Faculty of Fine Arts and Design and The Lodge Group helps manage the Geusan Ulun Museum with a new look but still maintains traditional values.

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Credit Authorship Contribution Statement:

Rahmat Ingkadijaya, a highly skilled figure in developing innovative research concepts and sophisticated research methodologies, is the central pillar in directing this research team. His extraordinary expertise ensures that the research foundation is solid and relevant to the final goals.

Fetty Asmaniati, as the research project manager, showed her high dedication to managing all administrative aspects of this project. With his extraordinary thoroughness, Fetty ensures that all research-related processes run smoothly and efficiently, providing the necessary support for the smooth implementation of the project.

Heny Ratnaningtyas, as the principal author of this research, brings to life the concepts and methodology outlined by Rahmat Ingkadijaya. With his skill at putting words together, Heny can transform complex data into scientific articles that are informative and easy for readers to understand.

Myrza Rahmanita has a vital role as a reviewer of this research article. With her expertise in analyzing and evaluating content, Myrza ensures that this article meets the highest scientific standards and makes a valuable contribution to scientific literature.

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.

References

[1] Abouelmagd, D. 2023. Sustainable urbanism and cultural tourism, the case of the Sphinx Avenue, Luxor. *Alexandria Engineering Journa*l, 71: 239-261. DOI: https://doi.org/10.1016/j.aej.2023.03.041

[2] Arumugam, A., Nakkeeran, S., and Subramaniam, E. 2023. Exploring the factors influencing heritage tourism development: A model development. *Sustainability*, 15(5): 1-18. DOI: https://doi.org/10.3390/su151511986

[3] Baskoro, P. P. A., Rizkiyanto, R., and Indrosaptono, D. 2014. Museum kontemporer *Jakarta. Imaji*, 3(4): 887-894. Available at: http://eprints.undip.ac.id/44138/2/Padmo_Prabowo_Aji_

[4] Boboc, R. G., Bautu, E., Girbacia, F., Popovici, N., and Popovici, D-M. 2022. Augmented reality in cultural heritage: An overview of the last decade of applications. *Applied Sciences*, 12(19): 9859; DOI:https://doi.org/10.3390/app12199859

[5] Buzon, C. M., Perez-Romero, A. M., Castro, J. L. L., and Jerbania, I. B. 2021. Photogrammetry as a new scientific tool in archaeology: Worldwide research trends. *Sustainability*, 13(9): 1-27. DOI:10.3390/su13095319

[6] Estrada Cruz, M., Verdujover, A. J., and Gomezgras, J. M. 2019. The influence of culture on the relationship between the entrepreneur's social identity and decision-making: Effectual and causal logic. *BRQ Business Research Quarterly*, 22(4): 226-244. DOI: https://doi.org/10.1016/j.brq.2018.10.002

[7] Fino, M. D., Galantucci, R. A., and Fatiguso, F. 2023. Condition assessment of heritage buildings via photogrammetry: A scoping review from the perspective of decision-makers. *Heritage 2023*, 6(11): 7031-7066. DOI: https://doi.org/10.3390/heritage6110367

[8] Franceschini, F., Maisano, D., and Mastrogiacomo, L. 2016. The Museum of errors/horrors in Scopus. *Journal of Informetrics*, 10(2): 174-182. DOI: https://doi.org/10.1016/j.joi.2015.11.006

[9] Gantina, D., Budiman, S. F., Nurbaeti., and Gunawijaya, J. 2021. Museum Prabu Geusan Ulun Kabupaten Sumedang sebagai daya tarik wisata Kabupaten Sumedang. *Jurnal Ilmiah Pariwisata,* 26(3): 233-242. DOI:https://doi.org/10.30647/jip.v26i3.1583

[10] Gao, B., and Yu, S. 2024. Upgrading museum experience: Insights into offline visitor perceptions through social media trends. *Emerging Trends in Drugs, Addictions, and Health*, 4, 100137. DOI:https://doi.org/10.1016/j.etdah.2023.100137

[11] Green, T. A., Hutchings, P. A., Scarff, F. R., Tweedley, J. R., and Calvera, M. C. 2023. Research publications of Australia's natural history museums, 1981–2020: Enduring relevance in a changing world. *Enduring relevance in a changing world. PLoS ONE*, 18(6): e0287659. DOI:https://doi.org/10.1371/journal.pone.0287659

[12] Hardy, W. Y., Setianti, Y., and Dida, S. 2021. Destinasi taman wisata alam Gunung Tampomas: Studi literatur pengembangan branding ekowisata. J*urnal Destinasi Pariwisata,* 9(1): 51-58. DOI:https://doi.org/10.24843/JDEPAR.2021.v09.i01.p06

[13] Hermawan, D., Sofian, M., and Kuswara. 2017. Improving the function of The Prabu Geusan Ulun Museum in Sumedang Regency as a tourist attraction for historical and cultural education. *Panggung*, 27(4): 319-333. DOI: http://dx.doi.org/10.26742/panggung.v27i4.288

[14] Laksmi, G. W., Haryono, J., and Rahmanita, M. 2023. Identifikasi Komponen daya tarik wisata dan manajemen pengelolaan Museum Prabu Geusan Ulun sebagai wisata pusaka di Sumedang. Y*ume Journal of Management*, 6(1): 15-27. DOI: https://doi.org/10.37531/yum.v6i1.3497

[15] Luo, L., *et al.* 2019. Airborne and spaceborne remote sensing for archaeological and cultural heritage applications: A review of the century (1907–2017). *Remote Sensing of Environment*, 232: 1-34. DOI:https://doi.org/10.1016/j.rse.2019.111280

[16] Luthfiatin, G., and Abdillah, A. 2022. Sejarah penyebaran Islam di Sumedang Melalui Pendekatan Budaya. *Jurnal Priangan*, 1(1): 48-59. Available at: https://journal.uinsgd.ac.id/index.php/priangan/article/view/19309

[17] Muhsin, M. 2008. *Kerajaan Sumedang Larang*. Bandung. Fakultas Sastra Universitas Padjajaran.

[18] Peleggi, M. 1996. National heritage and global tourism in Thailand. *Annals of Tourism Research*, 23(2): 432-448. DOI: https://doi.org/10.1016/0160-7383(95)00071-2

[19] Priyomarsono, N. W. 2023. Approaches to revitalization of areas with historical and cultural values: The Baluwerti Royal Surakarta Palace, Surakarta, Indonesia. *ISVS e-journal*, 10(4): 90-101.

[20] Richards, G. 2018. Cultural Tourism: A review of recent research and trends. *Journal of Hospitality and Tourism Management*, 36: 12-21. DOI: 10.1016/j.jhtm.2018.03.005

[21] Sellato, B. 2015. Sultans' palaces and museums in Indonesian Borneo: National policies, political decentralization, cultural depatrimonization, identity relocalization, 1950-2010. *Archipel, Études interdisciplinaires sur le monde insulindien*, 89: 125-160. DOI: 10.4000/archipel.494

[22] Thresnawaty, E. 2011. Sejarah Kerajaan Sumedang Larang. Patanjala: *Jurnal Penelitian Sejarah dan Budaya*, 3(1): 154-168. DOI: http://dx.doi.org/10.30959/patanjala.v3i1.276

[23] Tubagus, M. R., Yanti, N., and Sarip, I. 2020. Fungsi Tradisi Ngumbah Pusaka Prabu Geusan Ulun Sumedang Larang. *Jurnal Budaya Etnika*, 4(1): 3-22. DOI: http://dx.doi.org/10.26742/be.v4i1.1559

[24] Viejo-Rose, D. 2015. Cultural heritage and memory: untangling the ties that bind. C*ulture and History Digital Journal*, 4(2), e018. DOI: https://doi.org/10.3989/chdj.2015.018

[25] Xiao, W., *et al.* 2018. Geoinformatics for the conservation and promotion of cultural heritage in support of the UN Sustainable Development Goals. *International Society for Photogrammetry and Remote Sensing (ISPRS)*, 142: 38. DOI: https://doi.org/10.1016/j.isprsjprs.2018.01.001

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Strategy Approach for the Development of a Sustainable Environmentally Friendly Tourism City

Lilik SULISTYOWATI
Faculty of Science and Technology, Universitas Terbuka, Indonesia
liliks@ecampus.ut.ac.id

Eny KRISNAWATI
Faculty of Engineering, Tunas Pembangunan University, Indonesia
enykris.ftup@gmail.com

Novi ANDARESWARI
Faculty of Science and Technology,
Universitas Terbuka Malang, Indonesia
noviandareswari311@gmail.com

Firman AFRIANTO
Perseroan Terbatas Sagamartha Ultima, Indonesia
firmanafrianto@mail.ugm.ac.id

Abdul RAIS
Community Welfare Division, Batu City Government, Indonesia
alreskaku@gmail.com

Mohammad Fauzi HAFA
Faculty of Education and Teacher Training,
Universitas Terbuka Malang, Indonesia
fauzih@ecampus.ut.ac.id

Darwiyati DARWIYATI
Universitas Terbuka Malang, Indonesia
darwiyati@ecampus.ut.ac.id

Andi Lopa GINTING
Faculty of Economics,
Universitas Terbuka Malang, Indonesia
andi.lopaginting@ecampus.ut.ac.id

Rifqi Rahmat HIDAYATULLAH
Faculty of Agriculture,
Brawijaya University, Indonesia
rifqi_rh@ub.ac.id

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Abstract: This study employs a case study approach in the Batu City Region, East Java Province, Indonesia. Over time, Batu City has undergone a significant transformation, particularly in the tourism sector, leading to the growth of a large service industry. This study aims to propose a comprehensive development strategy for the Batu City area integrating economic, social, and environmental elements into the spatial layout of Batu City, with the ultimate goal of establishing an environmentally friendly Tourism City. Strengths, weaknesses, opportunities, threats analysis and analytic hierarchy process were employed to assess data from interviews, questionnaires, and agency sources. The stages of analysis are as follows:

1) data collection, 2) analysis, and 3) strategic prioritizing. This study recommends the main priority strategy for the development of a sustainable environmentally friendly tourism city is committing to implementing the principles of sustainable urban development and environmentally friendly tourism citiy through Regional Regulations. Considering the unique attributes of each city, such us their economy, resources, policies, and environment, among other factors, this paper considers contextual relevance issues. By doing so, it assists cities in developing sustainable cities based on their own strengths, weaknesses, opportunities, and threats.

Keywords: analytic hierarchy process (AHP); strength, weakness, opportunity, threat (SWOT); tourism city development; urban spatial.

JEL Classification: R58; D79; Z32.

Introduction

This study focuses on the Batu City Region in East Java Province, Indonesia, known for its mountainous terrain and highland territory The city's landscape includes plantation and agricultural lands, with hilly regions dedicated to agro crops and ornamental plants. Agriculture, plantations, and tourism are the primary livelihood sources for its residents. Batu City is located in a location with relatively good soil fertility, and the majority of the land is used for agriculture and tourism (Lusiana *et al.* 2017). The growth of Batu City in 2021 is good, as evidenced by a 4.04 percent (%) increase. Batu City is placed ninth out of 38 East Java regencies and cities in terms of economic growth (CBSBC (Central Bureau of Statistics of Batu City). 2022). The phenomenon of agricultural land conversion in Batu City happens in all sub-districts. Both in Batu District, which serves as the city's heart, Bumiaji District, which serves as a buffer since most of the area is forest, and Junrejo District, which serves as an agricultural area. When it occurs in paddy fields, the conversion of agricultural land in Batu City creates several problems. This is since paddy fields are the most ideal place for cultivation to preserve food stability. It must be conserved to prevent the function of paddy fields from shifting to other land purposes (Prayitno, Subagiyo, Kusriyanto 2020). The aim of the current study is to propose a comprehensive development strategy for the Batu City area integrating economic, social, and environmental elements into the spatial layout of Batu City, with the goal of establishing an environmentally friendly Tourism City. This study has been carried out in Batu City on Mei, Indonesia in 2022.

This study used AHP-based SWOT analysis to improve the quantitative side in producing strategic planning by determining priorities among SWOT factors methodically. This study acknowledges the importance of contextual relevance in city development, recognizing the significance of tailoring strategies to the specific strengths and weaknesses of each city. By adopting the SWOT-AHP method, the paper contributes to the theoretical understanding of sustainable tourism city development strategies while reflecting on the current situation of Batu Tourism City. This study provides decision-makers with a systematic flowchart, encompassing the fundamental stages of identifying factors, formulating strategies using the matrix, and prioritizing strategies using the quantitative approach. From a practical standpoint, this study offers a comprehensive and systematic approach to decision-makers involved in sustainable tourism city development strategies.

1. Research Background

In the twenty-first century, sustainable urban development has emerged as a crucial topic in urban policy debates, emphasizing the need for sustainable policies in environmental planning and decision-making (Pezzey 2004). Sustainability concepts trace back to influential works such as those of the Club of Rome, the Bruntland report, and the Rio Declaration. In recent years, the urgency of sustainability has been underscored by the adverse impacts of human activities (Yigitcanlar, Teriman 2015). The United Nations Sustainable Cities Program aims to sustainably manage natural resources while achieving economic, physical, and social progress and safeguarding against environmental risks (Hassan, Hyowon 2015). A sustainable city integrates social, cultural, environmental, political, economic, and physical objectives, ensuring equitable access to services while preserving resources for future generations (Hassan, Hyowon 2015). Such 'urban sustainability' demands a cohesive interaction among three environments: eco-physical, social, and economic.

Furthermore, today's tourism industry has always incorporated the concept of sustainability. This is linked to the economic improvement of a region that can be achieved by using sustainable tourism (Song, Hongmei 2023), including attracting investment into the regional economy, improving the standard of living, reducing unemployment (Dudin *et al.* 2017). Sustainable tourism can be defined as a form of tourism that can improve the quality of life of local people, provide a high-quality experience for visitors whileining environmental quality (Ginting, Munazirah, Julaihi Wahid. 2023), so good management of tourist enterprises must grow alongside efficient environmental management of all sectors (Phoochinda 2018). The link between tourism development

and environmental compatibility will form a framework for sustainable ecosystems. The framework explains the balance between business and environmental interests inining ecological systems with the help of moderation of government support and policy intervention (Baloch, *et al.* 2023; Nugroho *et al.* 2023). A study carried out by (Firman *et al.* 2023) revealed that environmentally friendly product innovation, environmentally friendly process innovation, organisational innovation, ecologically friendly tourism policy, and social media have a positive relationship with sustainable tourism growth in Indonesia. This is in line with the rise in international interest in the links between tourism, technological developments, and climate change in recent years (Song, Hongmei 2023). Therefore, environmental innovation as well as tourism policies can boost tourism development and need attention. Therefore, environmental innovation as well as tourism policy can boost tourism development and need attention.

Batu City's transformation has resulted in a large service industry, particularly in the tourism sector. The result is the establishment of numerous permissions that promote function transfer and the subtle appropriation of agricultural economic space. Additional issues arise, such as the conversion of forests to seasonal agriculture, rising temperatures, and agricultural practices that rely on pesticides and medications, which eventually damage the soil, causing the slow death of apples and other commodities, causing farmers to lose money. This condition was observed during Batu City's major makeover. Agriculture that was not "profitable" was abandoned, the land was sold, and farmers changed careers. Massive function transfer, with farmers eventually becoming workers in the tourism sector or filling service areas. Exploitation is also becoming more prevalent in the Brantas watershed's upstream section. Its status can be evaluated by satellite imagery using data from Global Forest Watch (GFW). For nearly two decades, Batu City's Forest cover has shrunk by 348 hectares (ha). In total, roughly 1,295 ha of forest were lost in Batu City, including 113 ha of protected forest. Furthermore, the area of green land in Batu City has decreased from 6,034.62 ha to 5,279.15 ha between 2012 and 2019. The changes that have transpired over the last almost ten years have been one of the elements driving the temperature increase in Batu City, as well as the problem. Temperature and rainfall fluctuations have caused a drop in apple yield. This circumstance has resulted in a huge modification of agricultural land functions. Farmers who are losing money because of decreased apple yields are urged to sell their land and convert it to other purposes, such as housing, tourism attractions and tourism support building. Food agricultural land, such as rice farms, is also converted for housing, tourism, and other purposes. From 2009 to 2019, using geographic information system (GIS) analysis, it was found that paddy fields decreased by around 6.19%, then settlements increased by 5.46% (Prayitno, Subagiyo, Kusriyanto 2020). The aforesaid conditions are becoming increasingly evident in Batu City data from the Central Bureau of Statistics In the Batu City in Figures report, there is a significant change in the type of work. In 2010, approximately 35,427 people worked as farmers out of a total working population of 95,679 people. A decade later, the number of persons working as farmers fell by around 5,426 people. This statistic is derived from the difference in the farming profession's average population in 2021, which is 3,001 people out of a total of 112,623. This drop has also led to a rise in the number of people working in the service industry. If in 2010 there were 14,932 people, then in 2021 it will skyrocket to 64,529 people, an increase of 49,581 people.

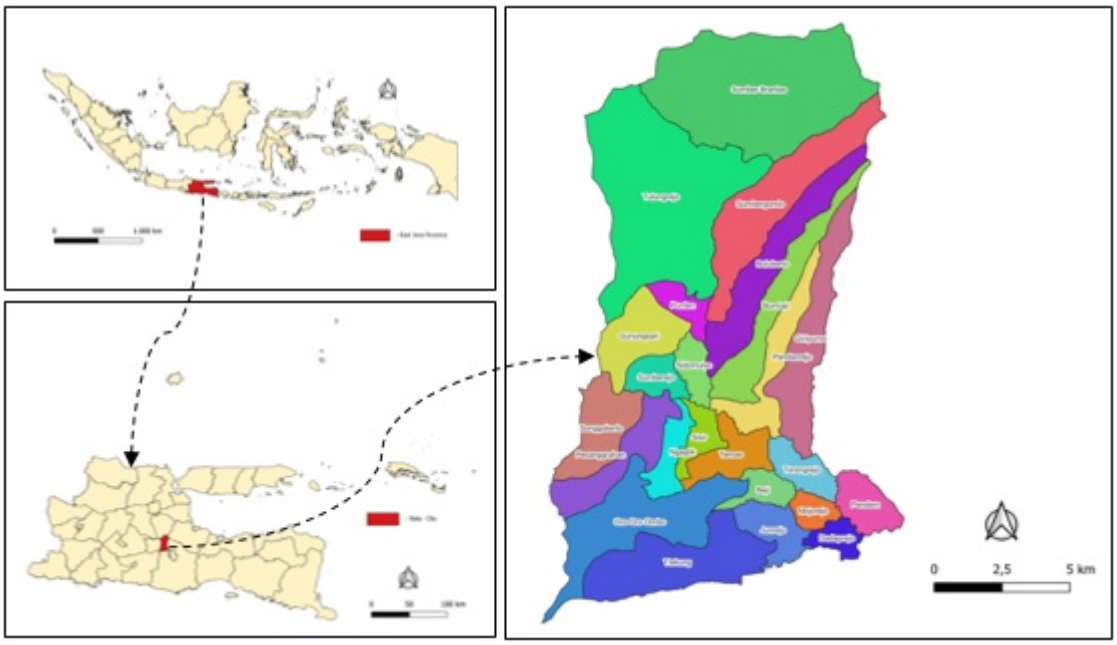
Plans and strategies are critical in assisting governments in developing sustainable cities (Mora, Deakin, Reid 2019; Yuan, *et al.* 2020). To better manage the connection of socioeconomic systems and natural resources, sustainability plans should be designed from this perspective (Fan, Fang, Zhang, 2019; Lee, Chueen-Wah, Ke Xue. 2021a). AHP-based SWOT analysis is used to improve the quantitative side in producing strategic planning by determining priorities among SWOT factors methodically (Gorener, Toker, Ulucay 2012). Furthermore, the proposed analytic hierarchy process and strength, weakness, opportunity, threat (AHP-SWOT) hybrid method can be used as an effective quantitative strategic planning tool for various purposes, including to help determine the right strategy to develop significant strategic determinants of smart cities for manufacturing companies (Gorener *et al.* 2012); define strategies to strengthen local sustainable development and urban resilience (Escobar *et al.* 2020) formulate sustainable smart city development strategies (Yuan *et al.* 2020); develop a strategy to accelerate the growth of the satellite industry (Lee *et al.* 2021b); decision-making strategies used in the revitalization of fishing village tourism (Lee *et al.* 2021c); make suggestions regarding province sustainable development goals (SDGs) (Kaymaz *et al.* 2022); reviewing suggestions for the development of science tourism (Long *et al.* 2023); analyze how to increase citizens' sense of profit in smart cities (Li, *et al.* 2023); and hiding the impact of green space planning on increasing social sustainability (Nasrabadi *et al.* 2023). This study provides a quantitative path analysis for strategic formulation of sustainable tourism city development by examining the benefits, drawbacks, possibilities and risks of existing developments. This is analyzed by SWOT (strength, weakness, opportunity, and threat) which is the right tool to identify the key variables currently influencing the

development of cities, highlighting internal (strengths and weaknesses) and external (opportunities and threats) factors that determine choices and provide strong support for decision makers.

2. Methodology

The geographical location of Batu City is 7° 44' 55,11" until 8° 26' 35,45" NL and 122° 17' 10,90" until 122° 57' 00,00" EL, as presented in Figure 1.

Figure 1. Gheographic location of the study area in Batu City, Indonesia



SWOT analysis is a widely used tool for simultaneously analyzing the external and internal environment, providing a systematic approach and decision-making support in various situations [Kurttila *et al.* 2020; Yuksel, Metin 2007; Oreski 2012). SWOT analysis is able to grow strengths, eradicate weaknesses, issue opportunities and minimize threats in an analytical way (Saaty 1987). In this research, SWOT and AHP methodologies were employed to analyze data obtained from interviews, questionnaires, and the Batu City Government. The SWOT and AHP analysis in this study encompassed the following stages: 1) data collection, 2) analysis, and 3) strategic prioritization. Through data collection, the internal and external environments were examined, with the internal assessment revealing strengths and weaknesses, while the external evaluation highlighted opportunities and threats. The data sources included primary data from interviews and surveys, as well as secondary data from related agencies. During the SWOT strategy formulation and analysis phase, both internal and external factors were considered, leading to the development of strategic priorities. This comprehensive approach allowed for a robust and informed decision-making process in formulating the development strategy for Batu City The formulation of the four sorts of strategies is presented in Table 1.

Table 1. SWOT Strategy Formulation Matrix

IFAS/EFAS	Internal Strenghts (S)	Internal Weaknesses (W)
External Opportunities (O)	SO Strategy Creating strategies that use strengths to take advantage of opportunities.	WO Strategy Creating strategies that minimize weaknesses to take advantage of opportunities.
External Treaths (T)	ST Strategy Create strategies that use strengths to overcome threats.	WT Strategy Creating strategies that minimize weaknesses and avoid threats.

Source: Rangkuti, F. 2016

Following the completion of the SWOT analysis, the next stage involves decision-making based on the multiple SWOT outcomes, with priority determined using the AHP. AHP is a powerful decision-making strategy, especially when dealing with subjective criteria (Saaty 1987). By performing pairwise comparisons, AHP

determines the relative importance of factors to select the optimal choice among different options. The use of AHP allows for objective prioritization of plans derived from the set of potential strategies identified in the SWOT analysis. To conduct the AHP analysis, Expert Choice software was employed, which enables the assessment of relative priorities on an absolute scale (Semih, Sipahi Seyhan. 2011). Each component in the AHP hierarchy is evaluated through pairwise comparisons, with a scale of 1-9 utilized to gauge the relative importance of factors at each level (Saaty 1977). The scale is presented in Table 2. The analysis engaged several experts in the field of urban spatial planning, who provided their evaluations using the Expert Choice software.

Table 2. Comparison Saaty Matrix

Intensity of interest	Definition
1	Equally important compared to the others
3	Slightly more important than the others
5	Quite important compared to the others
7	Very important compared to others
9	Extreme importance compared to others
2,4,6,8	Value between two adjacent assessments

Source: Saaty 1977.

According to Kahraman (2007), the hierarchy of the AHP-SWOT method consists of multiple tiers or levels. At the first level, the elements encompassed in each group of factors derived from the SWOT analysis are included. The second level comprises strategic considerations associated with each group of factors from the SWOT analysis, and finally, the strategies are reviewed and compared at the third level. In this study, a comprehensive SWOT-AHP assessment approach was adopted for sustainable tourism city development, integrating social, economic, and environmental dimensions. Saaty's AHP (1977) is among the most widely used multicriteria decision-making strategies. Building on this concept, Saaty (1982) developed a comparison method that models a hierarchical decision-making framework with numerous criteria and one-way interactions. AHP utilizes logical and numerical consistency to establish hierarchies and assess the preferences among alternatives (Wind and Saaty 1980).

It is a robust and comprehensive methodology that leverages empirical data and subjective judgments to support decision-makers in making well-informed choices (Escobar, Aguarón and Moreno-Jiménez 2004; Sólnes, J. 2003).

3. Case Studies

SWOT analysis

The strategy for building Batu City as a sustainable tourism destination was determined using the Internal Factor Analysis Strategy (IFAS) and External Factor Analysis Strategy (EFAS) components within the SWOT matrix. This matrix provides an overview of how external opportunities and threats are balanced against internal strengths and weaknesses. The SWOT matrix is a valuable tool for designing four types of strategies, namely S-O (Strengths-Opportunities), W-O (Weaknesses-Opportunities), S-T (Strengths-Threats), and W-T (Weaknesses-Threats) strategies (Attar *et al.* 2013). Combining these elements, the SWOT analysis generates four feasible alternative tactics. To prioritize the strategies, a strategic priority scale was developed based on previous studies (Rangkuti 2016, Abulebdah, and Musharavati 2011). Table 3 presents the findings of the alternative strategy study, outlining the four feasible alternatives: S-O, W-O, S-T, and W-T strategies. These strategies reflect an approach to developing Batu City as a sustainable and environmentally friendly Tourism City. According to Kanom *et al.* (2020), developing tourism destinations with a focus on sustainable tourism ideally involves attention to various aspects, including environmental sustainability, economic sustainability, and social and cultural sustainability for local communities.

Furthermore, AHP is used to prioritize the decision-making phases of the numerous SWOT outcome tactics. The priority values are determined based on the results of the questionnaire and analyzed using expert choice 2000 (Figure 2). The AHP findings reveal the weight values for the strategic priorities of Batu City's development as a sustainable tourism destination, ranked from the highest to the lowest priority.

Table 3: Matrix of SWOT strategy analysis results

IFAS/EFAS	STRENGHTS (S)	WEAKNESSES (W)
	S1. Batu City's economic growth continues to increase. S2. Batu City, which is still dominated by forests, is a tourist attraction. S3. Most of the population works in the tourism support sector. The second line of business is agriculture, forestry, hunting and fishing. S4. Geological conditions support the development of the agricultural and plantation sectors. S5. The agricultural sector can also be used for tourism. S6. Tlekung final landfill has implemented integrated waste management, TPS3R has been built in 8 urban villages.	W1. The topography of Batu City is a mountainous and hilly area that is prone to landslides, flash floods and mudflows (RPJMD 2017-2022). W2. Types of disasters with a high level of hazard and vulnerability are landslides, forest and land fires, and drought. W3. About 23 percent of the population in the 16-18 year age group are not in school. W4. The number of schools at the junior and senior high school level between the 3 sub-districts is not balanced between sub-districts. W5. Batu City still lacks green open space by 9%.
OPPORTUNITIES (O) O1. Investment value continues to increase. O2. The number of tourists in general has increased.	**SO Strategy** (1) Developing sustainable tourism and agriculture sectors as Batu City's leading sectors while preserving natural resources.	**WO Strategy** (2) Using commercial opportunities and regional income, particularly in the tourism industry, to create educational facilities and infrastructure and provide scholarships to raise school enrollment rates, so that an increasing number of people have access to environmental education from a young age.
TREATHS (T) T1. The population of Batu City in 2021 will experience a growth of 0.75 percent. T2. The occurrence of natural disasters in 2021 increases. T3. Paddy field area from year to year decreased. T4. Ecosystem services at very low class: ecosystem services function of shelter and living space; recreation and ecotourism; as well as climate regulation and cultural functions of natural aesthetics. T5. The Tlekung final landfill is said to be almost full. T6. The Upper Brantas River has a slightly polluted status. T8. Investors can be a threat because it is possible to pay less attention to nature and the environment. T7. The development of public transportation is not yet a priority.	**ST Strategy** (3) Commit to applying the concepts of sustainable urban development and eco-friendly tourism cities through Regional Regulations by taking the following factors into account: (a) expansion of public transportation facilities and infrastructure; (b) expansion of waste processing both at the final landfill, Waste Processing Site - Reduce Reuse Recycle, and at the source; (c) protection of the Brantas watershed upstream so that it is no longer polluted and is not used as much built-up area; (d) land use that does not deplete natural resources. (4) Increase selectivity in tourism and real estate development due to ecosystem services for shelter and living space; recreation and ecotourism; Climate regulation, as well as the cultural function of natural beauty, have the highest percentage value in the extremely poor class.	**WT Strategy** (5) Develop community disaster mitigation capabilities from an early age through environmental education in schools.

AHP analysis

Furthermore, AHP is used to prioritize the decision-making phases of the numerous SWOT outcome tactics. The priority values are determined based on the results of the questionnaire and analyzed using expert choice 2000 (Figure 2). The AHP findings reveal the weight values for the strategic priorities of Batu City's development as a sustainable tourism destination, ranked from the highest to the lowest priority.

Table 4. AHP analysis results

No	Strategies	AHP value
1	Developing the sustainable tourism and agriculture sectors as the leading sectors of Batu City while concurrently preserving the natural environment	0.170
2	Utilizing regional revenues, particularly from the tourism sector, to build educational facilities and infrastructure at increasing school enrollment rates.	0.060
3	Committing to implementing the principles of sustainable urban development and environmentally friendly tourism citiy through Regional Regulations.	0.565
4	Exercising selectivity in tourism and real estate development to ensure sustainable growth.	0.138
5	Instilling disaster mitigation capacity in the community from an early age through environmental education in schools	0.067
	Inconsistency = 0.09	

The firts priority strategy is The Batu City government should firmly commit to implementing the principles of sustainable urban development and eco-friendly tourism cities through Regional Regulations. To achieve this, the following factors need to be considered. (a) Increased development of public transportation facilities and infrastructure. The construction and improvement of public transportation facilities and infrastructure are essential for promoting sustainable urban development. By investing in efficient and accessible public transportation systems, the city can reduce reliance on private vehicles, lower travel expenses, and encourage a shift towards more environmentally friendly modes of transportation (Wang *et al.* 2018). (b) Increased development of waste processing: Proper waste management is crucial for long-term sustainable growth. The Batu City government should focus on developing waste processing facilities, including final landfills and Waste Processing Sites, using the Reduce, Reuse, Recycle approach. Effective waste management not only contributes to environmental protection but also enhances the overall sustainability of the city (Phdungsilp 2022). (c) Preservation of the Brantas watershed upstream. Protecting the Brantas watershed upstream from pollution and excessive urban development is essential to maintain the health of the water source and surrounding ecosystems. Preserving natural water resources is vital for sustainable development and the well-being of both residents and visitors. The study by Sulistyowati *et al.* (2023) emphasizes that the Government should immediately pay attention to the problem of Brantas DAS which includes the large proportion of change of land function to agriculture and tourism without taking into account the conservation aspects of land, as well as the shifting of the function of the river boundary designated as green areas, which is not in accordance with its provisions. In turn, water pollution can affect ecosystem and human health. (d) Sustainable land use practices. Land use planning should prioritize the conservation of natural resources and avoid excessive exploitation. Sustainable land use aims to preserve or restore soil quality and fertility, ensuring long-term physical and economic sustainability (Wrachien 2001). The approach recommended by Kisi (2019) in a study of sustainable tourism development in Zonguldak, Turkey, aligns with the results of this study. Both studies advocate for strategies that focus on enhancing tourism infrastructure, addressing waste management, and conserving nature. Additionally, empowering local authorities to apply sustainable principles is crucial in overcoming environmental threats and preserving natural resources. Furthermore, according to Baloch *et al.* (2023), sustainable ecotourism development requires supportive government policy interventions to ensure effective conservation of natural resources and the environment without compromising the economic viability and social well-being of the local population.

Second, developing sustainable tourism and agriculture sectors as Batu City's leading sectors while preserving natural resources. The statement emphasizes the importance of sustainable tourism development and its principles to ensure a positive impact on the tourism sector without compromising the needs of future generations (Obot, and Setyawan 2017). The principles of sustainable tourism development, as defined by MCT (The Minister of Culture and Tourism) (2010), include maintaining environmental quality, providing benefits to local communities and tourists, preserving the relationship between tourism and the environment, fostering harmony between local communities, tourist needs, and the environment, creating dynamic conditions aligned with carrying capacity, and promoting collaboration among all stakeholders based on a shared mission. Additionally, Kisi (2019) examination of the strategic approach to sustainable tourism development provides

valuable recommendations. These include supporting product diversification and event management through the guidance of destination management organizations to organize national and international events. Moreover, the development of traditional handicrafts can contribute to the preservation of local culture and heritage, which are essential components of sustainable tourism. By adhering to these principles and implementing the recommended strategies, Batu City can foster sustainable tourism development that respects the environment, benefits local communities, and creates a dynamic and resilient tourism sector for the present and future generations. This approach will ensure that tourism growth in Batu City is not only economically viable but also environmentally and socially responsible.

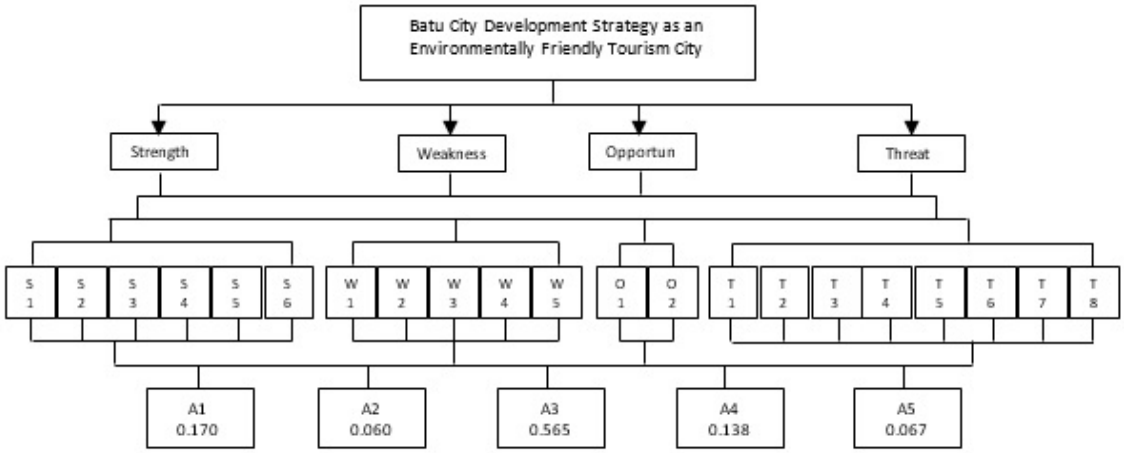
Third, increase selectivity in tourism and real estate. Increasing investment in improving the technological level of urban public pollution control infrastructure and other facilities can yield several benefits, particularly in terms of urban socioeconomic development. Upgrading technology not only contributes to lowering energy consumption and pollutant emissions but also enhances the overall urban environment. A beautiful and sustainable urban environment promotes the health of the urban population and attracts new residents, which, in turn, stimulates the economy and provides a skilled labor force for social development. Cities with advanced socioeconomic development usually offer better educational opportunities, which play a crucial role in encouraging people to adopt resource-efficient and environmentally friendly lifestyles (Fan, Fang and Zhang 2019). This highlights the interdependence and synergy between the social-economic subsystem and the ecological environment subsystem in generating a sustainable urban system (Wang, *et al.* 2011; Bai, *et al.* 2016; Fang, *et al.* 2016). Furthermore, in the context of sustainable tourism development, Kisi (2019) emphasizes the importance of organizing permanent programs for public-private partnerships. Strengthening linkages between tourism and other regional industrial sectors is also crucial to overcome threats to the environment and natural resources. Such collaborations can foster sustainable tourism practices that benefit both the tourism industry and the overall environmental preservation efforts. By investing in technological advancements and fostering partnerships between various sectors, Batu City can accelerate its socioeconomic development while ensuring the preservation of its ecological environment. This integrated approach will support sustainable urban growth and promote responsible tourism development in the region.

Fourth priority strategy is developing community disaster mitigation capabilities from an early age through environmental education in schools. Environmental sensitivity refers to an individual's ability to empathize with the environment, which subsequently leads to proactive environmental care activities. In the context of students, their comprehension of environmental issues is influenced by their personal experiences. As students' environmental knowledge increases, so does their empathy and concern for environmental issues, which can translate into a greater intention to take environmental action (Putri *et al.* 2022). Similarly, Kisi (2019) also emphasized the significance of education as a key strategy for sustainable tourism development. This includes educating students and communities about the city's identity and culture, raising awareness about community tourism entrepreneurship while considering the optimal utilization of environmental resources. Additionally, training on sustainable tourism practices can benefit stakeholders, leading to waste reduction and overall environmental preservation. By fostering environmental sensitivity and providing education on sustainable practices, Batu City can cultivate a community that actively engages in environmentally conscious actions. Empowering students and community members with knowledge and empathy for the environment will contribute to the preservation of natural resources and promote sustainable tourism practices in the region. This holistic approach will support the long-term development and resilience of Batu City as a sustainable tourism destination.

Fifth priority, using regional income, particularly in the tourism industry, to create educational facilities and infrastructure to raise school enrollment rates. Tourism has a role in national development by providing foreign exchange, leveling and growing employment and income prospects, strengthening unity and unity, and learning about the culture of the country. One of the area's potentials is tourism, which has the potential to become a large industry if adequately managed, directed, and sustainable (Setiyanti *et al.* 2011). Moreover, school participation rates correlate with progress in sustainable development. Research conducted by Song and Hongmei Han (2023) looks at how increased innovation and tourism can help the economy of the people. Evidence suggests that the level of primary school participation promotes sustainable development by reducing environmental degradation and promoting economic growth.

Figure 2 depicts the hierarchy for developing Batu City's growth strategy as a sustainable tourism city. The factors contained in each group of factors from the SWOT technical definition are at the first level; the strategic factors included in each group of factors from the SWOT definition are at the second level; and the strategy that must be assessed and compared is at the third level.

Figure 2. The hierarchy of Batu City's growth strategy as an environmentally friendly tourism city



Source: analysis result, 2023

Conclusion

Based on the results of the SWOT-AHP calculation, a quantitative priority analysis can be derived. The initial step in strategy formulation involves evaluating urban development to identify various factors derived from the SWOT analysis. By assessing strengths, weaknesses, opportunities, and threats, the research findings can not only assist Batu City in devising effective approaches for promoting and developing eco-friendly sustainable tourism cities but also serve as a guiding framework for other cities with similar characteristics. This study recommends the following strategies for the Batu City Government to develop the area into an environmentally friendly Tourism City; 1) committing to implementing the principles of sustainable urban development and environmentally friendly tourism citiy through Regional Regulations; 2) developing the sustainable tourism and agriculture sectors as the leading sectors of Batu City while concurrently preserving the natural environment; 3) exercising selectivity in tourism and real estate development to ensure sustainable growth; 4) instilling disaster mitigation capacity in the community from an early age through environmental education in schools; and 5) utilizing regional revenues, particularly from the tourism sector, to build educational facilities and infrastructure at increasing school enrollment rates.

This model case serve as an effective strategic planning tool for other countries or cities. Each city possesses unique attributes, such as economy, resources, policies, and environment, requiring distinct strategies for their development. This study acknowledges the importance of contextual relevance in city development, recognizing the significance of tailoring strategies to the specific strengths and weaknesses of each city. By adopting the SWOT-AHP method, the paper contributes to the theoretical understanding of sustainable tourism city development strategies while reflecting on the current situation of Batu Tourism City. This study provides decision-makers with a systematic flowchart, encompassing the fundamental stages of identifying factors, formulating strategies using the matrix, and prioritizing strategies using the quantitative approach. From a practical standpoint, this study offers a comprehensive and systematic approach to decision-makers involved in sustainable tourism city development strategies. The utilization of the SWOT-AHP method empowers decision-makers with data-driven insights, enhancing the effectiveness of decision-making processes and promoting the sustainable development of tourism cities.

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Credit Authorship Contribution Statement:

Lilik Sulistyowati: developed the concept and plan for this project research, carried out the project administration, supervised the entire research, and reviewed and edited the manuscript.
Eny Krisnawati: developed the concept and plan for this project research, and reviewed and edited the manuscript

Novi Andareswari: carried out the project administration, collected the data, carried out the analysis include the software, wrote the manuscript.
Firman Afrianto: collected the data, carried out the analysis include the software.
Abdul Rais: developed the concept and plan for this project research, carried out the project administration.
Mohammad Fauzi Hafa: collected the data, conducted a literature review, and wrote the manuscript.
Darwiyati: conducted a literature review and wrote the manuscript.
Andi Lopa Ginting: collected the data, conducted a literature review, and wrote the manuscript.
Rifqi Rahmat Hidayatullah: carried out the analysis include the software, wrote the manuscript.

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.

References

[1] Abulebdah, A.T., and Musharavati. F. 2011. A SWOT analysis of thhe construction and demolition waste management practicies in Qatar. *Sustainable Development and Planning VIII* 210: 749-759. DOI:https://doi.org/10.2495/SDP160631

[2] Attar, M., Luchman Hakim, Bagyo Yanuwiadi. 2013. Analysis of potential and policy strategies for developing ecotourism villages in Bumiaji District - Batu City. *Journal of Indonesian Tourism and Development Studies* 1(2): 68-78. DOI: https://doi.org/10.21776/ub.jitode.2013.001.02.04

[3] Bai, X., *et al.* 2016. Defining and advancing a systems approach for sustainable cities. *Current Opinion in Environmental Sustainability,* 23: 69-78. DOI: https://doi.org/10.1016/j.cosust.2016.11.010

[4] Baloch, Q., B., *et al.* 2023. Impact of tourism development upon environmental sustainability: a suggested framework for sustainable ecotourism. *Environ. Sci. Pollut. Res.,* 30: 5917–5930. DOI:https://doi.org/10.1007/s11356-022-22496-w

[5] Dudin, M., *et al.* 2017. Peculiarities of Sustainable Tourism Development in the Russian Federation. *J. Environ. Manag. Tourism* 8(8(24)). 1559-1566. DOI: https://doi.org/10.14505/jemt.v8.8(24).12

[6] Escobar, A. *et al.* 2020. Design of strategies for the implementation and management of a complementary monetary system using the SWOT-AHP Methodology. *Sustainability* 12: 1-23. DOI:https://doi.org/10.3390/su12176849

[7] Escobar, M.T., Aguarón, J. Moreno-Jiménez, J.M. 2004. A note on AHP group consistency for the row geometric mean priorization procedure. *European Journal of Operational Research* 153(2): 318-322. DOI:https://doi.org/10.1016/S0377-2217(03)00154-1

[8] Fan, Y., Fang, C. and Zhang, Q., 2019. Coupling coordinated development between social economy and ecological environment in Chinese provincial capital cities-assessment and policy implications. *J. Clean. Prod.,* 229: 289-298. DOI: https://doi.org/10.1016/j.jclepro.2019.05.027

[9] Fang, C.L., Haimeng Liu, Guangdong Li. 2016. International progress and evaluation on interactive coupling effects between urbanization and the eco-environment. *Journal of Geographical Sciences,* 26: 1081-1116. DOI: https://doi.org/10.1007/s11442-016-1317-9

[10] Firman, A. *et al.* 2023. The impact of eco-innovation, ecotourism policy and social media on sustainable tourism development: evidence from the tourism sector of Indonesia. *Economic Research-Ekonomska Istraživanja,* 36(2): 2143847. DOI: https://doi.org/10.1080/1331677X.2022.2143847

[11] Ginting, N., Munazirah, Julaihi Wahid. 2023. Community Participation in Sustainable Tourism: A case study in Balige, Indonesia. Paper presented at the annual international meeting for the 11th ABRA International Conference on Environment-Behaviour Studies, Mar 01-07, in Marrakech, Morocco. DOI:https://doi.org/10.21834/ebpj.v8i23.4509

[12] Gorener, A., Toker, K., and Ulucay, K. 2012. Application of combined SWOT and AHP: a case study for a manufacturing firm. *Procedia: Social and Behavioral Science,* 58: 1525-1534. DOI:https://doi.org/10.1016/j.sbspro.2012.09.1139

[13] Hassan, Abbas M., Hyowon Lee. 2015. The paradox of the sustainable city: definitions and examples. *Environment, Development and Sustainability* 17(6): 1267-1285. DOI: https://doi.org/10.1007/s10668-014-9604-z

[14] Kahraman, C., Demirel, N. C., and Demirel, T. 2007. Prioritazion of e-government strategies using a SWOT-AHP analysis: the case study of Turkey. *European Journal of Information Systems,* 16(3): 284-298. DOI:https://doi.org/10.1057/palgrave.ejis.3000679

[15] Kanom, K., Darmawan, R. N. and Nurhalimah, N. 2020. Socialization of the application of Sapta Pesona in planning and development of sustainable tourism destinations in leaders of Sumberarum Village, Songgon District, Banyuwangi Regency. *Cendekia: Journal of Community Services,* 2(1): 24-32. DOI:https://doi.org/10.32503/cendekia.v2i1.777

[16] Kaymaz, C. Kivanc, Birinci, S. Kızılkan, Y. 2022. Sustainable development goals assessment of Erzurum Province with SWOT-AHP analysis. *Environment, Development and Sustainabilty,* 24: 2986-3012. DOI:https://doi.org/10.1007/s10668-021-01584-w

[17] Kisi, N. 2019. A strategic approach to sustainable tourism development using the a'wot hybrid method: a case study of Zonguldak, Turkey. *Sustainability* 11(964): 1-19. DOI: https://doi.org/10.3390/su11040964

[18] Kurttila, M., Pesonen, M., Kangas, J. and Kajanus, M. 2000. Utilizing the analytic hierarchy process (AHP) in SWOT analysisa hybrid method and its application to a forest-certification case. *Forest Policy and Economics,* 1: 41-52. DOI: https://doi.org/10.1016/S1389-9341(99)00004-0

[19] Lee, J., Kim, I., Kim, H. and Kang, J. 2021b. SWOT-AHP analysis of the Korean satellite and space industry: Strategy recommendations for development. *Technological Forecasting and Social Change,* 164: 1-14. DOI:https://doi.org/10.1016/j.techfore.2020.120515

[20] Lee, S., Kim, D., Park, S. and Lee, W. 2021c. A Study on the strategic decision making used in the revitalization of fishing village tourism: using A'WOT Analysis. *Sustainability,* 13: 1-12. DOI:https://doi.org/10.3390/su13137472

[21] Lee, S.W., Seow, C., Xue, K. 2021a. Residents' sustainable city evaluation, satisfaction and loyalty: integrating importance-performance analysis and structural equation modelling. *Sustainable,* 13(6766): 1-14. DOI: https://doi.org/10.3390/su13126766

[22] Li, D., *et al.* 2023. How to enhance citizens' sense of gain in smart cities? A SWOT AHP TOWS approach. *Social Indicator Research* 165: 787-820. DOI: https://doi.org/10.1007/s11205-022-03047-9

[23] Long, C., Song Lu, Yiting Zhu. 2022. Research on popular science tourism based on SWOT-AHP model: a case study of Koktokay World Geopark in China. *Sustainability* 14: 1-16. DOI:https://doi.org/10.3390/su14158974

[24] Lusiana, N., Bambang Rahadi, Fajri Anugroho, 2017. Identification of suitability of agricultural land use and river water pollution level (Case study of upstream brantas watershed in Batu City). *Journal of Sustainable Earth* 17(1): 58-68. DOI: https://doi.org/10.21776/ub.jtp.2017.018.02.13

[25] Mora, L., Deakin, M., and Reid, A. 2019. Strategic principles for smart city development: a multiple case study analysis of European best practices. *Technological Forecasting and Social Change,* 142: 70-97. DOI:https://doi.org/10.1016/j.techfore.2018.07.035

[26] Nasrabadi, M. *et al.* 2023. Investigating the impacts of green spaces planning on social sustainability improvement in Tehran, Iran: a SWOT-AHP análisis. *Local Environment,* 28(5): 1-16. DOI:https://doi.org/10.1080/13549839.2023.2169914

[27] Nugroho, L. D., *et al.* 2023. Legal policy of implementation green economy in the tourism sector to realize sustainable tourism and environment. *IOP Conf. Ser.: Earth Environ. Sci.,* 1181 012018. DOI:https://doi/10.1088/1755-1315/1181/1/012018

[28] Obot, F., and Setyawan, D.2017. Implementation of Batu City Government policies in creating an environmentally friendly sustainable tourism city. *Journal of Social and Political Science,* 6(3): 113-120. DOI:https://doi.org/10.33366/jisip.v6i3.1469

[29] Oreski, D. 2012. Strategy development by using SWOT-AHP. *Technology, Education, Management Informatics,* 1(4): 283-291.

[30] Pezzey, J.C.V. 2004. Sustainability policy and environmental policy. *The Scandinavian: Journal of Economics,* 106(2): 339-359. DOI: https://doi.org/10.1111/j.1467-9442.2004.00355.x

[31] Phdungsilp, A. 2022. Waste management and its contribution to the sustainable development goals at Dhurakij Pundit University, Thailand. *Journal of Sustainability Perspective,* 2(1): 65-72. DOI:https://doi.org/10.14710/jsp.2022.15468

[32] Phoochinda, W. 2018. Development of Community Network for Sustainable Tourism based on the Green Economy Concept National Institute of Development Administration, Thailand. *J. Environ. Manag. Tourism* 9(6(30)). DOI: https://doi.org/10.14505//jemt.9.6(30).13

[33] Prayitno, G., Subagiyo, A., Kusriyanto, R. L. 2020. The conversion of agricultural land to non-agricultural land in Batu City, Indonesia. *Geography: Jurnal of Education Studies, Research and Development* 8(2): 135-150. DOI: https://doi.org/10.31764/geography.v8i2.2653

[34] Putri, S. *et al.* 2022. Student's environmental sensitivity toward citizenship behavior mediated by student's intention to act. *Indonesian Journal of Environmental Education and Management*, 7(1): 1-13. DOI:https://doi.org/10.21009/ijeem.v7i1.26068

[35] Rangkuti, F. 2016. *SWOT analysis: techniques for dissecting business cases*. PT. Gramedia Pustaka Utama.

[36] Saaty, R.W. 1987. The analytic hierarchy process—what it is and how it is used. *Mathematical Modeling,* 3-5, 161-176. DOI: https://doi.org/10.1016/0270-0255(87)90473-8

[37] Saaty, T. L. 1977. A scaling method for priorities in hierarchical structures. *Journal of Mathematical Pshycology,* 15(3): 234-281. DOI: https://doi.org/10.1016/0022-2496(77)90033-5

[38] Saaty, T. L. 1982. The analytic hierarchy process: A new approach to deal with fuzziness in architecture. *Architectural Science Review,* 25(3): 64–69. DOI: https://doi.org/10.1080/00038628.1982.9696499

[39] Semih, T., Seyhan, S. 2011. A multi-criteria factor evaluation model for gas station site selection. *Journal of Global Management,* 2(1): 12-21.

[40] Setiyanti, D. Widya, Dwi Sadono. 2011. Impact tourism on off farm business and employment opportunities in coastal area. Sodality: *Journal of Rural Sociology*, 5(3): 259-272. DOI:https://doi.org/10.22500/sodality.v5i3.9692

[41] Sólnes, J. 2003. Environmental quality indexing of large industrial development alternatives using AHP. *Environmental Impact Assessment Review,* 23(3): 283-303. DOI: https://doi.org/10.1016/S0195-9255(03)00004-0

[42] Song, B., and Hongmei Han. 2023. Does eco-friendly tourism necessary for entrepreneurship? The role of tourism and innovation in sustainable development. *Environ. Sci. Pollut. Res.,* 30: 84183–84199. DOI:https://doi.org/10.1007/s11356-023-28195-4

[43] Sulistyowati, L. *et al.* 2023. Preventing water pollution using importance-performance análisis and terrain analysis. *Global Journal Environment Science Management,* 9(4): 1019-1032. DOI:https://doi.org/10.22034/gjesm.2023.04.24

[44] Wang, L., *et al.* 2018. The impacts of transportation infrastructure on sustainable development: Emerging trends and challenges. *International Journal of Environmental Research and Public Health,* 15(6): 1-24. DOI:https://doi.org/10.3390/ijerph15061172

[45] Wang, R., *et al.* 2011. Cultivating eco-sustainability: Social economice natural complex ecosystem case studies in China. *Ecological Complexity*, 8 (4): 273-283. DOI: https://doi.org/10.1016/j.ecocom.2011.03.003

[46] Wind, Y., and Saaty, T. L. 1980. Marketing applications of the analytic hierarchy process. *Management Science* 26(7): 641–658. DOI: https://doi.org/10.1287/mnsc.26.7.641

[47] Wrachien, D. De. 2001. Land use planning: a key to sustainable agriculture. In García-Torres, L, Benites, J., Matínez-Vilela, A. (eds.). *Conservation Agriculture* 471-484. Kluwer Academic Publishers. DOI:https://doi.org/10.1007/978-94-017-1143-2_57

[48] Yigitcanlar, T., and Teriman, S. 2015. Rethinking sustainable urban development: towards an integrated planning and development process. *International Journal of Environmental Science and Technology,* 12(1): 341-352. DOI: https://doi.org/10.1007/s13762-013-0491-x

[49] Yuan, J., *et al.* 2020. Strategy formulation for the sustainable development of smart cities: a case study of Nanjing, China. *International Journal of Strategic Property Management,* 24(6): 379-399. DOI:https://doi.org/10.3846/ijspm.2020.13345

[50] Yuksel, I., Metin Dag deviren. 2007. Using the analytic network process (ANP) in a SWOT analysis. A case study for a textile firm. *Information Science,* 177: 3364-3382. DOI: https://doi.org/10.1016/j.ins.2007.01.001

[51] Central Bureau of Statistics of Batu City. 2022. Official news statistics No. 01/03/: 3579/Th.XXII Batu City's economic growth in 2021 by 4.04 percent. https://batukota.bps.go.id/pressrelease/2022/03/14/41/pertumbuhan-ekonomi-kota-batu-tahun-2021-sebesar-4-04-persen.html

[52] The Minister of Culture and Tourism. 2010. "Ministerial regulation number PM.26/UM.001/MKP/2010 about the general guidelines for the national program for community empowerment independent tourism through tourism villages". Available at: https://jdih.kemenparekraf.go.id/katalog-13-Peraturan%20Menteri

DOI: https://doi.org/10.14505/jemt.v15.1(73).09

An Importance-Performance Analysis of Accessible Tourism: A Tourist and Resident Perspective with Empirical Insights from Phuket

Kevin FUCHS
Faculty of Hospitality and Tourism,
Prince of Songkla University, Thailand
kevin.f@phuket.psu.ac.th

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Abstract: The fundamental principle of accessible tourism revolves around advocating for the inclusion and empowerment of individuals with disabilities, aiming to facilitate complete engagement for individuals with disabilities within tourism experiences. Previous research established a five-dimensional exploratory framework revealing several barriers that prevent Phuket Island from fully engaging in accessible tourism and increasing its global market share in this emerging market segment. This study sought to build upon previous findings by empirically investigating these barriers through the utilization of the importance-performance analysis method. Methodologically, survey data was collected from 391 tourists and residents in Phuket. The findings align with previous research, highlighting the preparedness of Phuket's international airport, diverse luxury accommodation options, and internationally accredited medical facilities. These elements stand out as exemplary in meeting the needs of accessible tourism. Conversely, the present infrastructure, insufficient transportation systems, and limited recreational options pose significant challenges, marking them as pivotal bottlenecks. The article discusses practical implications to rectify these limitations and advances the discussion about using the importance-performance analysis as a managerial tool to evaluate the quality of tourism experiences in the context of accessible tourism.

Keywords: accessible tourism; importance-performance analysis; inclusive tourism; disability; Thailand; sustainable development goals.

JEL Classification: L83; M39; Z32; Q01; R11.

Introduction

At its core, accessible tourism revolves around advocating for the rights of individuals with mental and physical disabilities to fully engage in tourism activities (Benjamin *et al.* 2021). This advocacy entails the removal of barriers that might impede differently abled tourists' participation (Scheyvens and Biddulph 2018), thereby ensuring that people with disabilities can enjoy tourist activities without hindrance (Szmukler *et al.* 2014). Accessible tourism is an emerging field of study and poised to impact the competitiveness of tourism destinations in various dimensions, be it from a human rights perspective, the emergence of a new market segment, or the enhancement of service delivery (Michopoulou *et al.* 2015; Fuchs, 2023). Moreover, accessible tourism is a pivotal consideration, not only because accessibility is a fundamental human right (McCabe and Diekmann 2015) but also due to its significance as a business opportunity (Darcy *et al.* 2010) and as an integral component of sustainable tourism implementation (Sica *et al.* 2020). Furthermore, this type of tourism serves to promote equality in tourism development, embracing individuals of all abilities (Qiao *et al.* 2021). Consequently, it plays a key role in the realm of inclusive tourism, aligning with the objectives of reducing inequalities outlined in Sustainable Development Goal Ten (SDG10) (United Nations, 2022).

An exploratory investigation in Phuket unveiled a range of barriers hindering the island's full engagement in accessible tourism and its global market share expansion for physically disabled tourists (Fuchs 2023). Addressing these barriers, including the enhancement of physical infrastructure, diversification of recreational offerings for the physically disabled, and provision of more affordable accommodation options, has the potential to reduce inequality (Sahoo and Choudhury 2023). To overcome these challenges, an importance-performance

analysis (IPA) was implemented to comprehensively assess Phuket's readiness. IPA can help prioritize areas for improvement while maintaining overall quality (Deepa and Baral 2019). An empirically informed approach can guide tourism stakeholders in Phuket to efficiently plan and implement improvements that benefit both the destination and the emerging accessible tourism segment. Therefore, the study presented in this article extends the existing literature in several ways and provides valuable practical implications for policymakers in Phuket. First, the study presented in this article builds upon prior research, which primarily aimed to understand barriers faced by differently abled travelers (Sisto *et al.* 2022; Fuchs 2023) or recognize the economic potential of specialized travel (Özogul and Baran 2016). Moreover, the article highlights the need for more research dedicated to identifying barriers and understanding tourist preferences from the perspective of differently abled individuals.

1. Literature Review

1.1. Literature on Accessible Tourism

The European Network for Accessible Tourism acknowledges that there is not one universal definition of accessible tourism, but broadly defines it as follows:

> "'*Accessible Tourism' refers to tourism that caters to the needs of a full range of consumers including persons with disabilities, older persons, and cross-generational families. It entails [the] removal of attitudinal and institutional barriers in society, and encompasses accessibility in the physical environment, in transportation, information and communications, and other facilities and services. It encompasses publicly and privately-owned tourist locations*" (ENAT, n.d.).

Furthermore, Simon Darcy, a renowned scholar and pioneer in accessible tourism research, said the following more than a decade ago:

> "*Accessible tourism enables people with access requirements, including mobility, vision, hearing, and cognitive dimensions of access, to function independently and with equity and dignity through the delivery of universally designed tourism products, services, and environments. This definition is inclusive of all people including those traveling with children in prams, people with disabilities, and seniors*" (Darcy and Dickson 2009, 34)

Successful implementation of accessible tourism often hinges on a closely coordinated effort involving collaboration among local stakeholders (Michopoulou *et al.* 2015). Furthermore, Michopoulou *et al.* (2015) noted that enhancing the accessibility of facilities, transportation, attractions, and, more broadly, destinations necessitates the collective involvement of a diverse range of stakeholders, including travelers with disabilities. Moreover, accessible tourism can be viewed as a competitive advantage in the global positioning and marketing of destinations (Kourkouridis and Salepaki 2023). Accessible tourism aims to make travel and tourism experiences inclusive for individuals with disabilities and people with special needs (Qiao *et al.* 2023).

Although it is an emerging market segment, accessible tourism gained increasing attention as more destinations and businesses recognized the importance of catering to a diverse range of travelers (Cockburn-Wootten and McIntosh 2020). Notably, Phuket, a tropical island heavily reliant on tourism and esteemed as a world-class destination (Jarumaneerat 2022), plays a substantial role in Thailand's economic prosperity through tourism revenues (Fuchs 2021). In addition, the proposed direction aligns with the government's strategy of positioning Phuket as a premier health and wellness tourism destination (Sopha *et al.* 2019). Despite Phuket's appeal as a destination, the study reveals that inclusivity remains a challenge there, contributing to inequality (Weiss *et al.* 2018; Fuchs 2023).

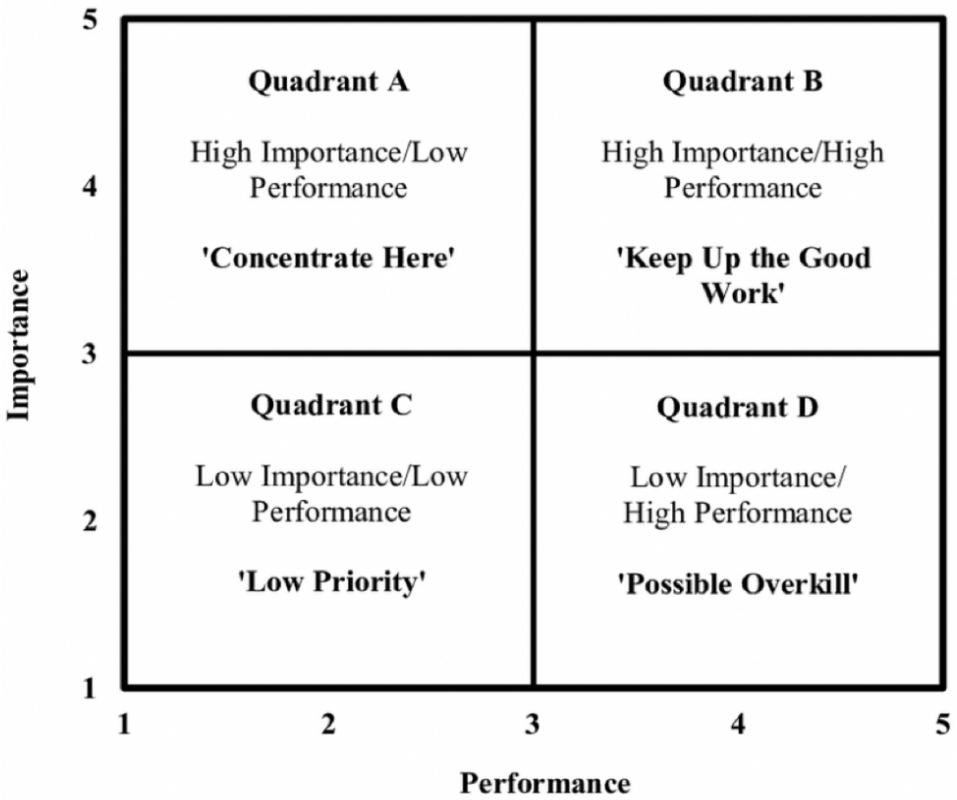
1.2. Importance-Performance Analysis in Tourism

Importance-performance analysis (IPA) is a well-established methodology employed in various fields to evaluate and improve the quality of products, services, or experiences (Agyekum *et al.* 2023). IPA is rooted in the field of marketing and was initially proposed by Martilla and James in the late 1970s (Chen *et al.* 2023). This analytical tool has since found widespread application in diverse sectors, with tourism being a prominent context (Simpson *et al.* 2020). The core purpose of IPA is to identify the critical dimensions or attributes of a product, service, or experience that deserve attention and improvement by categorizing them based on their importance and performance (Saleem *et al.* 2023).

In its fundamental form, IPA involves a two-dimensional matrix in which one axis represents the importance of various attributes and the other axis gauges the performance of the entity in delivering those

attributes (Mimbs *et al.* 2020). The resulting matrix is divided into four quadrants, each providing distinct insights and recommendations for action (Kokkhangplu and Kaewnuch, 2021; Boley and Jordan, 2023) as exemplified in Figure 1. Kokkhangplu and Kaewnuch (2021) as well as Boley and Jordan (2023) described these quadrants as "Keep Up the Work" (high importance, high performance), "Concentrate Here" (high importance, low performance), "Low Priority" (low importance, low performance), and "Possible Overkill" (low importance, high performance).

Figure 1. A visualization of the importance-performance analysis showing a two-dimensional matrix divided into four quadrants



Source: A modified version adapted from Ferreira and Fernandes (2015)

The importance of an attribute is usually determined through market research, while simultaneously, performance is evaluated by assessing the level at which the entity meets the standards or expectations set by its stakeholders, typically the customers (Boley *et al.* 2017). In the context of tourism, the application of IPA is of considerable significance (Simpson *et al.* 2020). Tourism is an industry that heavily relies on customer satisfaction and positive experiences (Simpson *et al.* 2020). The demand for destinations, accommodations, and attractions often hinges on the perceived quality of the experience offered (Yin *et al.* 2020). Consequently, managing the factors that contribute to a visitor's overall experience becomes paramount (Yin *et al.* 2020).

Tourism is inherently multifaceted, and tourists have diverse expectations and preferences (Cohen *et al.* 2014). Identifying which aspects of a destination, service, or experience matter most to various segments of tourists is a challenge that IPA can effectively address (Boley *et al.* 2017). By gathering data on tourists' perceptions of attribute importance and their corresponding assessments of performance, the tourism industry can better tailor its offerings to meet the needs and desires of different customer segments (Cohen *et al.* 2014). In doing so, it not only improves the overall tourist experience but can also gain an edge in a highly competitive market (Cohen *et al.* 2014; Singjai *et al.* 2018).

1.3. Accessibility Research in Phuket

Fuchs (2023) conducted an exploratory study in July 2022 focusing on the accessibility of Phuket for differently-abled individuals. The exploratory research collected data through semi-structured interviews. Moreover, the study revealed several noteworthy findings regarding the barriers and opportunities in this context. The research established a comprehensive framework to assess Phuket's readiness for accessible tourism, shedding light on the island's potential in this emerging market segment. Namely, the dimensions were: (1) airport facilities, (2)

accommodation services, (3) transportation and infrastructure, (4) recreational activities, and (5) health and wellness (including medical facilities). Within this framework, various dimensions were explored, encompassing different aspects of the travel experience (Fuchs 2023).

It was observed that the airport facilities at Phuket International Airport (IATA: HKT) generally provided adequate support for travelers with disabilities, including dedicated wheelchair services. However, the research also highlighted a noteworthy contrast between the ease of arrival at the airport and the challenges faced in departing from it. In terms of transportation and infrastructure, the study found that Phuket had limited options for disabled tourists, particularly when it came to the availability of accessible taxis. Furthermore, the absence of a well-developed public transportation network and the existence of insufficient infrastructure, such as roads and sidewalks, posed significant hurdles for differently-abled individuals moving around the island. The sentiment among participants was that "there are not many options for differently abled to independently move around the island" (Fuchs 2023, 801).

Accommodation services in Phuket varied widely, from budget to luxury options. Generally, lower-end accommodations were less accommodating for individuals with physical disabilities due to inadequate infrastructure. On the other hand, high-end hotels were better equipped to cater to the needs of disabled tourists. The availability of recreational activities for differently-abled tourists in Phuket was found to be limited, with the extent of options decreasing as the severity of physical disabilities increased. Inclusivity in these activities was lacking, partly due to additional costs associated with accommodating disabilities. For example, some participants in the study voiced their concern by noting that "the additional costs [for recreational activities] make it less desirable and financially sustainable" (Fuchs 2023, 801).

Table 1. Positive aspects and areas for improvement concerning Phuket's readiness for accessible tourism

Positive Aspects
The airport provides adequate support for travelers with disabilities (including dedicated wheelchair services)
High-end hotels are well-equipped to cater to the needs of differently-abled tourists
Availability of state-of-the-art private medical centers operated by world-class physicians
Areas for Improvement
Limited transportation options for differently-abled tourists, with a need for pre-booking accessible taxis
A lack of a well-developed public transportation network
Inadequate infrastructure (including road crossings and sidewalks that pose a significant barrier)
Limited availability of recreational activities for differently-abled tourists in Phuket

Source: Summarized in tabular form based on the findings from Fuchs (2023)

One of the most contentious findings emerged in the area of health and wellness. Phuket was recognized for its private medical centers staffed by world-class physicians. While some interviewees highlighted concerns about the cost of health insurance for people with disabilities, the quality of medical assistance in Phuket was generally regarded as meeting international standards. Access to high-quality healthcare facilities was deemed essential for selecting a vacation destination for differently-abled individuals. The aforementioned Table 1 presents a summary of the findings from Fuchs' study (2023), categorizing them into positive aspects and areas requiring improvement. This establishes the foundational framework for further exploration of Phuket's readiness for accessible tourism.

2. Methodology

2.1. Study Site

Phuket, a tropical island heavily reliant on tourism and esteemed as a world-class destination (Jarumaneerat 2022), plays a substantial role in Thailand's economic prosperity through tourism revenues (Fuchs 2021). Phuket is Thailand's largest island, with a total land area of 543 km2. In comparison, Phuket is somewhat smaller than the sovereign island city-state of Singapore (728.6 km2) and about half the size of Okinawa in Japan (1,199 km2). Given the island's location in the Andaman Sea, Phuket is often referred to as "The Pear of the Andaman Sea." Overall, Phuket is the second-smallest province in Thailand but a substantial contributor to the national GDP.

2.2. Research Instrument

A survey was used as the research instrument for this study. The questionnaire was designed to gather information on various aspects connecting Phuket to the realm of accessible tourism. In total, 10 statements were asked, including but not limited to the readiness of hotel staff to cater to differently-abled customers,

infrastructure, transport systems, accessibility, and marketing activities (Table 3). The questionnaire design for the IPA largely followed the guidelines in Simpson *et al.* (2020) based on the five themes identified in Fuchs (2023). The first draft of the questionnaire, including the phrasing of each statement, was established by the lead researcher and reviewed by two academics in similar research fields. After minor adjustments to improve comprehension and avoid ambiguous phrasing, a pre-test was conducted with a sample of 15. The final questionnaire asked the respondents to rate the 10 statements on their importance and performance on a 5-point Likert scale where 1 = "Not at all important" and 5 = "Extremely important" for the importance of an attribute and 1 = "Highly dissatisfied" and 5 = "Highly satisfied" for the performance of that attribute.

2.3. Sampling and Data Collection

Five hundred questionnaires were administered to obtain the desired number of responses. In total, 391 responses were included in the final analysis, corresponding to a response rate of 78%. The data collection was conducted during 2023 in three tourist locations (Patong Beach, Phuket Town, and Laguna Area). Research assistants were employed to distribute the questionnaires and collect them a few minutes later. To minimize selection bias by the fieldworkers, every fifth person was approached for participation. Informed consent about the research aim and objective of the study was a prerequisite for participation. After returning the questionnaire, each participant received a souvenir as a token of appreciation for their participation. Those who declined to participate in the survey and unreturned/incomplete questionnaires were considered as non-respondents. The sociodemographic characteristics of the sample are summarized in Table 2 below.

Table 2. Sociodemographic characteristics of the participants

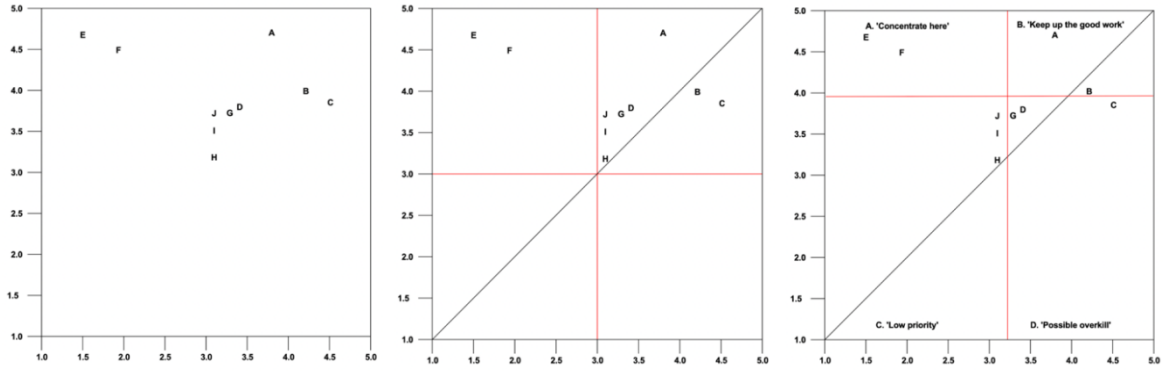
Characteristic		Frequency	Percentage
Type	Tourist	287	73%
	Resident	104	27%
Gender	Male	183	47%
	Female	208	53%
Nationality	Thai	86	22%
	Foreign	305	78%
Age	18 – 29 years old	92	24%
	30 – 39 years old	123	31%
	40 – 49 years old	51	13%
	50 – 59 years old	77	20%
	60 years old or over	48	12%
Education	Not Graduated	28	7%
	High School Diploma	135	35%
	University Degree	212	54%
	Other	16	4%

Source: Summarized in tabular form based on the empirical data

2.4. Data Analysis

The collected data was converted into a spreadsheet and cleaned by performing a consistency check before proceeding to a detailed analysis. For example, incomplete questionnaires with many missing responses were discarded. Furthermore, unengaged responses (*i.e.*, 3-3-3-3 or 5-5-5-5) were removed (Guin *et al.* 2012). The data set was analyzed using a combination of JASP (V.0.18.1) and Microsoft Excel. This process included calculating the mean values for each statement, the perceived gap between importance and performance (Table 3), and, finally, several iterations of plotting the results into graphs (Figure 2) until the final result emerged (Figure 3).

Figure 2. A visual representation of importance–performance analysis by plotting the mean values onto the graph (left), adding the four quadrants and a diagonal line where importance and performance align (center), and adjusting the quadrants based on the empirical results (right)



Source: The visualization plot is based on the collected empirical data

3. Empirical Results

The first statement asked the respondents to rate the importance and performance of medical facilities in Phuket. The exact statement read, "The medical facilities are well-equipped and prepared for differently-abled tourists." The perceived importance yielded a high average rating of 4.70 out of 5.00, whereas the perceived performance yielded 3.82 out of 5.00. This negative gap (-0.88) indicates that the perceived performance does not live up to the perceived importance (Statement A). The second statement inquired about the "variety of accommodation options for differently-abled tourists." The perceived importance yielded an average rating of 4.00 out of 5.00, whereas the perceived performance yielded 4.22 out of 5.00. This positive gap (+0.22) indicates that the perceived performance is higher than the perceived importance (Statement B).

The third statement, "The hotel staff is ready to help and assist differently-abled tourists," received an importance rating of 3.84 (out of 5.00) and a (relatively high) performance rating of 4.54 (out of 5.00). This positive gap (+0.70) indicates that the perceived performance is higher than the perceived importance (Statement C). The fourth statement asked the participants to rate the access and facilities for differently-abled tourists at Phuket International Airport. The importance rating was 3.80 (out of 5.00), whereas the performance rating was slightly lower at 3.46 (out of 5.00), creating a negative gap (-0.34) (Statement D). Fifth, the participants were asked to rate the following statement: "There are inclusive transportation options available for differently-abled tourists." The perceived importance yielded an average rating of 4.67, whereas the average performance yielded a 1.61 rating (Statement E).

Next, the participants were asked about the infrastructure, *i.e.*, "The infrastructure in the tourist areas supports access for differently-abled tourists," resulting in 4.47 for importance and 1.86 for performance (Statement F). Sixth, respondents were asked if Phuket brands itself as an accessible destination for differently-abled tourists. This resulted in average ratings of 3.67 out of 5.00 for importance and 3.33 out of 5.00 for performance (Statement G). The next item asked about recreational activities, *i.e.*, "There is a range of recreational activities catering to the differently-abled tourists," which yielded average ratings of 3.13 for importance and 3.07 for performance (Statement H). Furthermore, the participants were asked if "Restaurants around the island are prepared and cater to differently-abled tourists," which resulted in mean values of 3.52 (out of 5.00) for importance and 3.08 (out of 5.00) for performance, creating a negative gap (-0.44) (Statement I).

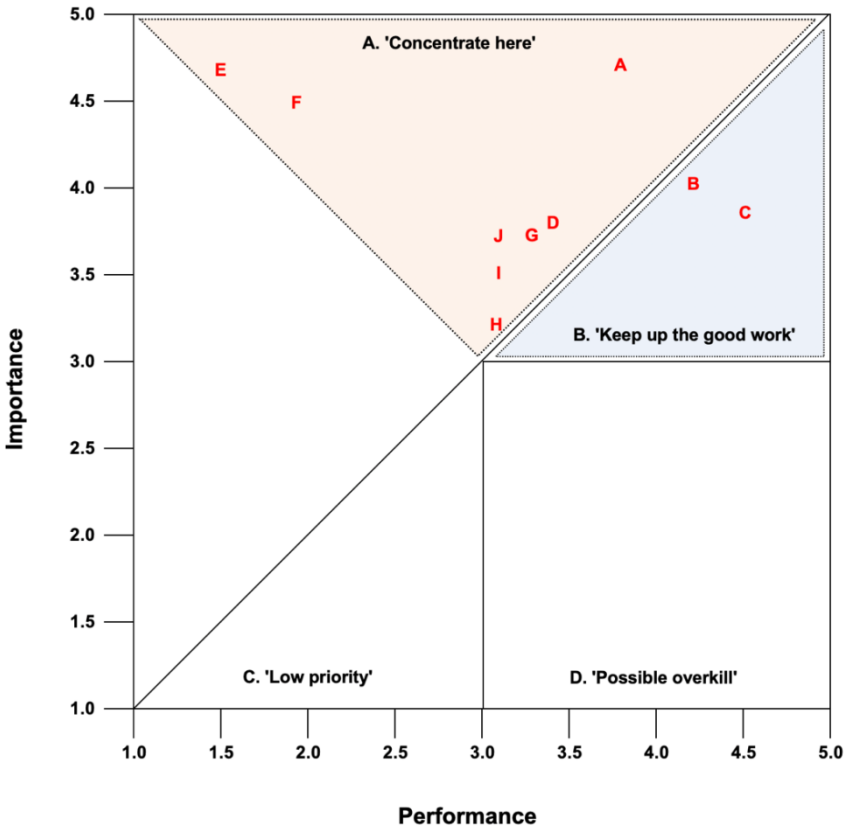
The last statement required the respondents to provide their overall sentiment, asking them if "Phuket Island is generally prepared and equipped for differently-abled tourists." This resulted in average ratings of 3.68 out of 5.00 for importance and 3.05 out of 5.00 for performance. This negative gap (-0.63) indicates that the perceived performance does not live up to the perceived importance (Statement J). A summary of all mean ratings and the corresponding gap are reported in Table 3 below. After descriptive analysis of the results, it is noteworthy to mention that two items had a positive gap (Statements B and C, respectively), indicating that the perceived performance outperforms the perceived importance. On the other hand, eight items had a negative gap ranging from -0.06 (Statement H) to -3.06 (Statement E). In the following step, the results are visualized through a plot graph to identify areas requiring attention (Figure 3).

Table 3. Results of the importance-performance analysis including mean values for each category and their gap dimension

Code	Abbreviation	Statement	Mean Value		Gap
			Importance	Performance	
A	MEDICAL	The medical facilities are well-equipped and prepared for differently-abled tourists.	4.70	3.82	-0.88
B	ACCOMMODATION	There is a good variety of accommodation options for differently-abled tourists.	4.00	4.22	0.22
C	READINESS	The hotel staff is ready to help and assist differently-abled tourists.	3.84	4.54	0.70
D	AIRPORT	The international airport provides access and facilities for differently-abled tourists.	3.80	3.46	-0.34
E	TRANSPORT	There are inclusive transportation options available for differently-abled tourists.	4.67	1.61	-3.06
F	INFRASTRUCTURE	The infrastructure in the tourist areas supports access for differently-abled tourists.	4.47	1.86	-2.61
G	MARKETING	Phuket brands itself as an accessible destination for differently-abled tourists.	3.67	3.33	-0.34
H	ACTIVITIES	There is a range of recreational activities catering to the differently-abled tourists.	3.13	3.07	-0.06
I	RESTAURANT	Restaurants around the island are prepared and cater to differently-abled tourists.	3.52	3.08	-0.44
J	OVERALL	Phuket Island is generally prepared and equipped for differently-abled tourists.	3.68	3.05	-0.63

Source: Summarized in tabular form based on the empirical data

Figure 3. A revised importance-performance analysis plot graph divided into four quadrants



Source: The visualization plot is based on the collected empirical data

As initially stated, the importance-performance analysis plot graph is divided into four quadrants following good practice (Kokkhangplu and Kaewnuch 2021; Boley and Jordan 2023). These quadrants are labeled as "Keep Up

the Work" (high importance, high performance), "Concentrate Here" (high importance, low performance), "Low Priority" (low importance, low performance), and "Possible Overkill" (low importance, high performance). Notably, the quadrants “Low Priority” and “Possible Overkill” yielded no results. This indicates that none of the reported statements are perceived as exceptionally unimportant or particularly high-performing. Both statements with the positive gaps (Statements B and C, respectively) are placed in the quadrant “Keep Up the Work.” This indicates that Phuket – as a destination – is perceived as well-positioned regarding the variety of accommodation options for differently-abled tourists and that lodging staff is ready to assist these tourists (Figure 3).

Consequently, the eight negative gaps are placed in the remaining quadrants, *i.e.*, “Concentrate Here” indicating that there is still room for improvement (Figure 3). However, it is noteworthy that not all eight statements are equally weighted. For example, priority should be placed on those with the largest gap between importance and performance, namely, “inclusive transportation options available for differently-abled tourists” (Statement E) and “infrastructure in the tourist areas supports access for differently-abled tourists” (Statement F). Moreover, it is important to see the results in context (to perceived importance) without entirely relying on the severity of the gap. For example, MEDICAL (statement A) yielded the third largest negative gap (-0.88) following TRANSPORT (Statement E) and INFRASTRUCTURE (Statement F), though this stemmed primarily from the high level of importance placed on this item (4.70 out of 5.00). Therefore, it is important to evaluate the gap (between perceived importance and perceived performance) in context to the perceived performance of each statement.

4. Discussion and Implications

The study focused on understanding the dimensions influencing the engagement of differently-abled tourists within Phuket, revealing a nuanced picture. The empirical investigation shed light on various aspects, showcasing both strengths and areas requiring substantial attention to foster a more inclusive and accommodating environment. Certain elements stood out positively. Notably, the variety of accommodation options available for differently-abled tourists and the readiness of lodging staff to assist these individuals were perceived as commendable. This indicates a level of preparedness and a proactive approach within the lodging sector, reflecting positively on Phuket's potential to cater to this specific segment of tourists (Scheyvens and Biddulph 2018). However, the study brought forward several critical areas demanding immediate focus and improvement.

Foremost among these are the inadequacies in transportation options and the deficiency in infrastructure supporting access for differently-abled tourists in the tourist areas. These findings underscore the pressing need for substantial enhancements to make Phuket more accessible and accommodating to individuals with disabilities (Fuchs 2023). Notably, the negative gaps between perceived importance and performance were not uniform across the surveyed dimensions. While some aspects like medical facilities showcased a negative gap, it is important to contextualize these results against the perceived importance assigned to each dimension. For instance, the high level of perceived importance of medical facilities (rated 4.70 out of 5.00) contributed to the negative gap despite a relatively high performance rating (3.82 out of 5.00). This underlines the high expectations and critical importance attached to this aspect.

The transformation of Phuket into a more inclusive destination requires a multifaceted approach, encompassing not only physical infrastructure but also cultural awareness and sensitivity toward diverse tourist needs. In light of these findings, the implications for the tourism industry in Phuket are significant. For example, addressing the identified shortcomings and implementing practical solutions will put Phuket on the map for another segment of tourism (*i.e.*, inclusive tourism). In particular, improving transportation systems and the local infrastructure (streets, sidewalks, road crossings, etc.) should be a priority (Natalia *et al.* 2019; Gillovic and McIntosh, 2020). Devile and Kastenholz (2020) add that these factors influence travel decisions and satisfaction, and therefore, Phuket is not maximizing its full potential with this customer segment.

Improving ground transportation options and enhancing the accessibility infrastructure within tourist areas can substantially boost Phuket's appeal as an inclusive and accommodating destination for differently-abled tourists (Fuchs 2023). Additionally, stakeholders within the tourism industry in Phuket should leverage the positive aspects identified, such as the readiness of lodging staff and the existing variety of accessible accommodations. Strengthening and further promoting these attributes can support Phuket's image as an attractive and hospitable destination for individuals with disabilities (Devile and Kastenholz 2020). Ongoing commitment to continuous improvement and sustained investment in accessibility infrastructure will be crucial in ensuring Phuket’s long-term success as an inclusive tourist destination (Adshead *et al.* 2019; Darcy *et al.* 2020).

Lastly, the study confirms the validity of the IPA as a managerial tool for evaluating accessible tourism experiences in Phuket. It not only identifies key areas for improvement but also assists in prioritizing efforts,

allocating resources effectively, and fostering a continuous cycle of enhancement. Its structured approach and ability to provide actionable insights make it an invaluable instrument for decision-makers aiming to enhance the inclusivity and quality of tourism experiences for individuals with disabilities. Moreover, the iterative nature of IPA lends itself well to continual assessment and monitoring (Deepa and Baral 2019). It offers a mechanism for tracking improvements over time, allowing managers to gauge the effectiveness of interventions and measure progress in enhancing the quality of accessible tourism experiences in Phuket (Simpson *et al.* 2020).

5. Limitations and Recommendations for Future Research

The results of this study add to our understanding of accessible tourism in Phuket while also highlighting avenues for future research (constrained by the methodology of this study or emerging from its findings). First, the study surveyed 391 tourists and residents in Phuket. Future research could aim for a larger and/or more diverse sample to enhance the representativeness. Additionally, including perspectives from a more extensive range of stakeholders (for example, interviews with local authorities or disability advocacy groups) could provide a more comprehensive understanding. Second, the study focused primarily on Phuket Island. Future research could expand the scope to include other tourist destinations in Thailand or compare other island destinations on a global scale and contrast the challenges and successes that various destinations face in promoting accessible tourism. Third, the study might not have fully accounted for cultural nuances or specific contextual factors that influence perceptions of accessible tourism. Therefore, future research should consider these cultural complexities that might impact the experiences of differently-abled tourists. Moreover, the study has natural limitations related to the time frame during which data was collected. Tourism landscapes evolve, and improvements might have occurred after the study's completion. Thus, continuous reassessments are needed to monitor the progress and evaluate the status quo.

Conclusion

The results of the research provide valuable insights into the strengths and weaknesses of Phuket's accessible tourism landscape. Phuket can significantly enhance its reputation as an inclusive and welcoming destination for all by addressing the highlighted areas of improvement. This approach aligns with the core principles of accessible tourism, fostering greater engagement among differently-abled tourists. Therefore, this research serves as a roadmap for stakeholders to focus on improving these key areas, positioning Phuket to excel in accessible tourism and offer fulfilling experiences to tourists with diverse needs. This can be achieved by leveraging the existing strengths while diligently addressing the highlighted bottlenecks. Thus, Phuket can establish itself as a leading and exemplary destination for accessible tourism, ensuring enjoyable and fulfilling experiences for all visitors, irrespective of their abilities. Moreover, the results highlight the economic potential of catering to accessible tourism, opening doors to a wider market and enhancing Phuket's competitiveness on the global tourism stage. Finally, emphasizing inclusivity not only benefits differently-abled tourists but also aligns with a broader global movement toward more equitable and accessible tourism practices.

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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.

References

[1] Adshead, D., Thacker, S., Fuldauer, L. I., and Hall, J. W. 2019. Delivering on the Sustainable Development Goals through long-term infrastructure planning. *Global Environmental Change*, 59: 101975. DOI:https://doi.org/10.1016/j.gloenvcha.2019.101975

[2] Agyekum, K., Akli-Nartey, E. E. K., Kukah, A. S., and Agyekum, A. K. 2023. Importance-performance analysis (IPA) of the indoor environmental quality (IEQ) of an EDGE-certified building in Ghana. *International Journal of Building Pathology and Adaptation*, 41(1): 73-95. DOI: https://doi.org/10.1108/IJBPA-03-2021-0040

[3] Benjamin, S., Bottone, E., and Lee, M. 2021. Beyond accessibility: exploring the representation of people with disabilities in tourism promotional materials. *Journal of Sustainable Tourism*, 29(2-3): 295-313. DOI:https://doi.org/10.1080/09669582.2020.1755295

[4] Boley, B. B., and Jordan, E. 2023. Leveraging IPA gap scores to predict intent to travel. *Journal of Hospitality and Tourism Management*, 57: 97-101. DOI: https://doi.org/10.1016/j.jhtm.2023.09.006

[5] Boley, B. B., McGehee, N. G., and Hammett, A. T. 2017. Importance-performance analysis (IPA) of sustainable tourism initiatives: The resident perspective. *Tourism Management*, 58: 66-77. DOI:https://doi.org/10.1016/j.tourman.2016.10.002

[6] Chen, J., *et al.* 2023. Evaluation and determinants of satisfaction with the urban-rural interface area liveability toward "15-min city": A case study in Henan Province, China. *Ecological Economics*, 214, 107994. DOI:https://doi.org/10.1016/j.ecolecon.2023.107994

[7] Cockburn-Wootten, C., and McIntosh, A. 2020. Improving the accessibility of the tourism industry in New Zealand. *Sustainability*, 12(24): 10478. DOI: https://doi.org/10.3390/su122410478

[8] Cohen, S. A., Prayag, G., and Moital, M. 2014. Consumer behaviour in tourism: Concepts, influences and opportunities. *Current issues in Tourism*, 17(10): 872-909. DOI:https://doi.org/10.1080/13683500.2013.850064

[9] Darcy, S., and Dickson, T. J. 2009. A whole-of-life approach to tourism: The case for accessible tourism experiences. *Journal of Hospitality and Tourism Management*, 16(1): 32-44. DOI:https://doi.org/10.1375/jhtm.16.1.32

[10] Darcy, S., Cameron, B., and Pegg, S. 2010. Accessible tourism and sustainability: a discussion and case study. *Journal of Sustainable Tourism*, 18(4): 515-537. DOI: https://doi.org/10.1080/09669581003690668

[11] Darcy, S., McKercher, B., and Schweinsberg, S. 2020. From tourism and disability to accessible tourism: A perspective article. *Tourism Review*, 75(1): 140-144. DOI: https://doi.org/10.1108/TR-07-2019-0323

[12] Deepa, R., and Baral, R. 2019. Importance-performance analysis as a tool to guide employer branding strategies in the IT-BPM industry. *Journal of Organizational Effectiveness: People and Performance*, 6(1): 77-95. DOI: https://doi.org/10.1108/JOEPP-04-2018-0024

[13] Devile, E., and Kastenholz, E. 2020. Accessible tourism experiences: the voice of people with visual disabilities. In Social Tourism at the Crossroads (pp. 84-104). Routledge. DOI:https://doi.org/10.4324/9780429290077-6

[14] Ferreira, H. P., and Fernandes, P. O. 2015. Importance-performance analysis applied to a laboratory supplies and equipment company. *Procedia Computer Science*, 64: 824-831. DOI:https://doi.org/10.1016/j.procs.2015.08.634

[15] Fuchs, K. 2021. How are small businesses adapting to the new normal? Examining tourism development amid COVID-19 in Phuket. *Current Issues in Tourism*, 24(24): 3420-3424. DOI:https://doi.org/10.1080/13683500.2021.1942439

[16] Fuchs, K. 2023. The Barriers to Accessible Tourism in Phuket: Toward an Exploratory Framework with Implications for Tourism Planning. *Tourism: An International Interdisciplinary Journal*, 71(4): 798-805. DOI:https://10.0.147.109/t.71.4.10

[17] Gillovic, B., and McIntosh, A. 2020. Accessibility and inclusive tourism development: Current state and future agenda. *Sustainability*, 12(22), 9722. DOI: https://doi.org/10.3390/su12229722

[18] Guin, T. D. L., Baker, R., Mechling, J., and Ruyle, E. 2012. Myths and realities of respondent engagement in online surveys. *International Journal of Market Research*, 54(5). DOI: 10.2501/IJMR-54-5-613-63

[19] Jarumaneerat, T. 2022. Segmenting international tourists based on the integration of travel risk perceptions and past travel experience. *Journal of Quality Assurance in Hospitality and Tourism*, 23(2): 508-538. DOI:https://doi.org/10.1080/1528008X.2021.1891596

[20] Kokkhangplu, A., and Kaewnuch, K. 2021. Importance and performance analysis on tourism components in the south of Thailand. *Kasetsart Journal of Social Sciences*, 42(2): 275-280. DOI:https://doi.org/10.34044/j.kjss.2021.42.2.092542

[21] Kourkouridis, D., and Salepaki, A. 2023. Cooperative Tourism Marketing in Accessible Tourism Development: The Case of the Cross-Border Area of Greece–Republic of Northern Macedonia. *Sustainability*, 15(19): 14093. DOI: https://doi.org/10.3390/su151914093

[22] McCabe, S., and Diekmann, A. 2015. The rights to tourism: reflections on social tourism and human rights. Tourism Recreation Research, 40(2): 194-204. DOI: https://doi.org/10.1080/02508281.2015.1049022

[23] Michopoulou, E., Darcy, S., Ambrose, I., and Buhalis, D. 2015. Accessible tourism futures: the world we dream to live in and the opportunities we hope to have. *Journal of Tourism Futures*, 1(3): 179-188. DOI:https://doi.org/10.1108/JTF-08-2015-0043

[24] Mimbs, B. P., *et al.* 2020. Importance-performance analysis of residents' and tourists' preferences for water-based recreation in the Southeastern United States. *Journal of Outdoor Recreation and Tourism*, 31, 100324. DOI: https://doi.org/10.1016/j.jort.2020.100324

[25] Natalia, P., *et al.* 2019. Critical elements in accessible tourism for destination competitiveness and comparison: Principal component analysis from Oceania and South America. *Tourism Management*, 75: 169-185. DOI: https://doi.org/10.1016/j.tourman.2019.04.012

[26] Özogul, G., and Baran, G. G. 2016. Accessible tourism: The golden key in the future for the specialized travel agencies. *Journal of Tourism Futures*, 2(1): 79-87. DOI: https://doi.org/10.1108/JTF-03-2015-0005

[27] Qiao, G., Cao, Y., and Zhang, J. 2023. Accessible Tourism–understanding blind and vision-impaired tourists' behaviour towards inclusion. *Tourism Review*, 78(2): 531-560. DOI: https://doi.org/10.1108/TR-03-2022-0129

[28] Qiao, G., Ding, L., Zhang, L., and Yan, H. 2021. Accessible tourism: A bibliometric review (2008–2020). *Tourism Review*, 77(3): 713-730. DOI: https://doi.org/10.1108/TR-12-2020-0619

[29] Sahoo, S. K., and Choudhury, B. B. 2023. Wheelchair Accessibility: Bridging the Gap to Equality and Inclusion. *Decision Making Advances*, 1(1): 63-85. DOI: https://doi.org/10.31181/dma1120239

[30] Saleem, M. A., *et al.* 2023. An exploration and importance-performance analysis of bus rapid transit systems' service quality attributes: Evidence from an emerging economy. *Transport Policy*, 141: 1-13. DOI:https://doi.org/10.1016/j.tranpol.2023.07.010

[31] Scheyvens, R., and Biddulph, R. 2018. Inclusive tourism development. *Tourism Geographies*, 20(4): 589-609. DOI: https://doi.org/10.1080/14616688.2017.1381985

[32] Sica, E., Sisto, R., Bianchi, P., and Cappelletti, G. 2020. Inclusivity and responsible tourism: Designing a trademark for a national park area. *Sustainability*, 13(1): 13. DOI: https://doi.org/10.3390/su13010013

[33] Simpson, G. D., *et al.* 2020. Importance-performance analysis to inform visitor management at marine wildlife tourism destinations. *Journal of Tourism Futures*, 6(2): 165-180. DOI: https://doi.org/10.1108/JTF-11-2018-0067

[34] Singjai, K., Winata, L., and Kummer, T. F. 2018. Green initiatives and their competitive advantage for the hotel industry in developing countries. *International Journal of Hospitality Management*, 75: 131-143. DOI:https://doi.org/10.1016/j.ijhm.2018.03.007

[35] Sisto, R., Cappelletti, G. M., Bianchi, P., and Sica, E. 2022. Sustainable and accessible tourism in natural areas: A participatory approach. *Current Issues in Tourism*, 25(8): 1307-1324. DOI: https://doi.org/10.1080/13683500.2021.1920002

[36] Sopha, C., Jittithavorn, C., and Lee, T. J. 2019. Cooperation in health and wellness tourism connectivity between Thailand and Malaysia. *International Journal of Tourism Sciences*, 19(4): 248-257. DOI:https://doi.org/10.1080/15980634.2019.1706027

[37] Szmukler, G., Daw, R., and Callard, F. 2014. Mental health law and the UN Convention on the rights of persons with disabilities. *International Journal of Law and Psychiatry*, 37(3): 245-252. DOI:https://doi.org/10.1016/j.ijlp.2013.11.024

[38] United Nations. (2022). Department of Economic and Social Affairs: Sustainable Development. Reduce inequality within and among countries. Available at: https://sdgs.un.org/goals/goal10

[39] Weiss, D. J., *et al.* 2018. A global map of travel time to cities to assess inequalities in accessibility in 2015. *Nature*, 553(7688): 333-336. DOI: https://doi.org/10.1038/nature25181

[40] Yin, J., Cheng, Y., Bi, Y., and Ni, Y. 2020. Tourists perceived crowding and destination attractiveness: The moderating effects of perceived risk and experience quality. *Journal of Destination Marketing and Management*, 18, 100489. DOI: https://doi.org/10.1016/j.jdmm.2020.100489

[41] ENAT 2023. What is "Accessible Tourism"?. European Network for Accessible Tourism. Available at: https://www.accessibletourism.org/

DOI: https://doi.org/10.14505/jemt.v15.1(73).10

The Role of Ecopreneurship in Bali's Sustainable Tourism Development: Insights into Government Policy, Tourist Awareness and Preferences

I G.P.B Sasrawan MANANDA
Tourism Faculty, Udayana University, Indonesia
ORCID: 0009-0009-4673-7853
gusmananda@unud.ac.id

I Nyoman SUDIARTA
Tourism Faculty, Udayana University, Indonesia
ORCID: 0000-0002-4538-1148
sudiarta_ipw@unud.ac.id

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Abstract: There are numerous environmental issues in Bali, a popular tourist destination in Indonesia, including the problems of waste, critical land, beach abrasion, coral reef destruction and water contamination, all attributed to the rapid expansion of the tourism industry. Ecotourism is one of the solutions to address these concerns, and the initiatives taken involve ecopreneurship, the process of starting and running green firms that support sustainable tourism growth in Bali. The goal of ecopreneurship in the tourism industry is to create and run enterprises that have as minimum negative environmental impacts as possible, while maximising positive social and economic consequences. This is done through improvements on both public policies and tourist preferences, to promote a sustainable tourism development. A mixed method was used, combining SEM PLS, Path Methods, and qualitative research, with comprehensive interviews conducted among ecopreneurs, government agencies, tourists, and academics in Bali. Ecopreneurship variables, comprising environmentally friendly products and services, green technology innovation, environmental and natural resource management, local community involvement, environmental education and awareness, waste and emission management, collaboration and partnerships, measurement of environmental performance and sustainability, moderated by the government policy and tourist awareness and preference, were found to have a significant influence on sustainable tourism variables, namely, natural environment preservation, social welfare and culture, local economic empowerment, resource management and environmental impact reduction, local community participation and public consultation.

Keywords: sustainable tourism; ecopreneurship; government policy; tourist awareness and preferences

JEL Classification: H11; L84; L85; L88; Q01; R11; Z32.

Introduction

In Bali, the tourism sector plays a crucial role for its revenue, due to its stunning natural landscapes, vibrant cultural heritage, and distinctive attractions (Ekawati, Giantari, Sariyanthi 2017; Sudiarta, Sumadi and Purnamawati 2021). Nevertheless, an unregulated tourism expansion done to capitalise on these opportunities may lead to adverse effects on the environment and the well-being of the residents. Bali is currently grappling with five severe environmental issues, namely, waste management, critical land depletion, coastal erosion, water contamination, and coral reef degradation (Chong 2020), all requiring mammoth tasks to resolve. To begin with, the waste predicament is alarming, with a reported daily accumulation of 5,806 cubic metres. This waste, generated by both community activities and tourism, is largely composed of plastic materials, including bags, wrappers, bottles, and other items. Traditional waste disposal methods are no longer viable, necessitating a shift towards responsible waste separation between organic and non-organic materials. Public awareness campaigns are essential to instigate this change (Chong 2020).

The other issues are also equally crucial; worrying land concerns, as noted by the Bali Environmental Board, with 51,107.26 hectares designated as critical; beach erosion impacting 184 km of Bali's 437.7 km coastline, with 67.1 km being severely affected; water pollution damaging ten rivers that serve essential purposes; and coral reef deterioration, being addressed through rehabilitation, conservation groups, anti-theft measures, illegal fishing control, and heightened community involvement (Chong 2020).

Figure 1. Plastic waste in the sea in Bali.

Figure 2. Plastic waste on the beach.

Prioritising coral reef preservation is essential, proven in research indicating the extensive ecological and economic benefits to be gained. These benefits can be categorised into direct and indirect advantages. Direct benefits encompass serving as crucial fishing grounds for valuable species, such as, grouper, baronang, and yellowtail, as well as offering opportunities for marine tourism and research on aquatic biodiversity. Meanwhile, indirect benefits involve acting as protective barriers against coastal erosion and supporting biodiversity. The Bali Environmental Department reported that, out of the 7,249.1 hectares of coral reefs in Bali, 20.8% are already damaged. Hence, fostering sustainable tourism in Bali becomes paramount, to ensure a harmonious integration of economic, social, and environmental aspects (Chong 2020).

Ecopreneurship, a blend of entrepreneurship and sustainability principles, comes to light as a technique for boosting Bali's tourism with sustainability. Entrepreneurs who prioritise on the environment, cultural preservation, and community empowerment, ahead of financial advantages, are known as ecopreneurs [6]. Nonetheless, while ecopreneurship holds great potential for Bali's sustainable tourism, a thorough research is required, to better comprehend ecopreneurial behaviour and its impact on the pursuit of sustainable tourism objectives. This study aimed to bridge this knowledge gap, offering valuable insights to stakeholders, who aim to foster sustainable ecopreneurial practices, within Bali's tourism industry. Ecopreneurship comprises three core components; eco-innovation, eco-opportunity, and eco-commitment. These components intersect the realms of economic, ecological sustainability, and entrepreneurship, as outlined Kainrath (2011), who divides ecopreneurship into sub-concepts, encompassing eco-innovation, eco-opportunity, and eco-commitment, as follows:

Eco-innovation

It refers to the actions of entrepreneurs who generate novel ideas, practices, products, and processes, before being implemented to alleviate environmental pressures and meet distinct ecological sustainability objectives, as stated by Kainrath (2011, 28). Eco-innovation holds the key to surmounting resource limitations, specifically focusing on sustainable development. For instance, the Bambu Indah Resort in Ubud, owned by the American couple John Hardys, exemplifies the application of eco-innovation principles.

Eco-opportunity

As stated by Dean and McMullen in Kainrath (2011), incomplete customer information might result in buying choices that support ecologically harmful products, which would have been avoided with better awareness. An ecopreneur can capitalise on this situation, by enlightening consumers about a product's environmental attributes. Informed consumers opting for eco-friendly items not only generate entrepreneurial gains for the ecopreneur, but also curtail environmental harms, by substituting detrimental products with greener alternatives, for example Avani Eco Based in Denpasar.

Eco-commitment

Eco-commitment is the way to show our willingness to put in a lot of effort, commit our time and energy to a task, or engage in an eco-friendly activity, for instance, those taking place in the Village of tourism in Pemuteran. Tourism Entrepreneurs in Bali are divided into 3,910 people in non star hotels, 498 people in star

hotels, 245 tourism destinations and 225 tourism villages, and only 20% of these have implemented the ecopreneurship concept, and this prompted for this research to be carried out.

Ecological entrepreneurship, in short, ecopreneurship, emerged in 1970 as a novel concept (Gibbs 2002). It addresses the role which entrepreneurs can play in overcoming environmental shifts (Huang 2009). It is characterised as the actions, which entrepreneurs take to minimise business-related environmental harms, while still ensuring profitability (Gibbs 2002; Huang 2009). Ecopreneurs prioritise their business's effects on both the society and the environment.

Ecopreneurship offers not only fresh prospects for agile early adopters, who recognise and capitalise on these openings, it also potentially becomes a substantial driving force inside a larger change, towards a business model that is more environmentally friendly (Schaltegger 2002). Promoting ecologically beneficial ideas, goods, or technologies is what ecopreneurs do. Ecopreneurship is defined by a blend of entrepreneurial qualities and environmental conscientiousness. Moreover, according to Gibbs, D. 2002, the basis for ecopreneurship emerges from fundamental entrepreneurial activities. It takes shape as an individual entrepreneurial endeavour, capitalising on skills and the awareness that, market success can be achieved, through creative environmentally conscious approaches. Presently, research on ecopreneurship remain scarce and largely confined to literature analyses.

Another misconception is that, only large, well-resourced industries can engage in ecopreneurship. Applying ecopreneurship often demands a relatively higher investment, compared to conventional approaches (Kainrath 2013). Yet, the potential for ecopreneurship within sustainable tourism is considerable. These viewpoints, whether implicitly or explicitly, underline the significance of ecopreneurship in Bali's sustainable tourism advancement. However, there remains a scarcity of empirical evidence regarding businesses in the sustainable tourism domain. Hence, this study serves as a preliminary investigation, aiming to establish, whether the spirit of ecopreneurship can be harnessed, as a novel avenue, to boost the progress of sustainable tourism.

Research urgency

How ecopreneurship as a new factor can influence the development of sustainable tourism? How can the government policies and tourist awareness and preferences promote ecopreneurship to influence sustainable tourism in Bali?

1. Literature Review

1.1 The Concept of Ecopreneurship and Ecopreneurs

Ecopreneurship, also known as green entrepreneurship or eco-entrepreneurship, shares a similar meaning and can be used interchangeably. The concept emerged as a response to market failures in addressing the adverse environmental impacts caused by industries (Pastakia 1998). Scholars have increasingly focused on this issue in recent decades, with Schaper (2002) asserting that the transition to sustainable development requires a substantial number of ecopreneurs.

Huang, Ding, and Kao (2009) define "green innovations" as novel technical improvements or administrative practices aimed at enhancing an organization's environmental performance and competitive advantage. Huang, Ding, and Kao (2009) emphasize that technical innovation impacts product/service development and manufacturing technology, while administrative innovation directly influences managerial activities and indirectly shapes organizational administrative processes. Hence, all environmentally friendly practices embedded in products/services, production processes, technology, and organization - whether technical or administrative - are considered green initiatives.

Examples of green initiatives in the telecommunications industry include waste reduction, air pollution mitigation, environmental education, the use of solar and wind-power generators, energy-efficient electronics, responsible air-conditioning usage, innovative carbon offsetting programs, network-sharing for efficiency, and deploying alternative energy supplies in rural off-grid locations (Anwar 2010). These initiatives underscore the diverse ways businesses can implement environmentally friendly practices, ranging from radical eco-innovations, like efficient air-conditioner use, to incremental eco-innovations, such as implementing carbon offsetting programs.

Entrepreneurship and ecopreneurship differ in their goals: entrepreneurs primarily seek profit, whereas ecopreneurship aims for both profit and environmental sustainability. While many entrepreneurs prioritize profit, an increasing number of ecopreneurs adopt a different paradigm, focusing on both financial success and addressing societal issues caused by their businesses (Ivanko and Kivirist 2008). Ecopreneurs, as described by Kirkwood and Walton (2010), are individuals who not only prioritize their business profits but also emphasize

underlying green values - an aspect lacking in traditional entrepreneurs. Schaper (2002) suggests that ecopreneurs act as a "pull" factor, influencing other firms to adopt green values proactively, in contrast to the "push" factors of government regulations and pressure from stakeholders or lobby groups. Furthermore, Pastakia (1998) classifies ecopreneurs into two categories based on their intentions: social ecopreneurs, aiming to promote eco-friendly products/ideas/technology through both market and non-market channels, and commercial ecopreneurs.

1.2 Benefits of Ecopreneurship

As outlined above, engaging in eco-friendly business practices yields numerous mutual benefits. These advantages not only open new opportunities for aspiring entrepreneurs but also hold the potential to instigate an innovative shift toward a more sustainable business paradigm (Schaper 2002). Dixon and Clifford (2007) discovered that the strategies pursued by ecopreneurs are more significantly influenced by their stance rather than traditional entrepreneurial principles.

Furthermore, environmentally friendly initiatives bring forth several advantages for a company, including the creation of a positive corporate image, serving as a regulatory model, reducing tax costs, fostering collaboration with trading partners, and enhancing key performance indicators (Huang, Ding, and Kao 2009). Businesses adhering to green values remain an attractive choice (Schick, Marxen, and Freimann 2002). Notably, green entrepreneurship has enhanced the competitiveness of Greek furniture enterprises (Marios *et al.* 2011). The benefits extend beyond business sustainability to encompass societal well-being, environmental conservation, and increased corporate competitiveness.

1.3 Challenges in Ecopreneurship

Schick, Marxen, and Freimann (2002) outlined various obstacles to sustainability during the startup process, including: Lack of information, limited knowledge and willingness of business advisers to share information on ecological issues, lack of awareness among startup entrepreneurs about the potential market for environmentally friendly businesses, limited availability of public funding for promoting sustainable enterprises, a point also supported by Yaacob (2010).

Additionally, Baxter (2004) identified other barriers such as a lack of incentives, ability, and supervision and support for the implementation of Environmental Management Systems (EMS). Two major challenges faced by ecopreneurs were recognized, namely, the negative response of potential users to alternative technology and products, especially in agriculture (Pastakia 1998). Combining the findings, it can be concluded that the most critical barriers to implementing eco-friendly businesses are a lack of awareness, insufficient knowledge/socialization, and a lack of guidance and support in implementing environmental standards (ISO 14000). Furthermore, Machiba (2009) suggested that understanding eco-innovation could be enhanced through better benchmarking and indicators. Richomme-Huet and De Freyman (2011) uncovered barriers from students in their study, including a cultural gap in France hindering entrepreneurial behavior, business schools focusing more on successful entrepreneurs, creating difficulties for students to learn, and a negative view on the development of non-profit businesses as startups. Machiba (2009) argued, in an OECD synthesis report, that the combination of innovation and environmental policies plays a crucial role in promoting eco-innovation.

Chapple, Kroll, and Montero (2010) categorized capital costs, information and technical knowledge, and regulatory constraints (Pastakia 1998) as industry barriers in their theory of barriers to environmental change. Correspondingly, Kirkwood and Walton (2010) also identified potential users' negative response to switching to alternative technology and products (agricultural inputs) and uncertain environmental regulations as the main barriers.

Managing the reputation of companies adopting green values was identified as another challenge for ecopreneurs (Dixon and Clifford 2007). Despite these barriers, overcoming them is possible. Examples include providing benefits for supportive individuals and imposing serious consequences for those resisting change.

2. Methods

The research on ecopreneurship as a pivotal determinant of sustainable tourism growth was initiated through a preliminary investigation conducted in June 2023 in Bali. The choice of Bali as the research location was deliberate, given its concentration of ecopreneurship activities, particularly in Gianyar, Badung, and Denpasar Regencies, where environmentally conscious businesses were prevalent.

2.1 Participants

A total of 50 participants, all proprietors of ecopreneurship businesses in Bali, were selected as primary data sources. The participants were chosen based on their shared objective of establishing environmentally conscious businesses. Direct interviews were conducted using a predefined set of questions to collect primary data.

2.2 Variables and Criteria

1.The ecopreneurship factor was assessed based on eight criteria: provision of eco-friendly products and services, advancements in green technology, environmental resource management, community engagement, environmental education and awareness initiatives, waste and emission control strategies, collaborative partnerships, and the measurement of environmental performance and sustainability (Schaltegger 2002).

2.Factors related to government policies that may influence ecopreneurship's impact on eco-friendly travel were also examined. These included regulations on sustainable power integration, policies on environmental protection and natural resource preservation, guidelines for waste management and pollution reduction, initiatives for ecotourism certifications or labels, and the extent of government funding for sustainable tourism (Kainrath 2011).

3.Tourist Awareness and Sustainable Tourism: The level of public awareness regarding environmental concerns and sustainability in tourism, along with tourist preference indices for sustainable tourism, were considered to understand their role in mitigating the effects of ecopreneurship. Destinations with sustainability certifications or labels were hypothesized to be more favored by tourists (Hyasat 2023)

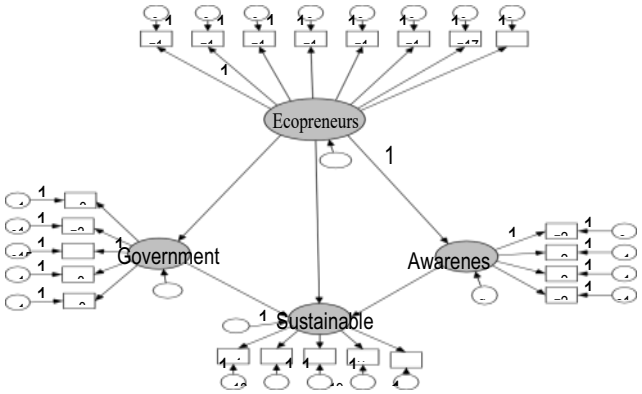
4.Sustainable Tourism Dimensions: Sustainable tourism dimensions, as defined by conservation of the natural environment, improvement of social well-being and culture, bolstering local economies, efficient resource management, environmental impact mitigation, and community engagement through public involvement, were examined. (Gibbs 2002)

2.3 Structural Equation Modeling (SEM)

The research employed the Structural Equation Modeling (SEM) framework using AMOS 16 software. The SEM analysis involved formulating the theoretical model, outlining the underlying theory, creating a path diagram, converting the path diagram into a measurement and structural model, conducting goodness-of-fit (GOF) evaluations, including assumption tests (normality, absence of outliers, and lack of multicollinearity), and GOF criterion testing with specified cutoff criteria.

These methodological steps were taken to ensure a comprehensive and rigorous examination of the interrelationships among ecopreneurship, government policies, tourist awareness, and sustainable tourism dimensions. The study's design aimed to provide detailed insights and facilitate replication by future researchers in the field. Ethical considerations, such as obtaining approvals and permissions for data collection from human participants, were adhered to throughout the research process.

Figure 3. The hypothetical SEM model for the development of sustainable tourism.



3. Research Results

The study assessed eight factors to determine the potential of ecopreneurship. The research findings indicate varying levels of potential across these factors:

1.Environmentally friendly products and services: exhibits a significant potential.

2.Green technology innovation: holds a moderate potential.
3.Management of environmental and natural resources: Presents a moderate potential.
4.Local community involvement: showcases considerable potential.
5.Environmental education and awareness: displays substantial potential.
6.Waste and emission management: reflects a noteworthy potential.
7.Collaboration and partnerships: holds a moderate potential.
8.Measurement of environmental performance and sustainability: demonstrates a noteworthy potential.

The study further evaluated the strength of relationships between ecopreneurship and its indicators, highlighting significant associations. The order of ecopreneurship variables, from strongest to weakest, based on standardized values, is as follows: Environmentally Friendly Products and Services, Green Technology Innovation, and Management of Environmental Resources.

1.Modeling ecopreneurship effects on sustainable tourism: according to Figure 3, ecopreneurship has both direct and indirect effects on sustainable tourism. The direct influence is depicted through the relationship between ecopreneurship and the development of sustainable tourism.

2.Indirect influences occur through two pathways: ecopreneurship - government policy - development of sustainable tourism and ecopreneurship - awareness and tourist preference - development of sustainable tourism.

3.Influence of ecopreneurship on sustainable tourism development: equation (3) shows that ecopreneurship has a direct impact on the progress of sustainable tourism, marked as 1.00. The investigation emphasizes how increased ecopreneurship potential catalyzes the growth of sustainable tourism. Additionally, ecopreneurship exerts a partial indirect influence on various aspects of sustainable tourism development, such as preserving the natural environment, promoting social welfare and culture, boosting local economies, managing resources, and involving the local community and the public.

4.Ecopreneurship links to government policies and tourist awareness: equations (1) and (2) demonstrate the influence of ecopreneurship on governmental policies and the development of tourist awareness and preferences. The findings suggest a significant and positive impact of ecopreneurship on both governmental regulations and the advancement of public knowledge and traveler preferences.

5.Influence of government policies and tourist awareness on sustainable tourism: equation (3) indicates the magnitude of visitor knowledge and preference processes on the development of sustainable tourism (1.31). These findings underscore the notable influence of the tourist awareness and preference process on sustainable tourism development. However, the extent of government policy's influence on sustainable tourism development is minimal (0.065), suggesting a limited discernible effect.

These results contribute valuable insights into the potential of ecopreneurship and its multifaceted impacts on sustainable tourism. The study emphasizes the need to consider ecopreneurship as a crucial factor in Bali's sustainable tourism approach. It also identifies critical factors shaping tourist awareness and preferences, shedding light on the importance of public awareness, consumer engagement, and reactions to ecopreneurial initiatives in sustainable tourism decision-making. Further analysis indicates that the efficacy of implementing green technology within the tourism industry is substantially influenced by the execution of tourist awareness and preference processes.

4. Discussions

The comprehensive analysis conducted in this study sheds light on the pivotal role of ecopreneurship in the context of sustainable tourism development. The discussion below highlights the significance of the results, their implications, and how this research contributes to the existing scientific knowledge:

4.1. Link to the Introduction and Hypotheses

The study commenced with an exploration of the multifaceted aspects of ecopreneurship, utilizing eight criteria to evaluate its impact on sustainable tourism. These criteria encompassed offerings of eco-friendly products and services, advancements in green technology, management of environmental resources, engagement with local communities, initiatives in environmental education and awareness, strategies for waste and emission control, collaborative efforts and partnerships, and the measurement of environmental performance and sustainability.

4.2 Relevance to Existing Theories

The study identified factors related to government policy that could potentially limit the influence of ecopreneurship on environmentally friendly travel. These factors included regulations concerning the integration

of sustainable power in tourism, policies for safeguarding the environment in tourist spots, guidelines for waste management and pollution mitigation, initiatives for ecotourism certifications or labels, and the extent of governmental funding for sustainable tourism. The findings align with existing theories on the interplay between governmental regulations and sustainable practices in the tourism sector.

4.3 Tourist Awareness and Preferences

Tourist awareness and preferences emerged as crucial factors in mitigating the effects of ecopreneurship. The study revealed that travel destinations with sustainable certifications or badges are more popular among tourists. Understanding consumer reactions to ecopreneur activities and the degree of customer involvement in sustainable tourism programs is essential for shaping future ecopreneurial strategies.

4.4 Sustainable Tourism Dimensions

The study affirmed that sustainable tourism encompasses the conservation of the natural environment, upliftment of social well-being and culture, strengthening of local economies, efficient resource management, mitigation of environmental impact, and engagement of local communities through public involvement. The detailed analysis of ecopreneurship's impact on each dimension provides a nuanced understanding of its contributions to sustainable tourism (Ahirwar, Gupta and Kumar 2023)

4.5 Specific Impacts of Ecopreneurship

1. Conservation of the Natural Environment (30-40% impact)

Ecopreneurship demonstrated substantial potential to positively influence the conservation of the natural environment within sustainable tourism. Through innovative and eco-conscious business strategies, ecopreneurs can advocate for responsible resource utilization, pollution mitigation, ecosystem safeguarding, and biodiversity preservation.

Figure 4. Bambu Indah Resort in Ubud which implemented ecopreneurship.

2. Enhancing Social and Cultural Well-being (20-30% impact)

Ecopreneurship plays a crucial role in enhancing social and cultural welfare within sustainable tourism. By fostering the involvement of local communities, upholding cultural values, and ensuring fair economic advantages, ecopreneurs positively influence social and cultural well-being.

3. Bolstering the Local Economy (30-40% impact)

Ecopreneurship assumes a pivotal role in strengthening the local economy within sustainable tourism. Initiatives such as endorsing local enterprises, providing skills training, expanding market reach, and facilitating sustainable economic growth contribute to the economic empowerment of local communities.

4. Resource Management and Environmental Impact Mitigation (40-50% impact)

Ecopreneurship directly impacts resource management and the mitigation of environmental impacts within sustainable tourism. Through the adoption of eco-friendly operational methods, ecopreneurs contribute to minimizing adverse environmental effects, with an estimated impact ranging from 40% to 50%.

5. Community Involvement and Public Consultation (20-30% impact)

Ecopreneurship assumes a crucial function in promoting the active involvement of local communities and public consultation in decisions tied to sustainable tourism. By engaging communities and prioritizing local aspirations, ecopreneurs make choices that are more comprehensive and attuned to community requirements.

Conclusions and Further Research

Conclusions:

1. SEM Model Appropriateness and Ecopreneurship's Influence
   Appropriateness of SEM Model: The constructed Structural Equation Modeling (SEM) model aligns seamlessly with the data, demonstrating its appropriateness as an initial framework for subsequent research endeavors. This model serves as a robust tool for understanding the intricate relationships within the context of ecopreneurship and sustainable tourism.
2. Significant influence of ecopreneurship: A groundbreaking conclusion emerges from the data, revealing that ecopreneurship manifests a significant and direct influence on the development of sustainable tourism. This novel discovery highlights the crucial role of ecopreneurship as a pivotal determinant for the enhancement of sustainable tourism practices.

Implications and Noteworthy Findings:

1. Impact on governmental strategies and tourist preferences: In addition to its substantial effect on sustainable tourism, ecopreneurship within the tourism sector significantly contributes to improving governmental strategies and developing procedures related to awareness and tourists' preferences. This finding underscores the broader implications of ecopreneurial initiatives in shaping not only business practices but also influencing policy and public awareness.
2. Influence of governmental regulations and tourist decision processes: The development of sustainable tourism is favorably influenced by governmental regulations and tourist knowledge and decision processes. This highlights the interconnected nature of ecopreneurship with external factors, emphasizing the need for collaborative efforts between entrepreneurs, policymakers, and tourists to drive sustainable tourism development.

Future Research Directions:

The positive and significant influence of ecopreneurship on sustainable tourism development opens avenues for future research and exploration. To build upon these insights, the following areas merit attention:

1. Enhancing ecopreneurship potential by recognizing the need for continued progress, future research should delve into strategies to enhance ecopreneurship potential. Exploring avenues for improvements in specific indicators, such as the development of environmentally friendly products and services, green technology innovation, and fostering local community engagement, can further amplify the positive impact of ecopreneurship.
2. Longitudinal studies and comparative analyses by conducting longitudinal studies can provide a deeper understanding of the evolving dynamics between ecopreneurship and sustainable tourism. Comparative analyses across different regions, industries, and scales can offer insights into the contextual variations and universal principles that govern the relationship.
3. Policy implications and framework refinement and future research should explore the policy implications arising from ecopreneurial initiatives in the tourism sector. Additionally, refining and expanding the SEM model based on new data and insights can contribute to a more comprehensive framework for understanding the complexities of ecopreneurship and its impact on sustainable tourism.

Practical Applications and Next Steps:

The conclusions drawn from this research carry practical implications for various stakeholders involved in sustainable tourism. Entrepreneurs, policymakers, and tourists can leverage these findings to make informed decisions and contribute to the advancement of sustainable practices. The next steps in this research involve implementing the insights gained to guide practical applications, inform policy interventions, and drive ecopreneurial initiatives that align with the principles of sustainable tourism.

In summary, this study not only enhances the scientific understanding of ecopreneurship but also lays the groundwork for practical applications and future research endeavors. The positive impact of ecopreneurship on sustainable tourism is a transformative finding, urging a collective commitment to further exploration, innovation, and collaborative efforts in the pursuit of a more sustainable and responsible tourism industry.

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I Gusti Putu Bagus Sasrawan Mananda: Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Writing – review and editing, and funding acquisition.
I Nyoman Sudiarta: Methodology, Software, Formal analysis, Writing – original draft, Data curation and Visualization.

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. We affirm our commitment to conducting unbiased research and presenting the findings with transparency and integrity. This declaration ensures that the results and interpretations presented in this article are free from any perceived influence that could compromise the objectivity of the research.

References

[1] Ahirwar, V. Gupta, R. and Kumar, A. 2023. Impacts of Tourism on Development of Urban Areas in Indian Cities: A Systematic Literature Review. *Journal of Environmental Management and Tourism*, 8 (72). DOI: https://doi.org/10.14505/jemt.v14.8(72).02

[2] Anwar, Ch. Mahmood. 2010. Green Telecom Technology (GTT): Think Green – A step to achieve improved techno-environmental and socio-economic effects in Pakistan. *Science, Technology and Development,* 29(4).

[3] Baxter. 2004. Taking First Steps in Environmental Management. ISO - Management Systems, July-August.

[4] Chapple, Kroll, and Montero. 2010. Green, Local, and Growing. *Center for Community Innovation* (CCI), University of California. DOI: 10.13140/RG.2.2.15323.31521

[5] Chong, D K. 2020 The side effects of mass tourism: the voices of Bali islanders. *Asia Pacific Journal of Tourism Research*, 25(2):157-169. DOI: 10.1080/10941665.2019.1683591

[6] Cuculeski, N. and Petrovska, I. 2015. Sustainable Marketing and Consumers Preferences in tourism. *European Journal of Tourism Hospitality and Recreation*. 7(2) 84–90. DOI: 10.1515/ejthr-2016-0010

[7] Dixon, S. E.A. and Clifford, A. 2007. Ecopreneurship - a new approach to managing the triple bottom line. *Journal of Organizational Change Management,* 20(3): 326-345. DOI:https://doi.org/10.1108/09534810710740164

[8] Ekawati, N., Giantari, K. and Sariyanthi. 2017. Ecopreneurship and green innovation for the success of new spa products. *Journal of Business and Retail Management Research*, 11 (3) 13–24. DOI:https://doi.org/10.24052/JBRMR/268

[9] Gibbs, D. 2002. Sustainability entrepreneurs, ecopreneurs, and the development of a sustainable economy *Greener Management International,* 55(5): 63–78. DOI: 10.9774/GLEAF.3062.2006.au.00007

[10] Huang, D. and Kao. 2009. Salient Stakeholder Voice: Family Business and Green Innovation Adoption. *Journal of Management and Organization*, 15(3): 309 – 326. DOI: 10.1017/S1833367200002649

[11] Hyasat, A. 2023. Awareness and Perception Toward Heritage, Life, and Tourism in Converting Tourism Area. *Journal of Environmental Management and Tourism*, 8(72). DOI:https://doi.org/10.14505/jemt.v14.8(72).03

[12] Ivanko and Kivirist 2008. ECOpreneuring: putting purpose and the planet before profits. New Society Publisher

[13] Kainrath, D. 2011 Ecopreneurship in Theory and Practice : A Proposed Emerging Framework for Ecopreneurship (Lap Lambert Academic Publishing)

[14] Kirkwood and Walton. 2010. What motivates ecopreneurs to start businesses? *International Journal of Entrepreneurial Behaviour and Research,* 16 (3): 204-228. DOI: 10.1108/13552551011042799

[15] Machiba, T. 2009. Sustainable Manufacturing and Eco-Innovation: Framework, Practices, and Measurement. OECD Synthesis Report. DOI: 10.14207/ejsd.2013.v2n1p171

[16] Marios, *et al.* 2011. Green entrepreneurship in Greek furniture enterprises. *MIBES* – Oral. DOI:10.13140/2.1.2858.3687

[17] Pastakia, A. 1998. Grassroots ecopreneurs: change agents for a sustainable society. *Journal of Organizational Change Management*, 11(2): 157 – 173. DOI: https://doi.org/10.1108/09534819810212142

[18] Richomme-Huet, K. and De Freyman, J. 2011. What Sustainable Entrepreneurship Looks Like: An Exploratory Study from a Student Perspective. *International Conference on Small Business.* DOI:10.1007/978-3-319-01396-1_7

[19] Schaltegger, S. 2002. A framework for ecopreneurship. *Greener Management International,* (38). DOI:10.9774/GLEAF.3062.2002.su.00006

[20] Schaper, M. 2002. The Essence of Ecopreneurship. *Greener Management International*, 38: 26-30. DOI:https://doi.org/10.9774/GLEAF.3062.2002.su.00004

[21] Schick, M., and Freimann. 2002. Sustainability Issues for Start-ups Entrepreneurs. *Greener Management International*, 38: 59 – 70. DOI: 10.9774/GLEAF.3062.2002.su.00007

[22] Sudiarta, I N., Sumadi, K. and Purnamawati. 2021. Tanah Lot Tourism Attraction Based On Tri Hita Karana. *International Journal of Recent Advances in Multidisciplinary Research*, 08(12): 7401-7406.

[23] Yaacob, Mohd Rafi 2010. A Preliminary Study of Green Micro-entrepreneurs in Kelantan, Malaysia. *International Journal of Business and Management*, 5(3): 81 – 88 . DOI: 10.5539/ijbm.v5n3p81

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Antecedents of Revisit Intention of Thai Cultural Tourist in Thailand

Thanat KORNSUPHKIT
Faculty of Management Sciences,
Bansomdejchaopraya Rajabhat University, Thailand
ORCID: 0009-0009-4235-1187
msthanat@bsru.ac.th

Sarana PHOTCHANACHAN
School of Management, Shinawatra University, Thailand
ORCID: 0000-0001-5916-0250
sarana.p@siu.ac.th

Kitti CHAROERNPORNPANICHKUL
College of Sports, Rangsit University, Thailand
ORCID: 0009-0009-4580-134X
kitti.c@rsu.ac.th

Chaveewan SHOOSANUK
Independent Scholar, Thailand
ORCID: 0009-0005-9438-0685
chaveewans@gmail.com

Ampon SHOOSANUK
Independent Scholar, Thailand
ORCID: 0000-0002-3614-1062
amponsh@gmail.com

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Abstract: The objectives of this research are (1) to develop the causal relationship model for antecedents of revisit intention of Thai cultural tourist in Thailand and (2) to validate the causal relationship model of antecedents of revisit intention of Thai cultural tourist in Thailand with empirical data. This research adopts quantitative research utilizing a questionnaire as a tool to collect data from 416 Thai cultural tourists. This research employed non-probability sampling with quota sampling. Statistical analysis includes frequency, percentage, mean, standard deviation, and structural equation modeling. The findings of the study revealed that (1.1) travel motivation, novelty seeking and destination image positively influence the memorable experiences of Thai cultural tourist in Thailand; (1.2) travel motivation, novelty seeking, destination image and memorable experiences positively affect the satisfaction of Thai cultural tourist in Thailand; (1.3) memorable experiences and satisfaction have a positive impact on positive word of mouth of Thai cultural tourist in Thailand and (1.4) Memorable experiences, satisfaction and positive word of mouth positively influence the revisit intention of Thai cultural tourist in Thailand. The causal relationship model of antecedents of revisit intention of Thai cultural tourist in Thailand was consistent with empirical data.

Keywords: cultural tourism; travel motivation; novelty seeking; destination image; memorable experiences; satisfaction; positive word of mouth; revisit intention; Thai.

JEL Classification: Z19; Z30; Z32; R11.

Introduction

Tourism industry is one of the major component in the development of the world's economy (Firman *et al.* 2023) and it has become an important driving force of the world economy as well (Kasikornthai 2023). Beside aforementioned importance to the world's economy, it also creates jobs for the job market. Tourism is one of the

most profitable sector of the developed and developing countries (Statista 2023). This will also help to improve lifestyle of people in the destination's tourist attractions (Hipsher 2019) at the same time quality of life will be improved as well (Ramkissoon 2023). Tourism not only gives positive benefits to Gross Domestic Product (GDP) of the destination countries, but it also plays an important role in terms of providing employment opportunities, reduce poverty and increase income distribution. Tourism also helps in demand of goods and services, which help in increase tax collection and foreign exchange reserves for that particular country's government (Taizeng, Can, Paramati, Fang and Wu 2019). Tourism revenue is the main income of the Thai economy (ThaiPublica 2020).

From the above information, it can be seen that tourism has a huge impact on the country's income, in term of promoting the well-being of the people, creating jobs, generating income for the community. Historical and cultural tourism are examples outstanding part of tourism in Thailand, they can attract a lot of tourists locally and internationally. Cultural tourism is defined as "the movement of individuals for important cultural motives, such as field trips, performing arts and cultural tours, travel to festivals and other cultural events, visit sites and monuments, travel to study nature folktales or art, and pilgrimage" (Florida Division of Arts and Culture, 2023). Cultural tourism helps preserve historical and cultural heritage by reviving traditions and serves as a source of income that can be used to develop tourist attractions. The benefits that come with cultural tourism are key to supporting the management and protection of historical and cultural tourism sites (Suwannasank and Kheokao 2019). Thailand has just come out of the COVID-19 pandemic crisis and is in the process of reviving its tourism, in which cultural tourism is one of the most popular types of tourism among Thai people. While waiting for foreign tourists to visit Thailand during the reviving period, encouraging Thai tourists to travel to cultural tourist attractions is one of the good alternatives for generating income from tourism in Thailand. Therefore, this research focuses on Thai tourists who are interested in traveling to cultural tourist attractions in Thailand. If we can encourage Thai tourists to revisit any cultural attractions in Thailand then it will result in generating income for the communities in the neighborhood, which result in creating employment and it might help many local products to generate sales, which will replace the loss of income for GDP from foreign tourists.

The objectives of this research are: (1) to develop a causal relationships model of antecedents of revisit intention of Thai cultural tourist in Thailand and (2) to develop a causal relationships model of antecedents of revisit intention of Thai cultural tourist in Thailand with empirical data.

1. Literature Review

The revisit intention for tourist means the intention of the tourist who want to return to the same attractions again (Zhang, Wu and Buhalis 2018). Revisit of tourist result in up to 10 times more revenue for the destinations compared with the need to find new tourist (Bandara and Ranasinghe 2019), which is critical to succeed in a highly competitive tourism markets (Singh and Singh 2019). While positive word of mouth means that tourist is willing to introduce friends, relatives and other potential travelers to an attraction by spreading positive words. Positive word of mouth of tourists are important in attracting new travelers to the destination (Matzler, Teichmann, Strobl, and Partel 2019) and have a high significant impact on purchasing behavior and consumer acceptance (Ameri, Honka, and Xie 2019).The term word-of-mouth (WOM) is defined as person-to-person communication– orally, evaluating and recommending product to others. Revisit intention is a form of behavior (behavioral intention) or the customer's desire to come back, give positive word of mouth, stay longer than expected, shop more than expected (Andrian and Trinanda 2019). In today's competitive world, attracting tourists for the first time does not represent a destination's success in the competition, whereas this is the repeated attraction of tourists and their positive word of mouth to the potential visitors that makes a destination successful (Ghafari, Rezaei Dolatabadi, and Dehghani 2014).

1.1 Factors Affecting Tourist's Memorable Experiences

Memorable experience means creating unforgettable, positive memories of tourist about the sights they visit (Zatori, Smith, and Puczko 2018), while travel motivation is the expression of people's desire for travel that is intense enough to encourage travel decisions (Fodness 1994). From the previous researches it was found out that travel experience has a positive influence on memorable experiences (Tešin, Kovačić, and Obradović 2023). Novelty seeking means searching for new or different travel experiences, new excitement, risks and new environments (Lee and Crompton 1992). The concept of novelty seeking is fundamental to understanding tourism experiences (Mitas and Bastiaansen 2018). It was revealed that novelty seeking has a positive influence on memorable experiences (Tiwari, Bajpai, and Pandey 2023). Destination image refers to the knowledge, feelings and overall perception that tourists have about the tourist attractions (Fakeye and Crompton 1991). Destination is

very important as it impact memorable experiences (Ernawadi and Putra 2020; Kurniawan *et al.* 2023; Shakoor, Yapang Gharavi, Feizi, and Salimi Sobhan 2021).The current study hypothesis was proposed in response to the previous empirical research:

H1: Travel motivation would have a positive influence on memorable experiences.

H2: Novelty seeking would have a positive influence on memorable experiences.

H3: Destination image would have a positive influence on memorable experiences.

1.2 Factors Affecting Tourist's Satisfaction

Tourist satisfaction is the judgment of whether a tourist attraction meets expectations by comparing what is expected and what is received in return (Oliver 1993). While travel motivation is the inner state of a person, or certain needs and wants of a tourist that can be considered as one of the most important psychological influences of tourist behavior (Bhattacharya and Kumar 2017). From the previous studies, it was found out that travel motivation has a positive influence on tourist's satisfaction (Huang 2023). Novelty seeking is one of the important element in measuring satisfaction of tourist (Albaity and Melhem, 2017). It was found that novelty seeking has a positive influence on satisfaction (deMatos, Duarte, and Sá 2023). Destination image is widely accepted and powerful, it is one of the tool for the tourism industry, which create a competitive advantage for the attractions (Foroudi *et al.* 2018). Destination image influences tourism behavior, which means that destinations which have positive and strong image has a more tenor for tourists to choose as travel destination (Foroudi *et al.* 2018). From the past research, it was found that destination image has a positive impact on tourist's satisfaction (Hasan Md, 2019; Kusumah and Wahyudin 2024). Memorable experiences refer to travel experiences that involve the positive memories a traveler has after experiencing an activity and surprising special events (Dagustani, Kartini, Oesman, and Kaltum 2017). If tourist remembers the attractions, they will be satisfied with the attractions as well. It can be concluded that memorable experiences have a positive impact on tourist's satisfaction (Gohary, Pourazizi, Madani, and Chan 2018; Greenwell 2019; Kim 2018; Terasaki, Hara, and Ikegami 2023). This study's hypothesis was constructed following past empirical research:

H4: Travel motivation would have a positive influence on satisfaction.

H5: Novelty seeking would have a positive influence on satisfaction.

H6: Destination image would have a positive influence on satisfaction.

H7: Memorable experiences would have a positive influence on satisfaction.

1.3 Factors Affecting Tourist's Positive Word of Mouth

Positive word of mouth means that tourist is willing to introduce friends, relatives and other potential travelers to an attraction by spreading positive words. Positive word of mouth of tourists are important in attracting new travelers to the destination (Matzler *et al.* 2019). While memorable experiences mean creating unforgettable, positive memories of tourist about the sights they visit (Zatori *et al.* 2018), if tourists have wonderful memories of favorite attractions, then it will result in willingness to recommend that attractions to their friends (Leung *et al.* 2022; Moliner-Tena, Monferrer-Tirado, Estrada-Guillen, and Vidal-Meliá 2023). Tourist satisfaction can be put into the context of research as expectation of the tourist has been reached that is receiving what they have expected prior to their visits (Oliver 1993). If tourists are satisfied, it will lead to willingness to introduce their friends to travel to the place they like (Fotiadis, Rice and Hiyasat 2023; Moliner-Tena *et al.* 2023; Phi, Quang, Phuong, and Linh 2022). The present study hypothesis was created based on the preceding empirical investigation as follows:

H8: Memorable experiences would have a positive influence on positive word of mouth.

H9: Satisfaction would have a positive influence on positive word of mouth.

1.4 Factors Affecting Tourist's Revisit Intention

Revisit intention refers to the intention of tourists who want to return to the same tourist attractions over and over again (Zhang *et al.* 2018). If it can create memorable experiences for tourist, it will result in tourist coming back again and again (Di-Clemente, Hernández-Mogollón, and Campón-Cerro 2019; Mahdzar 2019; Sthapit and Björk 2019; Terasaki *et al.* 2023). At the same time, if tourists are satisfied, it will result in coming back for more (Rifaatulloh, Waluya, and Andari 2019; Terasaki *et al.* 2023; Zhang *et al.* 2018). Finally, when tourists are happy to recommend their favorite tourist attractions to others, they tend to want to come back and visit that place again as well (Phi *et al.* 2022; Sharipudin, Cheung, De Oliveira and Solyom 2023). According to the previous empirical research above, the current study developed the hypothesis as follows:

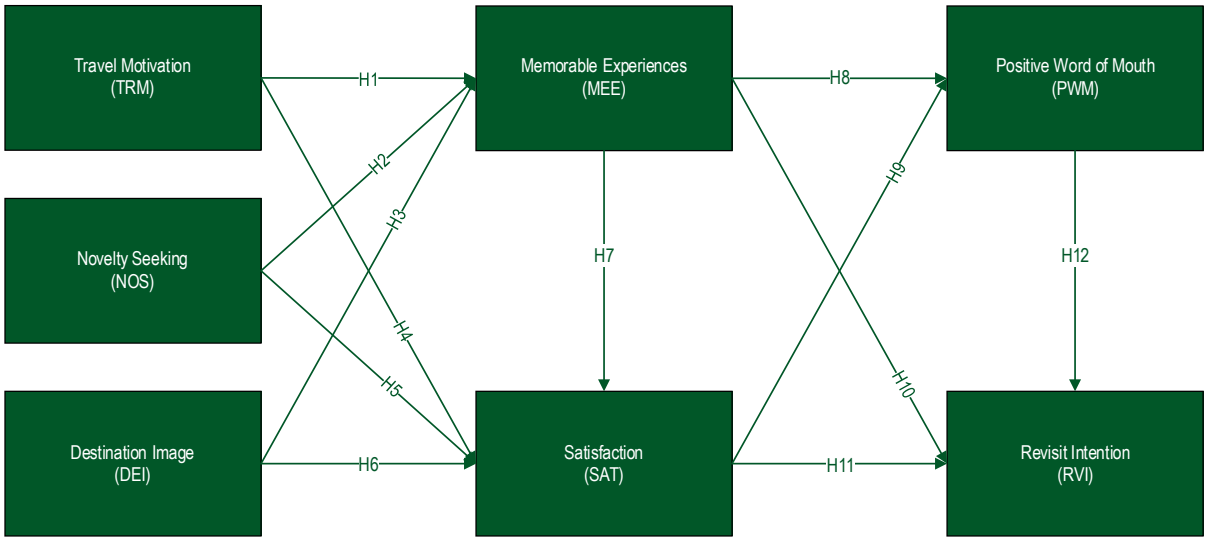
H10: Memorable experiences would have a positive influence on revisit intention.

H11: Satisfaction would have a positive influence on revisit intention.

H12: Positive word of mouth would have a positive influence on revisit intention.

According to the above information about the preceding empirical study and proposed hypothesis, it could be formed the conceptual framework as followed:

Figure 1. Conceptual framework



Source: Researchers.

2. Research Methodology

2.1 Research Design

This study employed a quantitative approach using the questionnaire to collect data from 416 Thai cultural tourists.

2.2 Population and Samples

The population in this study was tourists who visited the top 10 cultural tourism destinations in Thailand (Manton 2020), including (1) the Temple of the Emerald Buddha, (2) Wat Phra That Doi Suthep, (3) Ayutthaya historical park, (4) Wat Arun Ratchawararam, (5) Si Satchanalai historical park, (6) Sukhothai historical park, (7) Wat Phra That Phanom, (8) Phra Pathommachedi, (9) Phimai historical park, and (10) Phra Nakhon Khiri historical park. In this research, structural equation modeling analysis was used for hypothesis testing. Therefore, the researchers had set a sample size of 5 times the parameter (Hair, Babin, Anderson and Black 2019). It is found that there are 78 parameters, so the sample size should be at least 5x78 = 390 people. Sampling technique for this research will be a non-probability sampling method as we don't know the exact number of tourists who visited each cultural tourist attractions. Therefore, sampling method in this research was quota sampling, which is suitable for populations that are separated into similar subgroups.

2.3 Research Instruments and Validation

The instrument in this study was constructed based on prior research and consists of eight parts: demographic data, travel motivation, novelty seeking, destination image, memorable experiences, satisfaction, positive word of mouth, and revisit intention. Six questions were developed for the travel motivation on the research of Choi (2017). For novelty seeking, six questions were used based on the research of Choi (2017). For destination image, five questions were used based on the research of Stojanovic, Andreu, and Curras-Perez (2018). For memorable experiences, three questions were used based on the research of Kim (2018). For satisfaction, five questions were used based on the research of Zatori *et al.* (2018). For positive word of mouth, three questions were used based on the research of Narangajavana Kaosiri, Callarisa Fiol, Moliner Tena, Rodriguez Artola, and Sanchez Garcia (2019). For revisit intention, three questions were used based on the research of Zhang *et al.* (2018). All of the questions were measured using the five-point Likert scale for each item, ranging from (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. The interpretation of mean score from data analysis are as follows:

Mean score	Interpretation
1.00-1.49	Strongly disagree
1.50-2.49	Disagree
2.50-3.49	Neutral
3.50-4.49	Agree
4.50-5.00	Strongly agree

The research instrument was evaluated by five experts in tourism, comprising both academics and businesspeople, in terms of content validity using the item-objective congruence (IOC) index. The IOC requirements were fulfilled with the items in the research instrument score was in range from 0.80-1.00, passing the acceptable standard of more than 0.50. In addition, the questions in the survey questionnaire were validated in terms of reliability by being pretested on 40 samples in the sample group (n=40). The criteria were met with the Cronbach's alpha coefficient for all variables were in range from 0.833 to 0.939, passing the acceptable standard of more than 0.70 and corrected item-total correlation were in range from 0.620 to 0.914, passing the acceptable standard of more than 0.30.

2.4 Data Collection

The researchers of the research collected the data by themselves by distributing questionnaires at each of the 10 cultural heritage destinations as mentioned above. Data collection and analyzing data for the research result from August 2022 to December 2022. Total of 5 months. Questionnaires were distributed and collected at the spot; respondents were given souvenir for their time as a mean of courtesy. The researchers distributed 700 questionnaires, and 416 were return and valid for data analyzing. The response rate of return was 59.42%. The researchers did not cut out any of the valid questionnaires. The more respondents the more valid the result.

2.5 Statistics

Statistics used to validate the research instrument: (1) reliability, including Cronbach's alpha coefficient and (2) construct validity, including confirmatory factor analysis.
Statistics used to analyze the data; (1) descriptive statistics, including frequency, percentage, mean, and standard deviation and (2) inferential statistics, including structural equation modeling analysis. Mplus was used as a software tool for the structural equation modeling analysis.

3. Research Results

3.1 Demographic Characteristics and Opinion on Variables of the Samples

According to the findings, most of the samples were female and married in the age of over 50 years. They had earned a bachelor's degree, with a monthly income of more than 50,000 baht and had a career as a private company employee. The objective of place visiting was rest/travel. The frequency of travel to cultural heritage sites was 2-3 times. The most information source of historical heritage was from an internet.

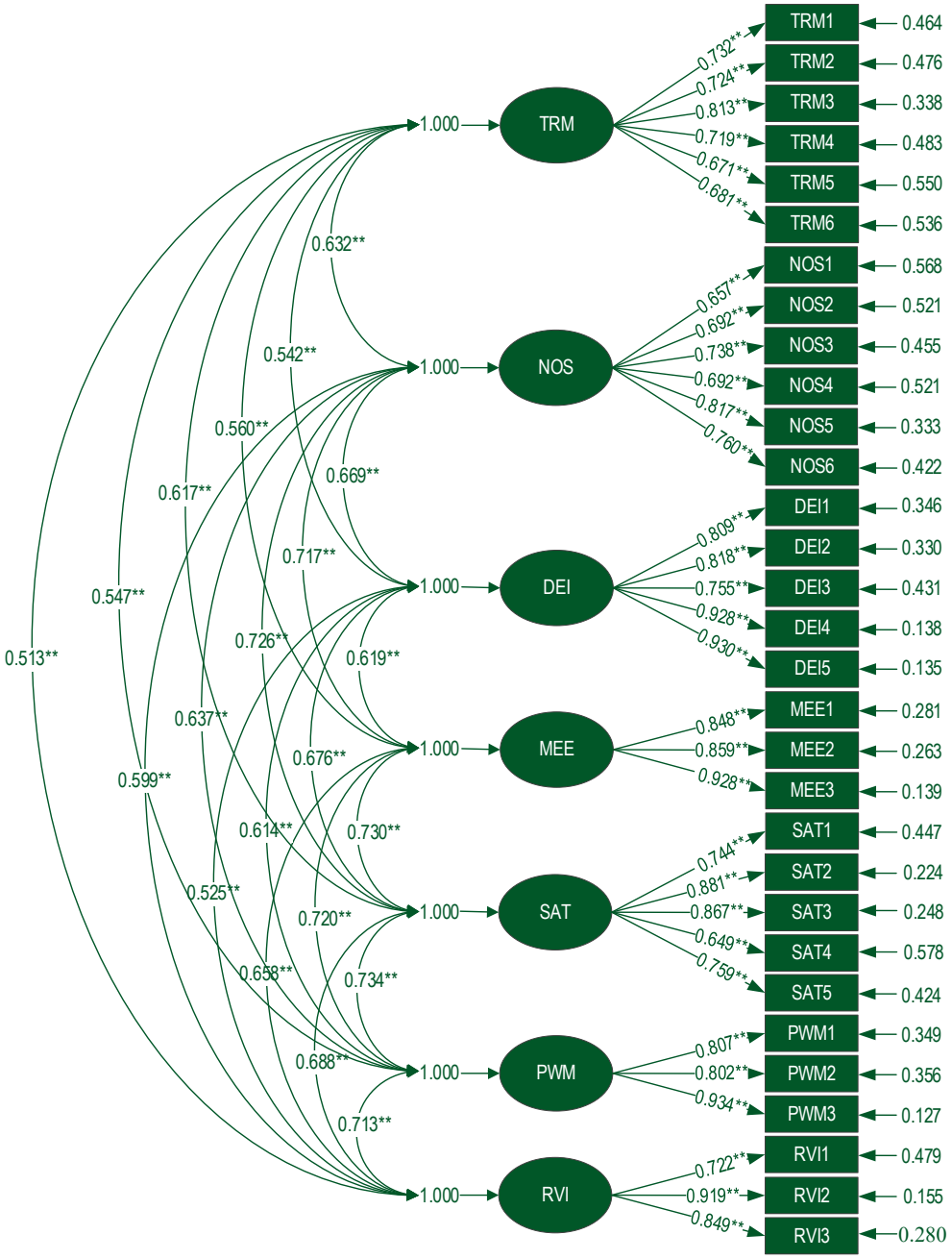
The sample group that responded to the questionnaire had opinions on the variables travel motivation, novelty seeking, destination image, memorable experiences, satisfaction, positive word of mouth and revisit intention at the agree level.

3.2 Assessment of the Measurement Model

Construct validity assessments were carried out by confirmatory factor analysis. Construct validity composed of convergent validity and discriminant validity assessment. Convergent validity assessment is considered three criteria: (1) standardized factor loading (λ_i) must be at least 0.5, (2) average variance extracted (AVE or ρ_v) must be at least 0.5, and construct reliability (CR or ρ_c) should be at least 0.7 (Hair *et al.* 2019). According to Table 1 and Figure 2, the λ_i for all observed variables were reached and was more than 0.5, the AVE for all latent variables were more than 0.5, and the CR for all latent variables were more than 0.7.

For discriminant validity, each construct's AVE value must be higher than the highest squared correlation of the construct with any other latent variables in the model (Hair *et al.* 2019). According to Table 2, compares each construct's AVE to the squared correlation of the other constructs revealed that all construct's AVEs were more than squared correlation of the other constructs. Figure 2 depicts the construct's validity using factor loadings and average variance extracted. As a result, the measurement models were passing the standard criteria and trustworthy.

Figure 2. Confirmatory factor analysis to assess the measurement model



χ^2=223.951, *df*=255, χ^2/*df*=0.878, *p*-value=0.920, *RMSEA*=0.000, *CFI*=1.000, *TLI*=1.000, *SRMR*=0.025

Source: Researchers.

Table 1 .Convergent validity assessment (AVE and CR)

Latent variables	Average Variance Extracted (AVE)	Construct Reliability (CR)
Travel motivation (TRM)	0.525	0.869
Novelty seeking (NOS)	0.530	0.871
Destination image (DEI)	0.530	0.871
Memorable experiences (MEE)	0.547	0.857
Satisfaction (SAT)	0.616	0.888
Positive word of mouth (PWM)	0.722	0.886
Revisit intention (RVI)	0.696	0.872

Source: Researchers.

Table 2. Discriminant validity assessment (AVE vs Squared correlation)

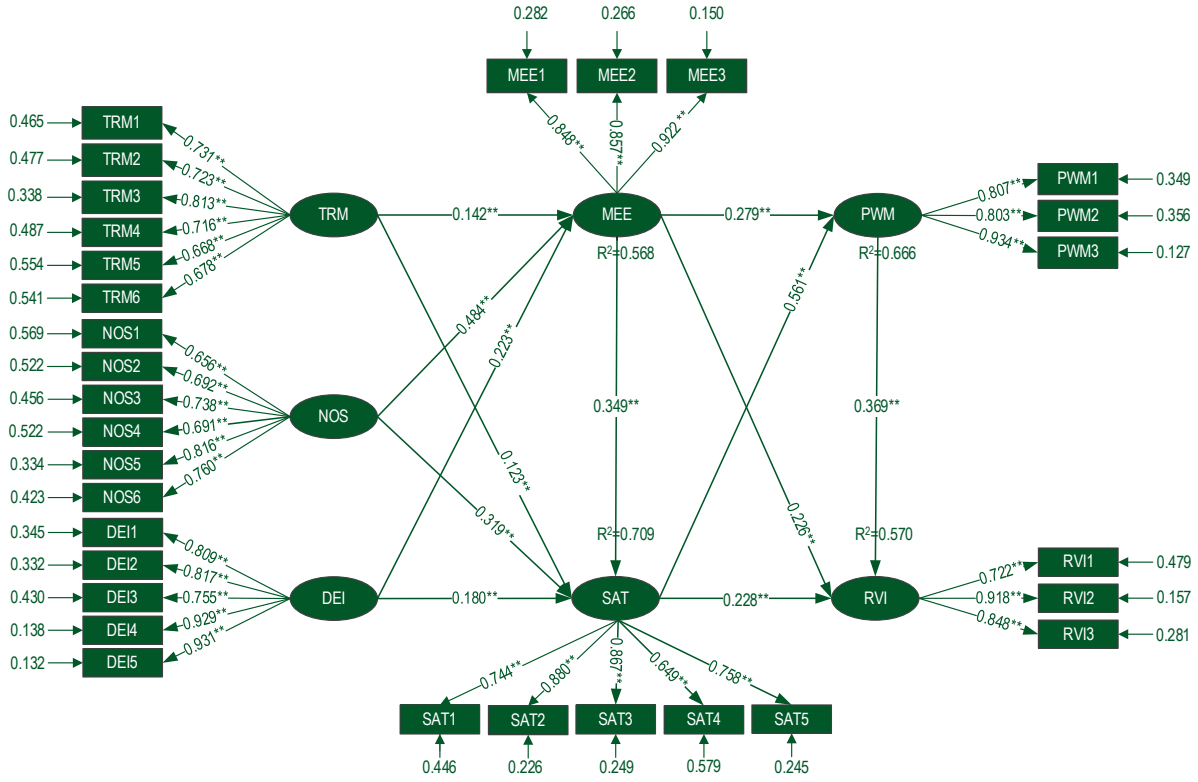
	AVE	Squared correlation						
		TRM	NOS	DEI	MEE	SAT	PWM	RVI
TRM	0.525	1.000						
NOS	0.530	0.399	1.000					
DEI	0.530	0.294	0.448	1.000				
MEE	0.547	0.314	0.514	0.383	1.000			
SAT	0.616	0.381	0.527	0.457	0.533	1.000		
PWM	0.722	0.299	0.406	0.377	0.518	0.539	1.000	
RVI	0.696	0.263	0.359	0.276	0.433	0.473	0.508	1.000

Source: Researchers.

3.3 Assessment of the Structural Equation Model

The findings showed that the modified structural equation model was consistent with the empirical data with the relative chi-square (χ^2/df) value of 0.877 (χ^2 =227.058 and df=259), passing the acceptable standard of less than 2., the p-value was at 0.925, passing the acceptable standard of more than 0.05, the root mean square error of approximation (RMSEA) was at 0.000, passing the acceptable standard of less than 0.05, the comparative fit index (CFI) value was at 1.000, passing the acceptable standard of more than 0.9, Tucker-Lewis index (TLI) value was at 1.000, passing the acceptable standard of more than 0.9 and standardized root mean square residual (SRMR) value was at 0.026, passing the acceptable standard of less than 0.05. The modified structural equation model analysis result is presented in figure 3 and table 3.

Figure 3. Modified structural equation model of the antecedents the revisit intention (RVI) of Thai cultural tourist in Thailand



χ^2 =227.058, *df*=259, χ^2/*df*=0.877, *p*-value=0.925, *RMSEA*=0.000, *CFI*=1.000, *TLI*=1.000, *SRMR*=0.026

Source: Researchers.

Table 3 .Direct effects (DE), indirect effects (IE), and total effects (TE)

Outcome Variables / Causal Variables	MEE			SAT			PWM			RVI		
	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE
TRM	0.142**		0.142**	0.123**	0.049*	0.172**		0.136**	0.136**		0.120**	0.120**
	(0.054)		(0.054)	(0.044)	(0.020)	(0.048)		(0.037)	(0.037)		(0.034)	(0.034)
NOS	0.484**		0.484**	0.319**	0.168**	0.487**		0.408**	0.408**		0.409**	0.409**
	(0.057)		(0.057)	(0.057)	(0.033)	(0.052)		(0.042)	(0.042)		(0.056)	(0.056)
DEI	0.223**		0.223**	0.180**	0.078**	0.258**		0.207**	0.207**		0.165**	0.165**
	(0.048)		(0.048)	(0.040)	(0.021)	(0.046)		(0.036)	(0.036)		(0.032)	(0.032)
MEE				0.349**		0.349**	0.279**	0.195**	0.474**	0.226**	0.254**	0.480**
				(0.054)		(0.054)	(0.062)	(0.036)	(0.053)	(0.062)	(0.037)	(0.052)
SAT							0.561**		0.561**	0.228**	0.206**	0.434**
							(0.061)		(0.061)	(0.077)	(0.050)	(0.062)
PWM										0.369**		0.369**
										(0.076)		(0.076)
Endogenous Variables	MEE			SAT			PWM			RVI		
R^2	0.568			0.704			0.666			0.570		
χ^2=227.058, *df*=259, χ^2/df =1.086, *p*-value=0.925, *RMSEA*=0.000, *CFI*=1.000, *TLI*=1..000, *SRMR*=0.026												

Source: Researchers.

3.4 Hypothesis Testing Results

The results of the data analysis show the research hypotheses testing as follows.

1. H1: *Travel motivation would have a positive influence on memorable experiences of Thai cultural tourist in Thailand* .From table 3 and figure 3, travel motivation had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.142, the first hypothesis was supported.

2. H2: *Novelty seeking would have a positive influence on memorable experiences of Thai cultural tourist in Thailand* .From table 3 and figure 3, novelty seeking had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.484, the second hypothesis was supported.

3. H3: *Destination image would have a positive influence on memorable experiences of Thai cultural tourist in Thailand* .From table 3 and figure 3, destination image had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.223, the third hypothesis was supported.

4. H4: *Travel motivation would have a positive influence on satisfaction of Thai cultural tourist in Thailand*. From table 3 and figure 3, travel motivation had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.123, the fourth hypothesis was supported.

5. H5: *Novelty seeking would have a positive influence on satisfaction of Thai cultural tourist in Thailand*. From table 3 and figure 3, novelty seeking had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.319, the fifth hypothesis was supported.

6. H6: *Destination image would have a positive influence on satisfaction of Thai cultural tourist in Thailand*. From table 3 and figure 3, destination image had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.180, the sixth hypothesis was supported.

7. H7: *Memorable experiences would have a positive influence on satisfaction of Thai cultural tourist in Thailand* .From table 3 and figure 3, memorable experiences had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.349, the seventh hypothesis was supported.

8. H8: *Memorable experiences would have a positive influence on positive word of mouth of Thai cultural tourist in Thailand* .From table 3 and figure 3, memorable experiences had a positive influence on positive word of mouth of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.279, the first hypothesis was supported.

9. H9: *Satisfaction would have a positive influence on positive word of mouth of Thai cultural tourist in Thailand* .From table 3 and figure 3, Satisfaction had a positive influence on positive word of mouth of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.561, the first hypothesis was supported.

10. H10: *Memorable experiences would have a positive influence on revisit intention of Thai cultural tourist in Thailand* .From table 3 and figure 3, memorable experiences had a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.226, the first hypothesis was supported.

11. H11: *Satisfaction would have a positive influence on revisit intention of Thai cultural tourist in Thailand*. From table 3 and figure 3, satisfaction had a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.228, the first hypothesis was supported.

12. H12: *Positive word of mouth would have a positive influence on revisit intention of Thai cultural tourist in Thailand* .From table 3 and figure 3, positive word of mouth had a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with the path coefficient of 0.369, the first hypothesis was supported.

3.5 Summary of the Findings as per the Research Objectives

Factors affecting for revisit intention of Thai cultural tourist in Thailand:

- Factors relating to travel motivation, novelty seeking, and destination image had a positive influence on memorable experiences with the combined predictive power of 56.80%.
- Factors relating to travel motivation, novelty seeking, destination image, and memorable experiences had a positive influence on satisfaction with the combined predictive power of 70.90%.
- Factors relating to memorable experiences and satisfaction had a positive influence on positive word of mouth with the combined predictive power of 66.60%.
- Factors relating to memorable experiences, satisfaction and positive word of mouth had a positive influence on revisit intention with the combined predictive power of 57.00%.
- The modified structural equation model of antecedents of revisit intention of Thai cultural tourist in Thailand was consistent with the empirical data.

4. Discussions

Travel motivation had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.142. The result of this research was consistent with the findings of Tešin *et al.* (2023) who studied foreignvisitors visiting to three biggest urban destinations in Serbia (Belgrade, Novi Sad, and Nis), and found out that tourist travel motivation had positive influence on tourist memorable experiences. That is to say, if tourists get to know the different cultures/lifestyles of cultural attractions, it will result in tourists being able to remember many good things about that cultural attraction. In order to develop wisdom, it will cause tourists to have excellent memories about cultural tourist attractions and if tourists travel to seek adventures, including enjoyment, will result in tourists not forgetting. The experience of visiting cultural tourist attractions can confirm that when tourists have higher travel motivation, it will result in more memorable experiences.

Novelty seeking had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.484. The results of this research is consistent with the findings of Tiwari *et al.* (2023) who studied tourists visiting destinations in central India, and found out that novelty seeking had postive influence on memorable experiences. That is to say, if a cultural attraction is unique compared to other types of tourist attractions, it will result in tourists remembering many good things about a cultural attraction while also experiencing new things, different from what it used to be when visiting cultural attractions will result in tourists not forgetting the experience of visiting cultural attractions. If tourists see a variety of things in cultural attractions, then it will result in tourists having excellent memories of cultural attractions. It could confirm that when tourists have more novelty seeking, it will result in more memorable experiences as well.

Destination image had a positive influence on memorable experiences of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.223. The results of this research is consistent with the findings of Kurniawan *et al.* (2023) who studied tourist visiting Trenggalek, Indonesia, and found out that destination image had postive influence on memorable experiences. That is to say, if a cultural tourist attraction has an image in terms of quality of service, it will result in tourists remembering many good things about a cultural tourist attraction. Meanwhile If a cultural tourist attraction has a good image in terms of the friendliness of the local people, it will result in tourists not forgetting the experience of visiting a cultural tourist attraction. And if a cultural attraction has a unique image, it will result in a wonderful memory of the cultural tourist attraction. It could be confirmed that when attractions have more destination image, it will result in more tourists having a memorable experiences as well.

Travel motivation had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.123. The results of this research is consistent with the findings of Huang (2023) who studied passengers who used low-cost airline services at Taoyuan Airport, and found out that tourist motivation had positive influence on tourist satisfaction. That is to say, if tourists travel and get to know new places, then it will result in making tourists happy that comes from traveling at cultural attractions. Likewise, when tourists travel to seek adventure, including enjoyment, it will influence tourists to decide to visit cultural attractions. And if tourists travel to seek entertainment, it will result in satisfaction with cultural attractions. It could be confirmed that when tourists have more travel motivation, it will result in more satisfaction for tourists as well.

Novelty seeking had a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.319. The results of this research is consistent with the findings of deMatos *et al.* (2023) who studied tourists visiting Portugal, and found out that tourist novelty seeking had positive influence on tourist satisfaction. That is to say, if cultural attractions are outstanding compared to other types of tourist attractions, it will result in tourists feeling more than their expectations for cultural attractions. At the same time, when tourists enjoy cultural attractions, it will result in tourist to satisfaction with cultural tourist attractions. And if the cultural attractions are interesting and exciting, then it will make tourists happy to decide to travel to cultural attractions. It could be confirmed that when tourists have more novelty seeking, it will result in more satisfaction for tourists as well.

Destination image has a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.180. The results of this research is consistent with the findings of Kusumah and Wahyudin (2024) who studied domestic attendees at World Superbike (WSBK) Mandalika 2022 in Lombok Island, Indonesia, the results of the analysis showed that the image of tourist destination has a significant effect on tourists' satisfaction. That is to say, when a cultural tourist attraction has a good image of service quality, it will result in tourists being satisfied with the cultural tourist attraction. Likewise, if a cultural attraction has a good image of being friendly among the local population, it will result in the willingness of tourists to decide to visit the cultural attraction. And if cultural attractions have a good image in terms of arts and culture, then it will result in cultural attractions exceeding the expectations of tourists. It could be confirmed that when attractions have more destination image, it will result in more satisfaction for tourists as well.

Memorable experiences have a positive influence on satisfaction of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.349. The results of this research is consistent with the findings of Terasaki *et al.* (2023) who studied U.S.tourists in Japan, the results of the analysis revealed that the memorable experiences had a positive influence on tourist satisfaction. That is to say, if tourists have a wonderful memory of cultural attractions, then it will result in tourists being happy to visit cultural attractions. At the same time, when tourists remember many good things about cultural attractions, it will make them feel exceeding expectations when traveling to cultural attractions. And when tourists remember the experience of visiting cultural attractions, it will result in tourists willing to decide to visit cultural attractions. It could be confirmed that when tourists have more memorable experiences, it will result in more satisfaction for tourists as well.

Memorable experiences have a positive influence on positive word of mouth of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.279. The results of this research is consistent with the findings of Moliner-Tena *et al.* (2023) who studied tourists who visited seven Spanish tourism destinations, the results of the analysis found that the memorable experiences had a positive influence on tourist positive word of mouth. In other words, if tourists have excellent memories of cultural attractions, it will result in tourists being willing to recommend cultural attractions to their friends. At the same time, if tourists can remember many good things about cultural attractions, it will result in tourists being more likely to speak positively about this attraction to their acquaintances. And if tourists remember the experience of visiting cultural attractions well, it will

result in tourists being willing to recommend friends or relatives to visit cultural attractions. It could be confirmed that when tourists have more memorable experiences, it will result in more positive word of mouth of tourists as well.

Satisfaction has a positive influence on positive word of mouth of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.561. The results of this research is consistent with the findings of Fotiadis *et al.* (2023) who studied either tourists or residents of the United Arab Emirates (UAE) who experienced at least one luxury yachting experience, the results of the analysis found that the satisfaction had a positive influence on tourist positive word of mouth. That is to say, if cultural attractions meet the expectations of tourists, it will result in tourists willing to recommend cultural attractions to their friends. Likewise, if tourists are happy to visit a cultural attraction, it will result in tourists being more likely to speak positively about the cultural attraction to their acquaintances. And if tourists are satisfied with cultural attractions as a whole, it will result in tourists being willing to recommend friends or relatives to visit cultural attractions. It could be confirmed that when tourists have more satisfaction, it will result in more positive word of mouth of tourists as well.

Memorable experiences have a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.226. The results of this research is consistent with the findings of Terasaki *et al.* (2023) who studied U.S.tourists in Japan, the results of the analysis revealed that the memorable experiences had a positive influence on revisit intention of the tourist. In other words, if tourists have a wonderful memory of cultural attractions, it will result in tourists returning to cultural attractions in the future. Likewise, if tourists remember many good things about a cultural attraction, it will result in tourists returning to the cultural attraction in the future. And if tourists can remember the experience of visiting cultural attractions very well, it will result in tourists being willing to come back to travel to cultural attractions again. It could be confirmed that when tourists have more memorable experiences, it will result in more revisit intentions as well.

Satisfaction has a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.228. The results of this research is consistent with the findings of The results of this research is consistent with the findings of Terasaki *et al.* (2023) who studied U.S.tourists in Japan, the results of the analysis revealed that the Satisfaction had a positive influence on revisit intention of the tourist. That is to say, if cultural attractions meet the expectations of tourists, it will result in tourists intending to return to the cultural attractions again in the near future. While when tourists are happy to travel to cultural attractions, it will result in tourists returning to the tourist attractions to return to this tourist attraction again in the future. And if tourists are satisfied with cultural attractions as a whole, it will result in tourists being willing to come back to travel to cultural attractions again. It could be confirmed that when tourists have more satisfaction, it will result in more revisit intentions as well.

Positive word of mouth has a positive influence on revisit intention of Thai cultural tourist in Thailand at the significance level of .01 with path coefficient equal to 0.369. The results of this research is consistent with the findings of Sharipudin *et al.* (2023) who studied the role of post-stay evaluation on ewom and hotel revisit intention among gen y, the results of the analysis found that the positive word of mouth had a positive influence on tourist revisit intention. That is, if tourists are willing to recommend cultural attractions to their friends, it will result in tourists coming back to travel to cultural attractions again in the future if they have the opportunity. Similarly, if tourists speak positively about a cultural attraction to their acquaintances, they will likely return to the cultural attraction again. And when tourists are willing to recommend to friends or relatives come to visit cultural attractions then it will result in tourists tend to intend to return to travel to cultural attractions in the future. It could be confirmed that when tourists have more positive word of mouth, it will result in more tourists' revisit intention as well.

5. Conclusions and Further Research

Travel motivation, novelty seeking, and destination image had a positive influence on memorable experiences of Thai cultural tourist. Also, travel motivation, novelty seeking, destination image and memorable experiences had a positive influence on satisfaction of Thai cultural tourist. Memorable experiences and satisfaction had a positive influence on positive word of mouth of Thai cultural tourist. Finally, memorable experiences, satisfaction and positive word of mouth had a positive influence on revisit intention of Thai cultural tourist. From the research results, it is recommended that the Tourism Authority of Thailand including cultural tourist attractions in Thailand should promote, develop, support and focus on novelty seeking, destination image and travel motivation, respectively to enhance cultural tourist's revisit intention through memorable experiences, satisfaction and positive word of mouth.

This research benefits to the Tourism Authority of Thailand (TAT) to apply novelty seeking, travel motivation and destination image to boost a memorable experience and satisfaction, which will result in increasing positive word of mouth and revisit intention of cultural tourist in Thailand. This research also benefits entrepreneurs and communities involved in the 10 cultural attractions by incentivizing repeat tourists, which will generate income from the spending of tourists in the future.

It is recommended that in addition to studying cultural tourist attraction, other tourist attractions such as historical tourism, eco-tourism, adventure tourism, creative tourism should be studied to confirm the research results. Nowadays, social media has a great influence on tourists. Therefore, it is recommended to study the variables related to social media that affect tourists to make repeat trips, such as the social media usage and electronics positive word of mouth to broaden the scope of research.

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Credit Authorship Contribution Statement:

Thanat Kornsuphkit: Conceptualization, Investigation, Methodology, Project administration, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition.
Sarana Photchanachan: Conceptualization, Investigation, Project administration, Supervision, Data curation.
Kitti Charoernpornpanichkul: Conceptualization, Data curation, Validation, Visualization, Funding acquisition.
Chaveewan Shoosanuk: Conceptualization, Writing – original draft, Writing – review and editing, Visualization.
Ampon Shoosanuk: Conceptualization, Investigation, Methodology, Software, Formal analysis, Writing – original draft, Data curation, Validation, Writing – review and editing, Visualization.

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.

References

[1] Albaity, M., and Melhem, S. B. 2017. Novelty seeking, image, and loyalty--The mediating role of satisfaction and moderating role of length of stay: International tourists' perspective. *Tourism Management Perspectives, 23*: 30-37. DOI: https://doi.org/10.1016/j.tmp.2017.04.001

[2] Ameri, M., Honka, E., and Xie, Y. 2019. Word of mouth, observed adoptions, and anime-watching decisions: The role of the personal vs. the community network. *Marketing Science, 38*(4): 567-583. DOI:https://doi.org/10.1287/mksc.2019.1155

[3] Andrian, J., and Trinanda, O. 2019. The influence of e-Service quality, e-Satisfaction, and e-word of mouth toward revisit intention on Tokopedia website in Padang City. *Jurnal Ecogen, 2*(1): 69-77. DOI:http://dx.doi.org/10.24036/jmpe.v2i1.6135

[4] Bandara, A., and Ranasinghe, J. 2019. *Study on the influence of marketing Mix factors on the revisit intention of inbound tourists*. Paper presented at the International Research Conference of UWU, International Research Conference of UWU.

[5] Bhattacharya, S., and Kumar, R. V. 2017. Modeling Tourists' Opinions Using RIDIT Analysis. In P. Vasant and M. Kalaivanthan (Eds.), *Handbook of research on holistic optimization techniques in the hospitality, tourism, and travel industry* (pp. 423-443). Hershey, PA: IGI Global. DOI: 10.4018/978-1-5225-1054-3.ch020

[6] Choi, M. 2017. Shopping tourist satisfaction: An application of hedonic and utilitarian values. *Journal of Tourism and Hospitality, 6*(308): 1-9. DOI: 10.4172/2167-0269.1000308

[7] Dagustani, D., Kartini, D., Oesman, Y. M., and Kaltum, U. 2017. Memorable tourism experience. Antecedents and destination image outcome in Indonesia. *Journal of Environmental Management and Tourism, 8*(8 (24)): 1482-1493. DOI: https://doi.org/10.14505/jemt.v8.8(24).04

[8] deMatos, N. M. d. S., Duarte, P. A. d. O., and Sá, E. S. d. 2023. Once-in-a-lifetime leisure experiences (OLLE): The role of Flow, novelty, and interpersonal interaction on tourists' satisfaction and memories. *Journal of Vacation Marketing*, 13567667231157012. DOI: https://doi.org/10.1177/13567667231157012

[9] Di-Clemente, E., Hernández-Mogollón, J. M., and Campón-Cerro, A. M. 2019. Tourists' involvement and memorable food-based experiences as new determinants of behavioural intentions towards typical products. *Current Issues in Tourism*, 1-14. DOI: 10.1080/13683500.2019.1631265.

[10] Ernawadi, Y., and Putra, H. T. 2020. Antecedents and consequences of memorable tourism experience. *Dinasti International Journal of Management Science, 1*(5): 676-684. DOI:https://doi.org/10.31933/dijms.v1i5.280

[11] Fakeye, P. C., and Crompton, J. L. 1991. Image differences between prospective, first-time, and repeat visitors to the Lower Rio Grande Valley. *Journal of Travel Research, 30*(2): 10-16. DOI:https://doi.org/10.1177/004728759103000202

[12] Firman, A., *et al.* 2023. The impact of eco-innovation, ecotourism policy and social media on sustainable tourism development: evidence from the tourism sector of Indonesia. *Economic research-Ekonomska istraživanja, 36*(2): 2143847. DOI: 10.1080/1331677X.2022.2143847

[13] Florida Division of Arts and Culture. (2023). What is cultural tourism? - Basic information. Available at: https://dos.fl.gov/cultural/info-and-opportunities/resources-by-topic/cultural-tourism-toolkit/what-is-cultural-tourism-basic-information/.

[14] Fodness, D. 1994. Measuring tourist motivation. *Annals of Tourism Research, 21*(3): 555-581. DOI:https://doi.org/10.1016/0160-7383(94)90120-1

[15] Foroudi, P., *et al.* 2018. Promising the dream: Changing destination image of London through the effect of website place. *Journal of Business Research, 83*: 97-110. DOI: https://doi.org/10.1016/j.jbusres.2017.10.003

[16] Fotiadis, A., Rice, J., and Hiyasat, R. 2023. Antecedents of yacht tourism participants' satisfaction and word-of-mouth intention. *Worldwide Hospitality and Tourism Themes, 15*(4): 349-361. DOI: 10.1108/WHATT-03-2023-0042

[17] Ghafari, M., Rezaei Dolatabadi, H., and Dehghani, F. 2014. Analysis of the factors affecting tourists loyalty to destinations (Case Study: Foreign tourists of Isfahan). *Organizational Culture Management, 12*(3): 551-568. DOI: 10.22059/JOMC.2014.51523

[18] Gohary, A., Pourazizi, L., Madani, F., and Chan, E. Y. 2018. Examining Iranian tourists' memorable experiences on destination satisfaction and behavioral intentions. *Current Issues in Tourism*, 1-6. DOI:10.1080/13683500.2018.1560397

[19] Greenwell, M. R. 2019. Memorable messages from family members about mental health: Young adult perceptions of relational closeness, message satisfaction, and clinical help-seeking attitudes. *Health communication, 34*(6): 652-660. DOI: 10.1080/10410236.2018.1431021

[20] Hair, J. F., Babin, B. J., Anderson, R. E., and Black, W. C. 2019. *Multivariate data analysis* (8th ed.). India: Cengage.

[21] Hasan Md, K. 2019. The antecedents of tourist attitudes to revisit and revisit intentions for coastal tourism. *International Journal of Culture, Tourism and Hospitality Research, 13*(2): 218-234. DOI: 10.1108/IJCTHR-11-2018-0151

[22] Hipsher, S. 2019. Increased equality of opportunity through international tourism. *Journal of Global Responsibility*, 10(4): 339-354. DOI: https://doi.org/10.1108/JGR-04-2019-0045

[23] Huang, Y.-C. 2023. Low-Cost Airlines Not So Low-Cost – Exploring the Relationships among Travel Motivation, Service Quality and Satisfaction: The Moderating Roles of Perceived Value. *Research in Transportation Business and Management, 49*, 101008. DOI: https://doi.org/10.1016/j.rtbm.2023.101008

[24] Kasikornthai. (2023). Tourism Remains Thailand's Key Economic Driver. Retrieved from https://www.kasikornbank.com/en/IR/ShareholderServices/Publications/ShareholderNewsletter_2_2023_EN.pdf

[25] Kim, J.-H. 2018. The impact of memorable tourism experiences on loyalty behaviors: The mediating effects of destination image and satisfaction. *Journal of Travel Research, 57*(7): 856-870. DOI: https://doi.org/10.1177/004728751772136

[26] Kurniawan, D. T., *et al.* 2023. *The Effect of Destination Image, Memorable Tourism Experiences, e-WOM, and Brand Trust on Revisit Intention in Trenggalek, East Java Indonesia.* Paper presented at the International Conference on Economics and Business Studies (ICOEBS-22-2).

[27] Kusumah, E. P., and Wahyudin, N. 2024. Sporting event quality: destination image, tourist satisfaction, and destination loyalty. *Event Management, 28*(1): 59-74. DOI: https://doi.org/10.3727/152599523X16896548396824

[28] Lee, T.-H., and Crompton, J. 1992. Measuring novelty seeking in tourism. *Annals of Tourism Research, 19*(4): 732-751. DOI: https://doi.org/10.1016/0160-7383(92)90064-V

[29] Leung, W. K. S., *et al.* 2022. The role of virtual reality interactivity in building tourists' memorable experiences and post-adoption intentions in the COVID-19 era. *Journal of Hospitality and Tourism Technology, 13*(3): 481-499. DOI: 10.1108/JHTT-03-2021-0088

[30] Mahdzar, M. 2019. Tourists' perception on memorable tourism experience towards their revisit intentions to Islamic tourism destination in Shah Alam, Selangor. *Journal Of Emerging Economies and Islamic Research, 7*(1): 37-44. DOI: 10.24191/JEEIR.V7I1.6034

[31] Manton, S. 2020. Cultural tourism attractions. Available at: https://sites.google.com/site/sunisamanton/haelng-thxng-theiyw-cheing-wathnthrrm

[32] Matzler, K., Teichmann, K., Strobl, A., and Partel, M. 2019. The effect of price on word of mouth: First time versus heavy repeat visitors. *Tourism Management, 70*: 453-459. DOI:https://doi.org/10.1016/j.tourman.2018.09.013

[33] Mitas, O., and Bastiaansen, M. 2018. Novelty: A mechanism of tourists' enjoyment. *Annals of Tourism Research, 72*: 98-108. DOI: https://doi.org/10.1016/j.annals.2018.07.002

[34] Moliner-Tena, M. A., Monferrer-Tirado, D., Estrada-Guillen, M., and Vidal-Meliá, L. 2023. Memorable customer experiences and autobiographical memories: From service experience to word of mouth. *Journal of Retailing and Consumer Services, 72*, 103290. DOI: https://doi.org/10.1016/j.jretconser.2023.103290

[35] Narangajavana Kaosiri, Y., *et al.* 2019. User-generated content sources in social media: A new approach to explore tourist satisfaction. *Journal of Travel Research, 58*(2): 253-265. DOI:https://doi.org/10.1177/0047287517746014

[36] Oliver, R. L. 1993. Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research*, 20(3): 418-430. DOI: https://doi.org/10.1086/209358

[37] Phi, H. D., Quang, T. N., Phuong, T. H. T., and Linh, N. N. 2022. Effects of Destination Image on Revisit Intention: The Intermediate Role of Satisfaction and Words of Mouth (Empirical Evidence in Ho Chi Minh City, Vietnam). *Estudios de economía aplicada, 40*(1): 1-15. DOI: 10.25115/eea.v40i1.5747

[38] Ramkissoon, H. 2023. Perceived social impacts of tourism and quality-of-life: A new conceptual model. *Journal of Sustainable Tourism, 31*(2): 442-459. DOI: https://doi.org/10.1080/09669582.2020.1858091

[39] Rifaatulloh, H., Waluya, B., and Andari, R. 2019. *The influence of Memorable Experience to Revisit Intention in Baduy Traditional Village.* Paper presented at the 3rd International Seminar on Tourism (ISOT 2018).

[40] Shakoor, A., Yapang Gharavi, M., Feizi, S., and Salimi Sobhan, M. R. 2021. Investigating the effect of perceived authenticity, destination image and memorable experience on the intention of visiting tourists again (Case study: Ardabil city). *Geography and Development Iranian Journal, 19*(63): 199-226. DOI:10.22111/J10.22111.2021.6192

[41] Sharipudin, M.-N. S., Cheung, M. L., De Oliveira, M. J., and Solyom, A. 2023. The role of post-stay evaluation on eWOM and hotel revisit intention among Gen Y. *Journal of Hospitality and Tourism Research, 47*(1): 57-83. DOI: https://doi.org/10.1177/109634802110198

[42] Singh, R., and Singh, J. 2019. Destination Attributes to Measure Tourist Revisit Intention: A Scale Development. *Global Business Review, 20*(2): 549-572. DOI: https://doi.org/10.1177/0972150918825329

[43] Statista. 2023. Travel, Tourism and Hospitality: Number of travel and tourism jobs worldwide from 2019 to 2022, with a forecast for 2023 and 2033. Retrieved from https://www.statista.com/statistics/1268465/number-of-travel-and-tourism-jobs-worldwide/#:~:text=Travel%20and%20tourism%20employment%20worldwide%202019%2D2033andtext=As%20forecast%2C%20this%20figure%20is,and%20drink%20services%2C%20and%20more

[44] Sthapit, E., and Björk, P. 2019. Relative contributions of souvenirs on memorability of a trip experience and revisit intention: A study of visitors to Rovaniemi, Finland. *Scandinavian Journal of Hospitality and Tourism, 19*(1): 1-26. DOI: 10.1080/15022250.2017.1354717

[45] Stojanovic, I., Andreu, L., and Curras-Perez, R. 2018. Effects of the intensity of use of social media on brand equity: An empirical study in a tourist destination. *European Journal of Management and Business Economics, 27*(1): 83-100. DOI: https://doi.org/10.1108/EJMBE-11-2017-0049

[46] Suwannasank, O., and Kheokao, J. 2019. *Cultural tourism and marketing communications in Thailand: Research synthesis and trends.* Paper presented at the International Conference on Social Sciences in the 21st Century, Amsterdam, Netherlands.

[47] Taizeng, R., *et al.* 2019. The Impact of Tourism Quality on Economic Development and Environment: Evidence from Mediterranean Countries. *Sustainability, 11*(8): 1-17. DOI: https://doi.org/10.3390/su11082296

[48] Terasaki, S., Hara, T., and Ikegami, J. 2023. Mediating role of the country image in enhancing memorable experiences and revisits: an Analysis of U.S. tourists in Japan. *Tourism Recreation Research*, 1-13. DOI: 10.1080/02508281.2023.2185733

[49] Tešin, A., Kovačić, S., and Obradović, S. 2023. The experience I will remember: The role of tourist personality, motivation, and destination personality. *Journal of Vacation Marketing*, 13567667231164768. DOI: 10.1177/13567667231164768

[50] ThaiPublica. (2020). Krungthai COMPASS evaluates "We travel together" to boost revenue by 36-67 billion baht. Available at: https://thaipublica.org/2020/07/krungthai-compass-ktb-20-7-2563/

[51] Tiwari, A. V., Bajpai, N., and Pandey, P. 2023. The measurement model of novelty, memorable tourism experience and revisit intention in tourists. *Leisure/Loisir*, 1-19. DOI:https://doi.org/10.1080/14927713.2023.2187864

[52] Zatori, A., Smith, M. K., and Puczko, L. 2018. Experience-involvement, memorability and authenticity: The service provider's effect on tourist experience. *Tourism Management, 67*: 111-126. DOI:https://doi.org/10.1016/j.tourman.2017.12.013

[53] Zhang, H., Wu, Y., and Buhalis, D. 2018. A model of perceived image, memorable tourism experiences and revisit intention. *Journal of Destination Marketing and Management, 8*: 326-336. DOI:https://doi.org/10.1016/j.jdmm.2017.06.004

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Visitor Perception of the Degradation of Bar Reef Kalpitiya Sri Lanka

Chamathi JAYARATNE
Faculty of Graduate Studies,
University of Sri Jayewardenepura, Sri Lanka
ORCID: https://orcid.org/0000-0003-1764-8615

Premachandra WATTAGE
Faculty of Agriculture,
Sabaragamuwa University of Sri Lanka
p.wattage@port.ac.uk

Prasanthi GUNAWARDENA
Department of Forestry and Environmental Science,
Faculty of Applied Science, University of Sri Jayewardenepura, Sri Lanka
prasanth@sjp.ac.lk

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Abstract: Bar Reef is a complex marine ecosystem with over 120 coral species living in the reef and over 300 fish species reported from the surrounding sea. It was declared a marine sanctuary in 1992. Despite efforts for conservation, the Bar Reef ecosystem is at risk of degradation due to overexploitation of extractive uses, namely, edible fish, other seafood species, and aquarium fish. In addition, destructive fishing practices are also responsible for damaging the reef ecosystem. The designation of Kalpitiya as a significant tourism promotion area has created additional pressure on the system. Further, the worldwide incidence of coral bleaching in 1998 has severely affected a major part of the Bar Reef. However, the amount of degradation persistent in the bar reef has not been valued so far. This research has attempted to value the extent of degradation prevailing in the Bar Reef from the perception of the visitors. It has used Choice Experiment Method to assess the visitors' perception of the degradation. Randomly selected 250 visitors were interviewed and the conditional logit model has been used to investigate the visitor preferences towards the habitat quality and analyze the significance of their preferences. According to the results obtained reduction of plastic and polythene by 50%, reducing the crowding in the beach area by 15%, and paying Rs. 1000 has become significant. Hence it is expected by this research to provide a signal to the relevant stakeholders on the extent of degradation prevailing and the importance of protecting this habitat.

Keywords: marine ecosystem**;** conditional logit; choice experiment; degradation of bar reef; perception.

JEL Classification: Q57; Q01; Z32; R11.

Introduction

Bar Reef is one of the largest coral reefs in Sri Lanka and is situated a few kilometers away from the shores of Kalpitiya, Puttlam District. It is enriched with high biodiversity, including rare coral species, seagrass beds, and associated ecosystems with over 120 coral species and over 300 fish species reported from the surrounding area (Coast Conservation Department, 2007; Rajasooriya *et al.* 1995). Recognizing the importance of biodiversity in the Bar Reef area, it was declared a marine sanctuary in 1992. Although declared as a marine sanctuary, the management of the reef is at the primary level.

Not only is Bar Reef important as a biodiversity destination, but it also continues to provide livelihood opportunities for many local users. Fishing is the major occupation in the Kalpitiya area. These fishers live in the coral reef area either along the continental shelf, in the Kalpitiya lagoon, or offshore areas beyond the Bar Reef. In addition to fishers who permanently reside in the villages, some migrants stay temporarily in the area during the peak fishing period. Usually, the southwest monsoon period (May - September) is considered a lean season for fishing in the area.

1. The Problem and the Objectives

Mere declaration of the Bar Reef as a protected area has yet to create an effective deterrent against harmful extractive practices, and the process of ecosystem degradation seems to be continuing. Rising demand for edible fish and other seafood species, aquarium fish, and products such as chanks has led to increasing extraction of those products from the Bar Reef area (Coast Conservation Department, 2007; Rajasooriya *et al.* 1995). Most intensive fishing can be observed during the period from February to June. In addition to overexploitation, destructive fishing practices also damage the Bar Reef and associated ecosystems. Among the destructive practices reported from the area are blast fishing and illegal fishing gear (*e.g.*, Laila nets, encircling nets, bottom set nets, and Moxy nets). An increase in the local population, a growing number of migrant fishers, especially after the conclusion of the war in the North, increasing poverty levels of local residents, and lack of other economic opportunities seem to encourage overexploitation and the use of destructive practices.

Further, booming tourism activities in the area have created additional pressure on the system in terms of the increased number of visitors, an extended number of recreation services, and associated damages to the system due to congestion and the accumulation of non-biodegradable waste. More visitors have also increased the demand for local products causing indirect pressure on local resources.

Not only the anthropogenic factors, but the Bar Reef is also susceptible to natural causes of degradation too (Coast Conservation Department, 2021, 2007; Ohmen *et al.* 1998; Rajasuriya *et al.* 1995). The worldwide incidence of coral bleaching in 1998 has severely affected a major part of the Bar Reef. Some estimates suggest that over 90% of coral died due to bleaching, and experts reported that the system's biodiversity has reduced after the mass bleaching (Rajasuriya and Karunarathna, 2000; Rajasuriya 2002). However, there are signs of recovery and new colonies growing on top of dead colonies (Department of Wildlife Conservation, 2020). Even before the incidence of bleaching, the Bar Reef underwent a severe attack of invasive crown-of-thorns starfish (COT) in the 1970s (Rajasuriya *et al.* 1995). The Department of Fisheries and Aquatic Resources (DFAR) had to make a major effort to destroy COT, and the reef recovered gradually since then. These incidents of natural disasters suggest that the Bar Reef is a fragile system, and excessive exposure to harmful anthropogenic activities could set the system on a rapid path of degradation.

Therefore, the objectives of this study are to value the amount of degradation persistent in the Bar Reef from the perception of visitors. Valuation of the extent of degradation may be useful to inform policymakers about the importance of this destination. Hence it is expected by this research to provide a signal to the relevant stakeholders on the extent of degradation prevailing and the importance of protecting this habitat.

2. Literature Review

The coral reef ecosystem is a pristine environment that represents a resource of primary importance to many economies. However, fragile developing economies which depend on natural resources to a greater extent and are burdened with poverty, demographic pressure, and low human capital capacity (Leisher *et al.* 2007; Pollnac *et al.* 2000, Laurans *et al.* 2013) seem to have created unfavorable consequences on this important ecosystem. Coral reefs are threatened by various negative pressures such as acidification of the oceans, climate change, excessive tourism, pollution, and sedimentation (Mumby and Steneck 2008, Laurans *et al.* 2013, Lee *et al.* 2019). Due to the said reasons, coral reefs are the core focus of many conservation organizations. According to the findings of the scientists, many coral reefs in the world, especially those found in the Indian Ocean will cease providing their basic functionalities very soon (Wilkinson, 2008; Bryant *et al.* 2011, Laurans *et al.* 2013).

To examine the extent of the degradation of corals and their impacts, various methods have been used by economists (Spurgeon 1992; Dixon, 1998). Cesar (2000), Ahmed *et al.* (2004), and Brander *et al.* (2007) have provided with meta-analysis of coral-associated ecosystems. Costanza *et al.* (1997) have estimated a global value for coral ecosystems.

The economic value of coral degradation is a standard topic nowadays though it was initially described by the end of the 1980s (Hodgson and Dixon (1988) and Hundloe *et al.* (1987)). In their study on tourism in Palawan, the authors (Pet-Soede *et al.* 1999) have attempted to compare the social cost and private benefits that have adversely affected the coral reefs. In Indonesia, the economic cost of blast fishing to society has been estimated to be several times higher than the total net private benefits. This is mainly because blast fishing damages coral habitats on which other fish depend (Pet-Soede *et al.* 1999). Other means of destructive practices are cyanide fishing (Mous *et al.* 2000) coral mining (Ohman and Cesar 2000), and tourism (Van Beukering and Cesar 2004).

Many authors have highlighted the benefits of conservation and management of natural resources over conversion effects. Mangroves and coral reefs of Olango Island in the Philippines generate net benefits of US$1.53 to 2.54 million per year. However, the cost of conservation of this environment is only US$100,000 per

year (White *et al.* 2000). In determining the importance of criteria in the management of wetlands in Sri Lanka, Wattage and Mardle (2005), considered two key issues: that is whether they should be conserved for environmental benefits, or whether they should be used for development activities.

Lane *et al.* (2013) have used the benefit transfer approach to calculate the economic values of changes in coral cover especially when greenhouse gas emissions are increased.

Coral reefs are non-market goods and hence their benefits need to be measured using an assessment method. Hence Contingent Valuation Method (CVM) and Choice Experiment Method (CEM) are used to measure the values of non-market goods like coral reefs (Lee *et al.* 2019). Persons and Thur (2008) have used a CE Survey to estimate the value of changes in the coral ecosystem to scuba divers. Lee *et al.* (2019) have valued the ecological conservation of the Kenting Coral Reef using CEM. This study used CEM to construct a random utility model for the conservation of coral ecology. It has also investigated the coral conservation preferences and willingness to pay the value of tourists.

Lara *et al.* (2021) have also valued the reef attributes of Cozumel Island using CEM. This study has attempted to investigate the link between the local economy and the management of the park using CEM to examine the economic values visitors assign to underwater visibility, biodiversity, and visitor congestion in reef areas.

Pakalniete *et al.* (2021) have used CEM to evaluate benefits from Ecosystem Services (ES) and welfare losses to people due to restrictions on economic activities from establishing new offshore Marine Protected Areas. Shen *et al.* (2019) have used CEM to estimate the social cost of marine litter in China. They have conducted surveys at ten different beaches in Zhejiang province. The social cost is US$1.00 to 1.07 per visit when the CEM is applied.

Cavalletti *et al.* (2021) have used CEM to examine the preferences of a sample of visitors of human-made services vs. natural services in a marine protected area where policymakers must balance when deciding on management strategies for coastal sites. The results of the choice experiment method indicated that natural services were preferred by the visitors. Armstrong *et al.* (2019) have investigated the tradeoffs between the protection of cold-water coral reefs and economic activities such as fisheries and petroleum extraction using a CEM in Norway and Ireland. Results indicated that Norwegian respondents prefer to protect corals than the Irish and that the present governance system does not properly focus on the protection of cold-water corals.

Davis *et al.* (2019) have used Integrated Choice Experiment (ICE) to value many attributes. They have used ICE to value marine ecological and recreational features at Moreton Bay, South-East Queensland where the results of the ICE approach were compared with full profile Discrete Choice Experiment (DCE) with all eight attributes.

Contingent Valuation Method is a non-market valuation method that values users' preferences for ecosystems in a good ecological state (Spash 2000, Lee *et al.* (2019). This method is a means to value individuals' willingness to pay for the preservation of the services or willingness to accept their loss by simulating the absent market for coral reef ecosystem services by eliciting through surveys. Ahmed *et al.* (2007) have valued the recreation and conservation benefits of coral reefs in the Philippines using travel cost and CVM. The results indicate that preserving the natural environment is not an immediate priority among the people in developing countries due to socio-economic considerations. Splash (2000) also has attempted to investigate whether CVM was applicable to the valuation of the benefits of maintaining and improving coral reef biodiversity.

Moreover, another method of valuing conservation involves considering the costs and benefits of specific engagement, such as establishing marine protected areas (Dixon *et al.* 1995; Subade 2007). Rani *et al.* (2020) have mentioned that the coral reefs of Saint Martin's coral island and the associated ecosystem of Bangladesh are damaged, mainly from fishing, anchoring of boats, and waste discarded by tourists. They have calculated the net present value of all the island's resources to be US$ 545 million over 25 years and presented a socio-ecological-political, restoration, and management framework to protect the reefs.

Some studies have focused on restoring critical habitats when considering coral reef degradation. Under this approach, cost and benefits of restoring degraded ecosystems are discussed (Spurgeon and Lindahl 2000) or rehabilitating and creating habitats. Thus, conservation examines the economic opportunity created by protection measures.

Jayasekera *et al.* (2019) have estimated the optimal entrance fee for the Hikkaduwa National Park, Sri Lanka using the travel cost method and have mentioned that the main threat to this recreational site are the rapid degradation of the coral reef and beach pollution.

Since coral reef conservation and climate change are interconnected, Ngoc (2019) has calculated the loss in the economic value of coral under climate change ranges from US$ 27.78 to US$ 31.72 million for Nha Trang

Bay in Vietnam and has pointed out that this value will be useful for the policymakers to draw conclusions for climate change policy. El Niño event which occurred in 1998 has resulted in massive coral bleaching all over the world and especially in the tropical coastal regions. It has been estimated by Westmacott *et al.* (2000) that losses in tourism revenues and welfare in Sri Lanka were estimated to be US$ 2.2 million due to the coral bleaching.

Pendleton (1995) mentioned that the marine park's economic benefit is the value of avoiding reef degradation. It has also mentioned that many previous studies have erroneously measured their economic benefits since they value “the resource protected and not the protection provided”. Further, Wielgus *et al.* (2002) have attempted to measure the economic valuation of pollution damage to coral reefs using dose-response modeling. In this study, they have discussed the importance of the economic value of coral reefs and how dose-response functions can be used for the economic valuation of coral reef damage.

Accordingly, there are more studies done regarding coral degradation globally. However, visitor perception and how it should lead to the improvement of existing governance systems still need to be researched in which is the focus of the present study.

3. Research Methodology

Revealed preference data is seldom found for recreation and tourism studies hence stated preference techniques are commonly used for such valuations. Two common approaches of stated preference are the Contingent Valuation Method (CVM) and the Choice Experiment Method (CEM). Although CVM is commonly used to examine respondents’ preferences for unpriced benefits related to coastal environments, specifically for non-use values, if the resource is difficult to be imagined by the respondents’ inaccurate estimates are likely to be produced (Wattage *et al.* 2011). However, this problem can be minimized if CEM can be adopted. CEM is derived out of conjoint analysis which was mainly developed for the purpose of market research (Carson *et al.* 1994). The basic form of CEM has been developed in the 1970s and the applications have been popular in recent years (Green and Sirinivansan 1978) partly in order to overcome the drawbacks of CVM and partly due to its own development (Wattage *et al.* 2011). CEM is viewed by some as the evolution of CVM since both these methods involve surveys and both are based on the economic theory of random utility (Adamowicz *et al.* 1998). At present, there is a trend of applying CEM in environmental valuations (Mariel *et al.* 2021).

The aim of the approach is to establish the relative importance of attributes and estimate the structure of individual preferences. To achieve this, a set of attributes and their levels are presented to the respondent. The total utility that an individual obtains from that alternative is thereby decided by the utility to the individual of each attribute. The ultimate objective of the conjoint analysis-based techniques is to “(a) estimate the relative importance of individual attributes (b) the trade-offs or marginal rates of substitution that individuals are willing to make between these attributes and (c) the total satisfaction or utility scores for a different combination of attributes" (Ryan 1996). In the CEM there are attributes and their respective levels. Different choice sets can be made by changing attributes and their levels. It is commonly seen that fixed choice sets are being used. In CEM respondents are making a choice from different combinations presented as a different set of attributes and associated levels. According to Green and Sirinivansan (1978), there are certain steps needed to be followed. As the first step set of attributes needed to be chosen and the alternatives needed to be described. This involves three key components. They are understanding the problem, identifying attributes, and setting attribute measures.

Further, two methods are usually practiced for data collection. They are two factors at a time and full profile. Two-factor method is simple, reduces information accumulation, and is more suitable for a postal survey. However, there are limitations inherent to this method. Since choice-based approaches depend on personnel interviews full profile approach provides a more realistic approach. Therefore, once the number of attributes examined is high, more comparisons are needed to be made, and hence limits needed to be placed on the number of attributes that can be examined.

For example, in this study, a full factorial design of the four main attributes was identified to produce a total of 4^3 combinations or profiles. Since it is difficult to show all these combinations to the respondent simultaneously, only a fraction of the possible combinations can be used for the choice cards. This is achieved by selecting an orthogonal, fractional factorial design. An orthogonal design confirms that individual estimates of attributes and levels are independent of each other (Aas *et al.* 2000).

3.1 Econometric Analysis

The choices of the respondents depend on the Random Utility Theory and Consumer Choice Theory. According to consumer choice theory satisfaction of the consumer is derived from the attributes of the goods and not from the good itself on the utility gained. According to Random Utility Theory, consumers will choose one alternative

over another once the utility derived from that alternative is higher. The utility of a choice can be mathematically represented as follows;

$$U_{ab} = V_{ab}(X_{ab}, S_a) + \in_{ab} \quad (1)$$

In the above equation, U denotes the utility of the a[th] respondent will obtain from choosing alternative b. V_{ab} is the systematic term, which is a function of X_{ab}, the vector that includes the attributes, and the respondent's characteristics are represented by S_a. Further, the random error is represented by $\in_{ab}$.The error term is inclusive of the effects of omitted variables. It also includes the case-specific factors that affect utility.

A respondent would choose alternative "c" over alternative "b" only when the satisfaction obtained is higher, *i.e.*, $U_{ac} > U_{ab}$ whereas U represent utility. So that the probability of the a[th] respondent choosing c[th] alternative over b, from the choice set c, is given as

$$P_{ac} = Prob\ (U_{ac} > U_{ab}\ ) \text{ for all b in c, b}\neq\text{c} \quad (2)$$

$$P_{ac} = Prob\ (V_{ac} + \in_{ac} > V_{ab}\ + \in_{ab}) \text{ for all b in c, b}\neq\text{c} \quad (3)$$

When considering the b[th] alternative, V_b is known as representative component utility and it includes the observed and measured attributes for the individual. The marginal utility of each attribute is explained by the weights attached to them. It is shown in the following equation.

$$V_b = \beta_{ob} + \beta_{1b} f(X_{1b}) + \beta_{2b} f(X_{2b}) + + \beta_{cb} f(X_{cb}) \ldots\ldots\ldots\ldots\ldots \quad (4)$$

It is mandatory to satisfy the condition of Independence of Irrelevant Alternatives (IIA) to calculate selection probabilities in a choice model. According to Can and Alp (2012), IIA condition states that "the presence or absence of an additional alternative does not affect the ratio of the probabilities of choosing one alternative over another when all alternatives having a non-zero probability of choice are considered."

IIA assumption ultimately means that error terms are independently and identically distributed. An assumption on the distribution of the error term is vital to getting a meaningful expression for probabilities. Further, error terms have a Gumbell, Weibull, or double exponential distribution. It can be represented as

$$P_{ab} = \frac{\exp\ (V_{ab})}{\sum c=1 \exp(Vac)} \quad (5)$$

It is known as conditional logit model or multinomial logit model.

$$P_{ab} = \frac{\exp\ (V_{ab})}{\sum_{c=1} exp(V_{ac})} \quad (5)$$

3.2 Calculating a Willingness to Pay Value

Given one attribute is measured in monetary terms; Willingness to Pay (WTP) can be interpreted as a ratio of two parameters provided that all others held are constant. It is a mandatory requirement that both the attributes are statistically significant. Attribute measured as the monetary term should be used in the denominator in the equation. The WTP is the ratio of the coefficient of the attribute of interest and price coefficient (Birol and Koundouri, 2008).

$$WTP = \beta_C^{-1} ln \left| \frac{\varepsilon_a \exp\ (v_a^1)}{\varepsilon_a \exp\ (v_a^0)} \right| \quad (6)$$

Letting β_k represent the coefficient of any attribute from the above-mentioned equation, WTP can be stated as

$$WTP = -\frac{\beta_K}{\beta_C} \quad (7)$$

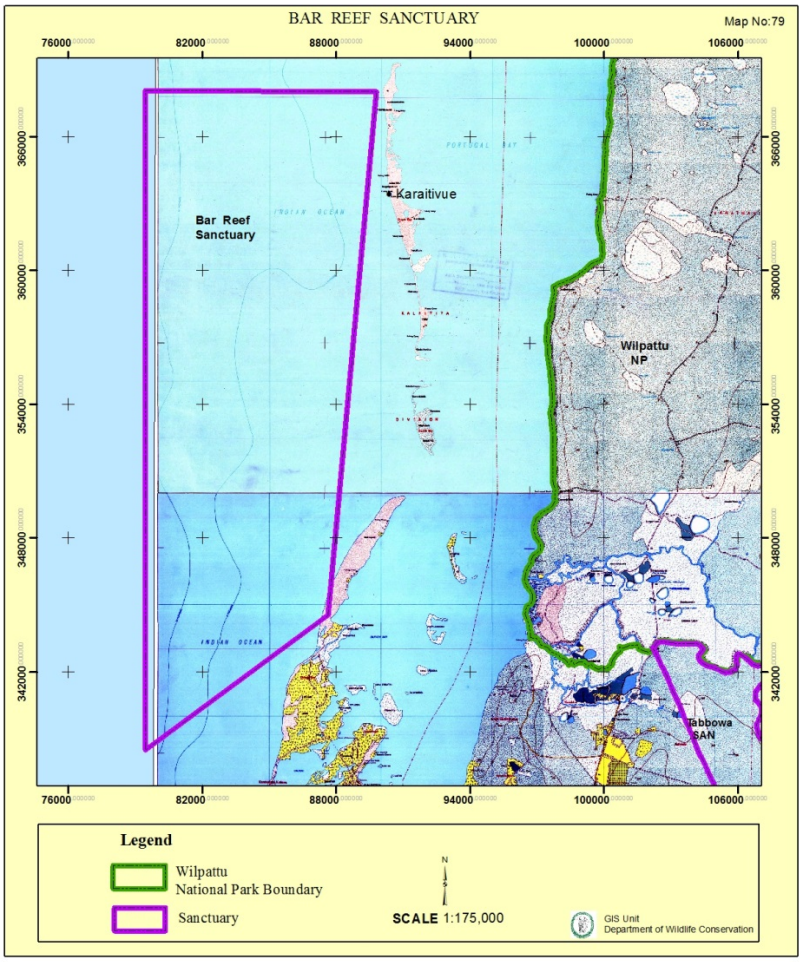
3.3 Main user Categories of the Bar Reef

The Bar Reef is fast becoming a tourism attraction and number of visitors to the area is increasing. Hence, a sample of visitors who traveled to the area for recreation during the study period was the focus of this study. Since fishing is the main occupation in the area, the main type of local resource users were fishers. Fishers are a user category whose livelihood is closely associated with the Bar Reef and also represents a significant share of the local population. Comparatively, other local users, such as divers and collectors, are few. Tourism is fast becoming an alternative source of income for residents in the area and there are around 25 hotels and guest houses in the area. In addition, there are unregistered free-lance boat operators and guides who offer services to the visitors.

3.4 Study Area

Bar Reef is found few kilometers away from the shores of Kalpitiya. It is a complex marine ecosystem consisted of near shore coral reefs, sea grass beds and associated ecosystem rich in biodiversity. There are 31 Grama Niladhari (GN) divisions (smallest administrative unit) in Kalpitiya Divisional Secretariat (DS). Only some of the GN divisions in the Kalpitiya DS area are equally dependent on the Bar Reef. Department of Wild Life Conservation charges LKR 20 for a local adult and US$20 for a foreign adult who wishes to enter the Marine Sanctuary. The map of Bar Reef Marine Sanctuary is presented in figure 1 below.

Figure 1. Map of Bar Reef Marine Sanctuary (Source: Department of Wildlife Conservation)



3.5 Data Sources

Primary data was the key source of information for the study. Visitors, the main user category of the recreation resources, were the target population. A sample of 250 visitors was selected using a random sampling method, and they were interviewed visiting local hotels, resorts, and beach areas. The other two main user groups, fishers and hotel owners were mainly included in the Key Informant Interviews and the focus group discussions. In addition, secondary data available from official sources (*e.g.*, Kalpitiya DS office, Department of Wildlife Conservation Regional office) and official documents (*e.g.*, Bar Reef Special Management Plan, Environmental Profile of Kalpitiya, Tourism Development Program for Kalpitiya area) and scientific literature on the Bar Reef and surrounding ecosystems were also consulted.

3.6 Data Collection Methods

Grama Niladhari divisions that are dependent on the Bar Reef were identified for data collection with the consultation of local stakeholders. Few key informant discussions were also held with a few local users of the Bar Reef that included fishers, hotel owners, boat operators and aquarium fish collectors. The data collection strategy was identified based on the information gathered from these interactions, and the survey was designed accordingly. Focus group discussions also were conducted in selected villages in the Kalpitiya peninsula. Since

the Choice Experiment Method was used in this study, the first step was to identify different attributes. In order to identify the attributes more precisely focus group discussions and Key Informative Interviews (KII) were held. KIIs were also held to gather qualitative information with local users that including fishers, hotel owners, boat operators, aquarium fish collectors, and local officers. Further, several field visits were conducted to identify the attributes more accurately. Thereafter pilot test was conducted to ensure the attributes selected were the most appropriate ones. Selected attributes and their levels are depicted in table 1.

Table 1. Different attributes and their levels

Attribute	Level I	Level II	Level III
Level of plastic and polythene accumulated	50% reduced plastic and polythene	25% reduced plastic and polythene	Current level of plastic and polythene
Use of illegal fishing nets	50% reduced illegal fishing nets	25% reduced illegal fishing nets	Current level of illegal fishing nets
Level of crowding in the beach	30% fewer people	15% fewer people	Usual number of people
Monetary contribution	LKR 1000	LKR 500	No additional contribution

Since there are four attributes and three levels, mathematically 4^3 or 64 combinations of different choice scenarios are possible. To perform this task more conveniently, an orthogonal main effect design was generated using SPSS 21 software, and then 9 choice cards were prepared, each having 4 different attributes. The number of random alternatives in each choice task was set to two, with a third fixed alternative corresponding to the status quo.

Several field tests and reviews were done to make sure the questions were clear and understandable. Additionally, the survey included different sections to collect socio economic information, on their perception on preservation issues, and on the choices made during the Discrete Choice Experiment section. An example of a choice set is presented in table 2.

Table 2. An example of the choice set used in the survey.

Attribute 1	Attribute 2	Attribute 3	Attribute 4	Choice
50 % reduced use of plastic	25% reduced use of illegal fishing nets	30% fewer people	No additional fee	1
50 % reduced use of plastic	50% reduced use of illegal fishing nets	Usual number of people	LKR 500 additional fee	2
25 % reduced use of plastic	Continue to use current illegal fishing nets	30% fewer people	LKR 500 additional fee	3
25 % reduced use of plastic	50% reduced use of illegal fishing nets	15% fewer people	No additional fee	4
25 % reduced use of plastic	25% reduced use of illegal fishing nets	Usual no of people	LKR 1000 additional fee	5
Current level plastic use	50% reduced use of illegal fishing nets	30% fewer people	LKR 1000 additional fee	6
Current level plastic use	Continue to use current illegal fishing nets	Usual no of people	No additional fee	7
50 % reduced use of plastic	Continue to use current illegal fishing nets	15% fewer people	LKR 1000 additional fee	8
Current level plastic use	25% reduced use of illegal fishing nets	15% fewer people	LKR 500 additional fee	9

Target population to the study was the visitors who come to the Bar Reef and data collection was done from January to August 2021. Random sampling was done, and 250 visitors were interviewed using a standard questionnaire.

4. Results

A value for each attribute was estimated using SPSS 21 software. The chi-squared estimated value for likelihood ratio implies that the model is significant at α 0.01. Also this model implies that null hypothesis which states that

there is no relationship between choice and the attributes can be rejected. The maximum likelihood estimates of parameter values and relevant statistics are mentioned in Table 3

Table 3. Results of conditional logit regression analysis

Parameter Variable	Estimate	S.E	*X2*	Pr>*X2*
Reduce plastic by 50%	0.651	0.173	14.253	0.000
Reduce plastic by 25%	0.266	0.181	2.158	0.142
Reduce Illegal nets by 50%	-0.04	0.174	0.001	0.982
Reduce Illegal nets by 25%	0.212	0.168	1.600	0.206
Reduce crowding by 30%	-0.068	0.156	0.193	0.661
Reduce crowding by 15%	-0.598	0.174	11.782	0.001
Pay Rs. 1000	-0.552	0.172	10.314	0.001
Pay Rs.500	-0.234	0.160	2.145	0.143

According to the above table, some parameter values are significant, and some are insignificant at α =0.01 level. Considering the reduction of plastic and polythene accumulation in the beach and the sea, reduction of plastic and polythene by 50% is significant at α = 0.01. However, reduction of plastic by 25% is not significant at the given probability level. Reduction of illegal fishing nets in fishery activities by 50% or 25% has not become a significant variable at the α = 0.01. Reducing the crowding in the beach area by 15% has become significant, whereas reducing the crowding by 30% in the beach area has not become a significant variable. Finally paying LKR 1000 has become a significant variable and paying LKR 500 has not become a significant variable.

According to the conditional logistic results depicted in the above table, regression equation can be presented as

Choice = -.552+ 0.651 reduce plastic by 50% - 0.598 reduce crowding by 15%

Marginal Willingness to Pay (MWTP) for reducing plastic by 50% is given by the negative value of the proportion between the coefficient of the attribute and the coefficient of the contribution.

MWTP = -(0.651/-0.552)
=LKR 1.179

Marginal Willingness to Pay value states that visitors are willing to visit this place if availability of plastic and polythene in the beach and sea can be reduced by 50%.

Similarly, MWTP can be calculated for crowding as well. Marginal Willingness to Pay for reducing the crowding of the beach by 15% is given by the negative value of the proportion between the coefficient of the attribute and the coefficient of the contribution.

MWTP = -(-0.598/-.552)
=LKR-1.083

Marginal Willingness to Pay value states that visitors are willing to visit this place if the crowding of the beach can be reduced by 15%.

5. Discussion and Recommendations

CEM is a flexible and practical method to evaluate complex tradeoffs between attributes. This paper aimed to scrutinize the robustness of the CEM approach to evaluate the visitor perception of the degradation of the Bar Reef Kalpitiya, Sri Lanka.

Further, reducing crowding by 15% has become a significant variable in this study, and the Marginal Willingness to Pay value for reducing crowding by 15% is LKR 1.083. According to the results of Lee *et al.* (2019), "restricting the daily number of visitors to 75% of the status quo will significantly improve the utility of the respondents". It ultimately depicts that both these studies, which are based on coral ecosystems have similar attributes in terms of significance.

Moreover, the paying LKR 1000 is positive and significant at ∞=0.01. This result is also similar to the results obtained by Lee *et al.* (2019) in the Kenting coral ecosystem, *i.e.*, the t value of "coral reefs conservation

fund" is negative and significant at the 1% level. It indicated that the visitors would gain less utility from the coral ecosystem if the contribution increased.

Ecosystem degradation, as evident in Bar Reef Marine Sanctuary, is common in many protected areas in other countries as well. According to Can and Alp (2012), the Göcek Bay area in Turkey although declared a protected area is polluted due to excessive boat tourism and a lack of efficient policies. Authors have used a CEM study to investigate the amounts that local residents and tourists are willing to pay for improved water quality and improvement in marine life.

Wattage *et al.* (2005) has mentioned that increasing sustainable yields, maintaining regional employment, and reducing conflict between fishers using towed and fixed gear are the most common attributes in evaluating the importance of fisheries management objectives. Kalpitiya being an important fishing destination has to be managed sustainably and in order to achieve this task, proper awareness must be made to protect the reef. Sea cucumbers, Lobsters, and Chanks were said to be drastically reduced due to over-harvesting.

Wattage *et al.* (2011) have examined the value held by the Irish public to protect deep-sea corals using CEM, and have arrived at a result to ban trawling in a Marine Protected Area, protect all areas with corals, and pay a tax of € 1per annum. In Sri Lankan context as a developing country, although people are not willing to pay taxes, they have expressed the view to ban Laila nets which creates similar problems to trawling.

Species conservation should be a priority in any marine protected area. Hence turtle conservation, which is practiced at present but not promoted as a conservation activity, needs to be promoted with immediate effect to protect valuable species. Proper awareness campaigns should be conducted to minimize waste disposal by visitors.

Norochcholei thermal power plant which is located 41.1 km away has created some negative effects on the environment. Mainly when unloading coal, it contaminates seawater. No research has been done to estimate the impact. Further, coal dust has created a severe impact on the people who are engaged in agricultural activities. Therefore, it is recommended to conduct research to examine the impact of the coal power plant on the associated ecosystem.

The coral reef has been significantly damaged and bleached. Further, there is accumulated garbage on the reef mainly plastic. Plastic water bottles carried into the sea by the fisherman have been minimized by the department by imposing a rule so that they cannot carry water containers less than 5 liters. Moreover, some beach areas are severely polluted by polythene and plastic so that it is strongly recommended to conduct reef cleaning programs to protect these valuable resources.

Mangroves are a part of the Bar Reef ecosystem and hence there is a need to protect mangroves as well in order to create a sustainably managed Bar Reef Marine Sanctuary. However, mangrove destruction is still present in this area for fencing, prawn farming, and illegal trespassing. Therefore, it is strongly recommended to closely monitor to avoid the above-mentioned activities.

Conclusion

This research has attempted to investigate the reasons for the degradation of the Bar Reef Marine Sanctuary due to natural and anthropogenic reasons. The main attributes used in this study were reducing plastic and polythene, reducing illegal fishing nets, and reducing crowding in the beach areas, pay LKR 500 and 1000. It was evident from the results that significant variables at $\alpha = 0.01$ were reduce plastic by 50%, reduce crowding by 15% and pay LKR 1000. It was evident from the MWTP values that visitors are willing to visit this place if availability of plastic and polythene in the beach and sea can be reduced by 50% and reduce the crowding of the beach by 15%. The results of this study will be important to the policy makers so that they can bring more rules and regulations to reduce the accumulation of plastic and improve sustainable management. It is also needful to consider that visitors prefer a less crowded beach than what they see at present.

Other attribute although was not significant the illegal fishing nets is a major problem and needed to be addressed by the policy makers. If the sample size could be increased the variable might be significant. However, the results of the model that was employed in this analysis depicts that it is a successive effort.

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Chamathi Tharanga Jayaratne: Conceptualization and writing: original draft
Premachandra Wattage: Supervising and guiding original draft.

Prasanthi Gunawardena: Supervising and guiding original draft.

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.

References

[1] Aas, Ø., Haider, W., and Hunt L. 2000. Angler responses to potential harvest regulations in a Norwegian sport fishery: a conjoint-based choice modeling approach." *North American Journal of Fisheries Management*, 20(4): 940-950.

[2] Adamowicz, V., and Boxall, P. 2001. Future directions of stated choice methods for environment valuation. *Choice experiments: A new approach to environmental valuation, London* (2001): 1-6.

[3] Adamowicz, W., Boxall, P., Williams, M. and Louviere J. 1998. Stated preference approaches for measuring passive use values: choice experiments and contingent valuation. *American journal of agricultural economics*, 80(1): 64-75.

[4] Ahmed, M., Chong, C. K. and Cesar, H. 2004. *Economic valuation and policy priorities for sustainable management of coral reefs*. WorldFish.

[5] Ahmed, M., *et al.* 2007. Valuing recreational and conservation benefits of coral reefs—The case of Bolinao, Philippines. *Ocean and Coastal Management*, 50(1-2): 103-118.

[6] Armstrong, C. W., Aanesen, M., van Rensburg, T. M. and Sandorf, E. D. 2019. Willingness to pay to protect cold water corals. *Conservation Biology*, 33(6): 1329-1337.

[7] Birol, E., and Koundouri, P. eds. *Choice experiments informing environmental policy: a European perspective*. Edward Elgar Publishing, 2008.

[8] Brander, L. M., Van Beukering, P. and Cesar, H. SJ. 2007. The recreational value of coral reefs: a meta-analysis. *Ecological Economics*, 63(1): 209- 218.

[9] Can, Ö. and Alp, E. 2012. Valuation of environmental improvements in a specially protected marine area: A choice experiment approach in Göcek Bay, Turkey. *Science of the Total Environment*, *439*: 291-298.

[10] Carson, R.T., *et al.* 1994. Experimental analysis of choice. *Marketing letters*, *5:* 351-367.

[11] Cavalletti, B., Corsi, M. and Lagomarsino, E. 2021. Marine Sites and the Drivers of Wellbeing: Ecosystem vs. Anthropic Services. *Sustainability*, 13(22): 12568.

[12] Cesar, H. S., and van Beukering, P. (2004). Economic valuation of the coral reefs of Hawai'i. *Pacific Science*, *58*(2): 231-242.

[13] Cesar, H. SJ. 2002. *Coral reefs: their functions, threats and economic value.*

[14] Coast Conservation Department (2007), Coastal Environmental Profile: Kalpitiya Special Management Area, Sri Lanka.

[15] Costanza, R., *et al.* 1997. The value of the world's ecosystem services and natural capital. *nature*, *387*(6630): 253-260.

[16] Davis, K. J., *et al.* 2019. Eliciting public values for management of complex marine systems: an integrated choice experiment. *Marine Resource Economics*, *34*(1): 1-21.

[17] Department of Wildlife Conservation, Sri Lanka (2020), Management Plan: Bar Reef Marine Sanctuary 2020-2025

[18] Dixon, J.A. 1998. Economic values of coral reef: what are the issues? *Coral reefs: challenges and opportunities for sustainable management. World Bank, Washington*, 157-162.

[19] Dixon, J. A., Scura, L. F. and van't Hof, T. 1995. Ecology and microeconomics as 'joint products': the Bonaire Marine Park in the Caribbean. In *Biodiversity conservation: problems and policies*, pp. 127-145. Dordrecht: Springer Netherlands.

[20] Green, P. E., and Srinivasan, V. 1978. Conjoint analysis in consumer research: issues and outlook. *Journal of consumer research*, 5(2): 103-123.

[21] Hodgson, G., and Dixon, J. A. 1988. Logging versus fisheries and tourism in Palawan: An environmental and economic analysis.

[22] Hundloe, T. J., and Miller, G. 1987. *Environmental impacts of tuna projects*.

[23] Jayasekara, KD De S., Gunawardena, U. A. D. P. and Rajapaksa, D. 2019. Valuing the Hikkaduwa Coral Reef: An Application of the Zonal Travel Cost Method. In *Proceedings of International Forestry and Environment Symposium*. 2019.

[24] Lane, D. R., *et al.* 2013. Quantifying and valuing potential climate change impacts on coral reefs in the United States: Comparison of two scenarios. *PloS one*, 8(12): e82579.

[25] Lara-Pulido, J.A., *et al.* 2021. A business case for marine protected areas: economic valuation of the reef attributes of Cozumel Island. *Sustainability*, 13(8): 4307.

[26] Laurans, Y., *et al.* 2013. Economic valuation of ecosystem services from coral reefs in the South Pacific: Taking stock of recent experience. *Journal of environmental management*, *116*: 135-144.

[27] Lee, C.-H., Chen, Y.J. and Chen, C. W. 2019. Assessment of the economic value of ecological conservation of the kenting coral reef. *Sustainability*, 11(20): 5869.

[28] Leisher, C., *et al.* 2007. Nature's investment bank: how marine protected areas contributed to poverty reduction.

[29] Mariel, P., *et al.* 2021. *Environmental valuation with discrete choice experiments: Guidance on design, implementation and data analysis* (p. 129). Springer Nature.

[30] Mous, P., *et al.* 2000. Cyanide fishing on Indonesian coral reefs for the live food fish market-what is the problem. *Collected essays on the economics of coral reefs. Kalmar, Sweden: CORDIO, Kalmar University,* 69-76.

[31] Mumby, P. J., and Steneck, R. S. 2008. Coral reef management and conservation in light of rapidly evolving ecological paradigms. *Trends in ecology and evolution*, *23*(10): 555-563.

[32] Ngoc, Q. T. K. 2019. Assessing the value of coral reefs in the face of climate change: The evidence from Nha Trang Bay, Vietnam. *Ecosystem services*, *35*: 99-108.

[33] Öhman, M.C., and Rajasuriya, A. 1998. Relationships between habitat structure and fish communities on coral. *Environmental biology of fishes*, 53: 19-31.

[34] Öhman, M.C., and Cesar, H.SJ. 2000. Costs and benefits of coral mining. *Collected essays on the economics of coral reefs. CORDIO*, 85-93.

[35] Pakalniete, K., *et al.* 2021. Economic valuation of ecosystem service benefits and welfare impacts of offshore marine protected areas: A study from the Baltic Sea. *Sustainability*, *13*(18): 10121.

[36] Parsons, G. R., and Thur, S.M. 2008. Valuing changes in the quality of coral reef ecosystems: a stated preference study of SCUBA diving in the Bonaire National Marine Park. *Environmental and Resource Economics*, 40: 593-608.

[37] Pendleton, L. H. 1995. Valuing coral reef protection. *Ocean and Coastal Management*, 26(2): 119-131.

[38] Pet-Soede, C., Cesar, H. S., and Pet, J. S. 1999. An economic analysis of blast fishing on Indonesian coral reefs. *Environmental conservation*, *26*(2): 83-93.

[39] Pollnac, R. B., *et al.* 2000. Unexpected relationships between coral reef health and socio-economic pressures in the Philippines: ReefBase/RAMP applied. *Marine and Freshwater Research*, 51(5): 529-533.

[40] Rajasuriya, A. R. J. A. N. 2002. Status report on the condition of reef habitats in Sri Lanka, 2002. *Coral reef degradation in the Indian Ocean*, 139.

[41] Rajasuriya, A. R. J. A. N., and Karunarathna, C. H. A. M. I. N. D. A. 2000. Postbleaching status of the coral reefs of Sri Lanka. *CORDIO status report*.

[42] Rajasuriya, A., and White, A.T. 1995. Coral reefs of Sri Lanka: review of their extent, condition, and management status. *Coastal Management*, 23(1): 77-90.

[43] Rani, S., *et al.* 2020. Economic valuation and conservation, restoration and management strategies of Saint Martin's coral island, Bangladesh. *Ocean and Coastal Management*, *183*, 105024. *Economics*, *40*(4): 593-608.

[44] Ryan, M. 1996. *Using consumer preferences in health care decision making: the application of conjoint analysis*. No. 000420. Office of Health Economics.

[45] Shen, M., *et al.* 2019. The social costs of marine litter along the East China Sea: Evidence from ten coastal scenic spots of Zhejiang Province, China. *Sustainability*, 11(6): 1807.

[46] Spash, C. L. 2000. Assessing the benefits of improving coral reef biodiversity: the contingent valuation method. *Collected essays on the economics of coral reefs,* 40-54.

[47] Spurgeon, J. PG, and Lindahl, U. 2000. Economics of coral reef restoration.

[48] Spurgeon, J.PG. 1992. The economic valuation of coral reefs. *Marine pollution bulletin,* 24(11): 529-536.

[49] Subade, R. F. 2007. Mechanisms to capture economic values of marine biodiversity: The case of Tubbataha Reefs UNESCO World Heritage Site, Philippines. *Marine Policy*, 31(2): 135-142.

[50] Wattage, P., *et al.* 2011. Economic value of conserving deep-sea corals in Irish waters: a choice experiment study on marine protected areas. *Fisheries Research*, *107*(1-3): 59-67.

[51] Wattage, P., Mardle, S., and Pascoe, S. 2005. Evaluation of the importance of fisheries management objectives using choice-experiments. *Ecological Economics*, *55*(1): 85-95.

[52] Westmacott, S. 2000. *Management of bleached and severely damaged coral reefs*. IUCN.

[53] Wielgus, J., *et al.* 2002. Dose–response modeling of recreationally important coral-reef attributes: a review and potential application to the economic valuation of damage. *Coral Reefs*, 21: 253-259.

[54] Wilkinson, C. CR. 2004. *Status of coral reefs of the world: 2004*. Australian Institute of Marine Science.

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Promoting Albania's Tourist Attractions: Tourist Guides and Marketing Strategies for the Successful Management of Tour Groups

Gjokë ULDEDAJ
Department of Business Management, Faculty of Economics,
Qiriazi University College, Albania
president@qiriazi.edu.al

Edlir ORHANI
Department of Business Management, Faculty of Economics,
Qiriazi University College, Albania
edlir.orhani@qiriazi.edu.al

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Abstract: Currently, Albania is a growing destination for foreign tourists because the country offers diverse natural, cultural, historical, and spiritual sites. Thanks to the contribution of national and foreign archaeologists, who have shed light on the rich Albanian archaeology, these sites have today received the designation of tourist destinations. However, the current situation does not reflect the full potential of Albania in this field because the country has many more discovered areas that need to be brought to light and promoted. Just as there are, a significant number of historical and cultural objects need to be treated and revived according to the standards of the time. Likewise, there is a need for the tourist guides to find new ways of marketing while leading and guiding the groups of tourists. The purpose of this study is to highlight the problems of promoting tourist attractions and handling cultural objects as well as to suggest new alternatives that are more efficient and compatible with the demands of the time. The methodology used in this research is a combination of qualitative and quantitative methodology. Specifically, for data collection, the main instruments used are a semi-structured interview and a focus group. Also, we have tried to extract data from tourist subjects, the institute of monuments and representatives of the tourism community, through which we have managed to draw conclusions and suggestions. The analysis of the data obtained in this study highlights the urgent need for a new and moderate conception and attitude for the strategy of promoting Albania's tourist attractions. The Albanian monuments of cultural heritage, as a precious asset, should take a special importance in the life of the country, through the functional promotion that becomes part of the life of its own citizens.

Keywords: cultural tourism; tourist attractions; tourist guide; management of cultural monuments; revitalization of cultural heritage.

JEL Classification: Z32; R11.

Introduction

This research focuses on the current demand for effective strategies on the management and especially the promotion of cultural heritage works, seeing this as a basic element to develop a sustainable cultural tourism. In recent years, a tourist movement has been noticed in Albania, which is increasing from year to year. Part of this movement is also the cultural tourism movement, which occupies the main place in the general tourism agenda in our country. For this purpose, our study focuses on the analysis and evaluation of tourism developments to identify problems as well as to argue the need to review and design more effective strategies in our tourism services.

The study was implemented through the qualitative and quantitative approach of scientific research, mainly through interviews with focus groups, but also with individuals. For this purpose, the instrument was built with seven basic questions related to the purpose and objectives of the scientific investigation. This instrument was constructed as an open-ended guide to generate and stimulate discussion about tourism experiences and

practices in Albania. The findings of this study coincide with the findings of many similar studies conducted in other countries that have consolidated experiences in this direction.

Currently, the interest in touristic Albania has been manifested in all dimensions, especially during the year 2023, and a historical record is foreseen until the end of this year. Consequently, such an increasing figure of the tourist movement means even more visitors to the country's cultural monuments. If we refer more specifically to the official data of the Ministry of Tourism and Environment (2023), they speak of a 67% increase in tourists to these monuments in June 2023, compared to the same period a year ago. So, the first six months of 2023 marks a total increase of 53% in the number of visitors to cultural monuments compared to the same six-month period of the previous year. The most visited objects in the country are the archaeological parks and the historical-cultural monuments, which have also recorded record revenues. The Castle of Gjirokastra has the largest number of visitors, followed by the Archaeological Park of Shkodra, the Archaeological Park of Butrint, and the Durrës amphitheater. More specifically, Gjirokastra Castle was visited by 50.6 thousand visitors in the first six months of the year, twice as much compared to the same period in 2022. Shkodra Archaeological Park, 53 thousand visitors or 30% more visitors in January-June 2023, compared to the same period a year ago. Butrint Park in January-June was visited by at least 37.2 thousand tourists, mainly from elite groups, a category which pays a lot of attention. The Amphitheater of Durrës had nine thousand visitors, with an increase of 64%, compared to the first 6 months of 2022 (Maho 2023).

The year 2023 is defined by the Albanian authorities as "the year of the tourist boom", but regardless of this growing trend, to ensure a sustainability and further growth of the tourist movement, first, it would be good to make an assessment of it from all administrative structures to record what went well and where the deficiencies are, or what can be corrected in accordance with international standards. Secondly, we think that it is worthwhile to work for awareness to create a new concept, especially for cultural tourism and its development. Third, concrete measures should be taken to align the treatment and management of our cultural heritage works with the standards of developed countries. Referring to international practices, there are many examples of the integration of cultural heritage in socio-economic development. Examples include urban and rural, national and local spaces in both industrialized and developing countries such as in England, European Union countries, Canada, Australia, Japan, Middle Eastern countries, North African countries and others (World Bank, 2001). However, referring to the researchers (Trautmann, *et al.* 2005), we must emphasize that the cultural heritage, treated in terms of development, still remains an area that needs further research both theoretically and practically.

1. Literature Review

At the end of the 20th century, specifically in 1999, the concept of cultural heritage, given by UNESCO (2003) and accepted internationally, includes material and non-material cultural heritage, as well as the environment. In recent heritage publications, explanations of this concept are evident in the spatial context (in relation to place, leisure and tourism) and in historical reality, national identity, planning and conservation, formal and informal education, business and modelling. According to researchers in this field (Yahaya 2006), the most characteristic elements of inheritance are elasticity and dynamism. What makes heritage resilient is the fact that, in its broad sense, it includes "*everything that is inherited from the past*", and in the narrow sense, it includes what has historical and cultural significance. Other definitions define culture as contemporary purposes of the past, or that part of the past which we have selected in the present for contemporary purposes, whether economic, cultural, political or social (UNESCO, 2003).

According to Colin Michael Hall and Mc Arthur (1996), four main heritage values are identified: economic values, which are related to the generation of income that comes to a country as a result of the use of this heritage for tourism and recreation purposes; social and cultural values, which are expressed in a person's strong spiritual connection with the country and his identity at the local and national level; scientific and educational values, which are expressed in the transmission of cultural values from one generation to another, to better understand the high cultural level that characterizes the period of their construction; and political value, which is expressed through the use of cultural heritage and the values it contains by politicians to promote their historical values and national identity.

A more complete definition of cultural heritage has been given by the Japanese researcher Tolina Loulanski (2006a), according to which cultural heritage includes aspects of material culture - sites, buildings, landscapes, monuments and objects, as well as immaterial (spiritual) culture. The idea that the recognition and preservation of cultural heritage can be economically beneficial goes back to 1970, when the UNDP and the World Bank began to provide funds for the protection of building environments and the development of

handicrafts, justifying them in purely economic terms. Cultural heritage is increasingly recognized as a public good (Rypkema 1999). While, in the non-economic evaluation, cultural heritage is considered as a value for education and awareness, cultivation of identity, social cohesion, development of human potential as well as preservation and transmission to future generations. While some researchers (Hall M. *et al.* 1996) view the valuation of cultural heritage in economic terms with risk, others try to provide methods to demonstrate the potential benefits. But good management is key for cultural heritage to be used for development purposes. For this, the World Bank points out that cultural heritage can increase values, can reap benefits, while assets are effectively preserved. Far from being only a liability for national budgets, heritage is increasingly becoming an "*added value*". This means that a somewhat different concept must be created for tourism in general, and for cultural tourism in particular.

The World Tourism Organization (WTO) defines tourism as the activities of individuals during their travel and stay in a country outside their usual place of residence, in a period of less than one year, for leisure, business or other purposes (WTO, 2010). In this view, the European Organization of Tourism and Leisure (ATLAS) describes cultural tourism as the movement of people towards cultural attractions, away from their place of residence, in order to gather information and experiences to satisfy the needs of their cultural. Researcher Catherine Trautmann (1994) points out that cultural tourism is not only cultural heritage tourism. Cultural tourism works as a network. Indeed, it includes types of art, such as dance, music, theatre. Thus, cultural tourism can be seen as the visit of people from abroad motivated in whole or in part by the hospitality of the community, with an interest in the historical, artistic, scientific heritage or lifestyle offered by a community, a region, a group, or an institution. The increasing inclusion of culture in tourism as a basic component for the tourism industry is a change that has led many authors to suggest that the current growth of cultural tourism is something "*new*" and qualitatively and quantitatively different from the cultural tourism of Grand Tour. However, guided tours can be more effective if they are part of a long-term dynamic process (Burrai *et al.* 2023).

There are several ways in which people conceptualize tourism and do tourism. Theresa Rappensperger (2023) says that, for her, tourism is when she is offline and is skiing or hiking in the mountains. Meanwhile, Kevin Eagan (2024) sees tourism as connected to technology. He indicates that important technological developments, such as artificial intelligence (AI) and green technology, are going to impact the tourism industry through 2024, resulting in beneficial outcomes for travellers, hotels, hosts, vacation rental leaders, OTAs, and other tourism businesses that can forecast future growth (Eagan 2024). Cultural tourism is also undergoing changes in both terms: in the way in which tourists consume culture and in the way in which culture is offered for tourist consumption. Cultural tourism has repeatedly been identified as a powerful economic and social resource, a development asset that can be used as a catalyst for local development, provide employment, generate income, revitalize urban and rural spaces, protect of the environment and the strengthening of social communities (Richards 1996). Forecasts show that investments in cultural heritage will increase even further, making it the most important product of the 21st century, determining the future of communities (Willmott, *et al.* 2001). This means that cultural tourism is part of sustainable development, along with the other three components, economy, society, and environment. Numerous social and economic benefits can be achieved from its appreciation and protection. According to Japanese researcher Loulanski (1996b), attention and debates between theorists and practitioners should focus not so much on the question of "*if*" but on the question of "*how*" cultural heritage, tourism and development can be successfully integrated in a sustainable manner?

2. Research Methodology

As mentioned above, the methodology we use to elaborate on this topic is mainly qualitative methodology. For data collection, the main instrument is a semi-structured interview with a focus group. But in order to provide sufficient data and to help in understanding the current tourist situation in our country, we also used some ready statistical data obtained from the Portal of the Ministry of Tourism and Environment of Albania.

3. Purpose of the Study

The purpose of the study is to help create a clear and more complete vision for the management of our cultural heritage, seeing this in relation to the new situation of the tourist movement in general and cultural tourism in particular.

4. Objectives of the Study

- To assess the current state of how cultural heritage is treated and promoted.

- To highlight the problems that tourist attractions are facing today and to contribute in any way to overcoming them.
- To suggest new innovative ideas for the treatment and promotion of tourist attractions according to the standards of the time.
- To give orientations on the enrichment of typologies and marketing alternatives of these attractions.
- To give suggestions and solutions, for the quality of performance, with tourist groups during the development of guides and the practice of historical and cultural tourism.
- These ideas should be put to the function of institutions or subjects, which deal with hospitality tourism.

5. Limitations and Limitations of the Study

Regardless of the results, this study has some limitations that should be addressed in future research in the field of cultural heritage management strategies. First, this study is not a purely longitudinal study, nor does it aim to get inside the problem it deals with. Second, the study did not extend to a generalizing sample and did not touch many variables of the relationship of cultural heritage with cultural tourism. Thirdly, the study did not include all the target regional territories of our country, but only in a limited sample of 54 visiting subjects and managers or specialists of some of the most important territories of our cultural heritage. Also, in the study, no other method of expanding information was used to ensure comprehensive benefits, except for the focus group method and some statistical data.

6. Ethical Issues

First, the subjects were informed of the request to be part of the study as well as their informed consent. Also, the participants were made aware of the importance of confidentiality, which includes not disclosing any information brought up during the focus group discussion. Likewise, before the focus group interview, respect for the diversity of everyone's thoughts, perspectives and experiences was requested, as a high ethical consideration in a group communication.

7. Data Collection and Analysis

Based on the concept of Krueger and Casey (2000), the collection and analysis of data is put at the service of realizing the purpose of the study. For this reason, our analysis also went through meaningful units of identification, coding these units in relation to the context, goals and objectives of the study. This procedure is known as the “open coding process” in the literature (Berg 2001). Also, the data were coded in terms of the frequency of mention of terms by the participants, for similar terms for the same or similar purpose questions (Gough and Madill 2008).

The coding process went through a comparative phase in a comparative axial axis, evaluating and repairing the data several times to understand differences and similarities, obtaining issues related to the study participants' interpretation of the topic while converging with the goals and study objectives. The data analysis of this study is presented in three tables, which summarize the demographic data in (Table 1), the most frequent citations from the data collection, the coding of terms and the classification of conceptual categories in (Table 2), and in (Table 3) where conceptual indicators of classifications are listed as findings and conclusions of the study, whenever in accordance with the purpose and objectives of this study.

Table 1. Presentation of demographic data

No. of participants	54 subjects
Gender	40 (M) and 14 (W)
Age	39 – 61 years old
Schooling	Highier and medium education
Time period	May- September 2023
Citizenship	40 foreigners and 14 Albanians
Region	Tirana, Berat, Korça, Gjirokastra, Saranda

Comment: The table above presents demographic data of the subjects that were part of this study. More specifically, subjects (40 men and 14 women) were activated in the study. Of them, 40 have Italian citizenship and 14 have Albanian citizenship. 5 focus group interviews were conducted (4 interviews with Albanians, who were employees and specialists in the Regional Directorates of Culture as well as operators of tourist agencies, while 1 interview was conducted with Italian tourists during a 5-day tourist itinerary that they conducted in Albania during the year 2023). The data were collected in regions such as Tirana, Berat, Korça, Gjirokastra, and Saranda.

Table 2. Citations, indicators, codes

Citations	*Indicators*	*Codes*
I had other thoughts about Albania and its cultural heritage.	Country image	The tourist movement has a strong influence on the growth of the image of a country.
I changed my opinion about cultural tourism and its real values, that's why I practice it.	Cultural heritage	Monuments of material culture (medieval castles, arched bridges, museums and others) and monuments of immaterial culture (Folk costumes and traditional clothing, customs and ceremonial rites, traditional songs and dances, traditional cooking and serving food and others).
Tourism satisfies my interests when it is well directed and managed.	Management strategy	There is a need for effective strategies in the management of cultural heritage.
I think cultural tourism is at the top of the list. We want to see as many concrete things as possible and not too many stories.	Cultural tourism	Tourist movement towards a country or region to get to know the culture, history, art, architecture, religion and other elements that have helped in the way of life.
The tourist movement is more oriented towards cultural monuments, but I want to practice other innovations of tourist activities.	Cultural ecotourism	Tourist activities for flora and fauna, intertwined with material and spiritual cultural heritage.
The tourist movement is more oriented towards cultural monuments, but I want to practice other innovations of tourist activities.	GIS technology	GIS, Information Device (digital geo-information), which serves all tourists, to get a detailed information on cultural objects as well as the identification of their location, planning well and faster their tourist tour.
I practice more cultural Ecotourism. I want to explore nature, its beauties and values as much as possible.	Typology of tourist activities	Development of diverse tourist activities that practice the sport of skiing, tourist trips with special cars, walking or horseback in groups to areas with natural wealth: characteristic rivers, karst caves, waterfalls and others.
I practice tourist movements with groups, walking or horseback to areas that are far from large urban centres.		

The analysis of qualitative data in this study, in order to arrive at assessments and conclusions, has been subjected to a long process of deductive reasoning, passing the stages of de- contextualization, dividing the quotes into small units of meaning. In the re-contextualization phase, checking that all aspects of the content are related to the purpose of the study (Burnard, 1991). From the analysis of the quantitative data that we were able to provide from the Portal of the Ministry of Tourism and Environment, it is noted that in the last three years there is an increase in the tourist movement in all its indicators. Thus, more specifically, in Albania, there are 621 tourist agencies distributed throughout the territory, 222 tourist operators and 522 tourist guides. If we refer to the data below (Graphic 1), we must emphasize that from 2021 the number of certified national and local tourist guides has increased.

Table 3. Certified tourist guides during the years 2021-2023

Year	For national category	For category local	Total
2021	35	6	41
2022	54	2	56
2023	118	6	124

Graphic 1. Certified tourist guides during the years 2021-2023.

Comment: From the analysis of quantitative data, we come to the conclusion that the tourism movement of recent years increases the responsibility of the institutions that deal with its management to show continued care not only for the expansion and extension of tourist units throughout the territory of the country, but also to increase the care for increasing the quality of the tourist service by the subjects and operators through their training and licensing.

Table 4. Summary table of study findings

The value	The codes
Reflection in thought	The tourist movement affects the thinking and attitude differently.
Vision for the future	The tourist movement affects the growth of the country's image, opens development perspectives.
New management strategies	The tourist movement influences the increase of care for the cultural heritage, draws up development, monitoring and management plans.
Increasing professionalism	The tourist movement affects the increase of professionalism to increase the quality of services to tourists.
Social/economic benefits	The tourist movement affects the increase in employment and income level.
Other material benefits	The tourist movement affects the improvement of tourist infrastructure and information technology.
Enriches promotional ability	The tourist movement affects the improvement of promotional experiences, enlivens the regional market.

8. Study Findings and Their Discussion

Based on the growth of the tourist movement in the Albanian reality in recent years, and based on the analysis of the data and facts that we have been able to provide, we are listing the findings of our research as follows:

The first finding is related to the fact that in recent years in Albania, especially during the year 2023, a "boom" of the tourist influx has been observed, and all the actors involved in it have begun to reflect, thinking somewhat differently to understand the usefulness of this movement and to take measures to ensure that this trend remains sustainable and develops further in the years to come. What stands out is that in today's Albania, the tourist movement is more oriented towards cultural tourism. The interviewees emphasize that, in the years we have left behind, we have lacked a clear vision for cultural heritage and continued care for it. In this direction, there have been shortcomings not only in terms of the concept for the development of cultural heritage and especially in terms of its treatment or management, but also in legal aspects, since many problems that our heritage has encountered have not been found solution due to vacuums or legal loopholes. In this view, the Law on Cultural Heritage (2003), although it is a relatively new law, it has become more than necessary to reformulate it in order to help and orient it concretely in solving the many problems that our heritage has faced. Regarding the improvement of the Law on Inheritance, not only our specialists, but also international organizations such as ICOMOS and others should be invited to contribute. In recent years, the Albanian government has drawn up and approved a series of laws, by-laws and instructions in record time, but the truth is that many of them have been defective both in content and in technical terms.

The second finding is related to the fact that the network of state institutions that are responsible for our cultural heritage, so far has not functioned well, and has not been able to protect and manage it properly. In this

direction, remarks and suggestions have also been made by foreign experts regarding the deficiencies in human resources as well as efforts to preserve its values during the implementation of restoration projects. According to our specialists, in this regard, it was better to work only in the historical centres of Berat and Gjirokastra, where restoration interventions were made within normal parameters, and this came from the fact that they were monitored by UNESCO specialists. We emphasize this fact since the preservation of cultural monuments as well as restoration interventions are among the main commitments of the actors involved in the management of cultural heritage. From the monitoring of the current state of the management of cultural monuments in the area of our study, in recent years it has been noticed the increase in the interest of our actors as well as many foreign organizations involved in the process for the protection of monuments in areas with rich heritage such as and increasing the number of projects for the restoration of damaged buildings during the transition years.

The third finding is related to the fact that local government institutions are becoming aware of the importance of drafting concrete plans in rural areas to manage cultural heritage in their territory. In this regard, the main responsibility falls on the local government itself, because its structures have not been seriously engaged in properly presenting the real values of works or objects of cultural heritage in their community, or in the general public and especially in the clientele tourist income. In addition, during the years of transition that Albania is going through, the lack of qualified personnel in the Regional Centres of Culture has been noticed. In fact, in the Regional Directories of culture, there were not enough and genuine specialists (administrators, architects, restorers, historians, translators or cicerones, etc.) to deal concretely with the administration of the cultural heritage and especially with the promotion of its values. In addition, their absence has made the work to educate the public and especially the young generation with the historical and original values of our people, referring to the cultural monuments or visiting the works of our cultural heritage for this purpose. In the same way, the interaction with the main consumers of culture, such as schools, different tourist operators, public and private, as well as planned educational activities in school curricula, has been missing.

The fourth finding is related to the fact that the tourist movement has influenced the improvement of the tourist infrastructure. In this direction, in addition to investments for the development of tourist capacities (hotels, bars, restaurants, etc.), the training of staff has become necessary, as actors of the services offered by tourist agencies and all tourist structures. These trainings aim to increase the quality of services related to food serving, hotel services, reception, communication in foreign languages and more. Likewise, Tourist Houses, especially in cultural centres, are being encouraged to advertise their traditional products, in order for tourists to see what is offered to them, especially tourists interested in the typical cuisine of all regions. Regarding hotels, under the pressure of the tourist movement, the tendency to increase their capacity and the extent of attendance throughout the year is being observed, improving the quality of services.

The fifth finding has to do with the fact that, in recent years, Albania has begun to pay more attention to the improvement of information technology in the management of cultural heritage, using modern technology, such as the use of GIS technology, which assists in the management of cultural heritage through the creation of geo-information, which is digital information that helps management actors to more easily locate damaged objects and the values they contain. Also, this information serves all tourists, domestic and especially foreign ones, who have the cultural one as the main motivation of the tourist movement. The ease of use of this geo-information gives them the opportunity to get detailed information on cultural objects as well as their location, planning their touristic tour well and faster.

The sixth finding is related to the fact that we have started gaining new experiences in relation to the promotion of cultural heritage through the organization of holidays, events, fairs by local enterprises, both in urban areas and in rural areas. This affects the stay of tourists for a longer time and consequently, their expenses would be higher. In this way, the local population is encouraged or motivated to be an active participant in the organization of cultural events in the area and beyond, presenting traditional products. Likewise, community participation in the promotion of cultural heritage and the design of development strategies at the local and regional level has begun to be valued more and more, becoming the main beneficiary of the development of regional cultural tourism.

The seventh finding is related to the increase in the number of tourist agencies, which have begun to promote local cultural tourism attractions, including them not only in one-day excursions, but also in tourist packages with longer stays, where the development of guides is also practiced in deep rural areas. This fact is positive, since in recent years, thanks to these initiatives, the licensing process has also begun for the employees of these agencies. This affects the increase of knowledge and quality in tourist services and satisfying the interests of local tourists, but above all foreign ones. Through national and local tourist guides, more space and territorial extension has begun to be given to the tourist movement and the promotion of these attractions.

The eighth finding shows that not only agencies and tourist guides, but also national and regional media, have begun to contribute more and more to the promotion of cultural values, products and attractions. This is through TV shows and documentaries, where the presenters of these shows put themselves in the role of tourist, visitor, explorer and even ethnographer or tourist guide.

The ninth finding illustrates that the profession of tourist guide, is a very good instrument which has served not only the protection and promotion policies of current tourist attractions, but also the bringing to light or advertising of new tourist attractions, as well as the implementation of strategic plans in tourism marketing and inclusion in various research projects.

The last finding indicates that there is an increased interest of tourists in the historical objects of the period of monism, and there are even many premises for these objects to turn into attractions of black tourism or dark tourism.

Conclusions

In the current conditions of integration, Albania is increasingly becoming an attractive country for foreign visitors, but *host* or *active tourism* highlights the demand for *a better management* of the works of the cultural heritage and the need for effective strategies in the promotion of their values. This means that the time has come for our cultural heritage to become functional, to popularize, to enliven the civic spiritual life, to increase human and financial resources.

Currently, in Albania, it has become necessary to reform the entire organizational scheme of state institutions that deal with cultural heritage to bring a contemporary spirit and a modern attitude regarding the protection, restoration, management and promotion of its values. This must be in sync with the requirement to place professionalism at the foundation of every activity within this field and operating according to a long-term strategy that ensures a correct and effective management of our cultural heritage. The time has come to appreciate and become aware of the values of our cultural heritage, awakening interests and increasing attention to them. Integrating does not mean losing the original, special national identity, but knowing how to treat, how to save this wealth built over centuries, how to present its values, how to preserve and pass them on these values to future generations.

The protection of the cultural heritage and the promotion of its values should be seen as one of the main factors contributing to the European integration of the Albanian society. This should serve as a basis for the development of cultural tourism and as support for the sustainable economic development of our country. Although many problems are encountered in this direction, it should be emphasized that, currently, the tourism sector and its development constitute one of the best opportunities to improve the image of Albania and to develop economically, creating premises for better living standards for its population. For this, we think that clearer and more complete concepts should be developed for the contribution of the tourist movement and its further development. This means that Albania offers quite good potentials in the historical and cultural context, but unlike other Mediterranean countries, these potentials have not been properly used to date, but they are best discovered and required by sustainable development and further of the tourist movement.

The more moderate treatment of our cultural heritage means looking at it also in the mutual relations that are created between it and the development of historical and cultural tourism, about which there is so much talk recently, truly appreciating the great contribution that the interventions make restorative and conservative in its successful practice. It is known that historical and cultural tourism is a very good instrument for strengthening Albanian tourism in general, but, on the other hand, it should be emphasized that to develop and adapt it according to the standards or requirements of the time, more knowledge and creative skills are needed. In the tourist destinations frequented by tourists, there should not only be restored and carefully maintained objects, but also the environment around them should be organized with accessible routes, with physical or digital orientation maps as well as with physical or electronic information boards to orient visitors. In addition, the need for qualified people, who must deal not only with the care of the monuments, but also with the development of animation or recreational activities is always growing. The need for better legal protection of cultural heritage and the awareness of the population about the important role it plays in the development of the country is also increasing.

Today, historical and cultural tourism ranks at the top of the classification and is among the typologies of tourist activities most preferred by tourist agencies and groups of tourists, when they design itineraries or develop tourist guides in Albania. But this also highlights the urgent demand for promoting the values of our heritage, as an important element of strategic plans and sustainable tourism. The time has come that the design and management of projects with an impact in the field of cultural heritage must be done in close cooperation with local communities, sensitizing the population and especially the young generation so that they themselves

become aware of protecting cultural heritage and its values. This presupposes that it is needed to change the approach to cultural monuments, treating them according to the standards of the time, as it happens in the civilized world.

It should be noted that in recent year, important steps have been taken in the good management of tourist movements and in proving the material and spiritual cultural heritage, practicing the development of tourist guides to historical and cultural centres with national tourist guides, local tourist guides or special tourist guides who operate as trained and licensed professionals. It is worth emphasizing that this is really a strategic plan, which serves to promote the cultural heritage and save it, as well as to find alternative opportunities for the employment of the new generation which paves the way for sustainable tourism and economic development of the country.

If we take into account the great prospects that the monuments have received in the framework of the development of a cultural tourism, in those environments where tourism is the primary economic activity for the relevant entities, whether from the local government or private entities, special attention should be paid to tourist propaganda, by publishing various written or electronic materials for the tourist clientele. Their presentation should be done intentionally in different meetings, offering the tourist clientele the cultural values of different territories through leaflets, posters, panoramas, video clips of tourist guides, etc. Today, this is common practice for any tourist environment.

This paper constitutes a step in the field of cultural heritage study from the point of view of its integration in the socio-economic development of a regional or local space. It would be of interest that other studies in the future focus on the broad analysis of the economic, social and cultural effects that derive from placing the values of cultural heritage in the function of tourism development. Cultural tourism, considered as a concrete development alternative, can be studied more broadly and more deeply, being coordinated with such development experiences from neighbouring countries or beyond.

Suggestions and Recommendations

Wanting to contribute to solving the circle of problems that Albania's heritage faces today, below we are giving some suggestions and recommendations, which are triggered not only by the reflection we made about the "boom" or the explosion of the tourist movement in Albania during the year 2023, but also from concrete data that we have collected in the field, as well as comments, suggestions or proposals of specialists as well-versed in this field. Our suggestions are as follows:

First, currently, in Albania, it is necessary to reform and restructure the scheme of institutions dealing with our cultural heritage. It is suggested that this reform be done in accordance with the standards required by UNESCO, EC, ICOMOS, ICROM and others to ensure clarification of the duties and competencies of every institution that deals with cultural heritage, its treatment and management. The promoter of this reform movement should be the Albanian government itself, responsible central and local institutions as well as tourist agencies, which are increasing every day.

Second, nowadays in Albania, it is more necessary to renew and expand the concept of tourism in general and cultural tourism in particular. In this direction, there is a need for new information and knowledge, for better quality tourist services and for the range of trained and certified professionals to expand further. This would pave the way for finding effective strategies that ensure diverse typologies of activities for tourists visiting Albania, would satisfy their interests, and serve as a basis for maintaining the sustainability of the tourist movement.

Third, it is suggested to pay special attention to the development of tourist infrastructure, providing suitable facilities for tourist movement. More specifically, we have many opportunities in this direction, even with little expenses, such facilities can be provided where, for example, group trips on foot (*off-road*); with bicycles (*biking-tour*); cultural ecotourism (*hiking and trekking*); skiing (*ski-tour*) in mountain areas or tourist villages; tourist activities with a focus on sailing in characteristic rivers, canyons (*rafting, kayak, canoe*), etc.

Fourth, it is suggested that the government should support tourist agencies to pay more attention to the marketing of tourist destinations. Even in our country, historical and cultural tourism remains the most preferred for tourists. Albanian tourist agencies should pay more attention to the promotion of the cultural identity of our people, suggesting typologies of activities that were mentioned above, stimulating the development of improvised guides with volunteer groups, or rehabilitating, restoring and activating the objects that encourage special tourist activity. Thus, this recreation gives the possibility of developing a year-round tourism, and as a result, it paves the way for sustainable tourism in the country. In this regard, the promotion of digital media and animation marketing would be of incalculable value.

Fifth, it is suggested by our specialists that, at the Ministry of Culture, it should be established a special centre which deals with the management of cultural heritage, its development. This centre should have a special

focus on the development of new heritage potentials in permanent consultation with the residents and owners of the respective areas for the promotion of heritage values, seeing this as a key component for the development of local tourism.

Sixth, it is suggested to define clear criteria for the recruitment of tourism service employees. For this reason, it is suggested that the Regional Directorates of Culture employ qualified specialists in the field of restoration, from the field of archaeology as well as that of education, translators and lecturers (cicerones). They do not only control the works within the territory and keep under control the objects declared cultural heritage, but also bring to light the potential of their values in front of visitors or tourist clientele.

Seventh, the national or local tourist guides should be heard more and be more involved in policies and strategic plans related to the promotion of current and new Albanian tourist attractions.

Eighth, it is suggested that as many animation and eventual activities as concerts, theatrical plays, interpretation of myths and legends take place in cultural monuments, as these activities would bring about their activation and promotion.

Ninth, it is suggested that the historical objects, belonging to the monist period, be revived and turned into assets, being put to the benefit of tourism. This is where creativity and digitization would play a big role, where videos and virtual games turn into marketing instruments against black tourism.

Tenth, the school should include in its programs, disciplines related to the promotion of Albanian tourist attractions, in order to cultivate, from the pre-university study cycles, individuals who have all the tendencies to become talented tourist guides.

Credit Authorship Contribution Statement:

Gjokë Uldedaj: Theoretical analysis, Setting study objectives, Drawing conclusions; Formulating recommendations and suggestions, Writing – original draft, Sta curation, Supervision, Funding acquisition.
Edlir Orahni: Conceptualization, Data Collection, Methodology, Formal analysis, Visualization.

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.

References

[1] Burns, P. 2004. Tourism planning: a third way? *Annals of Tourism Research*, 31: 24–43.

[2] Burrai, E., Buda, D-M., and Stevenson, E. 2023. Tourism and refugee-crisis intersections: co-creating tour guide experiences in Leeds, England. *Journal of Sustainable Tourism*, 31(12): 2680-2697. DOI:10.1080/09669582.2022.2072851

[3] Cernea, M. 2008. *"The Developmental Potential of Cultural Heritage Environments," in Cultural Heritage in the Arab World,* edited by Fekri Hassan, Aloisia de Trafford and Mohsen Youssef.

[4] Eagan, K. 2024. Top 5 Technology Trends Shaping Tourism in 2024. *Tourism Review*. Available at: https://www.tourism-review.com/travel-technology-trends-in-2024-news14109

[5] Escobar, A. 1995. *Encountering Development: The Making and Unmaking of the Third World.* Princeton, New Jersey: Princeton University Press.

[6] Hall, C. M. 1994. *Tourism and Politics: Policy, Power and Place*. Chichester: John Wiley and Sons.

[7] Hall, C. M. 2014. *Tourism and Social Marketing*. Abingdon: Routledge.

[8] Hall, M. and McArthur, S. 1996. *The Human Dimension of Heritage Management: Different Values, Different Interests, Different Issues*.

[9] Loulanski, T. 2006a. Cultural Heritage in Socio-Economic Development: Local and Global Perspectives Environments*, IDEAS,* 34(2): 54-55.

[10] Loulanski, T. 2006b. Revising the Concept for Cultural Heritage: The Argument for a Functional Approach*, International Journal of Cultural Property*.

[11] Maho, N. 2023. Cultural tourism, visitors increased by 45%, Kruja Museum and Gjirokastra Castle lead. *Monitor*. Available at: https://alfapress.al/english/ekonomi/turizmi-kulturor-vizitoret-u-rriten-me-45-kryeson-muzeu-i-krujes-dhe-kal-i80288

[12] Rappensperger, T. (2023). How to Use Social Media to Promote Tour Packages. *Regiondo*. Available at: https://pro.regiondo.com/blog/social-media-tours/

[13] Richards, G. 1996. *(ATLAS) Cultural Tourism in Europe, published by CAB international.* Wallingford, UK.

[14] Rypkema, D. 1999. Culture, Historic Preservation and Economic Development in the 21st Century. Paper for the Leadership Conference on Conservancy and Development, Yunnan Province, China.

[15] Trautmann, C. 1994. "*Strasbourg mise sur la Culture",* Cahiers espaces Nr. 37, Paris, Espaces 1994 (cit. Karine D., Sustainable World Heritage Site Management: Between interpretation, conservation and visitor management – case study of Bamberg, master thesis, 2005, pg.11).

[16] Willmott, M., and Graham, S. 2001. *The world of Today and Tomorrow the European picture. In Tourism and Hospitality in the 21st Century*. Eds. A. Lockwood and World Tourism Organization. 1999. Tourism 2020 Vision. Madrid: WTO.

[17] Yahaya, A. 2006. The Scope and Definitions of Heritage: From Tangible to Intangible, *International Journal of Heritage Studies* (Routledge), 12(3): 295.

[18] Ministry of Tourism and Environment (2019). *National Strategy for the Sustainable Development of Tourism 2019-2023, June 2019.*

[19] Ministry of Tourism and Environment (2023). Available at: https://turizmi.gov.al

[20] UNESCO. 2008. Convention for the Safeguarding of the Intangible Cultural Heritage. *ICOMOS*, 32nd Session of the General Conference, Paris, 29 September–17 October 2003. (cit. Prof. Dr. Jukka Jokilehto, On Definitions of Cultural Heritage, Heritage Theory).

[21] World Bank (2001). *Cultural Heritage and Development: A Framework for Action in the Middle East and North Africa,* Washington D. C.: World Bank. p .44.

[22] WTO, UNWTO. *Annual Report 2010*, p.61. www.en.unesco.org www.ligjet.com www.unesco.org, www.unesco.org; www.unesdoc.unesco.org

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QR Code Use and Identification Problems in Tourism

József UDVAROS
Budapest Business University, Budapest, Hungary
udvaros.jozsef@uni-bge.hu

Norbert FORMAN
Budapest Business University, Budapest, Hungary
forman.norbert@uni-bge.hu

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Abstract: The integration of technology with tourism increases its efficiency and improves the tourist experience, especially through QR codes and NFC technologies, which are already widely used. The number of research related to digitization and the sustainability of tourism is increasing, and the focus is shifting towards ICT, AR and VR. Mobile services like QR codes are crucial in tourism, improving service availability and user experience. The article analyzes the importance of QR codes and image processing in logistics and tourism. The focus is on the technological foundations, recognition, and decoding methods of QR codes, highlighting the role of artificial intelligence. The article discusses in detail the application of QR codes in tourism, along with technological challenges and development opportunities. It also presents future research directions and the potential effects of QR codes on tourism.

Keywords: QR code; code recognition; tourism; artificial intelligence.

JEL Classification: L86; L83; D83; Z32.

Introduction

Technology permeates all areas of life, so it is a logical step to integrate it with tourism in order to improve its characteristics and make the experience of tourists simpler and problem-free. Quick Response (QR) codes and Near Field Communication (NFC) technologies are already widely used in various fields, such as inventory systems and online payment solutions (Gubán and Udvaros 2022).

In recent years, the number of research conducted in the field of digitalization and the socio-economic sustainability of tourism has increased significantly, which indicates that this research area is receiving more and more attention. The researches of the last decade have presented many empirical studies on this topic. The bibliometric analyzes show that the focus of research has shifted to exploring the field of ICT (Information and Communication Technologies), especially AR (Augmented Reality) and VR (Virtual Reality) within the social and economic sustainability of tourism (Forman and Udvaros 2023).

Mobile services play an increasingly important role in many aspects of our daily lives, especially with the spread of mobile internet and more advanced mobile devices. This is especially true in tourism, where mobile tagging, such as the use of QR codes, can significantly improve the accessibility of services.

1. Methodology

In the article, we conduct a short literature review during the research. As a source, we review articles from several scientific databases. First, we examine the technical articles in the field of digitalization and the socio-economic sustainability of tourism. We examine what results other researchers have achieved internationally in the given field. We look at the impact of ICT on tourism, focusing on the use of QR codes, VR and AR technologies.

After that, we describe in detail the application of QR code recognition and image processing techniques in the fields of tourism. During the research, various image processing methods and artificial intelligence-based algorithms are applied, which enable the effective recognition and decoding of QR codes in different conditions.

We present how QR codes can be used to improve the visitor experience of tourist sites and to increase the efficiency of logistics processes.

Finally, we present the problems that appear when recognizing the QR code, for which we propose a solution.

2. Literature Review

Indonesia's Weh Island has many natural tourism opportunities that can contribute to increasing the income of the local community and provide valuable lessons for those living in volcanic areas. Traditional information provision is limited to guidebooks for tourists, in which guides explain the attractions and their significance. In their research, the authors of the article (Yanih *et al.* 2023) developed a digital tourism system that, by integrating QR codes and web-based technologies, provides more information to visitors and is easy to use for local residents as well. According to data analysis, the number of monthly visitors to tourist sites can be tracked using QR code information boards supplemented with a web programming system. With the javascript integration of QR code boards, visitors can access changing information such as links, images or videos without having to reprint the QR code. In addition, the research presents the main sites of Iboih village in Web-GIS format, including tourist attractions, road access, public infrastructure and dining options that are easily accessible to tourists. Based on their research, they came to the conclusion that the integration of QR code and web-based programming can be an effective option in the field of tourism development as a study tool that can be used by the community.

In their research, the authors of the article (Ekundayo *et al.* 2023) want to develop tourism in the Southland region of New Zealand using Quick Response (QR) codes and Near Field Communication (NFC) technology. The purpose of the QR Code and NFC Bases Information System (QNBIS) presented in their research is to help tourists by providing information about the attractions in the area, thus making their trip easier and more enjoyable. By scanning QR codes or reading NFC tags with a mobile phone, the system provides visitors with a presentation of the locations. Considering the threat of malicious use of QR codes and NFC tags, their research also proposes a security strategy that includes three specific implementation methods. Their research also includes the implementation and evaluation of the QNBIS prototype (POS), according to the results of which the QNBIS system effectively provides tourists with practical and safe information about the surrounding points of interest.

Australia is known for hosting major events such as the Australian Open, which attracts sports fans from around the world to experience the adrenaline-pumping atmosphere and world-class competition. As technology evolves, tour operators must adapt to stay competitive. The authors of the study (Tushar *et al.* 2022) use the content analysis method to examine how technological innovations affect Australian sporting events. The research finds that content sharing on social media, sharing platforms such as Airbnb and Uber, payment systems such as PayPal and Apple Pay, applications for information about nearby offers, and virtual reality for virtual tours of hotels they all increase the attractiveness of sports events. It is expected that sporting events with the help of technological applications will continue to be successful in the coming years. In their study, the authors recommend further research to measure the impact of technology on other Australian sporting events.

Penang is an important tourist destination in Malaysia. The most important contribution of the research presented in the article (Abumandil *et al.* 2022) is the exploration of the variables that can play a role in the development of smart tourism, with particular regard to mobile augmented reality applications and the use of social media. The study not only expands knowledge from a theoretical point of view, but also has practical and educational implications for travel agencies, potential customers, government officials and the long-term sustainability of smart tourism. The research also emphasizes the importance of adopting smart tourism. Smart tourism provides services that offer benefits not only to local visitors but also to international audiences, such as tourism and smart travel. In intelligent tourism, these services serve both tourism stakeholders and tourist attractions. Featured services include the display of online interactive content and information, such as culinary offers, handicrafts, performing arts, tourist villages and other ICT-based services for tours. As part of smart tourism, they help provide interactive and informative experiences, including online availability of prices, opening hours, contacts and visitor reviews.

In their study, Jiang and Phoong examined the impact of digitalization on the social and economic sustainability of the tourism sector through a systematic literature network analysis. According to the results, digitization has a positive impact on economic sustainability, including tourism product development, consumption and industrial development. Digitization contributes to social development, cultural awareness and tourism participation in the field of digital technologies and cultural heritage. The study used bibliometric analysis to identify publication trends and research hotspots. The study produced two main conclusions: the identification of

knowledge gaps and evidence-based decision-making based on previous literature. The research also makes recommendations for future research that can help policy makers, tourism planners and researchers develop research-based strategies. The results emphasize the importance of digital technology in the sustainable development of tourism. Researchers and industry experts are increasingly investigating the potential and effects of new forms of ICT in the field of tourism. AR and VR technologies are particularly relevant as they offer new opportunities to personalize experiences and interactions, which can significantly affect the social and economic sustainability of tourism (Jiang and Phoong 2023).

In their article with Canadi's co-authors, they present the possible applications of QR codes in tourism, specifically in the Mercedes-Benz Museum, and evaluated them in the test user study after the implementation of a prototype. According to the results, the use of QR codes potentially increases both usability and the intention to use services. QR codes provide convenient access to mobile content and services that can enhance the visitor experience. This can be a significant advantage for tourism, especially in cultural institutions, where visitors often seek information and context for exhibits or experiences. Incorporating QR codes and similar mobile tagging technologies into tourism services can increase visitor satisfaction and frequency of service use. An additional advantage of such technologies is that they offer a simple and cost-effective solution for tourist sites to update content and share information effectively (Canadi *et al.* 2010).

In their research, Mariotto and his co-authors present an innovative historical virtual geotrail that stretches along the eastern side of Mount Etna (Italy). This trail includes significant geological sites and features from the 1928 eruption. The "virtual geostops" of the virtual geotrail have become accessible to volcanologists, educators, the general public, tourists and volcanologists. These stops can be accessed using QR codes, which visitors can find on the printed or electronic documents and on the supplementary posters. The virtual geostations were created using the SfM (structure-from-motion) photogrammetry technique developed from images captured by unmanned aerial vehicles (UAV). The main result of the project is a virtual geopath consisting of eight geostops, divided into two parts, which presents outstanding examples of geological phenomena created during volcanic events. Their goal was for this approach to complement traditional earth science fieldwork and classic field trips, not only now, but also in the future. This virtual approach allows visitors to explore and study this fascinating geological area in an interactive and visually rich way, without being physically present at the site (Mariotto *et al.* 2023).

Drones are also a breakthrough technology in tourism, as they enable real-time, fast and accurate monitoring, while minimizing costs and with their help, we can also virtually visit areas that are dangerous for people. Nowadays, the use of drones is regulated by laws and regulations (Bódi 2023; Udvaros and Bódi 2023).

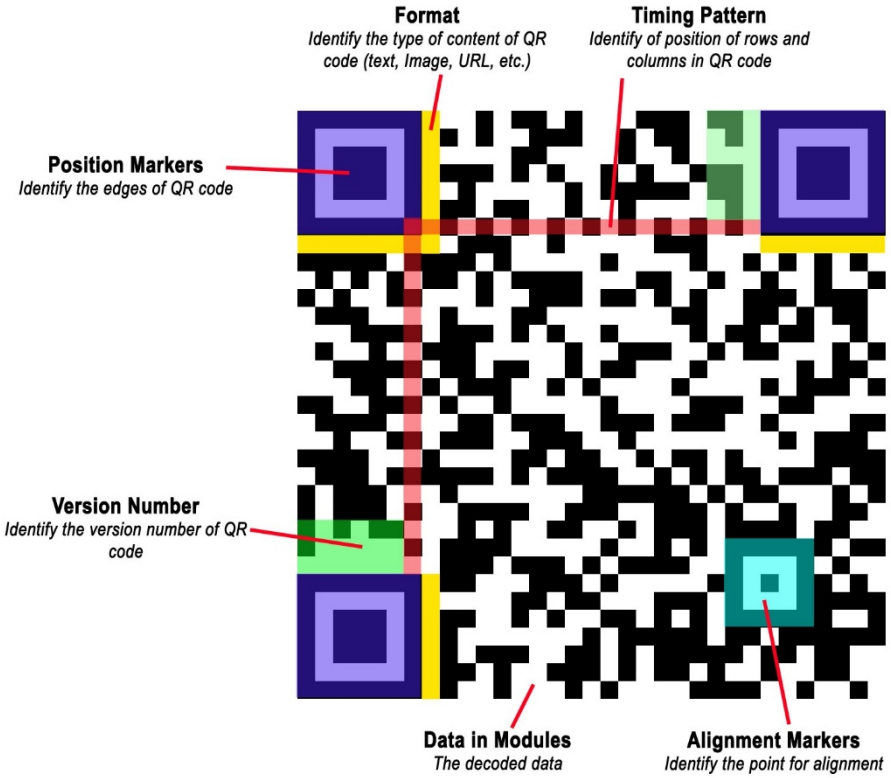
It can be seen from the articles that there is a serious potential for the application of information technologies in the tourism sector as well. To put it simply, for the layman, all you need to do is place a QR code near the given tourist location and scan the QR code with a smartphone. After that, use the information stored in the QR code to visit the website of the given location, where we get the desired information in the form of text information or with the help of VR and AR.

What exactly is a QR code?

QR codes can encode numeric, alphanumeric, kanji characters and binary data. There are 40 different versions of the QR code. Version 1 means a QR code that consists of 21x21 modules. If we take version 40, the 2D code consists of 177x177 modules. The relationship between size and version can be expressed as Size = 21 + (version-1)x 4.

Each QR code version has a maximum data capacity based on data volume, character type and error correction level. For example, a minimal version 1 QR code (where there are 21x21 modules) has a capacity of 10 alphanumeric (or 17 numeric) characters at the highest (H) error correction level. By comparison, the maximum version 40 (has 177x177 modules) has a capacity of 1852 alphanumeric (or 3057 numeric) characters at the highest debug level.

Figure 1. Constituent elements of the QR code



Source: Created by the authors

1. Position Markers: This is the position sensor of the QR code, which is formed by a darker square on a lighter square. They determine the position and orientation of the QR code.

2. Timing Patterns: An interconnected series of dark and light elements. They determine the size, the number of rows and columns, and we use them to identify distortions in the QR code.

3. Version Number: This is used to identify the version number of the QR code.

4. Format Identifiers: This identifier contains information about the mask pattern number and error correction level, which is necessary to decode the QR code to identify the type of content, such as URL, text, image, etc.

5. Alignment Markers: The alignment markers determine the alignment point in the QR code, which can be used to identify the distortion.

6. Data in Modules: The data encoded in the QR code is decoded using this indicator. If the QR code is damaged, it can be restored and read using the error correction method (Automatic Identification and Data Capture Techniques - QR Code Bar Code Symbology Specification 2015; Shettar 2016).

3. Research Results

Image recognition of QR codes provides a quick and convenient access point for users to information or websites. This procedure eliminates the need to manually type in URLs, making accessing information much easier and faster. Users can simply scan the QR code with their mobile device's camera and instantly access the content or services referenced by the code. This interactive and user-friendly approach improves the experience, especially in the fields of marketing, advertising and tourism, where QR codes can create a direct connection between users and products or services.

Automatic QR code recognition on smartphones is a complex but user-friendly process that uses the device's built-in camera and special software algorithms. When the user points the camera at a QR code, the camera lens focuses the light while the sensor digitizes the image. At this moment, the image processing algorithms are activated, which immediately recognize the characteristic pattern of the QR code, such as the three special corner marks and the information squares inside them. The software then decodes the content of the QR code, which usually contains data encoded in a standard format. After the recognition process is successfully completed, the user interface of the smartphone provides an indication to the user, often in the form of a pop-up window or notification, informing them of the successful scan of the QR code and the information

contained therein. Finally, the user can choose what action to take on the information provided by the QR code. For example, if the code contains a web address, it is possible to open the linked page in the mobile browser. Other types of data, such as text information or contact information, are displayed directly on the screen. This whole process is extremely fast and efficient, allowing users to use QR codes easily and quickly. This capability of smartphones significantly improves the convenience and efficiency of digital interactions.

3.1 Steps of Image Processing

Nowadays, QR code recognition technology is a popular topic in the field of digital image processing. With the constant development of IoT (Internet of Things), the QR code is increasingly used in various industries, even in tourism, due to its large information storage capacity and the use of reliable and secure coding technology. It is important to note that most of the time the QR code occurs in a non-optimal position (shape). For example, if the code is fitted to a cylindrical or spherical shape, it can be found in 3D on a square. It may also happen that we cannot read the QR code at the right angle. It is then necessary to perform corrections and image pre-processing. In most cases, recognizing the QR code consists of the following steps:

Figure 2. Image processing process

Source: Created by the authors

3.2 Localization - Recognition of QR Codes from the Image

Recognizing QR codes from an image is a complicated task. Nowadays, there are several different ways to solve this problem. One of the most well-known and widespread methods is the use of the Viola-Jones object detection framework. The mentioned framework provides an efficient way to focus the detection process on specific parts of the image. They focus on the Position Markers and Alignment Markers found in the three corners of all QR codes, where they perform an extensive investigation based on search patterns using the framework (Viola and Jones 2001).

Szentandrási and his colleagues deal with the detection and recognition of QR codes in high-resolution images. A real-time detector is provided on high-resolution (several megapixel) images. They present an efficient algorithm for detecting possible occurrences of QR codes. Their algorithm must be followed by an accurate detection/recognition algorithm. The use of a matrix code detection and recognition algorithm based on Hough transformation is recommended, since the information calculated with our new pre-detection algorithm can be reused, and thus a further reduction of the calculation requirements can be achieved (Szentandrási *et al.* 2013).

3.3 Correction of QR Codes

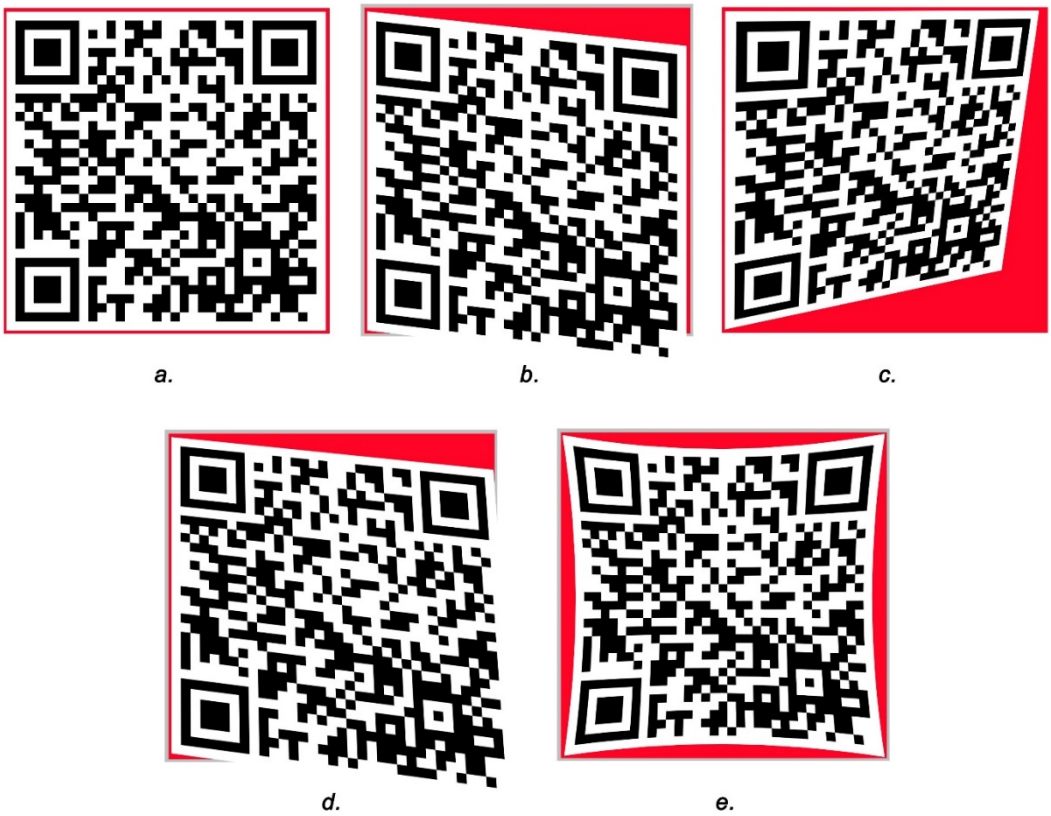
In most cases, the recognized images must be subjected to image pre-processing in order for the decoding algorithm to recognize the QR code, since the algorithms can recognize and process the code based on standards. Most of the time, the following corrections need to be made: clean up, correct blurring, skewing and bending. We know different methods for these, such as geometric perspective transformations.

Karach *et al.* propose an accurate and fast method for placing perspective-distorted 2D QR codes on arbitrary images under different lighting conditions. This method is suitable for localization of single or multiple QR codes on low-resolution images, as well as for real-time processing. The proposed methods use typical position detection patterns of QR codes, called search patterns, to identify the three corners of QR codes in an image. Distorted QR codes require perspective transformation. The optimal position of the fourth corner of the QR code is determined by analyzing the direction of the horizontal and vertical edges and maximizing the standard deviation of the horizontal and vertical projections of these edges. The prerequisite of our method is the existence of intact search patterns and quiet zones around the QR code. The novelty of the method lies in the definition of the bounding box of the QR code, especially in the case of perspectively distorted QR codes, and in the handling of modules of variable size.

This method was validated on a test set of synthetic and real samples and compared with competitive solutions. Experimental results show that their method has a high detection rate. A QR code is only considered

successfully recognized if it is decoded, not just localized. Accurate localization is a necessary but not sufficient condition for successful decoding (Karrach *et al.* 2020).

Figure 3. a - Correct QR code, b - Skewed QR code, c, d - Perspective distorted QR code, e - Wrapped QR code



Source: Created by the authors

The use of computer-readable visual codes has become commonplace in our daily lives, in industrial environments and in private use. The process of reading visual codes consists of two tasks: localization and data decoding. Bodnár and Nyúl investigate the localization efficiency of cascade classifiers using Haar-like features, local binary patterns and histograms of oriented color transitions, which are trained on the search patterns of QR codes and the entire code region and propose improvements in the field of post-processing. Various cascade classifiers based on different features and training objectives are presented and their performance and QR code localization ability are studied. Their approach can be used in real-time applications with high confidence rates and moderate false positive rates, which can be tuned according to the requirements of each final application, mainly depending on the training parameters. Efficient automatic localization of visual codes is desirable in many industrial environments and in pre-user cases where localization is done with little human assistance. According to their experiments, cascade classifiers are a suitable option for QR code localization (Bodnár and Nyúl 2015).

3.4 Artificial Intelligence in QR Code Identification

QR code recognition often faces the challenges of uneven background fluctuations, improper illumination, and distortions due to improper imaging methods. This makes it difficult to identify QR codes, so artificial intelligence-based systems were created to deal with the problem (Udvaros *et al.* 2019). To improve the recognition rate of QR image codes, Huo *et al.* use an improved adaptive median filtering algorithm and a QR code distortion correction method based on neural networks. This combination of artificial intelligence algorithms can match the distorted QR image into the geometric deformation pattern, and QR code recognition is realized. Their research deals with two-dimensional code distortion, which has been a serious research question in existing software systems. The research results obtained after emphasizing the pre-processing stage of the image showed that a significant 14% improvement in the reading speed of the QR image code can be observed after processing with the system algorithm in the article. The applied artificial intelligence algorithm has a certain effect on improving the recognition rate of the two-dimensional code image (Huo *et al.* 2021).

Chou *et al.* propose an algorithm that localizes and segments two-dimensional QR codes. The localization involved a convolutional neural network capable of detecting partial QR codes. Then, image processing algorithms were implemented to segment the barcodes from the background. Their experimental results show that the proposed approach was highly effective for detecting QR codes with rotation and deformation (Chou *et al.* 2015).

4. Discussions

QR codes and NFC technologies open up new dimensions in tourism. These technologies enable faster, more efficient information flow and interactivity between tourists and service providers. For example, with the help of QR codes, tourists can easily access city maps, restaurant menus, or even historical information. And NFC technology simplifies the payment and entry processes, reducing queue time and improving the user experience.

Artificial intelligence plays an important role in this process. AI enables faster and more accurate recognition of QR codes, which increases the reliability of the data and the quality of the user experience. In addition, with the help of AI, applications using QR codes and NFC technology are able to provide personalized offers and information to tourists, further refining the experience.

These technologies are not only beneficial for tourists, but also for service providers. They enable more accurate feedback and data collection, which can serve as a basis for further development of services. The use of QR codes and NFC technologies thus contributes to increasing the competitiveness of the tourism sector and promoting digital transformation.

The research also highlights that technological development does not stop, and its application in tourism constantly brings new opportunities and challenges. The document draws attention to the fact that further research is essential in order to fully exploit the technological potential inherent in tourism. This creates an opportunity not only to improve the tourist experience, but also to promote sustainable tourism.

The research contributes to the expansion of scientific knowledge in the field of tourism and technology, showing how the use of QR codes and NFC technologies positively affects the experience and operation of both tourists and service providers.

Conclusions and Further Research

In recent years, the increase in the number of research related to the socio-economic sustainability of digitalization and tourism is causing an increasing interest in the topic. Research in the last decade has produced many empirical studies in this area. According to bibliometric analyses, the research focus was on ICT, especially AR and VR technologies, within the social and economic sustainability of tourism. We have presented how we can use the possibilities of ICT in tourism, how we can access useful information with the help of Quick Response (QR) codes.

A QR code is a two-dimensional matrix barcode that uses the ISO/IEC 18004:2006 (18004:2015) standard, designed by Denso-Wave Corporation of Japan in 1994. Its advantages are high-speed recognition and strong error correction capabilities. The QR code is generated based on the protocols described in the standard, the same protocols are used for decoding.

In our article, we mainly focused on identifying the more distorted QR codes. In this case, the recognition rate of the QR code is very low or cannot be recognized at all. Improving the recognition rate of the QR code in special circumstances is of great importance, and improving the recognition rate can greatly promote the use of QR codes. We have proposed several algorithms for recognizing and improving QR codes. A detailed analysis of the image pre-processing work of the QR code components is performed before the QR code is decoded, followed by an analysis and research of the current QR code image pre-processing methods.

The use of QR codes and NFC technologies in tourism offers many advantages. These technologies enable quick and easy access to information and services, improving the tourist experience. By increasing the availability of services, tourists can find their way around more easily and use the available options more efficiently. Artificial intelligence plays a key role in the effective application of these technologies, especially in the fast and accurate recognition and correction of QR codes. Future research should focus on the further development of technological innovations, the development of new methods to improve the tourist experience, and the promotion of sustainable tourism. Emphasizing the importance of further investigating practical applications and expanding research towards new technological trends and the changing needs of tourism.

In the article, we dealt with the integration of QR codes and NFC technologies in tourism. We highlighted the importance of these technologies in improving tourist experiences and service availability. The article discussed the technological basis, recognition methods and challenges related to the use of QR codes in tourism, emphasizing the role of artificial intelligence in improving the recognition and decoding of QR codes. We

presented the future research directions and the possible effects of QR codes on tourism, illustrating the growing role of digital technologies in this area. The article makes a significant contribution to the understanding of QR codes that can be effectively used in tourism, providing insight into the opportunities and challenges offered by the technologies.

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József Udvaros: Conceptualization, Literature review, Methodology, Investigation, Data curation, Writing - original draft preparation, Writing - review and editing, Visualization, Project administration, and Supervision.
Norbert Forman: Conceptualization, Literature review and Data processing.

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.

References

[1] Abumandil, M., *et al.* 2022. Mobile augmented reality elements and social media usage on smart tourism in Penang: Malaysian. *ECS Transactions,* 107(1).

[2] Automatic Identification and Data Capture Techniques - QR Code Bar Code Symbology Specification, ISO/IEC, Switzerland, 2015. DOI: https://webstore.ansi.org/Previews/PREVIEWISO+IEC+18004-2015.pdf

[3] Bódi, S. 2023. Presentation of the Fundamental Law of Hungary, *Lawyer Quarterly,* 13(3): 296-307.

[4] Bodnár, P. and Nyúl, L. 2015. Improved QR code localization using boosted cascade of weak classifiers. *Acta Cybernetica*, 22(1): 21–33. DOI: https://doi.org/10.14232/actacyb.22.1.2015.3

[5] Canadi, M., Höpken, W. and Fuchs, M. 2010. Application of QR Codes in Online Travel Distribution. In: Gretzel, U., Law, R., Fuchs, M. (eds) Information and Communication Technologies in Tourism 2010. Springer, Vienna. DOI: https://doi.org/10.1007/978-3-211-99407-8_12

[6] Chou, T.H., Ho, C.S. and Kuo, Y.F. 2015. QR Code Detection Using Convolutional Neural Networks. In Proceedings of the 2015 International Conference on Advanced Robotics and Intelligent Systems (ARIS), Taipei, Taiwan, pp. 1–5.

[7] Ekundayo, S., Baker O. and Zhou, J. 2020. QR Code and NFC-Based Information System for Southland Tourism Industry-New Zealand, 2020 IEEE 10th International Conference on System Engineering and Technology (ICSET), Shah Alam, Malaysia, pp. 161-166. DOI:https://doi.org/10.1109/ICSET51301.2020.9265394

[8] Forman, N. and Udvaros, J. 2023. Digital Innovation in Hospitality: Bridging the Gap between Concierge Services and Hotel Guests. *Journal of Environmental Management and Tourism, 14*(6): 2673 - 2684. DOI:https://doi.org/10.14505/jemt.v14.6(70).15

[9] Gubán, M. and Udvaros, J. 2022. Új módszerek a raktárkészlet ellenőrzés területén. *Logisztikai trendek és legjobb gyakorlatok*, 8(1): 39-42. DOI: https://doi.org/10.21405/logtrend.2022.8.2.7

[10] Hasanuzzaman, T., Rahman, S., Thakur, S. and Hossain, S. 2022. 10 The Ubiquitous Role of Mobile Technology Application in the Australian Open. *Digital Transformation and Innovation in Tourism Events*.

[11] Huo, L., Zhu, J., Singh, P.K. and Pavlovich, P.A. 2021. Research on QR image code recognition system based on artificial intelligence algorithm. *J. Intell. Syst.* 30: 855–867. DOI: https://doi.org/10.1515/jisys-2020-0143

[12] Jiang, C. and Phoong, S.W. 2023. A ten-year review analysis of the impact of digitization on tourism development (2012–2022). *Humanit Soc Sci Commun*, 10: 665. DOI: https://doi.org/10.1057/s41599-023-02150-7

[13] Karrach, L., Pivarčiová, E. and Božek, P. 2020. Identification of QR code perspective distortion based on edge directions and edge projections analysis. *Journal of imaging*, 6(67). ISSN 2313-433X.

[14] Mariotto, P., *et al.* 2022. A New Way to Explore Volcanic Areas: QR-Code-Based Virtual Geotrail at Mt. Etna Volcano, Italy. *Land*, 11(3): 377. DOI: https://doi.org/10.3390/land11030377

[15] Shettar, IM. 2016. Quick response (QR) codes in libraries: case study on the use of QR codes in the central library, NITK. Proc. TIFR-BOSLA National Conference on Future Librarianship. Mumbai: Imperial Publications; p. 129–34.

[16] Szentandrási, I., Herout, A. and Dubská, M. 2013. Fast detection and recognition of QR codes in high-resolution images. In Proceedings of the 28th Spring Conference on Computer Graphics, SCCG '12, pages 129-136, New York, NY, USA, ACM.

[17] Udvaros, J. and Bódi, S. 2023. Division and Regulation of Drones in EU and Hungary. *International Journal of Science, Engineering and Technology*, 11(4): 1-6.

[18] Udvaros, J., Gubán, Á. and Gubán, M. 2019. Methods of artificial intelligence in economical and logistical education. eLearning and Software for Education Conference, 414–421. DOI:http://dx.doi.org/10.12753/2066-026x-19-055

[19] Viola, P.A. and Jones, M.J. 2001. Rapid object detection using a boosted cascade of simple features, In IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR), pp. 511–518.

[20] Yanis, M., Zainal, M., Putra, R.A., and Paembonan, A.Y. 2023. Integration of QR-Code and web-based applications for developing digital tourism in Iboih Village, Indonesia as a lesson learned media on the volcanic island. *GeoJournal TourismGeosites,* 47 (2): 499–507. DOI: https://doi.org/10.30892/gtg.47217-1049

DOI: https://doi.org/10.14505/jemt.v15.1(73).15

Examining the Mediating Effects of Social Capital and Community-Based Tourism on the Role of Tourism Villages in Sustainable Tourism

Jumiati JUMIATI
Department of Public Administration,
Universitas Negeri Padang, Indonesia
jumiati@fis.unp.ac.id

Boni SAPUTRA
Department of Public Administration,
Universitas Negeri Padang, Indonesia
ORCID: 0000-0002-5368-1343, Researcher ID: AAD-5271-2021
bonisaputra@fis.unp.ac.id

Aldri FRINALDI
Department of Public Administration,
Universitas Negeri Padang, Indonesia
ORCID: 0000-0003-1354-5061
aldri@fis.unp.ac.id

Nora Eka PUTRI
Department of Public Administration,
Universitas Negeri Padang, Indonesia
ORCID: 0000-0001-5119-2872
noraekaputri@fis.unp.ac.id

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Abstract: Sustainable tourism is still a topic of study that is predicted in tourism research in Indonesia. Various strategies and efforts have been made to create sustainable tourism, starting from issuing various government policies supporting sustainable tourism programs involving the private sector and the community. However, the results achieved still need to be optimal. There are so many factors that can affect sustainable tourism. Among the variables that are stated to have a contributing influence on it, they will be discussed in this study. This study aims to analyze the mediating role of social capital and community-based tourism between the influence of tourism villages on sustainable tourism in rural tourism in West Sumatra, Indonesia. Quantitative research of the associative type is sought to reveal the hypothesis proposed. A total of 422 samples were used in this study. The research instrument in the form of a validated and highly reliable questionnaire was used, supported by literature studies and documentation. Data analysis used Structural Equation Modeling (SEM) statistics Analysis Moment of Structural (AMOS) and continued with the Sobel test. The results proved that the role of tourism village through the mediating role of social capital and community-based tourism proved to have a significant effect on sustainable tourism but not a partial effect. The role of tourism village affects social capital and community-based tourism, while social capital and community-based tourism also significantly affect sustainable tourism.

Keywords: role of tourism village; social capital; community-based tourism; sustainable tourism.

JEL Classification: Z32; Q56; Q01; L83.

Introduction

Tourism in Indonesia is one of the sectors that has the fastest growth and has a strategic position; this can be seen from its significant contribution to the increase in the country's foreign exchange (Saputra *et al.* 2023), thus

having an impact on the profitability of the government's financial balance. Apart from that, the tourism industry also has quite a large workforce absorption capacity and has great potential to improve community welfare (Frinaldi *et al.* 2023) and is a hope for alleviating poverty (Phiri 2016; Shahbaz *et al.* 2021; Soliman 2014; Saarinen and Rogerson 2014).

One of the study topics in the tourism sector, which is still a strategic topic in Indonesia, is sustainable tourism. Because it is assumed to be able to contribute to the recovery of the country's economic growth after the COVID-19 pandemic several years ago (Sigala 2020; Schönherr *et al.* 2023). Sustainable tourism is a form of effort to develop tourist attractions and ensure that the natural, social, economic, and cultural resources used can still be enjoyed by future generations (Bruyn *et al.* 2023; Saputra *et al.* 2023; Mubarak *et al.* 2023). Sustainable tourism has existed since the early 1990s (Buckley 2012). However, the study of sustainable tourism has long been discussed by experts and researchers in the field of tourism, but until now, it is still a matter of debate and concern (Butler 2014); these concerns can be seen from the slow implementation of sustainable practices in the tourism sector (Moyle *et al.* 2018). Apart from that, there is still a lack of attention to sustainability research in the tourism sector. Research that explicitly examines progress and trends related to research in sustainable tourism is still limited (Bruyn *et al.* 2023). This will be a concern because there is still a lack of effort to maintain and preserve this research to remain relevant.

In Indonesia, sustainability research in the tourism sector is still deemed necessary to be carried out. It needs special attention from the government because Indonesia has great tourism potential, and every region in Indonesia has made tourism a leading sector. Sustainable tourism in Indonesia is expected to be able to make a significant contribution to the economic, social, and community welfare fields because tourism is one of the flagships of Indonesia's national development. Various government strategies and policies have been pursued to support the success of this program. However, this effort has not been able to produce optimal results. One of the regions in Indonesia that is aggressively promoting sustainable tourism development is the West Sumatra Province. West Sumatra's seriousness in tourism development can be seen with the issuance of Regional Regulation number 14 of 2019 concerning the tourism development master plan for West Sumatra province for 2014-2025. One of their focuses is developing rural tourism with a sustainable concept. Tourism with a rural concept is an alternative form of tourism based on preserving nature, culture, and traditions and empowering local communities (Rosalina *et al.* 2023). Local societies or communities are the main elements in implementing sustainable tourism (Susilo and Dharmawan 2021). Through this concept, it is believed to be able to improve the welfare of local communities and it is hoped that they can utilize resources sustainably (Yachin and Ioannides 2020).

The success of implementing sustainable tourism can be caused by many factors, including the role of tourism villages and the involvement of local communities, whether in the form of social capital or Community-Based Tourism. Based on this, this research seeks to effectively determine the influence of the role of tourism village on sustainable tourism through the mediating role of social capital and community-based tourism in rural tourism in West Sumatra. The mediating role of social capital and community-based tourism built into this concept is new, especially in sustainable tourism for developing countries like Indonesia. This is hoped to add new literature in the field of tourism because, unlike most previous research, this research assesses sustainable tourism from the perspective of the role of tourism village, social capital, and community-based tourism. Hence, this study is important for sustainable tourism developers.

Even though research on sustainable tourism has often been conducted, very little research on sustainable tourism has been found that focuses on the influence of the role of tourism village on sustainable tourism mediated by social capital and community based tourism variables in a research model. So, this research is here to address the research gaps and debates in previous studies to propose a more comprehensive framework by adding social capital and community-based tourism as mediating variables. This study also builds a new data set and focuses on sustainable tourism issues in the context of research in Indonesia as a developing country.

1. Literature Review

1.1 Role of Tourism Village

The tourism village program has a vital role in encouraging the sustainability of tourism in rural areas. Tourism in rural areas is expected to utilize resources sustainably and management based on community participation (Yachin and Ioannides 2020). Village tourism is an alternative form of tourism based on preserving nature, culture, tradition, and empowerment of local communities (Rosalina *et al.* 2023). Developing a tourist village is based on exploring potential resources (Herdiana 2019). Tourist villages are given the authority to manage their

rural tourism; it is intended that rural tourism will be able to progress and develop (Arafi *et al.* 2022). Tourism villages are responsible for developing sustainable tourism in their villages; besides that, tourism villages also have an essential role in developing sustainable tourism. One of the critical roles of tourist villages in sustainable tourism is the responsibility of protecting the environment and local culture. Tourism villages have a strategic role in the development of cultural tourism (Adi and Mulyadi 2019). The role of tourist villages is expected to increase stakeholders' capacity and assist rural tourism managers in improving the welfare of local communities (Rosalina *et al.* 2023).

1.2 Social Capital

Social capital has the power to understand the norms and social relations that work within the social structure in a community that involves all aspects, including social, religious, economic, cultural, and political, that are integrated into a pluralistic society and stated that social capital, which includes norms, actions, and values, can motivate the community to engage in tourism development (Kollmuss and Julian 2022; Rusdi *et al.* 2024). Social capital is one of the indicators of community-based tourism development. Social capital can be a tool used by individuals and groups in developing tourism (Hwang and William 2017). Social solid capital is one of the conditions for realizing tourism at the rural level (Rocca and Zielinski 2022). Therefore, the higher the appeal of social capital in the community, the more the potential for conflict can be resolved so that economic development programs can be easily realized (Suandi 2014). Social capital has components to support sustainable tourism development. These components are participation or proactive action in managing trust, mutual assistance, social norms and values, and social networks to strengthen communities. In its various components, social capital is significant for tourism development and multi-level community governance. *Social capital* is an asset that manifests through access to networks, trust relationships, solidarity, norms, rules and sanctions, political participation, and cooperation (Grootaert *et al.* 2004).

1.3 Community-Based Tourism

Community-Based Tourism (CBT) is a tourism management model that involves community participation and utilizes local communities in tourism development. CBT always seeks and maximizes the benefits and minimizes the negative impacts of tourism activities for local communities (Ballesteros and Ramírez 2010; Alhadi *et al.* 2023). CBT provides opportunities for the community to participate in controlling and developing management so that the maximum benefit of tourism is only for the community (Jugmohan *et al.* 2016; Hausler 2005). The main goal of the CBT concept is tourism development and improving the welfare of local communities (Arifin 2017). In general, CBT can be understood as a form of tourism development where control over the planning of tourism benefits is in the hands of community groups (Kontogeorgopoulos *et al.* 2013). The difference between ordinary tourism and CBT tourism is that there is another purpose of tourism, which is not merely as a business to get the maximum profit from investors or visitors but as a means to strengthen a community social organization in managing tourism resources with direct participation from residents (Suansri 2003). CBT products combine tourism activities, local food and beverages, and accommodation services (Benur and Bramwell 2015). One of the potential benefits of CBT for community welfare is economic benefits, such as contributing to rural development and poverty alleviation (Goh, 2015; Müllera 2020; Salazar 2012), as well as strengthening local cultural traditions (Kayat 2015; Lenao 2015), empowering rural communities (Salazar 2012), cross-cultural exchange (Regmi and Walter 2016), and preserving the natural environment and wildlife (Dowling *et al.* 2002; Reimer and Walter 2013).

1.4 Sustainable Tourism

The concept of sustainable tourism development arises because of the belief and joint efforts that ensure that future generations can enjoy the natural, social, and cultural resources utilized today; they have the same opportunity for the future (Zakiah and Alhadihaq 2023; Kurniawati 2013). The World Tourism Organization (WTO) defines *sustainable tourism development* as a development that meets the needs of tourists today while protecting and promoting opportunities for the future of tourism. Not only meeting the needs of the present and future generations (Bruyn *et al.* 2023) but So, in this case, the sustainable tourism development policy is directed at the utilization of natural resources and human resources for the long term (Sharpley 2010; Aimon *et al.* 2023). At least three aspects must be fulfilled in sustainable tourism development, namely economic, social, and environmental (Maftuhah and Wirjodirdjo 2018; Nugraheni *et al.* 2019). Sustainable tourism requires local communities to be directly involved and actively participate and look positively at tourism development (Han *et al.* 2023; Aleshinloye *et al.* 2021) able to maintain a balance between social, cultural and environmental (Andereck,

Valentine, Knopf, and Vogt 2005); Ramkissoon 2023), all resources must be managed sustainably (Saputra *et al.* 2022).

1.5 Hypotheses Development

1.5.1 Role of Tourism Village and Social Capital

Community social capital formed from the community's active role is indispensable in tourism development (Scott 2012). By relying on social capital alone without the intervention and support of the tourism village government, tourism development is likely to fail. On the other hand, tourist villages need social capital to succeed. Because tourist villages have limitations in terms of managing tourism, tourism villages can build social capital for community tourism development through the village government (Rocca and Zielinski 2022). Here, it can be seen that there is a dependency relationship between the two, and they influence each other, so the first hypothesis proposed in this study is:

H1: There is an influence of the role of tourism village on social capital.

1.5.2 Role of Tourism Village and Community-Based Tourism

The success of managing a tourist village is in the hands of its inhabitants. The community is the core of a tourist village and the main subject in rural tourism management (Noor and Zulfiani, 2021; Syafrini *et al.* 2023). A tourist village should start from the community and be for the community itself. Internally, the role of the community is the main factor in the success of a Tourism Village. Tourism village is a form of tourism development that focuses on the contribution of rural communities and the preservation of the rural area environment (Asianingsih *et al.* 2023). So that the success of tourist villages in tourism management and development can be connected to the name of community participation / community-based tourism. Here, it has been seen that there is a link between the role of tourism village and community-based tourism.

H2: There is an influence of the role of tourism village on community-based tourism.

1.5.3 Role of Tourism Village, Social Capital, Community-Based Tourism and Sustainable Tourism

Tourism villages have the authority to manage tourism in their villages and are required to be able to carry out tourism development in a sustainable manner (Arafi *et al.* 2022). One of the important roles of tourist villages in sustainable tourism is the responsibility of protecting the environment and local culture. Tourism villages are best positioned to encourage a sustainable tourism sector development agenda (Ruhanen 2012). Tourist villages have a direct role and involvement in organizing tourism in the village (Wang and Xu 2014). Through various policies, tourist villages can play their role in directing (Liu *et al.* 2020), encouraging the implementation of tourism towards the desired direction (Yang *et al.* 2021), and implementing various financial, marketing, and technical assistance, consultation and coordination strategies (Kata *et al.* 2022) as well as acting as a motivator and facilitator (Simamora and Sinaga 2016). One study that states that the role of tourism village influences sustainable tourism is influenced by research (Junaid *et al.* 2022).

H3: There is an influence of the role of tourism village on sustainable tourism.

One of the successful implementations of rural-level tourism can be caused by many factors, including social capital. Social capital can be a tool in developing tourism (Hwang and William 2017). The main goal of the social capital tourism concept is the development and sustainability of tourism that focuses on improving the welfare of local communities (Arifin 2017). Social capital has principles such as mutual trust, upheld norms, and relationships that play a role in solving problems in life together (Fathy 2019). Social capital has been proven to play a role in sustainable tourism development (Aji and Faniza 2022). Tourism as a form of activity can be driven by social capital (Aji 2020), so social capital needs to be developed to create sustainable tourism. Giango *et al.* (2022) mentioned that local community support in the form of social capital is needed for development and sustainable tourism. Community involvement in the form of social capital has contributed significantly to the development and sustainability of the tourism industry (Llupart 2022). From some of the above statements, it can be assumed that social capital is on sustainable tourism.

H4: There is an influence of social capital on sustainable tourism.

CBT is one of the concepts that contribute to sustainable tourism development. CBT is needed as a sustainable tourism development strategy (Wijaya and Sudarmawan 2019). As the main actors of CBT in sustainable tourism, local communities have an important role in developing and utilizing a tourism area because

tourism development cannot only be done by the government and tourism entrepreneurs or investors, but collaboration is needed. The community is integral to participating as a subject and object in sustainable tourism. CBT can provide benefits and positively impact sustainable tourism (Utami *et al.* 2022). The research results (Adi and Mulyadi 2019; Nurlena *et al.* 2021) also prove a significant positive influence between CBT and sustainable tourism.

H5: There is an influence of community based tourism on sustainable tourism.

1.5.4 Mediating Social Capital and Community-Based Tourism Between the Influence of the Role of Tourism Village and Sustainable Tourism

In general, the role of tourist villages in developing sustainable tourism using a participatory approach to social capital and CBT based on local community empowerment has proven to influence tourism sustainability. Sustainable tourism can run well if community involvement is actively implemented with collaboration between the two. Tourism villages, social capital, and community-based tourism are important in achieving sustainable tourism. If these three things are fulfilled, sustainable tourism will automatically form. This has been proven by the findings of previous research results, as described above. However, previous studies have not examined social capital and community-based tourism as mediating variables between the Role of tourism village and sustainable tourism. So, the next hypothesis in the study assumes that:

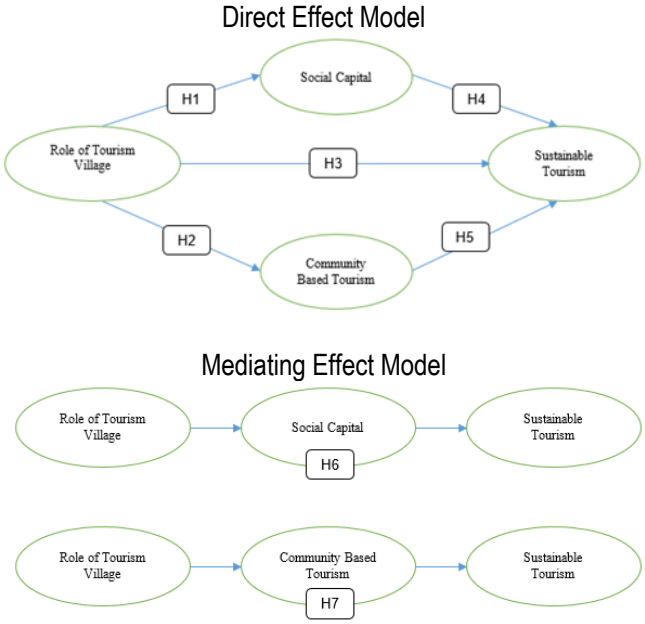
H6: There is an influence of the role of tourism village on sustainable tourism through social capital.

H7: There is an influence of the role of tourism village on sustainable tourism through community based.

1.6 Hypothezed Conceptual Framework

From the description and theoretical studies discussed in section 1.5, Figure 1 shows the conceptual framework model of the hypothesis built between research constructs.

Figure 1. Conceptual model



Source: Researchers' construct, 2023

2. Methods

2.1. Study Location

This study chose West Sumatra as the region where the research was conducted. West Sumatra is one of the 38 provinces in Indonesia. West Sumatra has much potential to develop and is a tourist destination that can bring in both local and foreign tourists (Edwin and Pramudia 2008). According to statistical data, in 2023, there were 5,913,795 tourist visits to tours spread across West Sumatra (BPS, 2023). At the same time, this research focuses on seven rural tourism locations managed based on social capital and CBT. These tourist locations include: Soghosah Waterfall Tourism in Nagari Koto Tinggi, Lima Puluh Kota Regency; Saribu Gonjong

(SARUGO) Tourism in Nagari Koto Tinggi, Lima Puluh Kota Regency; Nyarai Waterfall Tourism in Nagari Salibutan, Padang Pariaman Regency; Kapalo Banda Taram Tourism in Nagari Taram, Lima Puluh Kota Regency; Pariangan Most Beautiful Village in Nagari Pariangan, Tanah Datar Regency; Nagari Saribu Rumah Gadang Area in Nagari Koto Baru, South Solok Regency; and Kubu Gadang Tourism Village in Ekor Lubuk Village, Padang Panjang City. At least seven tourist sites are used as objects in this research. The most important reason for the choice of this research is that no previous research has been found that measures the mediating role of social capital and community-based tourism on sustainable tourism in one research conceptual framework model in West Sumatra; the next reason is that West Sumatra Province is currently focusing on sustainable tourism development.

2.2. Sampling and Data Collection

The research population is tourists, tourism managers, communities around tourism sites, and stakeholders involved in rural tourism. The population form in this study is infinite because the number is not fixed, the number cannot be known with certainty, and the researcher cannot calculate the total population (Frinaldi *et al.* 2023). Because the population has a large and broad target, the research sample is determined using the Accidental Sampling technique. Namely, respondents are selected by chance when the researcher is collecting data. The sample size was determined to be as many as 422 respondents. In this study, two types of data were used, namely primary and secondary data. Primary data was collected using research instruments in the form of questionnaires, while secondary data sources used were the results of literature reviews related to the study of this topic. Data was collected using a face-to-face questionnaire from August to November 2023. A closed questionnaire was used for data collection in the field; the questionnaire had previously been tested for validity and reliability. The questionnaire is compiled based on indicators of the variables outlined in the form of questions with alternative answers on a Likert scale that the respondent can select. A 4-point Likert scale was used to measure the questions on the questionnaire. On this scale, 1 means "strongly disagree," while 4 means "strongly agree."

Data collection was also assisted by enumerators from among students appointed and assigned who had previously been given information and understanding about the research and how to fill out the questionnaire. Respondents who were met in the field before being given a questionnaire to be answered by the respondent were previously asked first about their availability of time and knowledge of the topic of this research and were also asked how old they were, if the respondent's age were above seventeen years then the data collection through the questionnaire would continue, if the respondent's age was below seventeen years then the data collection would be stopped and look for other potential respondents. This study limits respondents to seventeen years of age and above because respondents at that age can provide an overview of a problem and can analyze the questionnaire they will answer later. This also aims to minimize the occurrence of misunderstandings or multiple interpretations of the questionnaire that will be answered later. Respondents are required to answer the questionnaire for 10-15 minutes. Documentation studies in the form of primary and secondary data were also involved in this research. A total of 422 data were collected and answered completely. Due to time and cost constraints, this research was stopped with this amount of data. The data were then tabulated and analyzed.

2.3. Measurement of Constructs

Each question in the questionnaire is developed and compiled based on indicators of the variables built in the conceptual framework model. The model built in this study uses five variables consisting of one exogenous variable and three endogenous variables. One exogenous variable is the role of tourism village variable (Adi and Mulyadi 2019), consisting of four dimensions (cultural role dimension, economic role dimension, social role dimension, and financial role dimension) with nine questions. The three endogenous variables include Social capital variables (Putnam 2015; Kollmuss and Julian 2022) consisting of four dimensions (trust, mutual help and network, norms, tolerance) with four questions contained in the research questionnaire, then community-based tourism variables (Saarinen 2006; Nurhidayati 2007), consisting of five dimensions (public participation dimension, institutional dimension, collaboration dimension, local wisdom dimension and inclusive dimension of rural development) with ten questions. Sustainable tourism variables (Schönherr *et al.* 2023; Mihalič *et al.* 2012; Roberts and Tribe 2008; Pitana and Diarta 2009) consist of four dimensions (sustainable management dimension, social and economic sustainability dimension, cultural sustainability dimension, and environmental sustainability dimension) with ten questions. Meanwhile, for descriptive analysis of respondents' demographic

characteristics, data were collected based on gender group, age group, education level group, occupation group, and type of tourism visited group.

2.4. Data Analysis

The initial data analysis presented is descriptive statistical analysis. It will continue with SEM (Structural Equation Modeling) statistical analysis with the help of AMOS (Analysis Moment of Structural) software to see the structural relationship model built in this study. The model was developed based on a previously designed conceptual framework (Figure 1). The SEM test was chosen because this study has several variables, including exogenous, mediating, and endogenous (Solimun *et al.* 2017). The Sobel test is also used to determine the contribution of the influence of the mediating variable (Lanin *et al.* 2023).

3. Research Result

3.1 Sample Profile

The distribution of data for this study can be seen in Table 1. The results of data analysis related to the demographic profile of respondents will be divided into several categories..

Table 1. Respondent's demographic characteristics (N 422)

Respondent of Characteristics		Frequency	Percent
Gender	Male	296	70%
	Female	126	30%
Age	≥17-24 Years	366	87%
	25-44 Years	49	12%
	45-59 Years	6	2%
	≥60 Years	0	0%
Level of studies	Elementary School Equivalent	2	1%
	Junior High School	6	2%
	High School Equivalent	228	54%
	Diploma	18	4%
	Bachelor	160	38%
	Master	5	1%
	Other...	3	1%
Occupation	Not Yet Working	21	5%
	Government Employees/Soldier/Police	42	10%
	Private Sector Employee	13	3%
	Student	198	47%
	Entrepreneur	17	4%
	Housekeeper	4	1%
	Farmer/Fisherman/Planters	93	22%
	Contract Worker/Honorary Staff	25	6%
	Laborer	0	0%
	Other...	8	2%
Type of tourism	*Air Terjun Soghosah*	63	15%
	Saribu Gonjong (SARUGO)	51	12%
	Air Terjun Nyarai	55	13%
	Kapalo Banda Taram	72	17%
	Desa Terindah Pariangan	68	16%
	Kawasan Nagari Saribu Rumah Gadang	59	14%
	Desa Wisata Kubu Gadang	55	13%

Source: Data analysis, 2023

For the gender category, it is known that the respondents of this study were mostly dominated by male respondents, as much as 70%. In contrast, in terms of age, these respondents were dominated by respondents

aged between 17-24 years, as much as 87%, an age classified as young and productive as a tourism actor. They are, on average, currently occupying or have completed education equivalent to High School Equivalent 54%; it is also known that most respondents are still students, with a percentage of 47%. In contrast, of the tourist destinations visited by the respondents, the most visited was the Kapalo Banda Taram tourist attraction, which was visited by 17%. A descriptive analysis of the demographics of respondents aims to describe the identity of respondents according to the research sample that has been determined and provide an overview and information on the distribution of samples in the study (Lanin *et al.* 2023)

3.2 Validity and Reliability Test

The validity test is carried out using the convergent validity test, where the construct (indicator) will be tested to determine whether each indicator has a high variance. Making a validity test decision, the indicator is declared valid if the "Loading Factor" or "Standardized Loading Estimate" value is> 0.5 and declared invalid if the value is <0.5. The results of the feasibility test of this research model are shown in table 2 below:

Table 2. Validity test results

Standardized Regression Weights			Loading Factor Limit	Estimate	Label
Cultural Role	←	Role of Tourism Village	>0.5	0,640	Valid
Economic Role	←	Role of Tourism Village	>0.5	0,735	Valid
Social Role	←	Role of Tourism Village	>0.5	0,640	Valid
Financial Role	←	Role of Tourism Village	>0.5	0,656	Valid
Trust	←	Social Capital	>0.5	0,721	Valid
Mutual Help and Network	←	Social Capital	>0.5	0,764	Valid
Norms	←	Social Capital	>0.5	0,612	Valid
Tolerance	←	Social Capital	>0.5	0,530	Valid
Public Participation	←	Community Based Tourism	>0.5	0,586	Valid
Institutional	←	Community Based Tourism	>0.5	0,589	Valid
Collaboration	←	Community Based Tourism	>0.5	0,506	Valid
Local Wisdom	←	Community Based Tourism	>0.5	0,625	Valid
Inclusive of Rural Development	←	Community Based Tourism	>0.5	0,524	Valid
Sustainable Management	←	Sustainable Tourism	>0.5	0,617	Valid
Social and Economic Sustainability	←	Sustainable Tourism	>0.5	0,668	Valid
Cultural Sustainability	←	Sustainable Tourism	>0.5	0,414	Invalid
Environmental Sustainability	←	Sustainable Tourism	>0.5	0,528	Valid

Source: Data analysis, 2023

Table 2 presents the results of the validity test analysis; it is known that only one indicator is declared invalid, namely "Cultural Sustainability," with a loading factor value of less than 0.5. Meanwhile, the other indicators can be declared valid and fulfill convergent validity because the loading factor value is more than 0.5. Invalid items will then be resolved by eliminating and modifying this indicator; this is possible because the Cultural Sustainability indicator on the questionnaire consists of more than one question item, making it possible to carry out elimination and modification treatments to make this indicator valid.

Table 3 presents the results of the reliability analysis. Reliability test is used to test the reliability and consistency of data. The construct is declared reliable if the Cronbach Alpha value is greater than 0.6 or Construct Reliability above 0.7.

Table 3. Reliable test results

Variable	Cut-Off Value	Construct Reliability	Label
Role of Tourism Village	>0.7	0,76347	Reliable
Social Capital	>0.7	0,75487	Reliable
Community Based Tourism	>0.7	0,78149	Reliable
Sustainable Tourism	>0.7	0,70841	Reliable

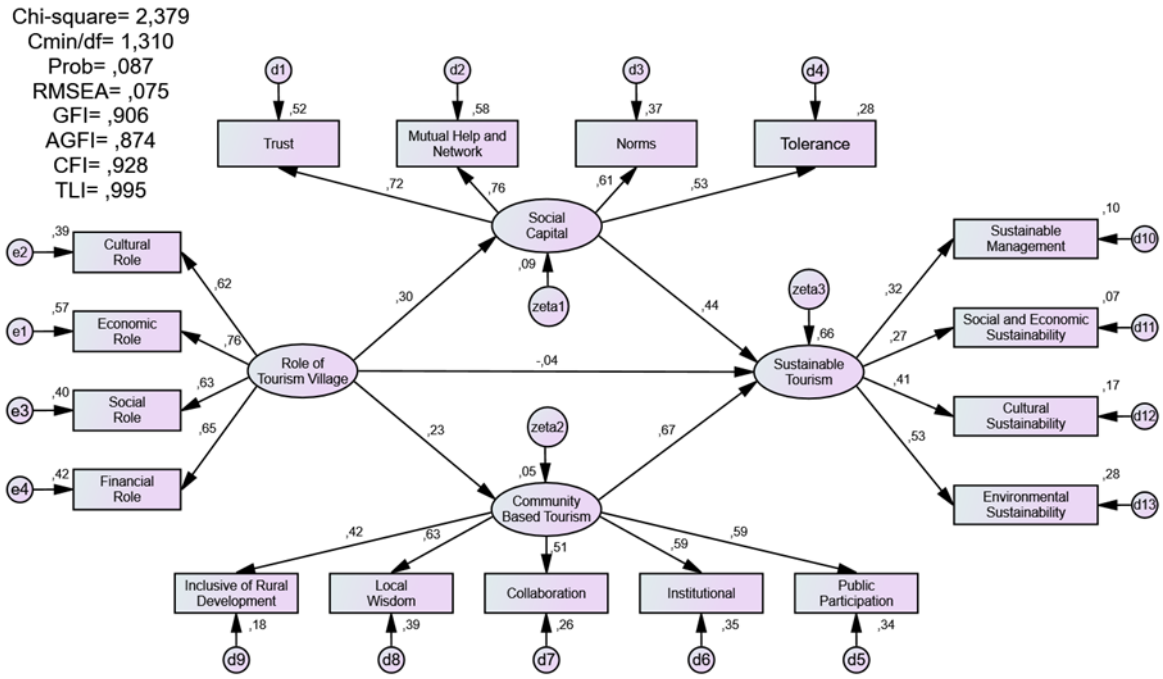
Source: Data analysis, 2023

Based on the analysis results presented in Table 3, it is known that all research constructs are declared reliable because the Cronbach Alpha value is greater than 0.6 and the construct reliability value is greater than 0.7. Thus, this research can be continued for further analysis.

3.3 Structural Model Analysis

After analyzing the indicators of latent variable formation, the next analysis is regression analysis with full model Structural Equation Modeling (SEM) statistics. At the initial stage, the SEM regression model will be tested for quality to ensure that the constructs and indicators to be analyzed have high quality and relevance so that the model output can be used for decision-making (Gonu *et al.* 2023). Analysis of data processing results at the full SEM model stage by conducting model feasibility tests and causality significance tests. The path diagram for the full model analysis that has eliminated invalid indicators is presented as follows:

Figure 2. Structural model indices



Source: Data analysis, 2023

Figure 2 presents the results of the model feasibility test showing model fit. This model has previously been modified (Modification indices) and model evaluation. The model evaluation uses several goodness-of-fit index criteria to measure whether the proposed model is good (Black and Babin, 2019). This test is carried out to determine how appropriate (fit) the model is in the study. The results of the model goodness of fit (GOF) test after modification can be seen in Table 4 below:

Table 4. Model fit indices

The Goodness of Fit Index	Cut-off Value	Analysis Results	Model
X^2/df	Minimum/<3.00	2.379	Fit
Significant Probability	≥0.05	0.087	Fit
RMSEA	≤0.08	0.074	Fit
GFI	≥0.90	0.908	Fit
AGFI	≥0.90	0.877	Fit
CMIN/DF	≤2.00	1.310	Fit
TLI	≥0.90	0.995	Fit
CFI	≥0.90	0.928	Fit

Source: Data analysis, 2023

Based on the goodness of fit test results in Table 4. shows the value of the Chi-Square, Probability index, RMSEA, GFI, AGFI, CMIN / DF, TLI, and CFI have met the requirements of the goodness of fit index criteria. The goodness of fit test results indicates that the study's model cannot be accepted. The model is acceptable for research.

3.4 Hypothesis Test

Table 5 will present the results of the research hypothesis test. Hypothesis testing is done using the t-value with a significance level of 0.05. The t-value in the AMOS program is the Critical Ratio (c.r) value on the Regression Weight of the fit model. Suppose the Critical Ratio (c.r) value is greater than 1.967. Alternatively, if the probability value is greater than 0.05, then Ho is rejected (the research hypothesis is accepted). The following are the results of AMOS SEM statistical processing of the full research model:

Table 5. Hypothesis test results

Variable	Direct Effect Coefficients (Standardized)	Indirect Effect	C.R.	Sig<0.05	Labelling
Role of Tourism Village → Social Capital	0.313	-	4,543	0.000 (Sig)	Accepted
Role of Tourism Village → Community Based Tourism	0.234	-	3,162	0.002 (Sig)	Accepted
Role of Tourism Village → Sustainable Tourism	-0.035	-	-0,404	0.686 (Not Sig)	Rejected
Social Capital → Sustainable Tourism	0.438	-	3,640	0.000 (Sig)	Accepted
Community Based Tourism → Sustainable Tourism	0.666	-	4,421	0.000 (Sig)	Accepted
Role of Tourism Village → Social Capital → Sustainable Tourism*	-	0.137	2.837	0.002 (Sig)	Accepted
Role of Tourism Village → Community Based tourism → Sustainable Tourism*	-	0.156	2,563	0.005 (Sig)	Accepted

*Sobel Test Partial Mediated
Source: Data analysis, 2023

From the results of data analysis, as shown in Table 5, it can be interpreted that in **H1**, it is proven that the role of tourism village has a significant positive effect on social capital, so when changes occur in the role of tourism village will cause changes in social capital by 31.3 percent. Meanwhile, **H2**, which proposes that the role of tourism village has a significant positive effect on community-based tourism, is also proven to be influential in this study. This can be seen from the c.r value 3.162 with a probability p-value of 0.002. These results show that the role of tourism village has a significant positive effect on community-based tourism, with a value of 16.2% contribution to changes in community-based tourism. In other words, community-based tourism can increase by 16.2 percent if the role of the tourism village is increased. In terms of **H3**, it is known that the role of the tourism village is partially proven not to affect sustainable tourism because the acquisition of a c.r value of 0.686 is below the standard value (c.r) of 1.967, and a significant value is also above 0.05. Meanwhile, for **H4**, it is known that the estimated value of the effect of social capital on sustainable tourism is positive at 0.438. This means that the better social capital is applied, the more sustainable tourism will increase by 43.8 percent. The c.r value is 3.640, and the p-value is 0.000, which means that the influence of social capital on sustainable tourism is significant. In addition, the estimation of **H5** shows that community-based tourism has a positive and significant influence on sustainable tourism, with a contribution value of 66.6%. The acquisition of the c.r value of 4.421 and a p-value of 0.000 means that the influence that occurs is significant. There will be an increase in sustainable tourism if community-based tourism is improved. Although the variable role of tourism village proved directly has no effect on sustainable tourism, the relationship is mediated by social capital and community-based tourism variables, and the influence that occurs will change to be significant. This can be seen from the results of processed data contained in **H6**, which shows that the path coefficient value of the indirect effect of the role of tourism village on sustainable tourism through social capital is positive, 0.137. That is, the more the role of the tourism village is improved, the more sustainable tourism will also increase, as well as social capital, which will increase if the role of the tourism village is improved. The indirect effect is only able to contribute 13.7 percent. The presence of social capital as a mediating variable between the role of tourism village on sustainable tourism is proven to have a positive and significant effect. However, the influence that arises is smaller when compared to the direct influence of the role of tourism village on sustainable tourism. Based on the results of the Sobel test (Sobel, 1982) using the Sobel online calculator which was carried out online, the Sobel test statistic value was obtained with a c.r value of 2.837 and a p-value of 0.002; this means that the indirect influence that occurs can be declared significant. Meanwhile, for **H7** as the final hypothesis in this research, based on the results of the analysis, it can

be concluded that community-based tourism as a mediating influence of the role of tourism village on sustainable tourism has proven to have a positive and significant influence, with an indirect influence contribution of 15.6 percent. Sustainable and community-based tourism will increase if the role of tourist villages is increased. The indirect influence that arises as a result of the mediating role of community-based tourism is very small when compared to the direct influence of the role of tourism village on sustainable tourism; however, even though the influence is small, it is still declared significant because the Sobel test results obtained a c.r value of 2.563 with a significance value of 0.005.

4. Discussions

4.1 Influence of Role of Tourism Village on Social Capital, Community-Based Tourism and Sustainable Tourism

The results of data analysis prove that this research has found a positive influence between the role of tourism village on social capital with a significance value of 0.000 and an estimated contribution value score of 0.313 or 31.3%. This means that the role of tourism village has had a significant influence on social capital. This research confirms the results of previous research conducted by (Scott 2012; Rocca and Zielinski 2022) that social capital has a causal relationship with the role of tourism village. Strong social capital owned by a social community requires intervention from stakeholders in tourism development; the role of tourism villages is one of them. Tourism villages have an important role in encouraging the sustainability of tourism in rural areas (Yachin and Ioannides 2020).

This research also reveals a positive influence between the role of tourism village and community-based tourism, with a significance value of 0.002 and an estimated value of 0.234 or 23.4%. This means that the influence of the role of tourism village on community-based tourism is significant. The results of this research strengthen the results of research from (Noor and Zulfiani 2021; Syafrini *et al.* 2023), which states that rural tourism management cannot be separated from the role of tourism villages and community-based tourism because the community is the core of the tourist village and the main subject in rural tourism management. Tourist villages are given the authority to manage their rural tourism; this is intended so that rural tourism can progress and develop (Arafi *et al.* 2022). With the role of tourism villages, it is hoped that they will be able to increase the capacity of stakeholders and assist rural tourism managers to improve the welfare of local communities (Rosalina *et al.* 2023).

This research found no influence between the role of tourism village on sustainable tourism partially because the significance value of 0.686 was below 0.05 and the estimated value given was also very small, namely -0.035 or 3.5%. This means that the influence of the role of tourism village on sustainable tourism is not significant. The research results contradict the results of research conducted (Ruhanen 2012; Wang and Xu 2014), which states that to create sustainable tourism, the role of tourist villages plays a large role in it. Although the results of this research do not support the results of their research, they do support the statement expressed by (Rusyidi and Fedryansah, 2018) that in realizing sustainable tourism, three important roles are needed that support each other and cannot be separated between the three, namely the roles of government, private sector, and society. The role of government in this case can be linked to the role of tourism villages because when we talk about village-level tourism, the government system in Indonesia, which is at the lowest level, is the village government. Even though the village is stated to be the lowest government, the village government has the authority. It plays a role in direct involvement in organizing tourism in the village (Wang and Xu 2014) as a motivator and, at the same time, as a facilitator for tourism development in the village (Simamora and Sinaga, 2016). Through various policies, tourist villages can play their role in directing (Liu *et al.* 2020), encouraging the implementation of tourism in the desired direction (Yang *et al.* 2021), and implementing various financial, marketing, technical assistance, consultation and coordination strategies (Kata *et al.* 2022).

The role of a tourism village is measured using four indicators, namely: cultural role, economic role, social role, and financial role (Adi and Mulyadi 2019). For the role of tourism village variable, the highest loading factor is the economic role indicator, namely 0.735 or 73.5%. This means that the role of a tourism village, according to the respondents studied that they most want, is an economic role. This is by the opinion (Rosalina *et al.* 2023) that community-based tourism focuses on improving the economy and the welfare of local communities. The birth of a tourist village will likely contribute to the surrounding community's economy, providing new employment opportunities for the local community.

4.2 Influence of Social Capital and Community-Based Tourism on Sustainable Tourism

Research has proven a positive influence between social capital on sustainable tourism with a significance value

of 0.000 and an estimated value of 0.438 or 43.8%. This means that the influence of social capital on sustainable tourism is significant. This research strengthens the results of research from (Hwang and William 2017; Arifin 2017), which said that the success of implementing sustainable tourism at the village level is the active involvement of local communities reflected in social capital. Social capital has been proven to play a role in developing sustainable tourism (Aji and Faniza 2022). Giango *et al.* (2022) states that local community support in the form of social capital is needed for sustainable development and tourism.

This research also found a positive influence between community-based and sustainable tourism, with a significance value 0.000 and an estimated score of 0.666 or 66.6%. This means that the influence of community-based tourism on sustainable tourism is significant. The results of this research strengthen the research results (Adi and Mulyadi 2019; Nurlena *et al.* 2021; Utami *et al.* 2022), which have proven that there is a significant positive influence between community-based tourism and sustainable tourism. Community-based tourism is necessary as a strategy for developing sustainable tourism (Wijaya and Sudarmawan 2019). Community participation in community-based tourism is necessary for every sustainable development, as stated by (Gunn and Var 2020), who emphasized that "Local people participation is prerequisite for sustainable tourism."

The social capital variable is measured using four indicators: trust, mutual help, network, norms, and tolerance (Putnam 2015; Kollmuss and Julian 2022). The highest loading factor for the social capital variable is the mutual help and network indicator, 0.764 or 76.4%. According to the respondents studied, the social capital they most want is mutual help and network. Cooperation, mutual assistance, and internal and external networking are needed to develop sustainable tourism to achieve goals, including improving the community's economy and creating natural environmental sustainability (Saputra *et al.* 2023) building cooperation between stakeholders in sustainable tourism management and networks between stakeholders. Networks have an important role in the process of sustainable tourism development. The network developed aims to build good relationships with all elements. In maintaining the network, coordination must be carried out vertically and horizontally. This ensures that communication remains good (Maulidah and Setiajid 2021). Social capital positively correlates with the physical environment and the development of community interactions (Zhai and Ng 2013).

The community-based tourism variable is measured using five indicators: public participation, institutional collaboration, local wisdom, and inclusiveness of rural development (Saarinen 2006; Nurhidayati 2007). The highest loading factor for the community-based tourism variable is the local wisdom indicator, 0.625 or 62.5%. This means that community-based tourism, according to the respondents studied, what they most want is to maintain local wisdom. The values of local wisdom contained in tourist attractions must be maintained and preserved because the unique traditions of the community have a high intention to sell local wisdom (Permatasari *et al.* 2022). Maintaining the uniqueness of cultural tourism through local wisdom is very much needed in realizing sustainable tourism.

Meanwhile, the sustainable tourism variable is measured using four indicators, namely: sustainable management, social and economic sustainability, cultural sustainability, and environmental sustainability (Schönherr *et al.* 2023; Mihalič *et al.* 2012; Roberts and Tribe 2008; Pitana and Diarta 2009). The highest loading factor for the sustainable tourism variable is the social and economic sustainability indicator, 0.668 or 66.8%. This means that according to the respondents studied, what they want most is social and economic sustainability. Good planning must also be considered in developing sustainable tourism, especially from a community, economic, social, and cultural perspective. Therefore, there is great potential in a sustainable tourism development approach that aims to support efforts to protect the natural and cultural environment and increase community participation in management to provide economic benefits to local communities. Ardika (2018) states that in creating a sustainable tourism world, involving local communities in tourism activities is necessary, which can provide many benefits in the economic, social, cultural, and job creation fields. Preserving environmental conditions and spurring local economic growth, This tourist village concept can become a form of environmentally friendly tourism in the future (Putra 2013).

Based on the results of the research on the results of statistical tests as explained above, the researchers obtained a picture that the influence of the role of tourism village on social capital and community-based tourism and the influence of social capital and community-based tourism on sustainable tourism has been empirically proven to be able to provide significant contribution to sustainable tourism in West Sumatra, Indonesia. However, the role of the tourism village in this research was proven unable to contribute partially to sustainable tourism (insignificant influence). The test results show that not all research hypotheses can be tested empirically. However, it is proven to have a significant effect if the role of tourism village is mediated by social capital and community-based tourism on sustainable tourism.

Based on the research results and discussion above, if it is linked to the theory used to analyze problems

in the field, the theory is true in the researcher's opinion. This research has proven it, so the theory is still quite current and relevant, according to the researcher. This research does not produce new theories or invalidate existing theories but can strengthen the theories used by researchers, except for the role of tourism village variable on sustainable tourism; the research results contradict the theory used because the influence is insignificant. This could be because the context and object of the research are slightly different from previous research, in which the object only focused on village-level panel research managed by local community groups.

Conclusions

Based on the results of data analysis in this research, the role of the tourism village variable has been proven to have a significant positive effect on social capital and community-based tourism. The social capital and community-based tourism variables have also been proven to affect sustainable tourism significantly. Each of these influences occurs partially. One variable that is proven to have no influence on sustainable tourism is the role of tourism village variable. This variable is proven unable to influence sustainable tourism partially (the influence is not significant). However, it is proven to have a significant effect if the role of village tourism is mediated by social capital and community-based tourism on sustainable tourism. So, the test results show that not all hypotheses proposed in the research can be tested empirically.

The most dominant loading factor of the indicators for each of these variables is: For the role of tourism village, according to the researched respondents, what they most want is an economic role, while for Social Capital, according to the researched respondents, what they most want is Mutual Help and Network, for community-based tourism, according to the respondents studied, what they want most is local wisdom and the last one, while for the sustainable tourism variable, according to the respondents studied, what they want most is social and economic sustainability.

This study has theoretical and practical implications, namely that the proposed hypothetical model can be used as a new model for managing sustainable tourism, which is managed participatively by using social capital and community-based tourism as mediating variables in realizing the success of sustainable tourism.

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Jumiati: Conceptualization, Investigation, Project administration, Writing – original draft, Supervision, Funding acquisition.
Boni Saputra: Conceptualization, Methodology, Software, Formal analysis, Writing – original draft, Writing – review and editing.
Aldri Frinaldi: Conceptualization, Investigation, Project administration, Writing – original draft, Data curation.
Nora Eka Putri: Conceptualization, Investigation, Formal analysis, Writing – original draft, Data curation, Validation.

Declaration of Competing Interest:

The authors declare that there are no conflicts of interest that relate to the research, authorship, or publication of this article.

References

[1] Adi, I. N. R., and Mulyadi, M. 2019. Mediasi Community Based Tourism Pada Pengaruh Peran Desa Adat Terhadap Pembangunan Pariwisata Berkelanjutan di Desa Penglipuran Kabupaten Bangli. *Jurnal Media Bina Ilmiah*, *14*(3), 2267–2280. Available at: https://pdfs.semanticscholar.org/a3b5/8d900eb1d53b12279711a87da6d8c020b838.pdf

[2] Aimon, H., Zulvianti, N., and Abror. 2023. Do Sustainable Tourism Development, Psychological Safety, and Halal Friendly Destination Performance Lead to Tourist Electronic Word of Mouth? The Role of Tourist Satisfaction. *International Journal of Sustainable Development and Planning*, *18*(4), 1167–1178. DOI:https://doi.org/10.18280/ijsdp.180421

[3] Aji, R R. 2020. Tourism social entrepreneurship in community-based tourism: A case study of Pentingsari tourism village. *International Conference on Planning towards Sustainability (ICoPS) 2019 6–7 November 2019, Surakarta, Indonesia*. DOI: https://doi.org/10.1088/1755-1315/447/1/012009

[4] Aji, Riswandha Risang, and Faniza, V. 2022. Peran Modal Sosial dalam Pengembangan Komponen Pariwisata di Desa Wisata Pentingsari. *Barista: Jurnal Kajian Bahasa Dan Pariwisata*, *9*(2), 47–59. DOI:https://doi.org/10.34013/barista.v9i02.703

[5] Aleshinloye, K. D., Woosnam, K. M., Tasci, A. D. A., and Ramkissoon, H. 2021. Antecedents and Outcomes of Resident Empowerment through Tourism. *Journal of Travel Research*, *16*(3), 656–673. DOI:https://doi.org/10.1177/0047287521990437

[6] Alhadi, Z., Zefnihan, Muchtar, B., and Evanita, S. 2023. Developing a Community-Based Tourism Model for Sustainable Tourism in the Mandeh Area, West Sumatra Province, Indonesia. *International Journal of Sustainable Development and Planning*, *18*(11), 3491–3503. DOI: https://doi.org/10.18280/ijsdp.181114

[7] Andereck, K. L., Valentine, K. M., Knopf, R. C., and Vogt, C. A. 2005. Residents' perceptions of community tourism impacts. *Annals of Tourism Research*, *32*(4), 1056–1076. DOI:https://doi.org/10.1016/j.annals.2005.03.001

[8] Arafi, A. Al, Jamal, M., and Surya, I. 2022. The Role Of The Village Head In Tourism Development in Luan Village, Muara Samu District, Paser District. *Jurnal Ilmu Pemerintahan*, *10*(2), 394–403. Available at:https://e-journals2.unmul.ac.id/index.php/jip/article/view/983/343

[9] Ardika, I. M. 2018. Kontribusi Industri Pariwisata (Sub Sektor Perhotelan dan Restoran) Terhadap Penyerapan Tenaga Kerja di Kabupaten Klungkung Tahun 2011-2015. *Jurnal Pendidikan Ekonomi Undiksha*, *10*(1). DOI: https://doi.org/10.23887/jjpe.v10i1.20111 (in Indonesian)

[10] Arifin, A. P. R. 2017. Pendekatan Community Based Tourism dalam Membina Hubungan Komunitas di Kawasan Kota Tua Jakarta. *Jurnal Visi Komunikasi*, *16*(1), 111–130. DOI:https://doi.org/http://dx.doi.org/10.22441/visikom.v16i1.1647

[11] Asianingsih, N. L. N. R., Dewi, N. D. utari, and Widnyani, I. A. P. S. 2023. Pengembangan Desa Wisata Berbasis Community Based Tourism (CBT) pada Desa Wisata Air Terjun, Desa Adat Mekar Sari Kabupaten Tabanan. *Jurnal Studi Perhotelan Dan Pariwisata*, *2*(1), 23–36. DOI: https://doi.org/10.35912/jspp.v2i1.2387

[12] Benur, A. M., and Bramwell, B. 2015. Tourism product development and product diversification in destinations. *Tourism Management*, *50*, 213–224. DOI: https://doi.org/10.1016/j.tourman.2015.02.005

[13] Black, W., and Babin, B. J. 2019. *Multivariate Data Analysis: Its Approach, Evolution, and Impact*. New Jersey: Prentice Hall.

[14] BPS. 2023. *Kunjungan Wisatawan Nusantara Menurut Kabupaten/Kota di Provinsi Sumatera Barat*. Padang.

[15] Bruyn, C. de, Said, F. Ben, Meyer, N., and Soliman, M. 2023. Research in tourism sustainability: A comprehensive bibliometric analysis from 1990 to 2022. *Heliyon*, *9*, 1–22. DOI:https://doi.org/10.1016/j.heliyon.2023.e18874

[16] Buckley, R. 2012. Sustainable tourism: Research and reality. *Annals of Tourism Research*, *39*(2), 528–546. DOI: https://doi.org/10.1016/j.annals.2012.02.003

[17] Butler, M. 2014. Using governance to manage information assets and prevent digital data avalanches. *Journal of the American Health Information Management Association*, *85*(10), 25–28. Available at: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3bandscp=84908207401andorigin=inward

[18] Dowling, R., Newsome, D., and Moore, S. 2002. *Natural Area Tourism: Ecology, Impacts and Management*. Clevedon, UK: Channel View Publications.

[19] Edwin, and Pramudia. 2008. *Evaluasi Potensi Obyek Wisata Aktual di Kabupaten Agam Sumatera Barat Untuk Perencanaan Program Pengembangan* (Institut Pertanian Bogor). Available at: http://repository.ipb.ac.id/handle/123456789/9130 (in Indonesian)

[20] Fathy, R. 2019. Modal Sosial: Konsep, Inklusivitas dan Pemberdayaan Masyarakat. *Jurnal Pemikiran Sosiologi*, *6*(1), 1–17. (in Indonesian)

[21] Frinaldi, A., Saputra, B., Embi, M. A., Habibie, D. K., and Hashanah, F. 2023. Mediation Effect of Job Satisfaction: Work Motivation and E-Government on Service Quality in the Government of Aceh Singkil, Indonesia. *Journal of Public and Nonprofit Affairs (JPNA)*, *9*(3), 317–337. DOI:https://doi.org/10.20899/jpna.9.3.317–337

[22] Giango, M. K., *et al.* 2022. Local Support on Sports Tourism Development: An Integration of Emotional Solidarity and Social Exchange Theory. *Sustainability (Switzerland)*, *14*(19). DOI:https://doi.org/10.3390/su141912898

[23] Goh, H. C. 2015. Nature and Community-based tourism (CBT) for poverty alleviation: A case study of Lower Kinabatangan, East Malaysia. *Geografia: Malaysian Journal of Society and Space*, *11*(12), 42–51. Availab le at: https://api.semanticscholar.org/CorpusID:56023047

[24] Gonu, E., Agyei, P. M., Richard, O. K., and Asare-Larbi, M. 2023. Customer orientation, service quality and customer satisfaction interplay in the banking sector: An emerging market perspective. *Cogent Business and Management*, *10*(1), 1–20. DOI: https://doi.org/10.1080/23311975.2022.2163797

[25] Grootaert, C., Narayan, D., Jones, V. N., and Woolcock, M. 2004. *Measuring social capital: An integrated questionnaire*. Washington DC: World Bank.

[26] Gunn, C. A., and Var, T. 2020. *Tourism planning: Basics, concepts, cases*. New York: Routledge.

[27] Han, S., Ramkissoon, H., You, E., and Kim, M. J. 2023. Support of residents for sustainable tourism development in nature-based destinations: Applying theories of social exchange and bottom-up spillover. *Journal of Outdoor Recreation and Tourism*, *43*. DOI: https://doi.org/10.1016/j.jort.2023.100643

[28] Hausler, N. 2005. Planning for Community Based Tourism-A Complex and Challenging Task. *The International Ecoutourism Society*.

[29] Herdiana, D. 2019. Peran Masyarakat dalam Pengembangan Desa Wisata Berbasis Masyarakat. *Jurnal Master Pariwisata (JUMPA)*, *6*(1), 63–86. DOI: 10.24843/JUMPA.2019.v06.i01.p04 (in Indonesian)

[30] Hwang, D., and William, P. 2017. Social Capital and Collective Action in Rural Tourism. *Journal of Travel Research*, *56*(1).

[31] Jugmohan, S., Spencer, J. P., and Steyn, J. N. 2016. Local natural and cultural heritage assets and community based tourism : challenges and opportunities. *African Journal for Physical Activity and Health Sciences (AJPHES)*, *22*(1–2), 306–317. Available at: https://www.researchgate.net/publication/303020246

[32] Junaid, I., Dewi, W. O., Said, A., and Hanafi, H. 2022. Pengembangan Desa Wisata Berkelanjutan: Studi Kasus di Desa Paccekke, Kabupaten Barru, Indonesia. *Journal of Regional and Rural Development Planning*, *6*(3), 287–301. DOI: https://doi.org/10.29244/jp2wd.2022.6.3.287-301

[33] Kata, R., Cyran, K., Dybka, S., Lechwar, M., and Pitera, R. 2022. The Role of Local Government in Implementing Renewable Energy Sources in Households (Podkarpacie Case Study). *Energies*, *19*(9), 1–22. DOI: https://doi.org/10.3390/en15093163

[34] Kayat, K. 2015. Community-based rural tourism as a sustainable development alternative: An analysis with special reference to the community-based rural homestay programmes in Malaysia. *Theory and Practice in Hospitality and Tourism Research - Proceedings of the 2nd International Hospitality and Tourism Conference* https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b%5Candscp=84907353072%5Candorigin=inward

[35] Kollmuss, A., and Julian, A. 2022. Mind the Gap: Why do People Act Environmentally and What are the Barriers to Pro-Environtmental Behaviour. *Environmental Education Research*, *8*(3).

[36] Kontogeorgopoulos, N., Churyen, A., and Duangsaeng, V. 2013. Success Factors in Community-Based Tourism in Thailand: The Role of Luck, External Support, and Local Leadership. *Tourism Planning and Development*, *11*(1), 106–124. DOI: https://doi.org/10.1080/21568316.2013.852991

[37] Kurniawati, R. 2013. *Modul Pariwisata Berkelanjutan*. (in Indonesian)

[38] Lanin, D., Saputra, B., Syamsir, and Magriasti, L. 2023. Assessing the Mediating Effect of the Role of Public Managers Between Service Quality and Public Satisfaction of Multiple Ethnicities in Local Governments in Sumatra, Indonesia. *Public Policy and Administration*, *22*(1), 33–47. DOI:https://doi.org/https://doi.org/10.5755/j01.ppaa.22.1.33725

[39] Lenao, M. 2015. Challenges facing community-based cultural tourism development at Lekhubu Island, Botswana: a comparative analysis. *Current Issues in Tourism*, *18*(6), 579–594. DOI:https://doi.org/10.1080/13683500.2013.827158

[40] Liu, C., Dou, X., Li, J., and Cai, L. A. 2020. Analyzing government role in rural tourism development: An empirical investigation from China. *Journal of Rural Studies*, *79*, 177–188. DOI:https://doi.org/10.1016/j.jrurstud.2020.08.046

[41] Llupart, M. R. N. 2022. Theoretical Model for the Analysis of Community-Based Tourism: Contribution to Sustainable Development. *Sustainability*, *14*(7), 1–41. DOI: https://doi.org/10.3390/su141710635

[42] Maftuhah, D. I., and Wirjodirdjo, B. 2018. Model for developing five key pillars of sustainable tourism: A literature review. *International Conference on Engineering, Technology, and Industrial Application (ICETIA)*. DOI: https://doi.org/10.1063/1.5042979

[43] Maulidah, S., and Setiajid, S. 2021. Modal Sosial dalam Pengembangan Desa Wisata (Studi Diskriptif Kualitatif di Desa Pandansari Kecamatan Warungasem Kabupaten Batang). *Unnes Political Science Journal*, *5*(2), 48–52. DOI: https://doi.org/https://doi.org/10.15294/upsj.v5i2.48839

[44] Mihalič, T., Žabkar, V., and Cvelbar, L. K. 2012. A hotel sustainability business model: evidence from Slovenia. *Journal of Sustainable Tourism*, *20*(5), 701–719. DOI:https://doi.org/10.1080/09669582.2011.632092

[45] Moyle, C., Moyle, B., Ruhanen, L., Bec, A., and Weiler, B. 2018. Business sustainability: How does tourism compare? *Sustainability*, *10*(4). DOI: https://doi.org/10.3390/su10040968

[46] Mubarak, A., Saputra, B., Frinaldi, A., and Suryani, A. 2023. Environmental Sustainability Analysis: A Theoretical Review of Emissions and Sanitation Management in Realizing Sustainable Tourism at Turtle Tourism Beaches in West Sumatra, Indonesia. *5th International Conference on Environment, Sustainability Issues and Community Development, INCRID 2023*, 1–7. DOI: https://doi.org/10.1088/1755-1315/1268/1/012005

[47] Müllera, S. 2020. Sustainable community-based tourism in cambodia and tourists' willingness to pay. *Austrian Journal of South-East Asian Studies*, *13*(1), 81–101. DOI: https://doi.org/10.14764/10.ASEAS-0030

[48] Noor, M. F., and Zulfiani, D. 2021. *"Indikator Pengembangan Desa Wisata" Jilid I*. Available at: https://repository.unmul.ac.id/bitstream/handle/123456789/18174/INDIKATORPENGEMBANGANDESAWISATA JILID I_Ok.pdf?sequence=1 (in Indonesian)

[49] Nugraheni, A. I. P., Priyambodo, T. K., Kusworo, H. A., and Sutikno, B. 2019. The social dimension of sustainable development: defining tourism social sustainability. *International Conference on Engineering, Science, and Commerce (ICESC)*, 168–175. DOI: https://doi.org/10.4108/eai.18-10-2019.2289855

[50] Nurhidayati, S. E. 2007. Community Based Tourism (CBT) sebagai Pendekatan Pembangunan Pariwisata Berkelanjutan. *Media Masyarakat Kebudayaan Dan Politik*, *10*(3), 191–202. Available at: https://journal.unair.ac.id/filerPDF/abstrak_214715_tpjua.pdf

[51] Nurlena, N., Taufiq, R., and Musadad. 2021. The Socio-Cultural Impacts of Rural Tourism Development: A Case Study of Tanjung Tourist Village in Sleman Regency. *Jurnal Kawistara*, *11*(62–74). DOI: https://doi.org/10.22146/kawistara.62263

[52] Permatasari, Y. D., Sholihah, M., and Ratnasari, K. I. 2022. Revitalization Strategy for Local Wisdom as an Effort to Improve Tourism Destination in Jember Regency. *Proceedings of Annual Conference on Community Engagement*, 119–136. Available at: https://proceedings.uinsby.ac.id/index.php/ACCE/article/view/1055/762

[53] Phiri, A. C. 2016. *Tourism and economic growth in South Africa: Evidence from linear and nonlinear cointegration frameworks* (North West Universit). Available at: https://repository.nwu.ac.za/handle/10394/23776

[54] Pitana, I. G., and Diarta, I. K. S. 2009. *Pengantar Ilmu Pariwisata*. Yogyakarta: Andi Offset. (in Indonesian)

[55] Putnam, R. D. 2015. *Bowling Alone: America's Declining Social Capital*. Routledge.

[56] Putra, T. R. 2013. Peran Pokdarwis dalam Pengembangan Atraksi Wisata di Desa Wisata Tembi, Kecamatan Sewon-Kabupaten Bantul. *Jurnal Pembangunan Wilayah and Kota*, *9*(3), 225–235.

[57] Ramkissoon, H. 2023. Perceived social impacts of tourism and quality-of-life: a new conceptual model. *Journal of Sustainable Tourism*, *31*(2), 442–459. DOI: https://doi.org/10.1080/09669582.2020.1858091

[58] Regmi, K. D., and Walter, P. G. 2016. Conceptualising host learning in community-based ecotourism homestays. *Journal of Ecotourism*, *15*(1), 51–63. DOI: https://doi.org/10.1080/14724049.2015.1118108

[59] Reimer, J. K. K., and Walter, P. 2013. How do you know it when you see it? Community-based ecotourism in the Cardamom Mountains of southwestern Cambodia. *Tourism Management*, *34*, 122–132. DOI:https://doi.org/10.1016/j.tourman.2012.04.002

[60] Roberts, S., and Tribe, J. 2008. Sustainability Indicators for Small Tourism Enterprises – An Exploratory Perspective. *Journal of Sustainable Tourism*, *16*(5), 575–594. DOI:https://doi.org/10.1080/09669580802159644

[61] Rocca, L. H. D., and Zielinski, S. 2022. Community-based tourism, social capital, and governance of post-conflict rural tourism destinations: the case of Minca, Sierra Nevada de Santa Marta, Colombia. *Tourism Management Perspectives*, *43*. DOI: https://doi.org/10.1016/j.tmp.2022.100985

[62] Rosalina, P. D., Wang, Y., Dupre, K., Putra, I. N. D., and Jin, X. 2023. Rural tourism in Bali: towards a conflict-based tourism resource typology and management. *Tourism Recreation Research*, 1–15. DOI:https://doi.org/10.1080/02508281.2023.2223076

[63] Ruhanen, L. (2012). Local government: facilitator or inhibitor of sustainable tourism development? *Journal of Sustainable Tourism*, *21*(1), 80–98. DOI: https://doi.org/10.1080/09669582.2012.680463

[64] Ruiz-Ballesteros, E., and Hernández-Ramírez, M. 2010. Tourism that Empowers?: Commodification and Appropriation in Ecuador's Turismo Comunitario. *Critique of Anthropology*, *30*(2), 201–229. DOI:https://doi.org/10.1177/0308275X09345426

[65] Rusdi, Saputra, B., Wirdanengsih, and Hardi, E. 2024. Social Capital of the Harau Community in Preserving Rendang Daun Kayu: Maintaining the Sustainability of Traditional Minangkabau Cuisine. *Kurdish Studies*, *12*(1), 3502–3508. DOI: https://doi.org/10.58262/ks.v12i1.248

[66] Rusyidi, B., and Fedryansah, M. 2018. Pengembangan pariwisata berbasis masyarakat. *Focus : Jurnal Pekerjaan Sosial*, *1*(3), 155–165. DOI: https://doi.org/10.24198/focus.v1i3.20490

[67] Saarinen, J. 2006. Traditions of sustainability in tourism studies. *Annals of Tourism Research*, *33*(4), 1121–1140. DOI: https://doi.org/10.1016/j.annals.2006.06.007

[68] Saarinen, J., and Rogerson, C. M. 2014. Tourism and the Millennium Development Goals: perspectives beyond 2015. *Tourism Geographies*, *16*(1), 23–30. DOI: https://doi.org/10.1080/14616688.2013.851269

[69] Salazar, N. B. 2012. Community-based cultural tourism: Issues, threats and opportunities. *Journal of Sustainable Tourism*, *20*(1), 9–22. DOI: https://doi.org/10.1080/09669582.2011.596279

[70] Saputra, B., Pegi, A. L., and Suripto. 2023. Reinventing the Authenticity of Nature Tourism: Social Capital-Based Ecotourism Development in Sendang Sombomerti. *5th International Conference on Environment, Sustainability Issues and Community Development*, 1–8. DOI: https://doi.org/10.1088/1755-1315/1268/1/012004

[71] Saputra, K. A. K., Subroto, B., Rahman, A. F., and Saraswati, E. 2022. Eco-Efficiency and Energy Audit to Improve Environmental Performance: An Empirical Study of Hotels in Bali-Indonesia. *International Journal of Energy Economics and Policy*, *12*(6), 175–182. DOI: https://doi.org/10.32479/ijeep.13565

[72] Schönherr, S., Peters, M., and Kuščer, K. 2023. Sustainable tourism policies: From crisis-related awareness to agendas towards measures. *Journal of Destination Marketing and Management*, *27*. DOI:https://doi.org/10.1016/j.jdmm.2023.100762

[73] Scott, J. 2012. Tourism, civil society and peace in cyprus. *Annals of Tourism Research*, *39*(4), 2114–2132. DOI: https://doi.org/10.1016/j.annals.2012.07.007

[74] Shahbaz, M., Bashir, M. F., Bashir, M. A., and Shahzad, L. 2021. A bibliometric analysis and systematic literature review of tourism-environmental degradation nexus. *Environmental Science and Pollution Research*, *28*(41), 58241–58257. DOI: https://doi.org/10.1007/s11356-021-14798-2

[75] Sharpley, R. 2010. Tourism and Sustainable Development: Exploring the Theoretical Divide. *Journal of Sustainable Tourism*, *8*(1), 1–19. DOI: https://doi.org/10.1080/09669580008667346

[76] Sigala, M. 2020. Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. *Journal of Business Research*, *117*, 312–321. DOI: https://doi.org/10.1016/j.jbusres.2020.06.015

[77] Simamora, R. K., and Sinaga, R. S. 2016. Peran pemerintah daerah dalam pengembangan pariwisata alam dan budaya di Kabupaten Tapanuli Utara. *JPPUMA: Jurnal Ilmu Pemerintahan Dan Sosial Politik UMA (Journal of Governance and Political Social UMA)*, *4*(1), 79–96. DOI:https://doi.org/10.31289/jppuma.v4i1.895

[78] Sobel, M. E. 1982. *Asymptotic confidence intervals for indirect effect in structural equation models. In S. Leinhardt (Ed.), Sociological Methodology 1982*. Washington DC: American Sociological Association.

[79] Soliman, M. S. A. 2014. Pro-poor tourism in protected areas – opportunities and challenges: "The case of Fayoum, Egypt." *Anatolia*, *26*(1), 61–72. DOI: https://doi.org/10.1080/13032917.2014.906353

[80] Solimun, S., Fernandes, A. A. R., and Nurjannah, N. 2017. *Metode Statistika Multivariat : Pemodelan Persamaan Struktural (SEM) Pendekatan WarpPLS*. Malang: Universitas Brawijaya Press.

[81] Suandi. 2014. Hubungan Modal Sosial dengan Kesejahteraan Ekonomi Keluarga di Daerah Perdesaan Jambi. *Jurnal Komunitas*, *6*(1).

[82] Suansri, P. 2003. *Community based tourism handbook*. Thailand: Responsible Ecological Social Tour-REST.

[83] Susilo, R. K. D., and Dharmawan, A. S. 2021. Paradigma Pariwisata Berkelanjutan di Indonesia dalam Perspektif Sosiologi Lingkungan. *Jurnal Indonesia Maju*, *1*(1), 49–64. Available at: https://jurnalim.andi17.com/index.php/jp/article/view/12

[84] Syafrini, D., Mardhiah, D., Permata, B. D., and Saputri, F. 2023. Social capital and cultural heritage tourism development in former mining town, West Sumatra, Indonesia. *Environment, Development and Sustainability*. DOI: https://doi.org/10.1007/s10668-023-04184-y

[85] Utami, V. Y., Yusuf, S. Y. M., and Mashuri, J. 2022. Penerapan Community Based Tourism dalam Pengembangan Pariwisata Berkelanjutan sebagai Upaya Pemberdayaan Sosial Ekonomi Masyarakat. *The Journalish: Social and Government*, *3*(3), 219–226. DOI: 10.55314/tsg.v3i3.286 (in Indonesian)

[86] Wang, C., and Xu, H. 2014. The role of local government and the private sector in China's tourism industry. *Tourism Management*, *45*, 95–105. DOI: https://doi.org/10.1016/j.tourman.2014.03.008

[87] Wijaya, N. S., and Sudarmawan, I. W. E. 2019. Community Based tourism (CBT) sebagai strategi pengembangan pariwisata berkelanjutan di DTW Ceking Desa Pekraman Tegallalang. *Jurnal Ilmiah Hospitality Management*, *10*(1), 77–98. DOI: https://doi.org/10.22334/jihm.v10i1.162

[88] Yachin, J. M., and Ioannides, D. 2020. "Making do" in rural tourism: the resourcing behaviour of tourism micro-firms. *Journal of Sustainable Tourism*, *28*(7), 1003–1021. DOI:https://doi.org/10.1080/09669582.2020.1715993

[89] Yang, L., Danwana, S. B., and Yassaanah, I. F. 2021. An Empirical Study of Renewable Energy Technology Acceptance in Ghana Using an Extended Technology Acceptance Model. *Sustainability*, *13*(19), 1–19. DOI: https://doi.org/10.3390/su131910791

[90] Zakiah, S., and Alhadihaq, M. Y. 2023. Sustainable Tourism: Effect of Destination Image on Loyalty Customers. *Journal of Environmental Management and Tourism*, *14*(6). DOI:https://doi.org/10.14505/jemt.v14.6(70).24

[91] Zhai, B., and Ng, M. K. 2013. Urban regeneration and social capital in China: A case study of the Drum Tower Muslim District in Xi'an. *CITIES The International Journal of Urban Policy and Planning*, *35*, 14–25. DOI: https://doi.org/https://doi.org/10.1016/j.cities.2013.05.003

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Geusun Ulun Museum as Sumedang Larang Kingdom Assets Entry Points of Tourism Destinations in Sumedang

Nurbaeti NURBAETI
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0000-0001-7750-2138; Researcher ID: GLU-0210-2022
nurbaeti@iptrisakti.ac.id

Heny RATNANINGTYAS
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0009-0006-1947-5278; Researcher ID: GLU-0203-2022
heny.ratnaningtyas@iptrisakti.ac.id

Sundring PANTJA DJATI
Institut Pariwisata Trisakti, Jakarta, Indonesia
ORCID: 0009-0007-8934-2216; Researcher ID: GLU-0200-2022
spantjadjati@iptrisakti.ac.id

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Abstract: Visit to the Geusun Ulun Museum are still very low compared to other tourist attractions in West Java; a management strategy for the Geusan Ulun Museum is needed. This study aims to apply a SWOT analysis to the Prabu Geusan Ulun Palace as an entry point for Sumedang tourist destinations. The research was conducted by observation and interviews. The results showed that the Geusun Ulun Museum had the highest score of 3.82 in quadrant/position I, which means that the condition of the Geusun Ulun Museum is very profitable and has opportunities and strengths so that it can take advantage of current opportunities; the strategy used is the SO/Strenght Opportunity strategy including: (1) Improving the presentation of collections to be more informative and conceptual; (2) The Nazir Prince Wakaf Sumedang Foundation, the manager of the Geusun Ulun Museum, is actively promoting and developing the Royal Sunda Museum; (3) The strategic location of the Museum is the main attraction for tourists; (4) The remaining land area is still widely used for facilities and infrastructure that still need to be created; (5) Cooperating with the private sector to promote through the internet about the Geusun Ulun Museum; (6) Package and synergize tour packages with travel agents.

Keywords: Geusun Ulun Museum; SWOT analysis; tourism destinations.

JEL Classification: L83; O18; Z11; R11.

Introduction

Sumedang Larang Palace, located in Sumedang, West Java, is one of the tourist attractions on Jl. Rey Geusan Ulun No. 40, Regol Wetan, Sumedang Regency, West Java. Inside the Sumedang Palace, there is the Geusun Ulun Museum, which was inaugurated in 1973 and served to store historical evidence of the birth of the Sumedang Larang Kingdom in the form of heirlooms such as royal crowns, kris, spears, gamelan, golden chariots, and other artifacts (Gantina et al., 2021).

The current condition is that the Geusun Ulun Museum has 6 (six) buildings: the Srimanganti, Bumi Kaler, Gendang, Gamelan, Cultural Heritage, and Railway. The palace yard is 1.88 ha, decorated with gardens and planted with rare trees. The following are the buildings in the Geusun Ulun Museum (Meisari et al., 2021): (1) Srimanganti Building with a collection of historical relics of the Sumedang government and as a venue for the Cianjuran Sunda Song performance; (2) Bumi Kaler Building with a collection of the relics of Prince Kornel; (3) Gendang Building with a public collection; (4) Gamelan building with a collection of gamelan heirlooms and a

place to practice Kesumedangan classical dance; (5) Heritage Building with a collection of heirlooms from the Sumedang ancestors; (6) The Train Building with a collection of trains.

Historical and cultural tourism destinations at the Geusun Ulun Museum are tourist attractions crowded with tourists on weekdays and holidays. Tourists can enjoy historical and cultural tourism through historical artifacts such as war heirlooms, royal attributes, kings' equipment, and ancient manuscripts from the Sumedang Kingdom (Mahdi, 2018). In addition to enjoying the heirlooms of the Sumedang Larang Kingdom, tourists can also enjoy cultural activities routinely held at the Geusun Ulun (Tubagus et al., 2021). The Museum held the Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival, which is the pride of the Sumedang indigenous people and has become a tradition since the first, where All heirloom collections in the Geusun Ulun Museum are removed for the ceremony. Only a few interested people attended the ceremony, such as the Heads of Customs and Prabu Sumedang Larang (Thresnawaty , 2011).

The management of the Geusun Ulun Museum and its human resources were handed over by the Nazir Prince Wakaf Sumedang Foundation, where the Sumedang Larang Palace family is. The palace and the foundation cannot be separated because, at first, the palace came from a foundation, which is a waqf that has been described previously. This must be a productive waqf derived from cultural heritage to create a system for cultural reconstruction and palace revitalization. The management of the palace as a heritage tourism destination has been regulated in the organizational structure of the foundation. Human resource management is needed for the sustainable management of the Geusun Ulun Museum. Namely, several employees needed to care for and maintain this Sundanese history and culture museum so that it continues to develop and remain sustainable. The foundation, as the leader of the Geusun Ulun Museum, constantly regulates employees by determining the division of labor, work relations, delegation of authority, integration, and coordination. Then, the foundation also directs employees to do all their duties properly and controls employees to obey administrative regulations and work according to plans.

Before collaborating with outside parties, many tourists needed to learn the history and cultural tourism of the Geusun Ulun Museum because of the need for more promotion by the Nazir Prince Waqf Foundation of Sumedang. The Nazir Prince Wakaf Sumedang Foundation is now collaborating with The Lodge Group and the Faculty of Art and Design of the Jakarta Arts Institute. Cooperation with The Lodge Group is to manage tickets and events that can be promoted through Posters, Brochures, Websites, Applications, X-banners, and social media. This can attract general tourists to visit the Geusun Ulun Museum.

Meanwhile, the collaboration with the Faculty of Fine Arts and Design at the Jakarta Arts Institute is to expand the research and community service field. Community service by making accessories and decorations from resin, stage make-up for children, and making accessories from used buttons that can be used during events held at the Geusun Ulun Museum. While in the research, IKJ students can do their final assignments, and IKJ lecturers can do research with the theme of the Relics of the Sumedang Larang Kingdom. This can attract tourists from students, namely Lecturers / Teachers, and Students can visit the Geusun Ulun Museum.

The total number of visitors to the Geusun Ulun Museum increased in the number of visitors from students and the general public. This needs special attention from the museum manager, the Nazir Prince Wakaf Sumedang Foundation. Further development is needed so the Geusun Ulun Museum can show the value of its stored collections to the public. Suppose the manager is fully aware of the function and role of the Museum, which is not only a place for storing ancient objects. In that case, many people will be more interested in visiting and more concerned with the existence of a museum.

The research gap in this research is the lack of promotion before the collaboration; before collaborating with outside parties, the Geusun Ulun Museum was not well known to many tourists because of the lack of promotion carried out by the Nazir Pangeran Wakaf Sumedang Foundation. In-depth research is needed on the impact of lack of promotion on the number of visitors before and after collaboration with external parties. Then, there has been no research that focuses on aspects of human resource management for the management of the Geusun Ulun Museum, and there has been no in-depth analysis regarding the further development of the Geusun Ulun Museum as a heritage tourism destination that can better demonstrate the values of its collections. Previous research has not measured the impact of collaboration with educational institutions and businesses on increasing museum visits and development. There is a lack of prior research that uses SWOT to reveal the strengths, weaknesses, opportunities, and threats possessed by analytical museums and determine appropriate development strategies.

The novelty of the research is that this research will contribute by applying SWOT analysis to identify internal and external factors that influence the Geusun Ulun Museum. This can better understand the museum's position in the tourism market. This research will provide new insights into the impact of collaboration with

external parties, such as The Lodge Group, the Faculty of Fine Arts and Design, and Jakarta Arts Institute, on the promotion, development, and number of visitors to the Geusun Ulun Museum. The novelty of this research lies in its focus on human resource management, especially in the context of museums, which can provide new views regarding the management of the Geusun Ulun ecosystem. The contribution of this research is to give recommendations for development strategies based on SWOT analysis specific to the Geusun Ulun Museum, which can be a guide for management in increasing the attraction and desirability of the museum. This research will highlight the role of museums not only as places to store ancient objects and as educational and cultural centers that can arouse public interest and concern for cultural heritage.

1. Literature Review

1.1. Analysis SWOT

SWOT analysis is an invaluable approach in the context of business strategic planning. This method assesses the strengths, weaknesses, opportunities, and threats that may affect the business or consider factors such as product lines and competitors (Gürel, 2017). In its implementation, the initial stage involves setting business objectives or identifying the objects to be analyzed. Furthermore, strengths and weaknesses are grouped as internal factors that the company can control, while opportunities and threats are identified as external factors that may be beyond the company's control (Farida & Setiawan, 2022). The importance of SWOT analysis lies in its ability to provide a comprehensive picture of a business's position in the market and help a company understand the key factors that can influence its success (Lestari & Yunita, 2020). By sorting out internal strengths and weaknesses and identifying external opportunities and threats, companies can design more effective strategies to increase competitiveness and achieve their business goals. This analysis is an evaluation tool and a basis for making better decisions in the face of ever-changing market dynamics (Puyt et al., 2023).

SWOT is the internal positive aspects of a business entity or project that provide an advantage compared to its competitors (Nazarko et al., 2017). Strengths may involve superior resources, special skills, a good reputation, or other assets that provide a competitive advantage. Weaknesses are internal aspects that can be a challenge or challenges to the success of a business. Weaknesses can be limited resources, lack of specific skills, inefficient business processes, or other internal performance problems. Opportunities include external aspects a business entity or project can exploit to succeed. Opportunities can arise from changing market trends, technological developments, regulatory changes, or market voids that can be exploited. Threats are external factors that can hinder or threaten the success of a business. Threats may come from competitors, changes in the economic environment, regulatory risks, or consumer behavior that could harm the business' position. By identifying and understanding these strengths, weaknesses, opportunities, and threats, SWOT analysis helps organizations make more informed strategic decisions. It enables them to design effective strategies to achieve their business goals (Lorenzo et al., 2018).

1.3. Cultural Tourism Destination

Cultural Tourism Destination opens the door to immersive adventure, inviting tourists to immerse themselves in the cultural diversity of a region through a series of fascinating experiences. During the trip, visitors are allowed to explore historical nuances through visits to museums that display valuable heritage and to explore living historical sites that tell the story of the past in rich detail (Richards, 2018). Apart from that, the beauty of local art exhibitions also reflects the richness of creativity and expression of local culture. More than just transferring knowledge, Cultural Tourism Destinations invite tourists to be directly involved in the social life of the local community (Duan et al., 2023). Exuberant cultural festivals liven up the atmosphere with colorful traditional celebrations, dazzling artistic performances soaking up the local beauty, and unique culinary delights, highlighting an unforgettable tourist experience in this destination (Somnuxpong, 2020).

The main attraction of a Cultural Tourism Destination lies in its ability to provide a deep understanding of cultural heritage, sparking respect for the diversity of local traditions and values. Through these visits, tourists become not only witnesses of history but also an active part of efforts to preserve and develop unique and valuable cultural heritage. Apart from the undeniable cultural benefits, cultural tourism destinations also play an essential role in local economic development (Arumugam et al., 2023). The income generated from tourist visits boosts local communities' economic growth and creates employment opportunities in the tourism sector. Moreover, interactions between visitors and host communities form a sustainable network of positive cooperation, supporting sustainable development and mutual understanding between various community groups (Matteucci et al., 2022).

1.4. Tourism Component 4A

Tourism products are all tangible and intangible facilities or services provided to tourists that are obtained and felt or enjoyed so that a series of trips can provide a good experience for tourists from leaving their residence to the chosen tourist destination until they return to their destination (Alwi et al., 2022). A tourist destination must own 4 (four) components to develop tourism potential: attractions, accessibility, amenities, and ancillaries (Nurbaeti et al., 2022). Tourist attractions or tourism resources significantly attract tourist arrivals and can be developed where tourist attractions are found or outside their original locations (Vengesayi et al., 2009). Accessibility is a means and infrastructure that makes it easy for tourists to move from one area to another. Important factors related to tourist accessibility include directions, airports, terminals, the time required, travel costs, and frequency of transportation to tourist sites (Fitra et al., 2019). Amenities are all kinds of supporting facilities and infrastructure while tourists are in tourist destinations, including accommodation needs, provision of food and drinks, theaters, entertainment venues, and shopping areas (Rangkuti, 2015). Facilities are not an attraction for tourists, but a condition that determines the duration of a tourist's stay, and a lack of facilities will make tourists avoid specific destinations (Nurbaeti et al., 2022). Additional services include various organizations that facilitate and encourage the development and marketing of a tourist destination (Kumar et al., 2015).

2. Research Methodology

Primary data were obtained from interviews and observations related to research at the Geusun Ulun Museum. Secondary information is data obtained and collected from previous research published by various other agencies. Secondary data in this study are in the form of documents and literature. Data collection techniques were used to obtain data in this study through observation, interviews, and questionnaires. Data in this study will be collected using a questionnaire for interested parties. The data analysis method used in this research is descriptive with a qualitative approach. The technique used is to analyze the internal environment (strengths and weaknesses) and external (opportunities and threats) of the Geusun Ulun Museum, which is the basis for conducting a SWOT analysis. SWOT analysis is carried out through the IFE matrix (Internal Factor Evaluation), which will describe the most significant strengths and weaknesses of the Geusun Ulun Museum, and the EFE matrix (External Factor Evaluation), which will explain the opportunities and threats factors owned by the Geusun Ulun Museum. Geusun Ulun Museum. The Geusun Ulun Museum and the IE (Internal External) matrix show where the Geusun Ulun Museum is now.

The type of data used in this research is qualitative data. Qualitative data is data expressed in the form of numbers or data presented in the form of words that contain meaning (Auer-Srnka & Koeszegi, 2007). Qualitative data in this study came from interviews, field notes, and official documents; after that, the data was collected and then processed and explained according to the data (Bowen, 2009). Descriptive (qualitative) assessment includes collecting data to test hypotheses or answer questions about the current status of research subjects (Creswell, 2014). Descriptive data is collected through a list of questions in surveys, interviews, or observations; data comes from two sources, namely secondary data and primary data (William, 2007). Primary information is collected by someone directly from the object under study and for research through interviews and observations (Taherdoost, 2022).

The SWOT analysis process involves determining the specific objectives of a business venture or project and identifying factors that internal and external supports and those that do not achieve these goals, including (Yunita & Lestari, 2020): (1) Strength is an internal factor that supports the company in achieving its goals, and supporting factors can be in the form of resources, expertise, or other advantages that may be obtained thanks to financial sources, image, excellence in the market, as well as good relations between buyers and suppliers; (2) Weaknesses are internal factors that hinder a company from achieving its goals, inhibiting factors can be in the form of incomplete facilities, lack of financial resources, management skills, marketing expertise, and corporate image; (3) Opportunities; external factors that support the company in achieving its goals. External factors that support the achievement of goals can be in the form of policy changes, changes in competition, changes in technology, and developments in supplier and buyer relationships; (4) Threats are external factors that hinder the company in achieving its goals, external factors that hinder the company can be in the form of the entry of new competitors, slow market growth, increased bargaining power of the leading suppliers and buyers, technological changes and new policies.

The stages of the SWOT analysis are Istan (2022) and Suci et al. (2021): (1) Determine the factors that are the strengths and weaknesses of the company in column 1; (2) Giving weight to each of these factors on a

scale ranging from 1.0 (most important) to 0.0 (not essential), based on the influence of these factors the sum may not exceed a total score of 1.00); (3) Calculate the rating (in column 3) for each factor by giving a scale ranging from 4 (excellent) to (poor), based on the influence of these factors on the condition of the company concerned, variables with a positive sign are obtained (all variables included in the strength category are given a value ranging from +1 to with +4 (very good) by comparing with the industry average or with the leading competitor, while the negative variable is the other way around; (4) Multiply the weight of column 2 by the weight of column 3, for obtaining factor weighting in column 4. The result is a weighted score for each factor whose characteristics vary from 4.0 (Very Good) to 1.0 (Poor); (5) Add up the weighted score (in column 4 to get the weighted total score for the company concerned; this total value shows how a company reacts to its internal strategic factors. SWOT analysis shows that internal and external factors can determine company performance. SWOT analysis compares external factors, namely opportunities and threats, with internal factors, namely strengths and weaknesses (Rangkuti, 2015).

Quadrant I is a very favorable situation. The company has opportunities and strengths to take advantage of existing opportunities. Quadrant II, although facing various threats, this company still has internal strength. Using product or market strategies, the strategy must use strength to take advantage of long-term opportunities. In Quadrant III, the company faces a considerable market opportunity; however, on the other hand, it has to deal with some internal weaknesses. This condition minimizes internal problems so that it can seize better market opportunities. Quadrant IV is unfavorable; the company faces various internal threats and weaknesses. Calculate the weights for internal and external factors, including 100% or 1 (Oetomo & Ardini, 2012; Safa'at et al., 2021).

3. Result and Discussion

3.1 Attractions

The Geusun Ulun Museum has an extensive collection of relics of historical objects from the Sumedang Larang Kingdom; the following attractions are cultural tourist attractions: The Srimanganti Building Houses, The Bumi Kaler Building, The Gamelan Building Houses, Gedung Gedeng stores the and Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival. The Srimanganti Building houses an extensive collection of historical objects, including the Karnataka cannon left by the Kompeni, gamelan panglipur left by Prince Rangga Gede in 1625-1633, Gamelan Pangasih left by Prince Kornel in 1791-1828, and gamelan Sari Arum left by Prince Sugih in 1836-1882. The Bumi Kaler building stores ancient books/scripts consisting of a handwritten Al-Quran from the 19th century, the early 18th century waruga jagad book, and a history book from the 19th century and pegon letters. Apart from the book, there are collections of domestic and foreign currency, tiger statues, parades, altars for circumcised children in the 19th century, and books from the regents' collections. The gamelan building houses several gamelans, including the 19th-century gamelan sari oneng parakan salak, which was included in exhibitions in Amsterdam in 1883, Paris in 1889, and Chicago in 1893. Apart from the gamelan sari, one para kan salak, gamelan sari, one Mataram 17th century heritage Prince, Panembahan, and several other gamelans from the 18th century. Gedung Gedeng stores heirlooms, conventional weapons, keris, swords, spears, crowns, royal clothing, and manuscripts (Quran, wawacan, books, paririmbon) and types of cariosan (history, saga, manakib, history). The Geusun Ulun Museum annually organizes Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival, which is the pride of the Sumedang indigenous people and has been a tradition since long ago, where all the heirloom collection objects in the Geusun Ulun Museum are taken out for the ceremony.

3.2. Accessibility

The Geusun Ulun Museum has advantages compared to other museums in West Java, especially in terms of its very strategic location. Located in the city center and close to Sumedang City Square, the Geusun Ulun Museum is a destination that is very easy to reach for visitors. Apart from that, the asphalt road to the Museum makes it easy for public and private vehicles to reach the location. Public transportation facilities involving KRL, buses, conventional motorbike taxis, and online motorbike taxis are also available, providing various transportation options for visitors. Also, the Geusun Ulun Museum ensures the comfort of tourists with clear signage leading to the museum location. This aims to make it easier for visitors to find and visit the Museum, providing a more enjoyable tourist experience. With good infrastructure and accessibility, the Geusun Ulun Museum is not only a culturally exciting destination but also provides practical convenience for visitors to enjoy and explore the rich history of the Museum.

3.3. Amenity

The Geusun Ulun Museum provides adequate visitor facilities, including a large parking area, a prayer room for worship, and clean water and toilet facilities. Lodging is also available in various forms, such as hotels and motels around the Museum; however, interestingly, there are no homestays managed by the local community. This shows an opportunity for museum managers to develop partnerships with local communities so that homestays can become a more personal lodging option and are closely linked to local life. Around the Geusun Ulun Museum are souvenir shops and eating places offering various kinds of food and drinks. However, what is more interesting is that the manager of the souvenir shop and eating place comes from outside Sumedang City. This allows local businesses to be promoted by empowering local business actors to manage gift shops and eating places around the Museum. Even though the tour guides come from the Geusun Ulun Museum community, involving more local parties can provide a dimension of sustainability and a more authentic tourism experience for visitors.

3.4. Ancillary

Geusun Ulun Museum recognizes the importance of collaborating with travel agents to promote tour packages and guides. Through this partnership, the Museum can be better known and become a tourist attraction. This collaboration also opens up opportunities to empower local guides and create more diverse tour packages, improving the tourist experience when visiting the Geusun Ulun Museum. On the other hand, this Museum also collaborates closely with the Sumedang Regency Government and the Sumedang City Community. Every year, they hold a Heirloom Ngumbah and Sumedang Ancestral Heritage Ceremony. This activity is a routine event and a source of pride for the Sumedang traditional community. This collaboration reflects a shared commitment to preserving local cultural and historical heritage and strengthening identity and togetherness in the Sumedang community. With a combination of local cooperation and broader promotional efforts, the Geusun Ulun Museum can create a sustainable positive impact in advancing tourism and introducing the rich culture of Sumedang to the world.

3.5. Strength

Strength is the capability of the Geusun Ulun Museum, which makes it superior to other museums in West Java in meeting visitors' needs. Strength arises from the resources and competencies available at the Geusun Ulun Museum. The following are the powers that exist in the Geusun Ulun Museum: (1) The source of funding comes from the management of palace assets such as 150 hectares which is the most significant income by renting out Rp.1,000 per meter of land to be used for the surrounding community; (2) Entrance tickets to the Geusun Ulun Museum are relatively cheap and affordable for all people; (3) Geusun Ulun Museum has an extensive collection of historical relics of the Sumedang Forbidden Kingdom; (4) The location is very strategic in Sumedang City; (5) Having activity programs that involve the general public such as research and community service activities involving lecturers, students and the community, then Ngumbah Pusaka and the Sumedang Ancestral; (6) Having activity programs that involve the general public such as research and community service activities involving lecturers, students and the community, then Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival involving the Sumedang indigenous community; (7) The number of collaborations between the Nazir Pangeran Wakaf Sumedang Foundation and the Sumedang Regency Government, the Faculty of Fine Arts and Design, the Jakarta Arts Institute and The Lodge Group to increase the attractiveness of tourist visits with a new look but still maintain the old values.

3.6. Weakness

The weaknesses of the Geusun Ulun Museum are limitations or deficiencies in one or more resources or capabilities of a museum against other Geusun Ulun Museums in effectively meeting consumer needs. In practice, these limitations and weaknesses can be seen in the facilities owned, low managerial skills, marketing skills not by market demands, and products that are less or less attractive to less able tourists. The following are the weaknesses of the Geusun Ulun Museum: (1) The circulation flow in each showroom at the Prabu Geusan Ulun Museum is unstructured, and visitors are free to view and observe collections so that visitors feel confused; (2) Lack of employees who have formal tourism education, information about museums, culture/technology, use of English; (3) There is no collaboration with travel agents for tour package promotions; (4) There is no Service Standard yet; (5) There are no homestays and restaurants managed by the community around the Geusun Ulun Museum.

3.7. Opportunity

Opportunity is the primary profitable situation in the Geusun Ulun Museum environment. The primary trend is one source of opportunity. Identification of previously overlooked market segments, changes in competitive/regulatory conditions, technological changes, and improved relations with buyers/sellers can be opportunities for the Geusun Ulun Museum. The following are the opportunities that exist at the Geusun Ulun Museum: (1) Has attractive historical and cultural potential to be developed again; (2) Increase in the number of museum tourists in the future; (3) Sumedang Regency Government support for historical and cultural tourism; (4) Private collaboration support with the Museum; (5) Advances in information technology to make it easier for tourists to access the existence of the Museum; (6) The image of Sumedang Regency tourism that continues to improve and shows increasing growth; (7) The customary and cultural conditions of the people of Sumedang Regency are polite and friendly.

3.8. Threat

The threat is a significant situation that could be more profitable within the Geusun Ulun Museum environment. Threats are the main obstacle for the Geusun Ulun Museum in achieving its current or desired position. The entry of new competitors, slow market growth, increased bargaining power of significant buyers/suppliers, technological changes, and revised or updated regulations can all become barriers to the success of the Geusun Ulun Museum. The following are the threats to the Geusun Ulun Museum: (1) A similar tourist attraction is a museum that has been significantly developed; (2) Low public awareness of historical heritage; (3) Lack of public understanding of museums; (4) The emergence of entertainment centers such as malls; (5) Changing people's lifestyle.

Table 1. Internal Factor Analysis Summary

No	Strength	Weight	Rating	Score
1	The source of funding comes from the management of palace assets such as 150 hectares, which is the most significant income by renting out Rp.1,000 per meter of land to be used for the surrounding community	0.08	4	0.32
2	Entrance tickets to the Geusun Ulun Museum are relatively cheap and affordable for all people	0.08	4	0.32
3	Geusun Ulun Museum has an extensive collection of historical relics of the Sumedang Forbidden Kingdom	0.06	4	0.24
4	The location is very strategic in Sumedang City	0.06	4	0.24
5	Potential as a place for research and educational tours for students, namely kindergarten, elementary, junior high, and high school	0.08	4	0.32
6	Having activity programs that involve the general public, such as research and community service activities involving lecturers, students, and the community, then Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival involving the Sumedang indigenous community	0.08	4	0.32
7	The number of collaborations between the Nazir Pangeran Wakaf Sumedang Foundation and the Sumedang Regency Government, the Faculty of Fine Arts and Design, the Jakarta Arts Institute, and The Lodge Group to increase the attractiveness of tourist visits with a new look but still maintain the old values.	0.06	4	0.24
	Total Score	0.50		2.00
No	Weakness	Weight	Rating	Score
1	The circulation flow in each showroom at the Prabu Geusan Ulun Museum is unstructured, and visitors are free to view and observe collections so that visitors feel confused	0.15	4	0.60
2	Lack of employees who have formal tourism education, information about museums, culture/technology, use of English	0.10	4	0.40
3	There is no collaboration with travel agents for tour package promotions	0.12	3	0.36

No	Strength	Weight	Rating	Score
4	There is no Service Standard yet	0.06	3	0.18
5	The community around the Geusun Ulun Museum manages no homestays and restaurants	0.07	3	0.21
	Total Score	0.50		1.75
	Sub Total	1.00		0.25

Source: Processed by Researchers (2022)

Table 2. External Factor Analysis Summary

No	Opportunity	Weight	Rating	Score
1	Has attractive historical and cultural potential to be developed again	0.08	4	0.32
2	Increase in the number of museum tourists in the future	0.08	4	0.32
3	Sumedang Regency Government support for historical and cultural tourism	0.08	4	0.32
4	Private collaboration support with the Museum	0.08	4	0.32
5	Advances in information technology make it easier for tourists to access the existence of the Museum.	0.06	3	0.18
6	The image of Sumedang Regency tourism continues to improve and shows increasing growth	0.06	3	0.18
7	The customary and cultural conditions of the people of Sumedang Regency are polite and friendly	0.06	3	0.18
	Total Score	0.50		1.82

No	Threat	Bobot	Rating	Score
1	A similar tourist attraction is a museum that has been significantly developed	0.10	4	0.40
2	Low public awareness of historical heritage	0.10	3	0.30
3	Lack of public understanding of museums	0.10	3	0.30
4	The emergence of entertainment centers, such as malls	0.10	3	0.30
5	Changing people's lifestyle	0.10	3	0.30
	Total Score	0.50		1.60
	Sub Total	1.00		0.20

Source: Processed by Researchers (2022)

3.8. SWOT Matrix

The SWOT matrix is a tool used to compile the strategic factors of the Geusun Ulun Museum, and the SWOT diagram consists of 4 quadrants, namely Quadrants I, II, III, and IV.

Table 3. SWOT Matrix Museum Geusun Ulun

IFAS/EFAS	Strength	Weakness
Opportunity	SO Strategy: 2.00 + 1.82 = 3.82 (I)	WO Strategy: 1.75 + 1.82 = 3.57 (III)
Threat	ST Strategy: 2.00 + 1.60 = 3.60 (II)	WT Strategy: 1.75 + 1.60 = 3.35 (IV)

Source: Processed by Researchers (2022).

Figure 1. SWOT Chart Museum Geusun Ulun

Source: Processed by Researchers (2022).

The results above indicate that the primary strategy produced is the SO strategy, with the highest score of 3.82 in position I, which means that the condition of the Geusun Ulun Museum is very profitable and has opportunities and strengths to take advantage of current opportunities. The strategy that must be applied in this condition is to support an aggressive growth policy (growth-oriented).

The total score of each factor can be broken down into strengths of 2.00, weaknesses of 1.75, and opportunities of 1.82. Then, the threat is 1.60, the difference in the total score of advantages and disadvantages is 0.25, and the difference between the real opportunities and threats is 0.20. The SWOT analysis diagram above shows that the Geusun Ulun Museum is taking advantage of the current opportunities. So, it is clear that the Geusun Ulun Museum must choose and use an aggressive or developing strategy that includes conditions of strength and opportunity to be in a good position (SO strategy). The Geusun Ulun Museum has a collection of heirlooms from the Sumedang Larang Kingdom, rich in historical meaning and value. This is the potential that can be generated by the manager of the Geusun Ulun Museum as an entry point for tourist destinations in Sumedang.

The methods used by the Geusun Ulun Museum can be developed (SO/Strenght Opportunity strategy) as follows: (1) Presenting the collections of the Geusun Ulun Museum is informative and conceptualized to be able to build emotions with visitors; (2) Geusun Ulun Museum is managed by the Prince of Wakaf Sumedang Nazir Foundation, which has a kinship with the Sumedang Larang Palace, which is the potential manager to promote and develop the Sunda Kingdom Museum actively; (3) The strategic location of the Geusun Ulun Museum, which is located in the center of Sumedang city, is a unique attraction for tourists; (4) The remaining land available for the provision of facilities and infrastructure that does not yet exist; (5) Cooperating with the private sector to promote through the internet and reproduce information related to the Geusun Ulun Museum; (6) Packaging and synergizing tour packages with nearby tourist attractions that are more popular with travel agents.

The ST strategy uses the strengths of the Geusun Ulun Museum to overcome the threats it faces. The strategy is to increase security and strengthen the potential that is the hallmark of the Geusun Ulun Museum, with programs including the following: (1) Museum program as an attractive place for the younger generation; (2) Training for human resources owned by museums; (3) Maintenance of museum amenities; (4) Maintain good relations with agencies and media.

The WO strategy is implemented by minimizing weaknesses to take advantage of opportunities. The strategy is to develop basic and supporting facilities and infrastructure for tourism around the Geusun Ulun Museum, with a program as follows: (1) Expanding market share, especially the domestic market; (2) Doing promotions and cooperation with travel agencies, hotels, restaurants, and other tourism service businesses; (3) Doing promotion to schools and colleges about existence Geuseun Ulun Museum; (4) Organizing events such as seminars, conferences or exhibitions at the Geusun Ulun Museum in collaboration with government and private institutions.

The WT strategy is based on defensive activities that minimize weaknesses and avoid threats. The alternative strategy is the development of museums and human resources, with programs including the following: (1) Improving the quality of human resources of the Geuseun Ulun Museum Management Body through tourism courses and training, in collaboration with tourism educational institutions, as well as by proposing the formation of technical personnel tourism or employee mutations within the Sumedang Regency Regional Government; (2) Cooperating with the Indonesian Tour Guide Association to improve the quality of service for tourist guides at the Geusun Ulun Museum; (3) Organizing outreach, working with related parties about benefits the importance of the existence of a museum, in order to be able to increase awareness and interest people to visit museums.

Table 4. Matrix SWOT Analysis

IFAS	STRENGTH	WEAKNESS
	1. The funding source comes from managing palace assets such as 150 hectares, which is the most significant income by renting out Rp.1,000 per meter of land to the surrounding community. 2. Entrance tickets to the Geusun Ulun Museum are relatively cheap and affordable. 3. Geusun Ulun Museum has an extensive collection of historical relics of the Sumedang Forbidden Kingdom. 4. The location is very strategic in Sumedang City. 5. Having activity programs that involve the general public, such as research and community service activities involving lecturers, students, and the community, then Ngumbah Pusaka and the Sumedang Ancestral 6. Having activity programs that involve the general public, such as research and community service activities involving lecturers, students, and the community, then Ngumbah Pusaka and the Sumedang Ancestral Heritage Carnival involving the Sumedang indigenous community 7. The number of collaborations between the Nazir Pangeran Wakaf Sumedang Foundation and the Sumedang Regency Government, the Faculty of Fine Arts and Design, the Jakarta Arts Institute, and The Lodge Group to increase the	1. The circulation flow in each showroom at the Prabu Geusan Ulun Museum is unstructured, and visitors are free to view and observe collections, so visitors feel they need clarification. 2. Lack of employees who have formal tourism education, information about museums, culture/technology, use of English. 3. There is no collaboration with travel agents for tour package promotions. 4. There is no Service Standard yet 5. The community around the Geusun Ulun Museum manages no homestays and restaurants.

EFAS	attractiveness of tourist visits with a new look but still maintain the old values.	
OPPORTUNITY	S – O	W – O
1. Has attractive historical and cultural potential to be developed again 2. Increase in the number of museum tourists in the future 3. Sumedang Regency Government support for historical and cultural tourism 4. Private collaboration support with the Museum 5. Advances in information technology to make it easier for tourists to access the existence of the Museum; 6. The image of Sumedang Regency tourism continues to improve and shows increasing growth. 7. The customary and cultural conditions of the people of Sumedang Regency are polite and friendly.	1. Presenting the collections of the Geusun Ulun Museum is informative and conceptualized to build emotions with visitors. 2. Geusun Ulun Museum is managed by the Prince of Wakaf Sumedang Nazir Foundation, which has a kinship with the Sumedang Larang Palace, which is the potential manager to promote and develop the Sunda Kingdom Museum actively. 3. The strategic location of the Geusun Ulun Museum, located in the center of Sumedang city, is a unique attraction for tourists. 4. The remaining land available for the provision of facilities and infrastructure that does not yet exist 5. Cooperating with the private sector to promote through the internet and reproduce information related to the Geusun Ulun Museum 6. Packaging and synergizing tour packages with nearby tourist attractions that are more popular with travel agents.	1. Expanding market share, especially the domestic market 2. Doing promotions and cooperation with travel agencies, hotels, restaurants, and other tourism service businesses 3. Promotion to schools and colleges about the existence of the Geuseun Ulun Museum 4. Organizing events such as seminars, conferences, or exhibitions at the Geusun Ulun Museum in collaboration with government and private institutions
THREATS	S – T	W – T
1. A similar tourist attraction is a museum that has been significantly developed. 2. Low public awareness of historical heritage 3. Lack of public understanding of museums 4. The emergence of entertainment centers, such as malls 5. Changing people's lifestyle.	1. The museum program is an attractive place for the younger generation 2. Training for human resources owned by museums 3. Maintenance of museum amenities 4. Maintain good relations with agencies and media	1. Improving the quality of human resources of the Geuseun Ulun Museum Management Body through tourism courses and training in collaboration with tourism educational institutions, as well as by proposing the formation of technical personnel tourism or employee mutations within the Sumedang Regency Regional Government 2. Cooperating with the Indonesian Tour Guide Association to improve the quality of service for tourist guides at the Geusun Ulun Museum 3. Organizing outreach and working with related parties about the benefits and the importance of

	the existence of a museum in order to be able to increase awareness and interest people to visit museums.

Source: Processed by Researchers (2022)

4. Discussion

4.1 Strategy SO (Strength Opportunity)

The strength opportunity strategy implemented by the Geusun Ulun Museum, which the Prince Wakaf Sumedang Nazir Foundation manages, includes the ability to present collections in an informative and conceptual manner. This Museum, with close ties to the Sumedang Larang Palace, is strategically located in the center of Sumedang city, attracting the attention of tourists with its unique attractions related to history and culture. The remaining land that can be utilized to provide facilities and infrastructure that does not yet exist provides an excellent opportunity for further development, illustrating positive potential in the context of sustainability and improving the facilities of the Geusun Ulun Museum. Furthermore, this strategy emphasizes active collaboration with the private sector to exploit the marketing potential via the internet and increase information related to museums. This collaboration can be a proactive step in increasing visits to the Geusun Ulun Museum. Another effort involves packaging and synergizing tour packages with nearby tourist attractions that are more popular with travel agents, strengthening the Museum's position as an attractive tourist destination and creating an integrated tourist experience. Thus, the SO strategy implemented by the Geusun Ulun Museum creates a strong foundation for the growth and sustainability of the Museum as a competitive tourist destination.

4.2 Strategy WO (Weakness Opportunity)

Geusun Ulun Museum, in designing opportunities for strategic weaknesses, must be able to expand market share, especially domestically, by implementing promotional strategies and cross-sector collaboration. Collaboration with travel agencies, hotels, restaurants, and other tourism service businesses is the main focus in increasing the visibility and attractiveness of museums. The management of the Prince Wakaf Sumedang Nazir Foundation, which is responsible for the Geusun Ulun Museum, also needs to seek effective partnerships to ensure the wishes and development of the Museum. The foundation must also actively promote the Geusun Ulun Museum to educational institutions such as schools and universities. This effort aims to provide information about the Museum's existence to the younger generation, supporting their understanding of history and culture. Also, holding events such as seminars, conferences, or exhibitions at museums involving collaboration between government and private agencies can be an effective forum for introducing this Museum to the broader community. It is hoped that active involvement from various parties can create positive support in advancing and developing the Geusun Ulun Museum as a meaningful tourist destination.

4.3 Strategy ST (Strength Threaths)

The Geusun Ulun Museum designed a threat force strategy to create programs that appeal to the younger generation. This effort includes creating interactive platforms that invite participation and increase their understanding of history and culture. In human resource management, the Museum is also trained to improve its staff's competence and skills, aiming to provide high-quality services to visitors. Another priority is the maintenance of museum facilities, which aims to create a comfortable and adequate environment for visitors, making the visiting experience more satisfying. In addition, the Geusun Ulun Museum maintains good relations with agencies and the media as an integral part of this strategy. Through effective communication, the Museum tries to increase its visibility to attract more people's attention. Through close collaboration with government agencies and the media, this Museum supports growth and development as a cultural institution that not only plays a role in preserving history and culture but also actively participates in building communities and advancing local wisdom values.

4.4 Strategy WT (Weakness Threats)

The management of the Geuseun Ulun Museum shows its activeness in designing strategies to deal with weaknesses and threats by focusing efforts on improving the quality of human resources. They not only hold tourism courses and training but also collaborate with tourism education institutions. Apart from that, they were active in encouraging the formation of tourism technical personnel or involving the murder of employees within the Sumedang Regency Regional Government. This action reflects the museum management's commitment to

strengthening the human resources capacity in museum operations and management. Furthermore, to improve the quality of service to visitors, the management of the Geuseun Ulun Museum is collaborating with the Indonesian Tourist Guide Association. This collaboration aims to develop the competence and professionalism of tour guides at the Geusun Ulun Museum, thereby providing a more satisfying tourism experience. With the Museum's involvement in this initiative, the quality of service can be improved, create a stronger attraction for visitors, and improve the Museum's image as a superior tourist destination.

Conclusions and Further Research

From the analysis above, it is stated that the Geusun Ulun Museum should use a development strategy in its development strategy. That is, the strength (Strength) is greater than the opportunity (O), which means that the choice of strategy is rapid growth by taking advantage of the strengths and opportunities the Museum possesses. The calculations comparing strengths and weaknesses in the IFAS and EFAS tables IFAS calculations show that strengths are more significant than weaknesses. Meanwhile, the EFAS calculation shows that the opportunities are more significant than the threats. From the analysis that has been done, the Geusun Ulun Museum chooses and uses an aggressive or developing strategy, which includes the condition of strengths and opportunities to be in a good position, namely the SO Strategy.

The management strategy of the Geusun Ulun Museum as an entry point for tourist destinations in Sumedang can be implemented with the SO program strategy: (1) Increasing the collection to be more informative and conceptual; (2) The Nazir Prince Wakaf Sumedang Foundation as the manager of the Geusun Ulun Museum, is actively promoting and developing the Royal Sunda Museum; (3) The strategic location of the Museum is the main attraction for tourists; (4) The remaining land area is still widely used for facilities and infrastructure that do not yet exist; (5) Cooperating with the private sector to promote through the internet about the Geusun Ulun Museum; (6) Package and synergize tour packages with travel agents.

Suggestions for future researchers are: (1) Future researchers are expected to conduct in-depth research on artifacts, historical relics, and cultural uniqueness owned by museums. Thus, this research can provide more prosperous and more contextual insight into the role of the Geusun Ulun Museum as an asset of the Sumedang Kingdom; (2) Future researchers can look for ways to improve the visitor experience at the Geusun Ulun Museum, which includes analysis of educational programs, interactivity and presentation of information to provide a more in-depth and memorable experience for visitors. By identifying aspects that can be improved, researchers can provide concrete recommendations to increase the attractiveness of the Geusun Ulun Museum as a leading tourist destination in Sumedang.

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Credit Authorship Contribution Statement:

Nurbaeti, M.M, as the first author, was tasked with conducting a literature study on the history of the Geusun Ulun Museum, the Sumedang Larang Kingdom, and the Sumedang Tourism Destination, then compiling a research conceptual framework and designing a research methodology, and collecting primary data through interviews with museum managers, community leaders, and other related parties.

Heny Ratnaningtyas, S.E., M.M, as the second author, was tasked with collecting secondary data such as statistics on museum visits, collection documentation, and existing promotional materials, then analyzing data related to the strengths and weaknesses of the Geusun Ulun Museum based on methodology. Designed by the first researcher, then played a role in analyzing the internal factors (IFAS) that influence the museum as a tourism asset.

Sundring Pantja Djati, as the third author, collected data related to external factors (EFAS), which included analysis of opportunities and threats to the Geusun Ulun Museum and Sumedang tourist destinations, then was involved in field research related to collaboration with the private sector and travel. Agents and contribute to formulating strategic suggestions and recommendations based on IFAS and EFAS analysis findings.

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.

References

[1] Alwi, M. Y., Kadir, A. R., and Munir, A. R. 2022. The Effects of tourism product, service quality, and health protocol to satisfaction and revisit intention of tourists in Three Gilis West Nusa Tenggara. Hasanuddin Journal of Applied Business and Entrepreneurship (HJABE), 5(1), 75-82. DOI: https://doi.org/10.26487/hjabe.v5i1.502

[2] Auer-Srnka, K. J., and Koeszegi, S. T. 2007. From words to numbers: how to transform qualitative data into meaningful quantitative results. Schmalenbach Business Review, 59(1), 29-57. DOI:10.1007/BF03396741

[3] Arumugam, A., Nakkeeran, S., and Subramaniam, R. 2023. Exploring the Factors Influencing Heritage Tourism Development: A Model Development. Sustainability, 15(15). DOI:https://doi.org/10.3390/su151511986

[4] Bowen, G. 2009. Document analysis as a qualitative research method. Qualitative Research Journal, 9(2), 27–40. DOI:10.3316/QRJ0902027

[5] Creswell, J. W. 2014. Research design qualitative, quantitative, and mixed methods approaches. Los Angeles: Sage Publications, Inc.

[6] Duan, Z. Y., Tan, S-K., Choon, S. W., and Zhang, M. Y. 2023. Crafting a place-based souvenir for sustaining cultural heritage. Heliyon, 9(5), 1-16. DOI: https://doi.org/10.1016/j.heliyon.2023.e15761

[7] Farida, I., and Setiawan, D. 2022. Business strategies and competitive advantage: The role of performance and innovation. Journal of Innovation: Technology, Market, and Complexity, 8(3), 1-16. DOI:https://doi.org/10.3390/joitmc8030163

[8] Fitra, H., Devi, V., and Yuliana, D. D. 2019. Principle component analysis in determining development strategy for culture tourism in bangka regency. Eurasia: Economics & Business, 3(21), 86-93. DOIhttps://doi.org/10.18551/econeurasia.2019-03

[9] Gantina, D., Budiman, S. F., Nurabeti., Gunawijaya, J. 2021. Museum Prabu Geusan Ulun Kabupaten Sumedang sebagai daya tarik wisata Kabupaten Sumedang. Jurnal Ilmiah Pariwisata, 26(3), 233-242. DOI:https://doi.org/10.30647/jip.v26i3.1583 (in Indonesian)

[10] Gürel, E. 2017. SWOT analysis: A theoretical review. Journal of International Social Research, 10(51), 994–1006. DOI:10.17719/jisr.2017.1832

[11] Istan, M. 2022. SWOT analysis in the determination of competing strategies (Study at PT. Bank Syariah Indonesia Curup Branch). Budapest International Research and Critics Institue-Journal (BIRC-Journal), 5(1), 2826-2840. DOI: https://doi.org/10.33258/birci.v5i1.3897

[12] Kumar, P., Mishra, J. M., and Yedia, V. R. 2021. Analyzing tourism destination promotion through Facebook by Destination Marketing Organizations of India. Current Issues in Tourism, 25(15), 1–16. DOI:10.1080/13683500.2021.1921713

[13] Lestari, T. I., and Yunita, L. 2020. The Implementation of SWOT analysis as a Basis for determining marketing strategies. Enrichment: Journal of Management, 10(2), 25-29. DOI:https://doi.org/10.35335/enrichment.v10i2,%20May.16

[14] Lorenzo, J. R. F., Rubio, M. T. M., and Garces, S. A. 2018. The competitive advantage in business, capabilities, and strategy. What general performance factors are found in the Spanish wine industry?. Wine Economics and Policy, 7(2), 94-108. DOI: https://doi.org/10.1016/j.wep.2018.04.001

[15] Mahdi, S. 2018. Pelestarian Naskah-Naskah Kuno di Museum Prabu Geusan Ulun Sumedang. Jurnal Pengabdian Kepada Masyarakat, 2(2): 1-7. http://jurnal.unpad.ac.id/pkm/article/view/16559 (in Indonesian)

[16] Matteucci, X., Koens, K., Calvi, L., and Moretti, S. 2022. Envisioning the futures of cultural tourism. Future, 142(103013), 1-10. DOI:10.1016/j.futures.2022.103013

[17] Meisari, Y., Cardiah, T., and Raja, T. M. 2021. Redesain interior Museum Geusun Ulun. E-Proceeding of Art & Design, 8(2), 667-674. https://openlibrarypublications.telkomuniversity.ac.id/index.php/artdesign/article/view/14488

[18] Nazarko, J., Ejdys, J., Halicka, K., Magruk, A., Nazarko, L., and Skrek, A. 2017. Application of enhanced SWOT analysis in the future-oriented public management of technology. Procedia Engineering, 182, 482-490. DOI: https://doi.org/10.1016/j.proeng.2017.03.140

[19] Nurbaeti., Rahmanita, M., Amrullah., Ratnaningtyas, H., and Nurmalinda, E. 2022. Pengaruh komponen 4A terhadap minat berkunjung kembali dengan kepuasan sebagai variabel intervening pada Telaga Biru Cisoka, Kabupaten Tangerang, Provinsi Banten. Kawistara: Jurnal Ilmiah Sosial dan Humaniora, 12(3), 354-367. DOI: https://doi.org/10.22146/kawistara.69846 (in Indonesian)

[20] Puyt, R. W., Lie, F. B., and Wilderom, C. P. M. 2023. The origins of SWOT analysis. Long Range Planning, 56(3), 1-24. DOI: https://doi.org/10.1016/j.lrp.2023.102304

[21] Oetomo, H. W., and Ardini, A. 2012. SWOT Analysis in strategic management: A case study at Surabaya Bus Station. Journal of Economics, Business, and Accountancy Ventura, 15(2), 171-186. DOI:http://dx.doi.org/10.14414/jebav.v15i2.73

[22] Rangkuti, F. 2014. Analisis SWOT teknik membedah kasus bisnis. Jakarta: PT. Gramedia Pustaka Utama. (in Indonesian)

[23] Richards, G. 2014. Cultural tourism: a review of recent research and trends. Journal of Hospitality and Tourism Management, 36(September). DOI:10.1016/j.jhtm.2018.03.005

[24] Safa'at., Fatimah, N., and Ahmad, M. A. 2021. SWOT analysis to determine a company's strategy in The State of The Covid-19 Plague in XYZ Company. Journal of Islamic Economics Perspectives, 3(2), 1-9. DOI:https://doi.org/10.35719/jiep.v3i2.44.

[25] Suci., Sanjaya, D. A., Idris, I., Sari, R. A., Supriyanto., and Ritonga, M. M. 2012. SWOT analysis as strategy to improve competitiveness of Durian Pancake medium enterprises. JOJAPS-Journal Online Jaringan Cott Polipd, 29-41. DOI:10.31219/osf.io/4zh7k

[26] Somnuxpong, S. 2020. Chiang Mai: A creative city using creative tourism management. Journal of Urban Culture Research, 20, 112-132. DOI: https://doi.org/10.14456/jucr.2020.8

[27] Taherdoost, H. 2022. Data collection methods and tools for research; A step-by-step guide to choose data collection technique for academic and business research projects. International Journal of Academic Research in Management (IJARM), 10(1), 10-38. https://hal.archives-ouvertes.fr/hal-03741847/document

[28] Thresnawaty, E. 2011. Sejarah Kerajaan Sumedang Larang. Patanjala, Jurnal Penelitian Sejarah dan Budaya, 3(1), 1-10. DOI:10.30959/patanjala.v3i1.276 (in Indonesian)

[29] Tubagus, M. R., and Yanti, N. 2020. Fungsi Tradisi Ngumbah Pusaka Prabu Geusan Ulun Sumedang Larang. Jurnal Budaya Etnika, 4(1), 3-22. DOI: http://dx.doi.org/10.26742/be.v4i1.1559 (in Indonesian)

[30] William, C. Research methods. Journal of Business & Economic Research, 5(3): 65–72. DOIhttps://doi.org/10.19030/jber.v5i3.2532

[31] Yunita, L., and Lestari, T. I. 2020. The implementation of swot analysis as a basis for determining marketing strategies. Enrichment: Journal of Management, 10(2), 25-29. DOI: https://doi.org/10.35335/enrichment.v10i2,%20May.16

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Measuring Tourism Social Carrying Capacity: An Exploratory Study of Social Dynamics in Ecotourism Development of Cirebon

Meizar RUSLI
Institut Pertanian Bogor, Indonesia
meizar@univpancasila.ac.id

Ricky AVENZORA
Institut Pertanian Bogor, Indonesia
rickyav@apps.ipb.ac.id

Tutut SUNARMINTO
Institut Pertanian Bogor, Indonesia
tutut_s@apps.ipb.ac.id

Elly MALIHAH
Universitas Pendidikan Indonesia, Indonesia
ellyms@upi.edu

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Abstract: The carrying capacity of tourism activities is a crucial thing that needs attention, considering that it is closely related to sustainable development to maximize the future of human rights to resources. The study and concept of tourism carrying capacity can be assessed through a comprehensive research methodology based on existing social interaction analysis space. Areas of tourist and non-tourist attractions in the activity centre of Cirebon City are the empirical application of this study. Some of the findings from the analysis show that negative social interactions exist in spaces that are directly or indirectly affected. Therefore, the procedures and results of this study can be of particular concern to managers, planners, developers and marketers in the tourism sector.

Keywords: tourism activities; social carrying capacity.

JEL Classification: L13; L83.

Introduction

Sustainable tourism is a leading concept in tourism development. One of the keys to the success of sustainable ecotourism development is through carrying capacity. The better the carrying capacity of tourism space, the more optimistic sustainability can occur. The World Tourism Organization (1981) defines having the ability as the maximum limit of space acceptance for tourism activities, especially the level of tourist visits that will provide various physical and social pathways. Tourism activity is a field with multiple disciplines and sectors. Understanding the tourism business does not only meet the needs of tourists so that they are satisfied and willing to pay for these activities. The location's ability to accept tourism activities cannot be separated from its various interests, so it is necessary to understand the overall carrying capacity. Since the government has made tourism a leading sector, methods are needed to increase the carrying capacity and reduce pressure from the growth of the tourism sector.

According to K. Wen et al. (2015), sustainable development goals will work well if the ability to estimate carrying capacity through the "decompression and increasing capacity" method is more easily achieved by integrating potential, absolute and relative carrying capacity. An understanding of social carrying capacity has been formulated by several sources from researchers, the government, the community and the private sector. Apart from understanding social carrying capacity, several sources have conducted studies, implementation and

evaluation, as stated by Tokarchuk et al. (2020), directing and forming a U-shaped pattern of prosperity with various factors, including tourism activities through existing dynamics. Saveriades (2000) provides an in-depth understanding of space availability to meet the needs of tourists and the community without eliminating efforts to maintain and minimize negative impacts. Furthermore, Saveriades focuses on two things: tourist satisfaction, which must be obtained, both physical and non-physical, and local community acceptance of tourist activities in their personal space. Rebollo and Castiñeira (2010) believe that approval of applying this limited perspective encourages various research for tourism management that upholds sustainability to continue. This paper seeks to sharpen the experts in assessing social carrying capacity. Multiple studies on maintaining the quality of social carrying capacity in sustainable tourism have recently been noted in academic studies (Brandolini and Mosetti 2005; Stankey and McCool 1984; Zhang and Chung 2015; Joshi and Dahal 2019; Grefe 1987; Del Monte-Luna et al. .2004; Mc Cool 2013: Rusli et al 2018). Many efforts have been made to build sustainable tourism. One of these efforts is establishing physical and social harmony and balance through the values offered. This effort, in principle, leads to a movement to improve human welfare as visitors and hosts, as whole individuals and as social groups. This research answers how the importance of formed social values encourages things with a negative or positive tendency. Therefore, the research results in this paper are beneficial and can be utilized in managing better tourism from a social standpoint. The novelty of this research is the formulation of a social carrying capacity optimization model by taking into account seven social situations of war, conflict, dissociative, conducive, associative, cooperative and productive collaborative in the seven areas of religion, economics, technology, science, rights & obligations, arts and communication. Theoretically, the novelty in this research is the development of social carrying capacity theory, which has focused on psychological approaches and is static.

4. Methodology

The research was carried out from March 2021 to February 2022 in tourism and non-tourism areas in Cirebon City and Regency, divided into the Palace Area, West Java Border Area and Central Java. Various attractions are spread across these three areas with distinctive social and cultural characteristics. Three characteristics are unique to each research area. First, the Palace Area was the centre of the Kingdom of Sultanate of Cirebon, which grew and developed in the 15th century AD. This area is heavily influenced by a touch of Islam with a unique cultural mix. This palace area is a centre of activity that connects various regions of Indonesia. Both Cirebon areas border West Java. These areas have firm Sundanese characteristics, although they differ from Sunda Tanah Parahiyangan. This difference was formed due to the Sundanese and Central Javanese mixture, creating a new, distinctive colour. The three areas of Cirebon bordering Central Java have strong Central Javanese characteristics, although they do not leave the uniqueness of the Cirebon people intact.

The research Measuring Tourism Social Carrying Capacity: An Exploratory Study of Social Dynamics in Ecotourism Development of Cirebon was carried out to evaluate the quality of social carrying capacity for interactions in tourism spaces. The consideration for choosing Cirebon as a research location is because Cirebon has a unique cultural diversity, strategic location, and strong history in the context of interactions between immigrants and hosts. This research will focus on assessment through polarization of perceptions of seven stakeholders regarding social support capacity. Perception is expressed as experience about objects, events or relationships obtained by inferring information and interpreting messages. Perception functions as a means of giving meaning to interaction stimulation. Factors that influence perception are functional factors that determine perception originating from needs, past experiences and other things, including personal factors. The higher the degree of similarity of perception between individuals, the easier and more frequent they are to communicate, and consequently, the more likely they are to form cultural groups or identity groups. Perception includes sensory sensations through the sense organs, attention and interpretation. Phenomenon refers to messages sent to the brain through sight, hearing, touch, smell and taste. Perception consists of three activities, namely selection, organization and interpretation. A person will perceive because the individual can perceive something through his senses and will perceive something if he has a frame of reference that allows him to interpret, understand and give meaning to that something (Mercer 1997).

This approach uses a phenomenological approach to study human phenomena and social behaviour and as an alternative approach that emphasizes a holistic understanding of a phenomenon. A phenomenological approach is applied to assess the conditions of stakeholder responses in measuring the social support capacity of their own spaces, especially tourism spaces. Another phenomenon explored in this research is related to tourism development by paying attention to sustainability aspects. It was obtaining data using descriptive research. Descriptive research is a type of research that provides a picture or description of a situation as clearly as

possible without any treatment of the object being studied. In general, this research analyses the magnitude, level and direction of polarization of the orientation formed.

Determining the sample to represent the data population was carried out using the purposive sampling method. Purposive sampling includes non-probability sampling, a sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample (Sugiyono 2022). Purposive sampling is a technique for sampling data sources with specific considerations. Apart from that, this technique can be used by considering the sample as people who are deemed suitable and appropriate because they have knowledge and experience in the study to be researched (Usman and Okafor 2019). Sample selection using the purposive sampling technique is based on the sample's suitability to answer the objectives of the research to be studied. The sample criteria used as respondents in this research are government employees, the general public, indigenous people, academics, religious figures, NGOs and business actors who live in Cirebon and have knowledge of the positive and negative conditions that occur in Cirebon.

In general, this research looks at the direction, magnitude and harmony of the stakeholder orientation of the Cirebon community. Exposure can be understood as a way, point of view, or complete perception that shapes individuals' and groups' logic, feelings and attention. The orientation on the crucial dynamics of tourism's social carrying capacity refers to economics, arts, science, communication, technology, rights and obligations, and religion. The seven aspects are assessed based on positive conditions of productive collaboration, cooperative, associative, conducive and adverse conditions of dissociative, conflict and war. The seven elements of the assessment space refer to seven positive assessment indicators: equal opportunities, impartiality, freedom, dynamics of justice, upholding rules, positive contestation and positive competition, and all people are entitled to benefits according to their performance.

Table 2. Variables and Research Methods

Aspects/Elements Goals	Variables and Research Methods		
Measuring Tourism Social Carrying Capacity: An Exploratory Study of Social Dynamics in Ecotourism Development of Cirebon	1. Productive collaboration 2. Cooperative 3. Associative situations 4. Conditions are conducive 5. Disassociative situation conditions 6. Conditions of conflict situations 7. War situation conditions	• Equal opportunities • Impartiality • Freedom • Dynamics of justice • Upholding rules • Positive contestation and positive competition • All people are entitled to benefits according to their performance.	• Quantitative descriptive • Polarization analysis (comparison test) • 420 respondents representing seven characteristics: government employees, the general public, indigenous people, academics, religious figures, NGOs and business actors

The findings of the orientation towards the social carrying capacity of tourism through a survey process with a closed questionnaire research tool provide flexibility and convenience for respondents to answer. The total sample is 420 respondents with seven representative characteristics, including academics, religious leaders, NGOs, government, business actors, indigenous peoples and the general public using a purposive sampling approach. The question indicators in the closed questionnaire were designed based on the One Score One Indicator Scoring System method (Avenzora, 2008). A range of 1 to 7 is used as a rating limit to approve existing conditions. The orientation patterns formed were analyzed using the One Way Anova statistical test with comparison results between respondents (Untari et al., 2019). The results of different stakeholders indicate this result through the p-value or significance value while testing. The validity is assessed by the r > r table weight and reliable through Cronbach's Alpha > 0.6.

5. Results and Discussion

The research results show that the people involved have various characteristics. These results can provide a broad representation of the population. Some of the dominating features in Table 10 are that men, reaching 60.5 per cent, dominate this sex. Characteristics of age over 26 and under 55 years went 76.6 per cent. The educational background was dominated by high school graduates, reaching 43.7 per cent, and bachelor

degrees, reaching 20.8 per cent. Characteristics based on experience are more diverse, with the highest level of involvement of State Civil Apparatus at 19.3 per cent, Private Employees at 19.2 per cent and Traders at 15.6 per cent.

Characteristics	Quantity	%	Total
Number of Respondents			100%
a. Man b. Woman	420	100%	
Age			
Gender			
a. Man	254	60.5%	100 %
b. Woman	166	39.5%	
Age			
a. ≤ 25	42	10.1 %	
b. 26 – 35	118	28.1 %	
c. 36 – 45	115	27.3 %	100 %
d. 46 – 55	89	21.2 %	
e. > 55	56	13.3 %	
Marital status			
a. Marry	347	82.6 %	
b. Bachelor	37	8.9 %	100%
c. Widower widow	36	8.5 %	
Educational background			
a. No School	9	2.2 %	
b. Elementary school	26	6.1 %	
c. Junior High School	76	18.0 %	
d. Senior High School	184	43.7 %	100 %
e. Diploma	31	7.4 %	
f. Bachelor	87	20.8 %	
h. Postgraduate	7	1.8 %	

Table 2 shows that the results of the validity and reliability tests of the research instruments used to obtain data are valid and reliable. Based on this, the distribution of research tools in getting polarization of stakeholder orientation towards social dynamics can be further analyzed.

Aspect/Variable	Validity Test		Reliability Test	
	Sig.	Information	Cronbach's Alpha	Information
War	0.000	Valid	0.971	Reliable
Conflict	0.000	Valid	0.969	Reliable
Dissociation	0.000	Valid	0.970	Reliable
Conducive	0.000	Valid	0.951	Reliable
Association	0.000	Valid	0.959	Reliable
Cooperative	0.000	Valid	0.958	Reliable
Productive Collaboration	0,.000	Valid	0.961	Reliable

Valid if Sig < 0.05; reliable if Cronbach's Alpha value > 0.6

The geographical location of the city of Cirebon, which is on the coast of the island of Java, makes the culture of the town of Cirebon diverse. The culture in Cirebon City that has developed to date is not a reflection of the work, intention and taste (thoughts/reason) of the people of Cirebon City itself but rather a refraction of cultures from outside. So, strong culture is mixed with other cultures such as Chinese culture, Indian culture, Arab culture, Dutch culture, and others. The city of Cirebon is very rich in cultural history, which is shaped by this cultural diversity. The city of Cirebon is very open to widespread and deep cultural interaction. Culturally, the ethnic groups mentioned above mingle and complement each other. In plain view, we can see and listen to the influences of Hindu-Buddhist (India), Chinese, Islamic and Western (Europe) cultures. In addition, an ancestral

(indigenous) culture still unites and forms a distinctive civilization structure. Starting from there, the cultural construction of Cirebon City was built. The genetic touches of diverse primordial cultures, demographically, play a significant role in forming characteristics and giving birth to cultures that tend to be hybrid. This hybrid identity is then applied to various forms of material culture, ranging from cloth (batik), culinary arts, performing arts, buildings to places of worship and even fundamental everyday life, such as the people's belief system.

Furthermore, it is undeniable that tourists who come to Cirebon bring the behaviour where they come from into the local community, which influences the community's social life. In line with what Aswita et al. (2021) described, the current identity conflicts in various aspects have threatened the preservation of regional natural and cultural resources in different regions in Indonesia, including in ecotourism development. This issue is essential and related to the social response to the presence of tourism. The results of the validity test and the reliability test of the research instruments used to obtain data are valid (all values reach Sig <0.05) and reliable (reliable with Cronbach's Alpha value > 0.6). Based on this, the distribution of research tools in obtaining polarization of stakeholder orientation towards social dynamics can be further analyzed. The accuracy of a model begins by using the Confirmatory Factor Analysis (CFA) approach. This process examines how a measurable variable or indicator that is good at describing or representing some factors in research on the carrying capacity of social tourism in Cirebon is displayed in a model. In this study, the model built looks at the relationship between aspects and social carrying capacity criteria offered as a concept assessed by seven characteristics of the respondents. Seven aspects tested include religion, economy, science, technology, rights and obligations, communication and parts of the arts. The following results are obtained based on Confirmatory Factor Analysis (CFA).

Aspect	Test parameters					information
	Probability ≥0.01	RMSEA ≤0.08	GFI ≥0.90	NFI ≥0.90	CFI ≥0.90	
Religion	0.021	0.030	0.994	0.986	0.998	Fit
Economy	0.330	0.000	0.993	0.993	1.000	Fit
Science	0.530	0.000	0.972	0.997	1.000	Fit
Technology	0.223	0.016	0.992	0.996	1.000	Fit
Rights and obligation	0.523	0.000	0.994	0.998	1.000	Fit
Communication	0.264	0.015	0.994	0.998	1.000	Fit
Art	0.227	0.036	0.987	0.996	0.999	Fit

The goodness of fit index (GFI) values for aspects of religion, economy, science, technology, rights and obligations, communication, and artistic elements illustrate that the characteristics of the model are appropriate or fit. These results are seen from statistical probability tests, Root mean square error of approximation (RMSEA), Goodness of fit statistics (GFI), Normed-fit index (NFI), and Comparative Fit Index (CFI) with outputs in the suitable criteria. These results explain that the requirements and aspects are included in the appropriate accuracy and can be developed to become an essential reference in assessing social carrying capacity.

Potential social reaction: War. War is the worst condition that occurs in social space. According to the Big Indonesian Dictionary, war means hostility between two countries, nations, religions, tribes, and so on; war is an armed battle between two armies. According to Lindemann (2010), four things motivate war, 1) Prestige (pride), 2) Antipathy (antipathy), which is a very striking difference in identity. 3) Universal dignity (universal dignity/honour), namely war caused by violating universal standards of state sovereignty. 4) Particular dignity (confident self-esteem).

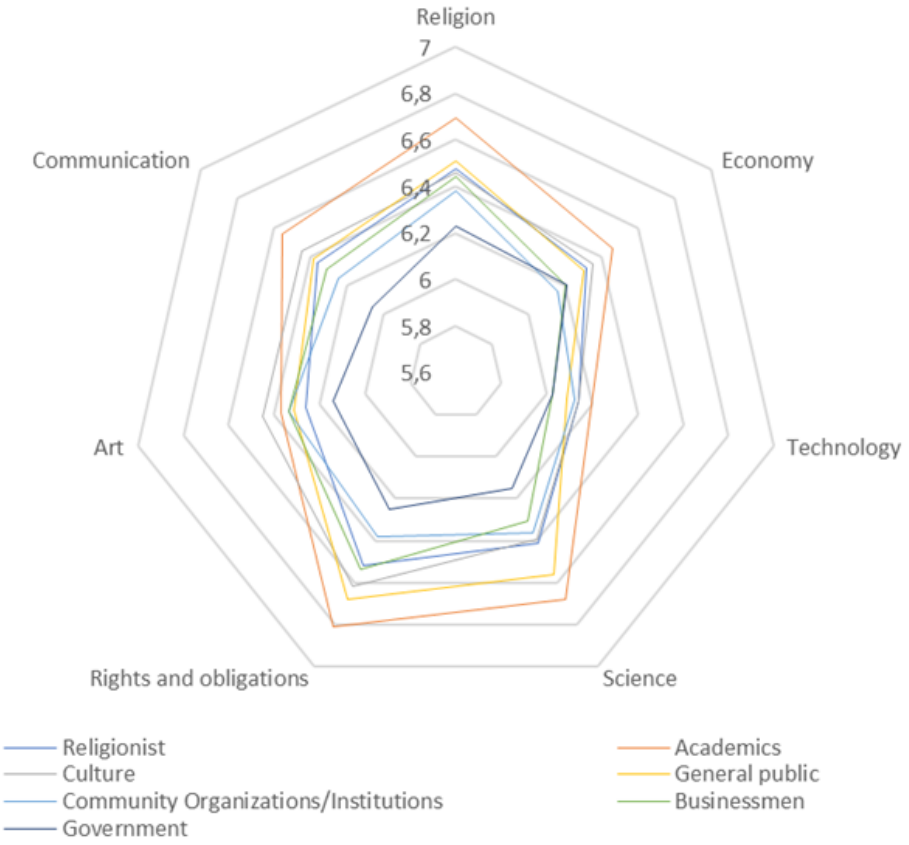
Cirebon is one of the areas located on the coast of Java Island with favourable geographical conditions. Cirebon is located on the north coastline, directly adjacent to the areas now known as Central Java and West Java. This makes the interaction between the two cultures in the two regions, namely Javanese and Sundanese, so a unique and distinctive culture is born. On the other hand, Cirebon was also an area directly passed by inter-island and even international trade routes in the 15th and 16th centuries, marked by a port as a place for ships to dock for trade or shipping. Besides the coastal area, Cirebon has fertile inland areas for agricultural activities whose results will be traded in international exchange (Deviani, 2016).

Furthermore, Deviani (2016) describes the establishment of Cirebon as not being separated from the role played by Prince Cakrabuana. Prince Cakrabuana continued to carry out developments in Caruban (before it was called Cirebon) until the status of this area, which was initially Pakuwon, changed to Nagari (kingdom). This is reflected in the recognition from King Siliwangi of the establishment of Nagari Caruban, which his son, Prince

Cakrabuana, founded. At that time, King Siliwangi sent his envoy, Tumenggung Jagabaya, to give his son the sign of kingship and receive the symbol of power (Anarimakna Kacakrawartyan) for royal autonomy. As a result, Prince Cakrabuana was also given the official royal title Sri Mangana (Iskandar, 2000).

Stakeholder orientation analysis of the values that become the platform of social life in the population of the Keraton tourism area under conditions of war. In general, the polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The guidance and magnitude of polarization in each element indicate a difference in scores for each group of respondents. This positive polarisation direction can be interpreted as the stakeholders agreeing on the social dynamics that cause war. The figure shows that the highest average score of social dynamics that causes war is the fulfilment of rights and obligations, namely 6.54, while the lowest is the economy, with a score of 6.29.

Figure 1. Social Values Conditions of War in the Keraton Tourism Area



A brief review of the literature reveals the following glossary of 'wars' terms: limited and total (or all-out) war, cold war and hot war, local and world wars, controlled and uncontrolled wars, accidental and planned wars, wars conventional and nuclear wars, declared and undeclared wars, aggressive or offensive wars and defensive wars, general wars and proxy wars, international wars and civil wars, tribal and civilized wars, preventive or preventive wars, protracted wars, total wars, liberation wars, wars of conquest, trade wars, wars of pillage, revolutionary wars, political wars, economic wars, colonial wars, imperialist wars, guerrilla wars, psychological wars, strategic wars, counter-insurgency wars, dynasty wars, monarchy wars, ritual wars, agonistic wars, holy war, instrumental war, genocidal war.

The Keraton people understand that various reasons can cause war. As in research conducted by Sarsito (2009), two types of reasons explain the emergence of war: direct and general. Primary reasons refer to specific events that prompt one party to start a war against another party for reasons it feels are legitimate and just. However, this immediate reason would not appear without the general reasons that preceded it. There are various kinds of fundamental reasons behind the war, such as psychological reasons, cultural and ideological reasons, economic reasons, and political reasons.

The polarization scale on seven aspects of social values under conditions of war in the Keraton tourism area illustrates differences based on the significance value (p-value ≤ 0.05) in the scores of each group of respondents. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

Values	Test Parameters	
	Average	Sig.
Religion	6.46	0.000
Economy	6.29	0.000
Technology	6.10	0.003
Science	6.41	0.000
Rights and obligations	6.54	0.000
Art	6.31	0.000
Communication	6.34	0.000

Description: There is a significant difference in value if Sig ≤ 0.05

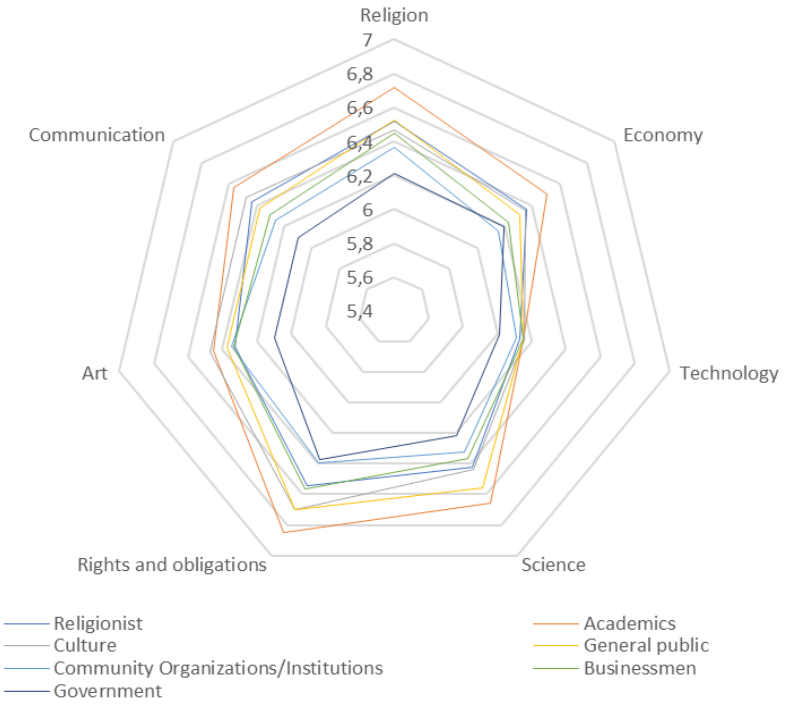
Potential social reaction: conflict. Conflict is the second adverse condition after the worst disease of war. According to the Big Indonesian Dictionary (KBBI), conflict is strife, disagreement, and conflict. Social conflict is a conflict between members of society that is comprehensive in life. Conflict is a dissociative process, but conflict is a form of social revolution with positive and negative functions. If conflict can be managed and resolved well by every element of society, it will positively impact progress and change in the community. However, on the other hand, if the conflict that occurs in society cannot be managed and appropriately resolved, the conflict will have negative impacts, resulting in various types of damage, both physical and non-physical, insecurity, disharmony, and creating instability, even resulting in loss of life.

Based on conflict theory, society is constantly changing, marked by continuous conflict between societal elements. Conflict theory sees that each component contributes to social disintegration. Apart from that, conflict theory assumes that the order in society is only caused by pressure or coercion of power from those in power. Conflict has become a part of human life. When people fight over an area, they not only fight over a piece of land but also natural resources such as water, gold, minerals, forests and various natural resources. In every social group, there are always seeds of conflict between individual and individual, group and group, individual or group and government. This conflict usually takes a non-physical form. But it can develop into physical clashes, violence and non-violence.

Conflicts at the community and palace levels coloured Cirebon's social journey. The internal conflict began when Prince Martawijaya, as the eldest son, demanded that the Cirebon royal throne fall to him because he thought he was the legitimate heir. Prince Kartawijaya rejected Prince Martawijaya's wish because he and his brother were crowned Cirebon sultans. Then, Prince Kartawijaya asked for protection from the Sultan of Banten. Meanwhile, Prince Wangsakerta also demanded to rule in Cirebon because when his father and two older brothers were held captive in Mataram, he was the one who ran the government of the Cirebon Kingdom (1650-1677). The internal conflict allowed outsiders, namely the VOC, to intervene. Under the pretext of protecting Cirebon from all threats, a friendship agreement was signed between the VOC and the Sultans of Cirebon on January 7, 1681 (Masduqi, 2011). If seen from the contents of the January 7, 1681 Agreement, it has implications that since then, Cirebon was no longer a sovereign country because it was no longer politically and economically independent. Politically, the Cirebon sultans still had the title of sultan, but in running their government, they had first to get VOC approval. The VOC also determined prices for export commodities sourced from Cirebon's natural resources to maximise the profits they could get from the economic sector. Of course, this situation was followed by conflicts between people who supported the VOC and those who did not, including those who helped each sultanate's leadership.

Analysis of stakeholder orientation on the values that become the platform of social life in the population of the Keraton tourism area in conditions of conflict. In general, the polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The advice and magnitude of polarization in each part indicate a difference in scores for each group of respondents. This positive polarization direction can be interpreted as the stakeholders agreeing on the social dynamics that cause conflict conditions. The figure shows that the average score of social dynamics that yields the highest conflict conditions is the fulfilment of rights and obligations, namely 6.59. At the same time, the lowest is the use of technology, with a score of 6.12.

Figure 2. Social Values Conditions of Conflict in the Keraton Tourism Area



Conflict, in essence, arises from abstract factors; however, the impact can include actual physical clashes between individuals involved in the conflict. Conflict in human life can be seen at various levels, from very small to very large. Differences in perceptions, differences of opinion, and disagreements in terms of interests trigger conflicts. Solutions to conflicts can include comprehensive, partial resolutions, or even no solutions are found so that the conflict continues without a clear way out. Conflict management involves recognizing and handling conflict wisely, reasonably and efficiently using three methods: triggering, reducing/mitigating, and resolving conflict.

The skills required in managing conflict include effective communication, problem-solving, and functions that contribute to increased productivity when conflict is handled correctly. However, conflict is often seen as something dysfunctional (dysfunctional) that can damage and reduce productivity (Wahyudi, 2019). The Keraton community in the tourism area understands that conflict cannot be separated from social interaction. In line with research conducted by Wijono (1993), various emotional conditions are experienced and considered normal and not disorders that affect individuals.

Values	Test Parameters	
	Average	Sig.
Religion	6.43	0.000
Economy	6.30	0.000
Technology	6.12	0.000
Science	6.43	0.000
Rights and obligations	6.59	0.000
Art	6.34	0.000
Communication	6.36	0.000

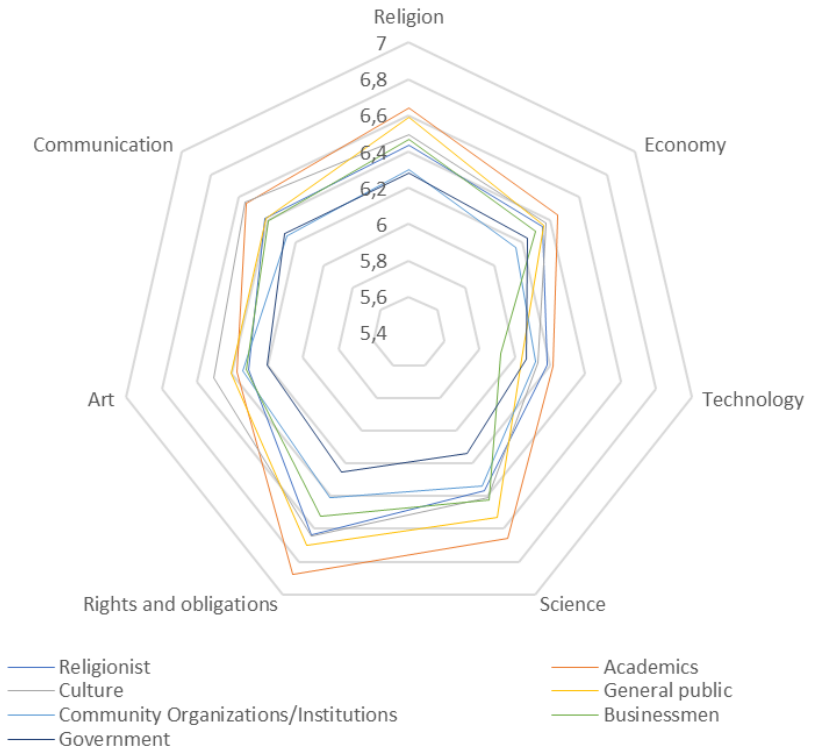
Description: There is a significant difference in value if Sig ≤ 0.05.

Next, there is a phase of change from what is perceived secretly without disturbing the individual, group or organization. This includes the emergence of different goals and values and differences in the roles played. The polarization scale on seven aspects of social values in conflict conditions in the Keraton tourism area illustrates differences based on the significance value (p-value ≤ 0.05) in the scores of each group of respondents. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

Potential social reactions: dissociative. Social interaction can be interpreted as dynamic social in Cirebon. According to Soekanto (2015), dissociation has positive and negative impacts. In this condition, there is a tendency to readjust to the norms of social relations within the ethnic-cultural group. Especially when individuals are at the quality of high-frequency interactions, the possibility of negative friction is very open because of a tolerant attitude that does not develop taste sensitivity. Dissociative processes are often referred to as oppositional processes, the same as cooperation, which can be found in every society. However, the culture and social system of the organisation concerned determine the form and direction. Opposition can be interpreted as fighting against a person or group to achieve specific goals. These resistance patterns are also a struggle to survive (struggle for existence). It should be explained that the notion of struggle for existence is also used to refer to a situation in which one human being depends on the life of another human being, which creates cooperation to stay alive.

Stakeholder orientation analysis of the values that become the platform of social life in the population of the Keraton tourism area is dissociative. The polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The advice and magnitude of polarization in each element indicate a difference in scores for each group of respondents. This positive polarisation direction can be interpreted as stakeholders agreeing on the social dynamics that cause dissociative conditions. The figure shows that the highest average score of social dynamics that causes dissociative states is the fulfilment of rights and obligations, namely 6.58. At the same time, the lowest is the use of technology, with a score of 6.10.

Figure 3. Social Values Conditions of Dissociative in the Keraton Tourism Area



Various reasons can be a trigger that leads to a dissociative condition in the Keraton Tourism Area. Unlike the reasons for conflict and war, the dissociative disorders of the Keraton Tourism Area are due to varying individual needs, pressures related to position or personality differences, conflicting interests between groups and competition that leads to only one party benefits. The polarization scale on seven aspects of social values and dissociative conditions in the Keraton tourism area illustrates differences based on the significance value (p-value ≤ 0.05). The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

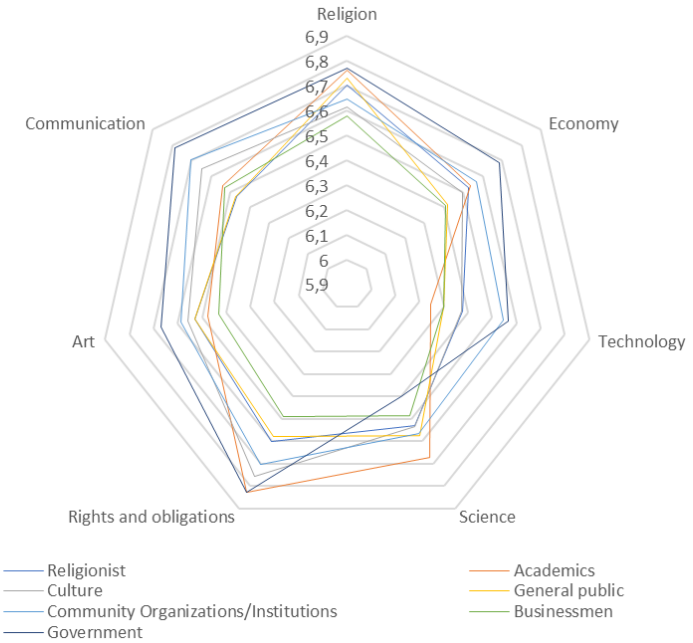
Values	Test Parameters	
	Average	Sig.
Religion	6.45	0.000
Economy	6.31	0.000
Technology	6.10	0.000
Science	6.41	0.000
Rights and obligations	6.58	0.000
Art	6.35	0.000
Communication	6.42	0.000

Description: There is a significant difference in value if Sig ≤ 0.05

Social reaction potential: conducive. Conducive in this study can be interpreted as the middle value of the existing social dynamics. The negative side leads to dissociative, conflict and war, while the positive leads to associative, cooperative and productive collaboration. Conducive can be said to be a situation where the Cirebon area is said to be running according to the rules that should be. According to KBBI, conducive is a calm and not chaotic condition that supports certain activities or goals. Conducive conditions can be achieved if the interaction pattern occurs in a balance in the fulfilment of each individual. Interaction patterns are created or formed with various motives. Ultimately, this motivation drives dissociative, conducive and associative tourism spaces in Cirebon.

Analysis of stakeholder orientation on the values that become the platform of social life in the population of the Keraton tourism area with conducive conditions. The polarization perceptions of the seven aspects of social space are positive (score > 4). The law and magnitude of polarization in each part indicate a difference in scores for each group of respondents. This positive polarization direction can be interpreted as the stakeholders agreeing on the social dynamics that cause conducive conditions. The figure shows that the average score of social dynamics that yields the highest conducive conditions is religion, namely 6.69. At the same time, the lowest is the use of technology, with a score of 6.39.

Figure 4. Social Values Conditions of Conducive in the Keraton Tourism Area



The polarization scale on seven aspects of social values conducive conditions in the Keraton tourism area illustrates differences based on the significance value (p-value ≤ 0.05) in the scores of each group of respondents. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

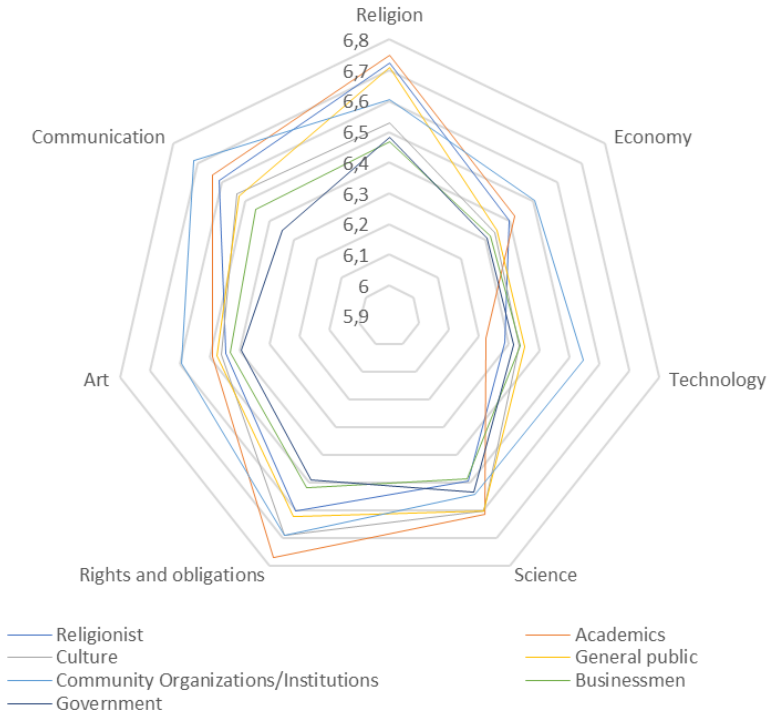
Values	Test Parameters	
	Average	Sig.
Religion	6.69	0.000
Economy	6.52	0.000
Technology	6.39	0.000
Science	6.54	0.000
Rights and obligations	6.68	0.000
Art	6.54	0.000
Communication	6.59	0.000

Description: There is a significant difference in value if Sig ≤ 0.05.

Potential social reactions: Associative. Some sociologists consider that associative is the main form of social interaction. Other sociologists believe that associative is a primary process. This last group understands associativity to describe most forms of social interaction because all forms of interaction can be returned to associativity. Associative here is a joint effort between individuals or groups to achieve one or several common goals. The connection can change, influence, and improve between one individual and another individual (Mahmudah, 2011). In addition, in social interaction, there is reciprocal or interstimulus contact and response between individuals and groups (Taneko, 1993). Social interaction can be said to be associative if the process of social interaction leads to a positive direction. Associative social interaction at least leads to activities: 1) Cooperation, 2) Accommodation, and 3) Assimilation. Factors that facilitate assimilation include tolerance, respect for foreigners and their culture, equality in culture, mixed marriages and the presence of expected enemies (Setiadi and Usman, 2011).

Analysis of stakeholder orientation on the values that become the platform of social life in the population of the Keraton tourism area in associative conditions. The polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The advice and magnitude of polarization in each element indicate a difference in scores for each group of respondents. This positive polarisation direction can be interpreted as stakeholders agreeing on the social dynamics that cause associative conditions. The figure shows that the average score of social dynamics that yields the highest associative conditions is the fulfilment of rights and obligations, namely 6.63. At the same time, the lowest is the use of technology, with a score of 6.34.

Figure 5. Social Values Conditions of Associative in the Keraton Tourism Area



The polarization scale on seven aspects of social values associative conditions in the Keraton tourism area illustrates differences (p-value ≤ 0.05) in the respondents' scores. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

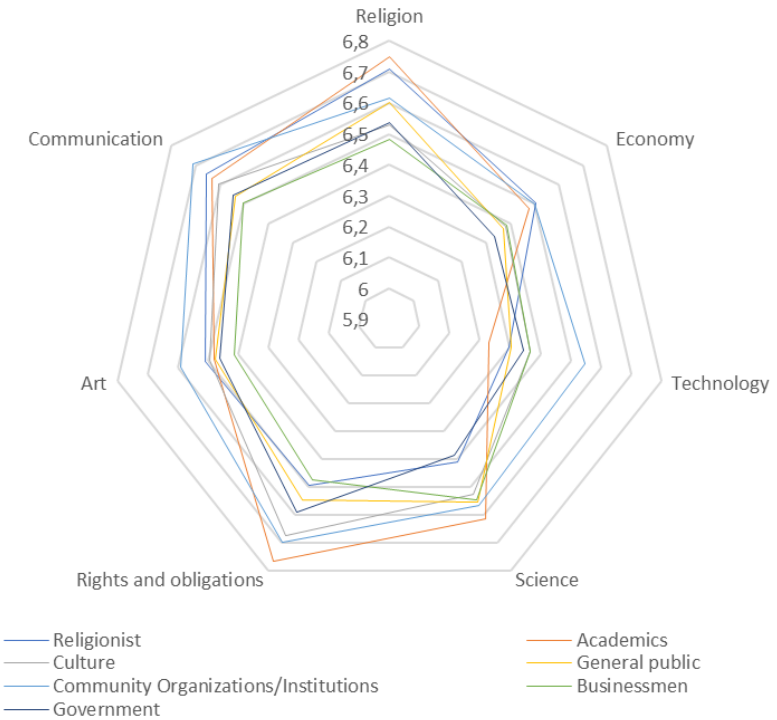
Values	Test Parameters	
	Average	Sig.
Religion	6.61	0.000
Economy	6.38	0.000
Technology	6.34	0.000
Science	6.56	0.000
Rights and obligations	6.63	0.000
Art	6.47	0.000
Communication	6.55	0.000

Description: There is a significant difference in value if Sig ≤ 0.05.

Social reaction potential: cooperative. Social contact is seen from its form of positive and negative social connections. Social contact can be said to be positive if the structure of the relationship is more directed towards cooperative or cooperative patterns. Cooperation can be in the form of spontaneous cooperation, direct cooperation, contractual cooperation, as well as traditional cooperation. Unexpected collaboration is cooperation that occurs immediately, while direct cooperation is the result of orders from superiors or authorities, contractual cooperation is cooperation that occurs on an individual basis, and traditional cooperation is cooperation as part of the elements of the social system (Soekanto, 2015).

Analysis of stakeholder orientation on the values that become the platform of social life in the population of the Keraton tourism area in cooperative conditions. The polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The guidance and magnitude of polarization in each element indicate a difference in scores for each group of respondents. This positive polarisation direction can be interpreted as the stakeholders agreeing on the social dynamics that cause cooperative conditions. The figure shows that the average score of social dynamics that yields the highest cooperative situation is the fulfilment of rights and obligations, namely 6.61. At the same time, the lowest is the use of technology, with a score of 6.35.

Figure 6. Social Values Conditions of Cooperative in the Keraton Tourism Area



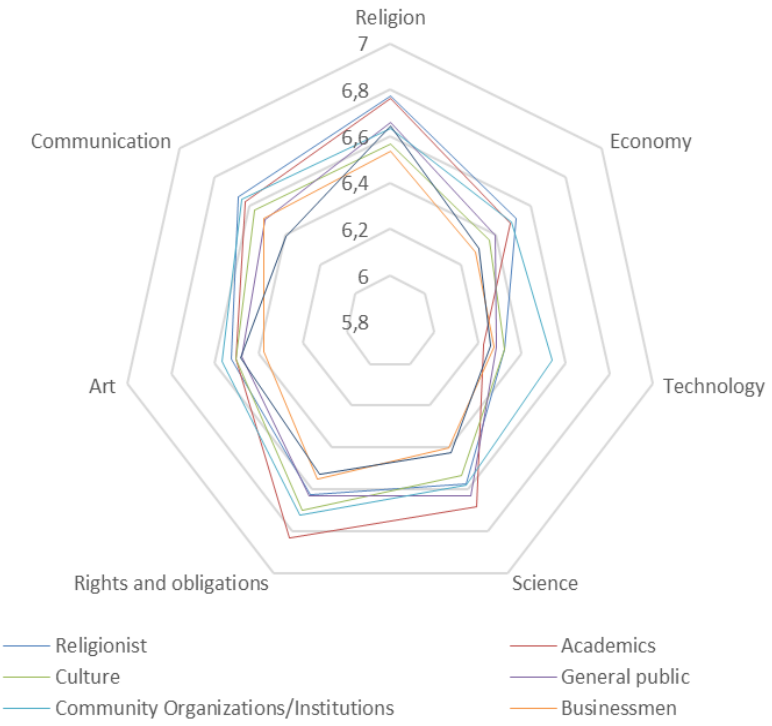
The polarization scale on seven aspects of social values of the Keraton tourism area's cooperative condition illustrates differences based on p-value ≤ 0.05 in the respondents' scores. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

Values	Test Parameters	
	Average	Sig.
Religion	6.60	0.000
Economy	6.42	0.000
Technology	6.35	0.000
Science	6.52	0.000
Rights and obligations	6.61	0.000
Art	6.49	0.000
Communication	6.59	0.000

The potential for a social reaction: productive collaboration. Social structural factors influence the collaboration process. In the social structure, stakeholder relationships are encouraged in the collaboration process. This social structure relates to the planning structure, task structure and stakeholder functions so that Each stakeholder knows their duties and tasks in the collaborative process of managing green open spaces. This will increase stakeholder awareness of their duties. Building an attitude of being aware of their responsibilities improves performance in the collaboration process, not only carrying out tasks but also paying attention to maximum results in their work. (Abdulsyani, 1994). Productive collaboration can occur in every social space, religion, economy, (3) technology, science, fulfilment of rights and obligations, arts and communication.

Analysis of stakeholder orientation on the values that become the platform of social life in the population of the Keraton tourism area in conditions of productive collaboration. The polarization of stakeholder perceptions of the seven aspects of social space is in a positive direction (score > 4). The guidance and magnitude of polarization in each element indicate a difference in scores for each group of respondents. This positive direction of polarization can be interpreted as stakeholders agreeing on the social dynamics that lead to conditions of productive collaboration. The figure shows that the average score of social dynamics that causes the highest requirements of productive collaboration is the fulfilment of rights and obligations, namely 6.66. At the same time, the lowest is the use of technology, with a score of 6.32.

Figure 7. Social Values Conditions of Productive Collaboration in the Keraton Tourism Area



The polarization scale on seven aspects of social values in the condition of productive collaboration in the Keraton tourism area illustrates differences based on the p-value ≤ 0.05 in the scores of each group of respondents. The difference in value for each aspect of the Table is more due to the variation in the interests of each stakeholder involved.

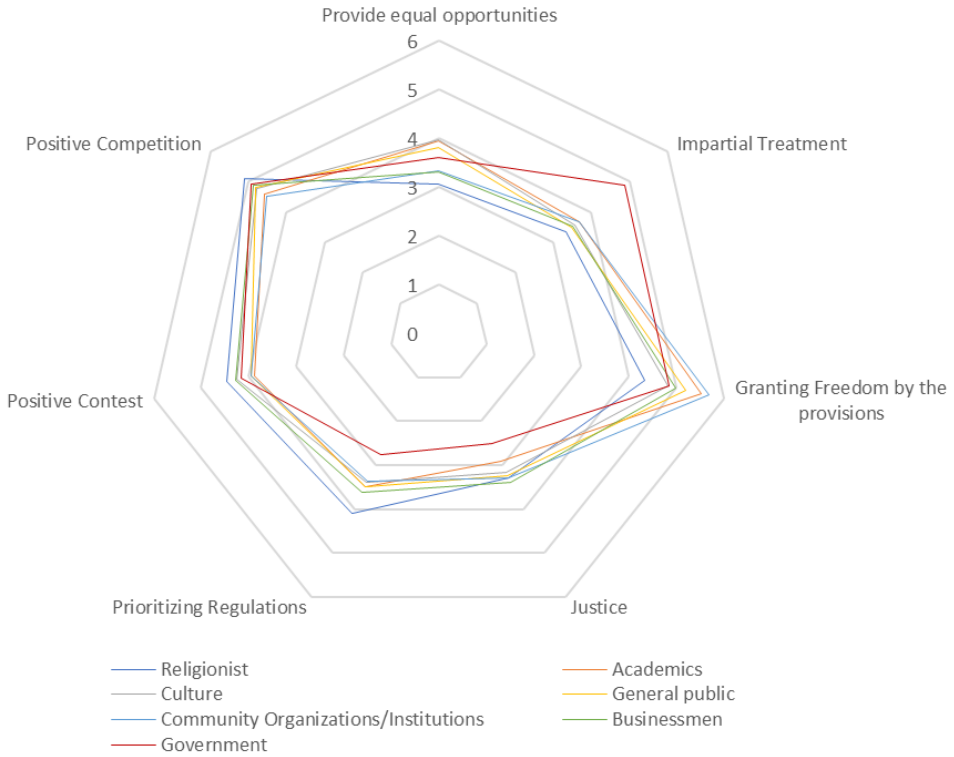
Stakeholder orientation analysis on crucial favourable conditions of social life in the population of the palace tourism area. In general, the direction of polarization of stakeholder perceptions is evenly distributed across the seven indicators on the positive aspect of social space. The advice and magnitude of polarization in each element indicate a difference in scores for each group of respondents. The direction of negative polarisation (score < 4) can be interpreted as the stakeholders agreeing on crucial things that form a favourable situation conducive to productive collaboration on the four assessment indicators.

Values	Test Parameters	
	Average	Sig.
Religion	6.65	0.000
Economy	6.41	0.000
Technology	6.32	0.000
Science	6.55	0.000
Rights and obligations	6.66	0.000
Art	6.49	0.000
Communication	6.56	0.000

Description: Sig ≤ 0.05, then there is a significant difference in the average value.

The figure shows the average score of social dynamics that causes favourable conditions, in order of crucial things to improve favourable conditions, namely: (1) Justice with an average score of 3.11, (2) Prioritizing regulations with an average score of 3.46, (3) Providing equal opportunities/tolerance with an average score of 3.58, (4) Impartial treatment with an average score of 3.73 (5) Positive contention with an average score of 4.13, (6) Positive competition with an average score of 4.80 (7) Granting freedom according to the provisions with an average score of 5.06.

Figure 8. Positive Crucial Conditions in the Keraton Tourism Area



Justice indicators are crucial in building positive conditions in the Keraton Tourism Area. These results align with Astri research (2011) that when a society can create harmony through social justice among its members, order, peace, and comfort will become natural and can be felt in a social environment. As social entities, individuals cannot avoid dependence and interaction with others, which contributes to the development of harmony in society. It focuses on helping each other and aims to build a solid social community that can work together to achieve the goals, including the Keraton Community. This community consists of individuals with diverse backgrounds, such as religion, occupation, education, economy, age, and different perspectives. The beauty of the social community lies in its ability to reconcile these differences, creating opportunities for mutual understanding and strengthening social relationships. Forming social harmony within the palace environment is a process that requires quite a long time and extra effort.

This process involves various parties, including academics, government, indigenous peoples, and the general public. Reviewing multiple phenomena of life, harmony is a need and hope for every individual. The potential for fairness and compliance with regulations is a must that must be introduced early on. In addition to understanding existing social interactions, land use and area intensity must be considered. The conduciveness of place as a forum for interacting forms a healthy exchange. This is because of one of the land uses of the Kasepuhan Palace. There are eight land uses in the Kasepuhan Palace Area: cultural heritage, health, vacant land, trade and services, worship, settlements, education, and open space. The use of cultural heritage land in the Kasepuhan Palace Area is identified as the Kasepuhan Palace itself and the gate of the mace sanga outside the palace complex, namely to the south of the palace complex near the Kriyan River. The Lawang Sanga Door is still part of the cultural heritage of the Kasepuhan Palace because the Lawang Sanga Door has a function closely related to the palace, namely as the southern entrance of the Kriyan River in ancient times. The use of health land in the Kasepuhan Palace Area was identified as the Mother and Child Hospital (RSIA) Panti Abdi Dharma. This hospital is located on Jl. Pulasaren no. 7. This hospital has been around for over 20 years.

The intensity or density of an area is one of the physical characteristics a cultural heritage area possesses. According to Viciani G. & Hanan (2017), regional power can explain the form of the site from the cultural heritage area itself. Building density is the number of buildings in a one-hectare area. The classification of building density in the Kasepuhan Palace area is divided into three types, namely medium, high, and very high. In general, the Kasepuhan Palace area is in the category of high building density. The same thing was conveyed by Laskara (2015), that the settlements around the Kasepuhan Palace are increasing in intensity. Residential land uses dominate the built environment around the Kasepuhan Palace. At first, the territories around the Kasepuhan Palace were explicitly for the residence of palace courtiers, so they were called magersari areas, but over time, other settlements also grew. One of the causes is the attitude of the people who lease land given by the sultan to other people for personal gain. Based on this, the indicator prioritizes regulation as a crucial thing that forms a positive situation that must be carried out, including how to use the existing land.

Conclusion

The direction of polarization of stakeholders towards the social values of the Cirebon people in the tourism space is positive. The seven aspects of the confirmed assessment aspect can form positive and negative situations. Each aspect's polarization scale indicates a different orientation for each stakeholder group towards social values. This illustrates the existence of an orientational gap that should be minimized to strengthen the policy direction in managing the social support capacity of Cirebon tourism. Based on the crucial conditions, it is considered that efforts are needed to maintain the quality of justice and prioritize regulations in social interaction.

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Credit Authorship Contribution Statement:

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

Ricky Avenzora: Conceptualization, Investigation, Methodology, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition;

Tutut Sunarminto: Methodology, Supervision, Data curation, Validation, Writing – review and editing, Visualization, Funding acquisition;

Elly Malihah: Methodology, 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.

References

[1] Aswita and Avenzora, Ricky. 2021. Stakeholders Motivation on the Gayo Ethnic Ecoregional Identity for the Development of Ecotourism in Bener Meriah District, Aceh Province. Journal of Empowerment Community and Education Volume 1 (3).

[2] Abdulsyani.1994. Sosiologi Skematika, Teori dan Terapan. Jakarta (ID): Bumi Aksara.

[3] Astri, Herliana. 2011. Penyelesaian Konflik Sosial Melalui Penguatan Kearifan Lokal. Jakarta (ID): Pusat Pengkajian Pengolahan Data Dan Informasi Sekretariat Jenderal DPR RI

[4] Avenzora R. 2008. Ecotourism: Evaluasi Tentang Konsep. in: Avenzora R, editor. Ekoturisme Teori dan Praktek. Aceh (ID): BRR NAD-Nias.

[5] Brandolini, S. Marzetti Dall'Aste dan Mosetti, R.2005. Social Carrying Capacity of Mass Tourist Sites: Theoretical and Practical Issues about its Measurement. Natural Resources Management Working Papers 12154, Fondazione Eni Enrico Mattei (FEEM). DOI: http://doi:10.22004/ag.econ.12154

[6] Del Monte-Luna, P., Brook, B. W., Zetina-Rejon, M. J., and Cruz-Escalona, V. H..2004. The carrying capacity of ecosystems. Global helogy and Biogeography, 13(6), 485–495. DOI: http://doi:10.1111/j.1466-822x. 2004.00131.x

[7] Deviani F.T. 2016. Perjanjian 7 Januari 1681 Dan Implikasinya Terhadap Kehidupan Sosial Politik Ekonomi Di Kerajaan Cirebon (1681 M-1755 M). Tamaddun Vol. 4 Edisi 1 Januari – Juni 2016.

[8] Iskandar Y. 2000. Negara Gheng Islam Pakungwati Cirebo. Bandung (ID): Padepokan Sapta Rengga.

[9] Joshi, Subash dan Dahal, Raziv.2019. Relationship between Social Carrying Capacity and Tourism Carrying Capacity: A Case of Annapurna Conservation Area, Nepal. Journal of Tourism and Hospitality Education, 9. DOI: http://doi:10.3126/jthe.v9i0.23677

[10] Laskara, G. W. 2015. Identifikasi Stakeholder dan Peranannya dalam Pelestarian Kawasan. Prosiding Seminar Perencanaan Dan Pelestarian Lingkungan Terbangun. 5(1): 244–255.

[11] Mahmudah, Siti. 2011. Psikologi Sosial. Malang (ID): Maliki Press.

[12] McCool, F. Stephen. 2013. Limits of Acceptable Change and Tourism In Holden, A., and Fennel, D.A. (eds) Routledge Handbook of Tourism and the Environment. 285-298. https://www.academia.edu/19690670/Limits_of_Acceptable_Change_and_Tourism

[13] Mercer, D.C. 1977. Leisure and Recreation in Australia. Journal of Leisure Research 10(3), 256. DOI:http://doi:10.1080/00222216.1978.1196936

[14] Rebollo, J.f.V., and Castineira, C.J.B. 2010.Renovación y reestructuración de los destinos turísticos consolidados del litoral: las prácticas recreativas en la evolución del espacio turístico. Boletín de la Asociación de Geógrafos Españoles, 53, 329-353.

[15] Rusli, M., Firmansyah, R., Mbulu, Y.P. (2018). Halal Tourism Destination Development Model. Journal of Environmental Management and Tourism, (Volume IX, Fall), 6(30): 1296 - 1302. DOI:http://doi:10.14505/jemt.v9.6(30).19

[16] Sarsito, Totok. 2009. Perang dalam Tata Kehidupan Antarbangsa. Jurnal Komunikasi Massa. Vol. 2 No. 2 Januari 2009 hal. 112-126

[17] Saveriades, Alexis. 2020. Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the Republic of Cyprus. Tourism Management 21. DOI: http://doi:10.1016/S0261-5177(99)00044 -8

[18] Setiadi, Elly M. and Usman Kolip. 2011. Pengantar Sosiologi. Jakarta (ID): Kencana

[19] Soekanto, Soerjono. 2015. Sosiologi Suatu Pengantar. Jakarta (ID): Rajawali Press

[20] Stankey H. George dan McCool F. Stephen.1984. Carrying capacity in recreational settings: Evolution, appraisal, and application. Leisure Sciences: An Interdisciplinary Journal. 6:4, 453-473, DOI:http://doi:10.1080/01490408409513048

[21] Sugiyono. 2022. Metode Penelitian Kuantitatif Kualitatif dan R & D. Bandung(ID): Alfabeta.

[22] Taneko, S.B. 1993. Struktur dan proses Sosial. Jakarta (ID): PT Raja Grafindo.

[23] Tokarchuka, Oksana., Roberto Gabriele, Roberto., and Maurera, Oswin.2020. Estimating tourism social carrying capacity. Annals of Tourism Research. DOI: http://doi:10.1016/j.annals.2020.102971

[24] Untari R, Avenzora R, Darusman D, Sunarminto T. 2019. Community Responses to Nature-based Tourism Promotion Materials in Indonesia. Jurnal Manajemen Hutan Tropika 25. DOI: 10.7226/jtfm. 5.1.17

[25] Usman, Ali., & Okafor, Sebastian.2019. Exploring the Relationship Between Social Media and Social Influence. In Bowen, G., & Ozuem, W. (Ed.), Leveraging Computer-Mediated Marketing Environments (pp. 83-103). IGI Global. DOI: http://doi:10.4018/978-1-5225-7344-9.ch004

[26] Viciani G, R., & Hanan, H. 2017. Karakteristik Kawasan Tamansari Watercastle sebagai Warisan Budaya Kraton Yogyakarta. Prosiding Seminar Heritage Cirebon 2017. 1(B): 53–60.

[27] Wahyudi. 2019. Konflik, Konsep Teori dan Permasalahan. Journal Unita. Vol 3 Edisi 1. (in Indonesian)

[28] Wen, K., Zhu, E., Zhang, G., Ye, T., Wu, Q., Zhu, H. 2015. Basic Situation of Carrying Capacity of Beijing, Tianjin, and Hebei Province and Development Countermeasures. In : K Wen, E Zhu, editor. Report on Development of Beijing, Tianjin, and Hebei Province (2013) Measurement of Carrying Capacity and Countermeasures. Current Chinese Economic Report Series. Berlin, Heidelberg (DE): Social Sciences Academic Press and Springer-Verlag.hlm 3-29

[29] Wijono 1993. Konflik Dalam Organisasi. Semarang (ID): Satya Wacana

[30] Zhang, Liye dan Chung, ShanShan.2015. Assessing the Social Carrying Capacity of Diving Sites in Mabul Island, Malaysia. Environmental Management. 56, 1467–1477. DOI: http://doi:10.1007/s00267-015-0586-x

[31] United Nations World Tourism Organization 1981.Saturation of Tourist Destinations. Madrid (ES): Report of the Secretary General World Tourism Organization.

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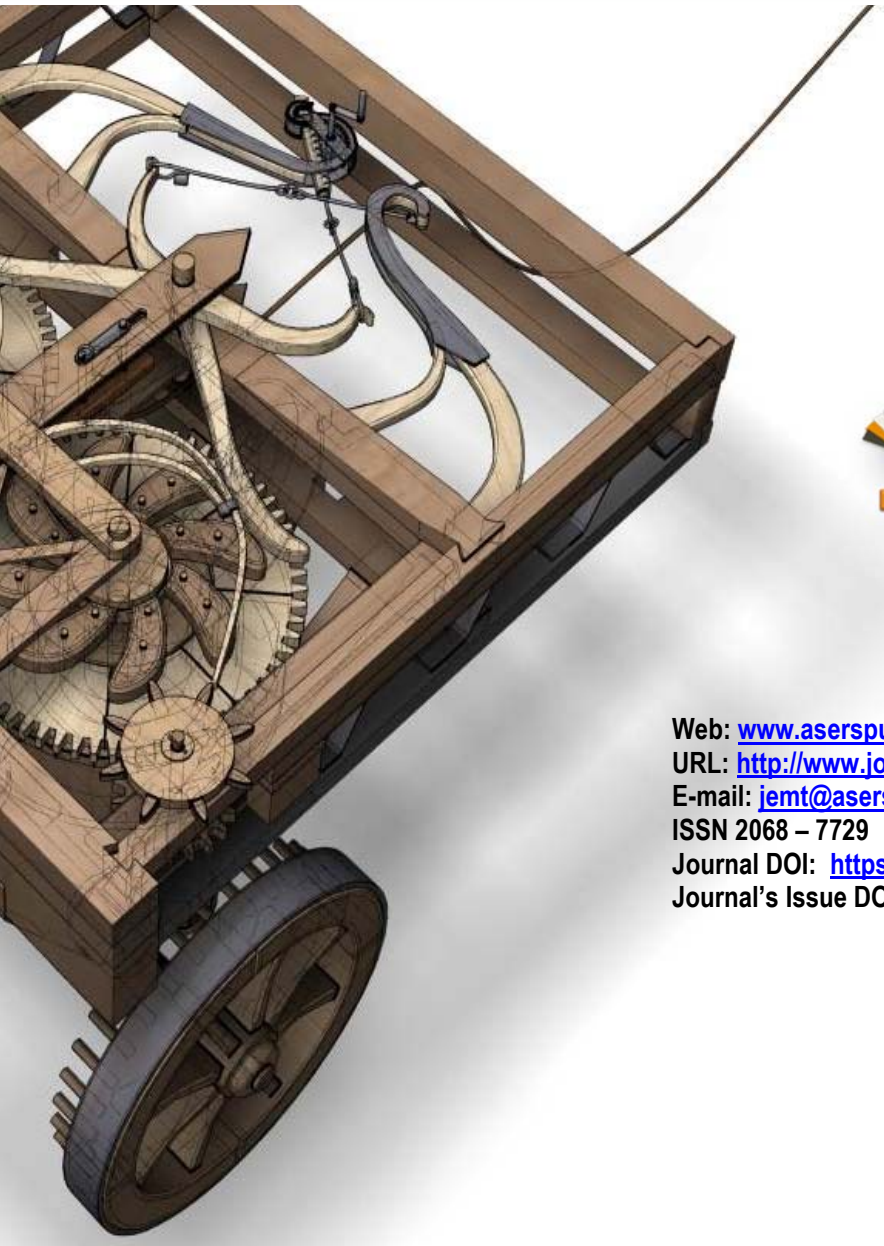

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