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Sustainable tourism from the perspective of tourists in Nganjuk Indonesia

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Abstract

Purpose: This study aims to analyze tourists' perspectives regarding the sustainability of four tourism destinations, namely Sedudo Waterfall, Roro Kuning, TRAL, and Margo Tresno Cave in Nganjuk East Java, Indonesia. Moreover, this study attempts to reveal tourists' sustainability awareness based on the triple bottom-line concept and which dimensions are considered the most important for tourists.

Research Methodology: Data were obtained from a survey of visitors (16 years old and over) to the four tourist objects in Nganjuk. Furthermore, this study utilized Principal Component Analysis (PCA) and ANOVA tests to evaluate the differences between types of tourists and their views on sustainability.

Results: The number of types of tourists found in the Nganjuk tourist destination was change, amusement, rupture, interest, and dedication. The ANOVA test results show a different tourist perception of sustainability issues from the five types of tourists in Nganjuk.

Limitations: This study involved only young respondents who did not consider tourists beyond a young age. In addition, this study focused only on one regency in Indonesia.

Contributions: To create a tourism industry that can last and protect the environment, the vital role of tourists cannot be ignored. This research makes a theoretical contribution by expanding the theory to explain aspects that have never been studied before regarding tourists' understanding of the sustainability issue in the tourism sector.

Novelty: This study is one of the first to discuss tourists' perceptions of sustainability issues in the Indonesian context.

Keywords: Sustainable tourism, tourist, Indonesia, triple bottom line, sustainability awareness

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1. Introduction

The concept of sustainability comes from the definition introduced by the Brundtland Commission in its report 'Our Common Future' to meet current needs without compromising the ability of future generations to meet their own needs (UN, 1987). The Commission was formed because of environmental disasters that threaten global ecosystems. Climate change, ozone depletion, industrial pollution, soil erosion, extinction of some species, and other environmental and social threats (McChesney, 1991) are part of what the Commission calls a 'new reality.' A reality that has no way out, it must be recognized and faced. Even though natural environmental conditions are becoming unhealthy, the Earth must still provide resources for human population growth (UN, 1987).

Therefore, most governments worldwide have adopted sustainable development as a national goal in response to the initiative of the Commission and the United Nations Conference on Environment and Development in 1992, known as the Earth Summit (Atkinson, 2000). In this regard, all parties are expected to be involved in sustainable development, including sustainable tourism, as a result of discussions from the Brundtland Commission report and increasing global concern about sustainability (Butler, 1999). As Bramwell (2004) states, sustainable tourism is part of the larger concept of sustainable development (Szymanska, 2013).

Efforts to ensure that tourism reduces its negative impacts and increases its positive effects on the environment and socioeconomic dimensions of sustainability have resulted in sustainable tourism. Sustainable tourism, which has been widely recognized as proposed by The United Nations Environment Program (UNEP) and United Nations World Tourism Organization (UNWTO), is a form of tourism that takes complete account of its current and future economic, social, and environmental impacts, addresses the needs of visitors, industry, the environment and the community of the tourism area (Postma, Cavagnaro, & Spruyt, 2017).

Sustainable tourism is urgently needed because of its role in being able to 1) protect the environment, natural resources, and wildlife; 2) provide socio-economic benefits to people living in tourist destinations; 3) preserve cultural heritage and create authentic tourism experiences; 4) bringing tourists and local communities together for mutual benefit; 5) creating tourism opportunities that are inclusive and accessible to everyone (Wardle, 2021). The importance of sustainable tourism is in line with the research of Ceballos-Lascurain (1996) and Dedek (2017) that sustainable tourism can contribute to conservation, often seen as a means of protecting areas such as rainforests and private nature reserves (Dedek, 2017).

Due to the importance of sustainable tourism, the sector is a growing segment of tourism worldwide (Dedek, 2017), as is Indonesia. Sustainable tourism development is currently the main concern of the Government of Indonesia, as stated in the press release of the Coordinating Ministry for Economic Affairs of the Republic of Indonesia (number HM.4.6/449/SET). M.EKON.3/08/2022 (Limanseto, 2022; Wardle, 2021).

Because of its importance, most Indonesian regions are encouraged to develop and manage their tourism sector. Nganjuk, a regency in East Java with a beautiful natural landscape that has the most potential regency in East Java to develop its tourism (Primadany, 2013), is no exception. The Ministry of Tourism and Creative Economy also promotes the implementation of sustainable tourism, stating by the Minister of Tourism and Creative Economy in the Nganjuk Regency that Nganjuk must be an excellent and sustainable tourism destination (Wismabrata, 2023).

However, tourism development focuses only on economic growth (Susilo & Dharmawan, 2021). This causes various social and environmental problems arising from tourism activities are still happening. For example, the most recent and viral is the destruction of the Edelweiss Ranca Upas flower garden, Ciwidey, Bandung, due to a trail motorbike event, which also harms the community and damages the tourism ecosystem (Sunartono, 2023). Likewise, in Bali, the problem of waste and environmental damage is due to the excessive exploitation of nature for tourism (Anisa, 2021). Such problems also occur in the tourism area of the Nganjuk Regency, one of which is the Sedudo waterfall, the largest PAD contributor from the tourism sector. Another disaster that occurs in tourist areas is Mount Wilis Nganjuk, where landslides often occur. The last landslide hit Mount Wilis in May 2023 (Purnomo, 2023).

Landslides can be categorized as hydrometeorological disasters, which are natural disasters or destructive processes that occur in the atmosphere (meteorology), water (hydrology), or the oceans (oceanography). According to Prof. Chay Asdak, hydrometeorological disasters are caused by natural phenomena such as high rainfall and human activity (Unpad, 2021). In order to improve the quality standards, it is essential to develop the tourism masterplan for specific destinations and the overall plan

¹ for Ngunjuk Regency (Ari, Sari, Wicaksono, & Harisanti, 2018), wherein sustainable tourism can be recommended.

Therefore, sustainable tourism practices are needed to address such problems. Sustainable tourism will help minimize the negative impacts of tourism activities. This will help to preserve the natural environment (Nafi & Ahmed, 2017), where tourists are key stakeholders in implementing sustainable tourism (Moscardo & Murphy, 2014).

Therefore, it is important to understand tourists' perceptions of sustainable tourism, namely, the extent to which tourists see sustainability issues and fill in the information gap on how tourists can reach conclusions about sustainable tourism development. Therefore, the purpose of this research is to analyze the perspective of tourists regarding sustainable tourism, namely, aspects of sustainability at specific tourism locations, and to assess differences in perceptions of sustainability between types of tourists. This study also aims to determine the level of awareness of Ngunjuk tourists regarding sustainability issues in tourist areas and to determine which dimensions of sustainability they consider most important.

In Indonesia, to the best of the researcher's knowledge, there is still very little research on tourists' perceptions of sustainable tourism, so there is still an information gap between what tourists think and say and how they behave in relation to the environment. The results of this study will reveal tourists' insights and sensitivities about sustainability and contribute to creating awareness, setting agendas, and implementing responsible behavior (Budeanu, Miller, Moscardo, & Ooi, 2016) by setting up the right rules.

2. Literature Review

Sustainable tourism is not only about the environment, which is usually the main focus, but also includes social, cultural, economic, political, and ethical matters (Moyle, Moyle, Ruhanen, Weaver, & Hadinejad, 2020). Sustainable tourism refers to activities that can continue for a long time because they positively affect the social, economic, natural, and cultural aspects of the area where they occur (Stoddard, Pollard, & Evans, 2012).

There are several ways to define sustainable tourism. Butler (1999) stated that sustainable tourism is difficult to define in a way that everyone agrees with. This study uses the triple bottom-line concept proposed (Elkington, 1998) through UNEP and UNWTO. Four stakeholders could be involved in creating sustainable tourism: the local people who live in the area now and in the future and those who visit the area now and in the future, known as tourists (Byrd, 2007).

A tourist goes to another place that is not their permanent home for less than a year, does not work permanently, and stays at least overnight in a place there (The Act on Tourism Services, 1997 in Szymanska (2013)). Tourists are key stakeholders in sustainable tourism (Byrd 2007; Rasoolimanesh, Ramakrishna, Hall, Esfandiar, and Seyfi (2023). Additionally, the ideal tourist model that follows sustainable development is when tourists understand and practice the goals and principles of sustainable tourism, which includes respecting all aspects of the triple bottom line (Szymanska, 2013). Thus, it is very useful to know the type of tourist.

One tourist typology was proposed by the travel organization NP Nature Travels, as reported by Elands and Lengkeek (2000).

1. Unconcerned/shallow amusement: A group of tourists enjoying lying in the sun for a long time but have no care about plants and animals.
2. Carefully Organised-Amusement: Tourists who have a preference for organized trips. Travelers enjoy guided tours along with stories and prefer contact with other travelers. This group appreciated safety and security, thus wanting safe and reliable vacation destinations.
3. Change: This type of tourist wants to take a break from home when they go on vacation.
4. Interest: This mode clarifies that they want to join local cultural activities and frequently visit cultural and historical places. Apart from enjoying a fun experience, tourists in this category also

- 1 like to relax on terraces when they are sunny.
5. Self-discovery-rupture: A tourist who enjoys discovering things about oneself and searching for different aspects of one's personality.
6. Nature-Dedication: Tourists like physical challenges, untouched nature, and loneliness.
7. Culture-Dedication: This tourist type is characterized by participating in local cultural activities, even though fully embracing culture is uncommon. This type of tourist cares about beauty and wants to explore places that are not commonly visited or that are far away.

Cottrell, Van der Duim, Ankersmid, and Kelder (2004) simplify the tourist typology above into 5 types. These are musicians, change, interest, rupture, and dedication. This study followed Cottrell et al. (2004).

This study uses Actor-Network Theory (ANT) because it focuses on the relationship between non-humans and humans, which is central to achieving sustainable tourism businesses and is useful for understanding tourism phenomena (Dedeke, 2017). From the perspective of ANT, tourists are actors who can collectively or individually wish to carry out a single or joint mission, namely, carrying out the three dimensions of sustainable tourism. Some frameworks identify the people involved and their roles in the tourism industry; it is also important to consider how these people interact with each other and include the role of tourists (Roxas, Rivera, & Gutierrez, 2020). The role of tourists as the most important stakeholders in the tourism sector cannot be abandoned to build sustainable tourism. This is also one of the contributions of this research (theoretical contribution), namely, expanding the theory to explain phenomena that have never been applied before (Combs et al., 2009). Moreover, this study attempts to reveal the sustainability awareness of tourists in Nganjuk. Therefore, the hypothesis proposed in this study was as follows:

H1: There are different perceptions regarding the issue of the sustainability of the four tourism objects in the Nganjuk area.

3. Research Methodology

Nganjuk has many tourism destinations that the Regional Culture and Tourism Office manages. Among them, Sedudo Waterfall, Roro Kuning, TRAL, and Margo Tresno Cave are considered the most important in their local revenue contribution. Therefore, this study focused on four tourism areas.

The data were obtained through a questionnaire survey given to visitors of the four tourist objects in Nganjuk. Thus, the respondents of this study were tourists (aged 16 years and over) at four tourism destinations. The questionnaire was developed based on a literature review conducted by (Cottrell et al., 2004) for sustainable tourism in three dimensions: economic, social, and environmental, including demographics, travel behavior, and a general understanding of sustainability. When creating indicators, it is important to understand that they should be customized for each industry (Stoddard et al., 2012). Therefore, some adjustments were made to the questionnaire in this study.

The age limit of 16 years was chosen because younger people have less knowledge and experience of sustainability aspects (Cottrell et al., 2004). The age range of 17-29 years was categorized as young tourists, following Nafi and Ahmed (2017). The remainder were categorized as old/adult tourists. In other words, purposive sampling was used for sample determination.

To determine which dimension of sustainability is most important, respondents were asked to divide ten coins among three aspects of sustainable tourism, each representing one dimension: improving the economic situation of residents in tourist areas, protecting nature and natural resources (such as water and energy), and maintaining the culture and livability of tourist destinations. The following are the aspects of sustainability in sustainable tourism used in this study.

Table 1. Aspects of Sustainability Impacted by Tourism

DIMENSIONS	INDICATORS
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Environment	<ol style="list-style-type: none"> 1. Pollution of the environment, water and air 2. Disturbance to ecosystem (plants and animals) 3. Lack of protection for flora and fauna 4. Extinction of rare plants and animals 5. Reduced water and energy resources 6. Damage to tourism area
Social	<ol style="list-style-type: none"> 1. Crowding, too many tourists around 2. Local Infrastructure has changed a lot 3. The Loss of local lifestyle and traditional habits 4. Too many buildings which sacrifice green space 5. The residents are not friendly and behave less well towards tourists
Economy	<ol style="list-style-type: none"> 1. Products and facilities' prices are becoming too high. 2. Residents have the lowest-paying jobs 3. Entrance fees have become too high 4. Local products are unable to compete 5. Foreign investors dominate the local economy

Source: Cottrell et al. (2004) with some adjustments

To measure tourists' perceptions of sustainability at four tourism object locations, 16 Likert scale items were used (Cottrell et al., 2004) with some adjustments to measure the extent to which tourists agree or disagree with each item regarding the ecological, economic, and socio-cultural impacts of tourism and tourist activities. Furthermore, Principal Component Analysis (PCA) and ANOVA tests were used to evaluate the differences between the types of tourists and their views on the concept of sustainability.

4. Results and Discussions

Nganjuk Regency is located in East Java and is known as the "city of winds" because of its position between Mount Wilis in the south and Kendeng Mountains in the north. The regional government has actively promoted economic development by exploiting the stunning potential of its territory, such as mountains and waterfalls, as well as tourist facilities, such as recreational parks. This district offers a variety of tourist destinations including natural beauty, cultural heritage, religious places, and culinary delights. In terms of tourism development, the Nganjuk Regency Regional Culture and Tourism Office has focused its efforts on four tourist objects that have great potential: the Sedudo Waterfall, Roro Kuning Creeping Water, Margo Tresno Cave, and Anjuk Ladang Recreational Park (TRAL).

The extraordinary tourism potential in Nganjuk Regency, especially in four popular destinations, namely, Sedudo Waterfall, Roro Kuning Creeping Water, Margo Tresno Cave, and Anjuk Ladang Recreation Park (TRAL), has resulted in making a significantly contributed to the Nganjuk economy. However, environmental and social problems in the tourism area of Nganjuk Regency threaten the sustainability of this sector, so that it can continue to contribute. Therefore, this study was conducted to solve this problem.

The survey involved 96 respondents who had visited four tourist spots. Demographic data showed that most respondents were women (58), while the rest were men (38). Respondents to this study were in the age range of 18–29 years or young. Meanwhile, other respondents were included in the category of adult tourists aged 30 years and over.

The majority of respondents in this survey had their last level of education at the senior high school (SMA) level, with 64 people (67%). Furthermore, 31 (32%) participants had higher educational levels. Meanwhile, only 1 person (1%) had the last education at the Elementary School level. These data show that tourist destinations have succeeded in attracting the interest and attention of tourists from various educational levels.

The majority of respondents in this survey (63 people) chose to use motorbikes as the main mode of transportation to reach tourist objects in Nganjuk. Meanwhile, 30 respondents chose to use cars, indicating that a group of visitors preferred the convenience and flexibility of cars. In addition, one respondent chose public transportation or bicycles as alternative modes of transportation.

The next analysis is the Principal Component Analysis (PCA) and ANOVA test to evaluate the differences between the types of tourists and their views on the concept of sustainability. This questionnaire contained 20 statements in the form of a Likert scale representing five types of tourists: types of amusement, change, interest, rupture, and dedication. The results of the main component analysis that has been carried out can be seen in Table 1.

Table 2. Principal Component Analysis Results

Rotated Component Matrix ^a					
	Component				
	1	2	3	4	5
CH1	0,920				
CH2	0,946				
CH3	0,946				
CH4	0,928				
CH5	0,956				
CH6	0,965				
RA1			0,952		
RA2			0,894		
RA3			0,922		
RA4			0,948		
AM1		0,959			
AM2		0,963			
AM3		0,969			
AM4		0,967			
INT1				0,897	
INT2				0,901	
INT3				0,906	
DE1					0,607
DE2					0,794
DE3					0,800

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Source: Primary data, processed (2023)

From the information in Table 1, it can be concluded that, through PCA with varimax rotation, five factors related to various groups of tourists were identified. The first factor is related to groups of tourists who tend to seek change (change), the second factor is related to groups of tourists who are looking for entertainment (amusement), the third factor is related to groups of tourists who have high enthusiasm and hope by traveling to get excitement (rapture), the fourth factor is related to tourist groups who have an interest in the tourist destinations they visit (interest), and the fifth factor is related to tourist groups who have dedication, especially to the culture of tourist destinations (dedication). Overall, from all samples, the type of tourist in Nganjuk Regency at the four tourist destinations is as much as 31% is the Change type, 21% the (Amusement) type, 20% the Rapture type, while 15% the Interest type, and 12% % is the type of Dedication.

Table 3. Percentage of Nganjuk tourist type

Tourist types	Percentage
Change	31%
Amusement	21%
Rapture	20%
Interest	15%
Dedication	12%

Source: Primary data processed (2023)

Travelers with the Change type prefer to travel as a means to escape to nature, looking for a place to relieve the pressures of everyday life, and get away from crowds. Nature was an important source of inspiration for visits. They prefer to spend hours alone in nature and observe the flora and fauna. Tourists with the Dedication type are dedicated or motivated to pursue authentic experiences in other cultures. They are interested in new tourist destinations to develop their self-identity; the environment, interactions with residents, and continuing traditions or culture are at the core of their travel experience.

On the other hand, tourists of interest type are tourists who have an interest in the tourist destinations they visit, not just looking for entertainment or pleasure. This type seeks in-depth information about tourist attractions. Because of their high interest, they tend to hire guides to satisfy their curiosity regarding the tourist objects they visit. Tourists with the amusement type are relaxed types who do not want to be bothered by everything they think is unimportant. They tend to seek pleasure and comfort, so they prefer to enjoy food from their area when on tours in other areas, because food makes them happy and comfortable. Hearing a language other than their own makes them uncomfortable, so they prefer to hear their language even when they are in a different place or area.

Finally, tourists are of the rapture or enthusiastic type. This type of tourist is the person who likes to seek challenges; traveling is to satisfy their enthusiasm. They like travel, which involves physical activity and exercise, and they do not pay much attention to comfort. This type is not affected by customs that differ from their place of origin.

After identifying the tourist types of the four tourist destinations in Nganjuk, the next analysis is ANOVA was used to identify differences in tourists' attitudes towards understanding the concept of sustainability. Table 3 presents the findings of this analysis.

Table 3. One-Way ANOVA Test

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.

2022 | Journal of Sustainable Tourism and Entrepreneurship/ Vol3No3, 235-252

Between Groups	1083,549	2	541,774	34,163	0,000
Within Groups	4519,729	285	15,859		
Total	5603,278	287			

Source: Primary data, processed (2023)

Based on Table 2, the results of the one-way ANOVA test show a p-value of 0.000, which is lower than the 5% significance level. Thus, from the results of this test, it can be concluded that rejecting the null hypothesis (H_0) indicates a different view of the attitudes of the five types of tourists toward understanding the concept of sustainability. In other words, there is a different understanding of the sustainability issues of the five types of tourists in the Nganjuk Regency.

The next analysis assesses the impact of tourism on sustainability by comparing several criteria using the Analytical Hierarchy Process (AHP) method. Because it uses three criteria, the AHP method is appropriate for making decisions based on these criteria. Questions from instrument variables in the AHP model were measured using a rating scale for comparison of vulnerable couples with a scale of 1-9, as shown in Table 3.

Table 4. Pair Comparison Value Scale

Importance Value	Information
1	Equally Important
3	Sufficiently Important (1 Level is more important than other criteria)
5	More Important (2 Levels more important than other criteria)
7	Very Important (3 Levels more important than any other criteria)
9	Absolutely More Important (4 Levels are more important than other criteria or the highest level)

Source: Nofriansyah and Defit (2017)

Based on the questionnaire results, a hierarchical scheme of the level of sustainability problems consisting of Social, Economic, and Environmental Aspects caused by tourism activities was built, as depicted in the figure below.

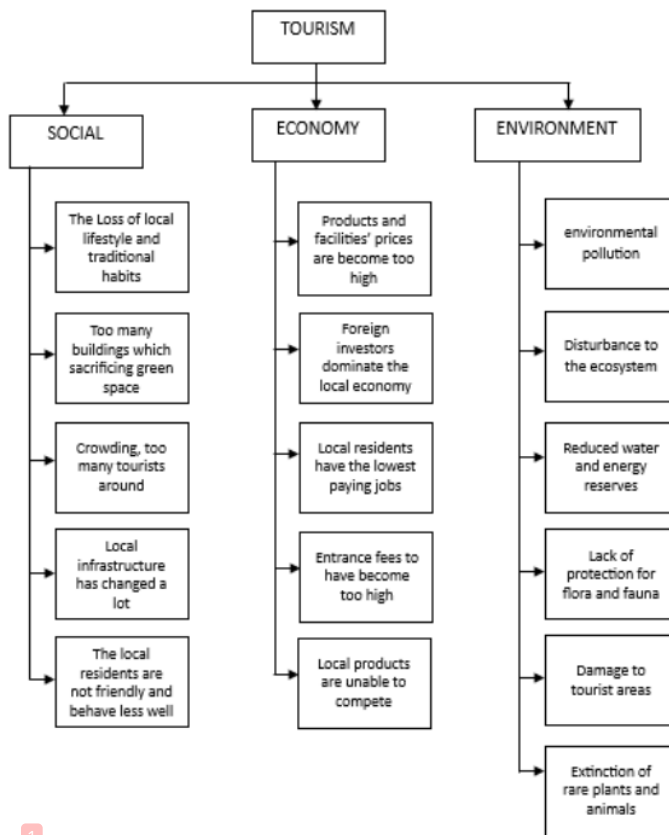


Figure 1. Tourism impact on sustainability Hierarchical Structure

The next stage in the Analytical Hierarchy Process (AHP) analysis is to assign weight to the pairwise comparisons between criteria, as presented in Table 5. At this stage, pairwise comparisons were performed to measure the importance of each criterion concerning the aspect being evaluated. By assigning weights to this comparison, a relative priority scale will be generated between the criteria that will be used in the next steps of the AHP analysis. This process helps produce more informed and rational decisions in the context of multi-criteria assessments, such as evaluating sustainability in this case.

Table 5. Pairwise Comparison between Criteria

Criteria	Economy	Social	Environment
Economy	1,00	4,94	5,69
Social	0,20	1,00	5,38
Environment	0,18	0,19	1,00
Total	1,38	6,12	12,06

Source: Primary data, processed (2023)

After the pairwise comparison data between criteria were entered into Microsoft Excel, the next step was to produce a normalization matrix between the criteria. This normalization matrix plays an important role in determining the relative weight of each criterion, as listed in Table 5. This process

helps to transform the comparison data into a more structured form and generates accurate weights for each criterion, guiding further analysis steps more clearly and rationally.

Table 6. Normalization of Pairwise Comparison Matrix between Criteria

Criteria	Economy	Social	Environment	Total	Priority
Economy	0,73	0,81	0,47	2,00	0,67
Social	0,15	0,16	0,45	0,76	0,25
Environment	0,13	0,03	0,08	0,24	0,08
Total	1,00	1,00	1,00	3,00	1,00

Source: Primary data, processed (2023)

Table 6 shows that each criterion was assigned a specific weighting value. The economic aspect criterion is assigned a weighting value of 0.67, which is equivalent to 67% of the total weighting value. The social aspect criterion had a weight value of 0.25, representing 25% of the total weighting value. Meanwhile, the environmental aspect criteria had a weight value of 0.08, which is equivalent to 8% of the total weighting. When these weight values are added together, the result is 1.0, or equivalent to 100%. This process results in a proportional weight allocation for each criterion, which helps to illustrate the relative contribution of each aspect in a more comprehensive and systematic analysis. The next stage of calculating the eigenvector is presented in Table 7.

Table 7. Eigen Vector calculation

Criteria	Economy	Social	Environment	Amount per line	Priority	Total
Economy	0,67	3,30	3,80	7,76	0,67	8,43
Social	0,05	0,25	1,35	1,66	0,25	1,91
Environment	0,01	0,01	0,08	0,11	0,08	0,19
					Total	10,53
					λ_{max}	3,51
					CI	0,17
					CR	0,09

Source: Primary data, processed (2023)

Table 7 shows that the Consistency Ratio (CR) has a value of 0.09, which is smaller than the limit of 0.1 (10%). The results show that the pairwise comparison matrix between the criteria has an acceptable level of consistency. In other words, the results of pairwise comparisons have an adequate level of agreement, and the analysis that has been performed is reliable. The next step is to calculate the sub-criteria or Alternative Criteria for the results to be used as the main input of the decision support system. The calculation results for the sub-criteria can be explained as follows.

4.1. Economy Dimension

4.1.1. Pairwise Comparison between Sub-Criteria

Table 8. Pairwise Comparison between Sub-Criteria

Criteria	Prices of Tourism Facilities and Products	Foreign investors	Wage Inequality	Entrance Fee	Local Products unable to compete
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Prices of Tourism Facilities and Products	1,00	3,88	4,63	3,88	3,69
Foreign investors	0,26	1,00	4,13	3,88	3,94
Wage Inequality	0,22	0,24	1,00	4,13	4,31
Entrance Fee	0,26	0,26	0,24	1,00	3,94
Local Products unable to compete	0,27	0,25	0,23	0,25	1,00
Total	2,00	5,63	10,22	13,13	16,88

Source: Primary data, processed (2023)

Table 8 shows that the pairwise comparison matrix between the sub-criteria on the economic aspect consists of Prices for Tourism Facilities and Products, Foreign Investors, Wage Inequality, Entrance Fees to Tourism Objects, and Support for Local Products. From an economic perspective, the criteria for Support for Local Products has the highest score, 16.88, followed by the Entrance Fee criteria for Tourism Objects, with a score of 13.13. The Wage Inequality criterion obtained a score of 10.22. The foreign investor criterion has a score of 5.63, and the lowest score is the price of facilities and tourism products, at 2.00. After the data are input, the next process determines the weight between the sub-criteria on the economic aspect.

4.1.2. Normalization of Pairwise Comparison Matrix of Sub-Criteria

Table 9. Matrix Normalization

Criteria	Prices of Tourism Facilities and Products	Foreign investors	Wage Inequality	Entrance Fee	Local Products unable to compete	Prices of Tourism Facilities and Products	Priority
Prices of Tourism Facilities and Products	0,50	0,69	0,45	0,30	0,22	2,15	0,43
Foreign investors	0,13	0,18	0,40	0,30	0,23	1,24	0,25
Wage Inequality	0,11	0,04	0,10	0,31	0,26	0,82	0,16
Entrance Fee	0,13	0,05	0,02	0,08	0,23	0,51	0,10
Local Products unable to compete	0,14	0,05	0,02	0,02	0,06	0,28	0,06

Source: Primary data processed (2023)

Based on Table 9, each criterion is assigned a specific weighting value. The Price Criteria for Tourism Facilities and Products had a weighted value of 0.43, representing 43% of the total weighted value. Foreign Investors are given a weighting value of 0.25, equivalent to 25% of the total weighting value.

Meanwhile, Wage Inequality is given a weighting value of 0.16, which reflects 16% of the total weighting. Entrance Fees to Tourism Objects have a weight of 0.10, which is equivalent to 10% of the total weight. Support for Local Products was given a weighting value of 0.06, representing 6% of the total weighting. When these weight values are added together, the result is 1.0, or equivalent to 100%. With a predetermined weighting value, the next step is to perform eigenvector calculations to continue a more in-depth analysis in multicriteria decision-making.

4.1.3. Eigen Vector Calculation

Table 10. Eigen Vector Calculation

Criteria	H	I	K	B	D	per line amount	Priority	Total
H	0,43	1,67	1,99	1,67	1,59	7,35	0,43	7,78
I	0,06	0,25	1,02	0,96	0,98	3,27	0,25	3,52
K	0,04	0,04	0,16	0,68	0,71	1,62	0,16	1,78
B	0,03	0,03	0,02	0,10	0,40	0,58	0,10	0,68
D	0,02	0,01	0,01	0,01	0,06	0,11	0,06	0,17
Total								13,93
λ_{max}								2,79
CI								-0,44
CR								-0,40

Source: Primary data, processed (2023)

Table 10 shows that the Consistency Ratio (CR) value is -0.40, which is lower than the limit of 0.1 (10%), indicating that the pairwise comparison matrix between sub-criteria on the economic aspect has an acceptable level of consistency.

4.2. Social Dimension

4.2.1. Pairwise Comparison Between Sub-Criteria

Table 11. Pairwise Comparison Between Sub-Criteria

Criteria	The Loss of local lifestyle & traditional habits	sacrificing green space	Crowding, too many tourists around	Infrastructure Changes	The residents are not friendly
The Loss of local lifestyle & traditional habits	1,00	3,94	3,25	3,38	4,00
sacrificing green space	0,25	1,00	3,81	3,94	3,94
Crowding, too many tourists around	0,31	0,26	1,00	3,56	3,56
Infrastructure Changes	0,30	0,25	0,28	1,00	3,69
The residents are not friendly	0,25	0,25	0,28	0,27	1,00
TOTAL	2,11	5,71	8,62	12,15	16,19

Source: Primary data, processed (2023)

Based on Table 11, it can be observed that the pairwise comparison matrix between the sub-criteria on the social aspect consists of the loss of local lifestyle and traditional habits (LL), sacrificing green space (SG), crowding, too many tourists around (MT), Infrastructure Changes (IC), and unfriendly residents (LR). In the Social aspect, the criterion with the highest score was the Interaction between Locals and Tourists, which was 16.19. Furthermore, the Loss of local lifestyle and traditional habits scored 3.94, followed by Sacrificing Green Spaces with a score of 3.56. Too many tourists scored 3.69, whereas

1 Infrastructure Changes had the lowest score (1.00). After the data are input, the next step is to determine the weight between the sub-criteria for the social aspect.

4.2.2. Normalization of Pairwise Comparison Matrix of Sub-Criteria

Table 12. Matrix Normalization

Criteria	The Loss of local lifestyle & traditional habits	sacrificing green space	Crowding, too many tourists around	Infrastructure Changes	The residents are not friendly	TOTAL Missing "	Priority
The Loss of local lifestyle & traditional habits	0,47	0,69	0,38	0,28	0,25	2,07	0,41
Sacrificing green space	0,12	0,18	0,44	0,32	0,24	1,31	0,26
Crowding, too many tourists around	0,15	0,05	0,12	0,29	0,22	0,82	0,16
Infrastructure Changes	0,14	0,04	0,03	0,08	0,23	0,53	0,11
The residents are not friendly	0,12	0,04	0,03	0,02	0,06	0,28	0,06

Source: Primary data, processed (2023)

Based on Table 12, the determined weighting values show the allocation of specific weights for each criterion. The criterion for the loss of local lifestyle and traditional habits was 0.41, representing 41% of the total weighted value. Meanwhile, Development against Green Space is assigned a weight of 0.26, which is equivalent to 26% of the total weighting value. Crowding, with too many tourists around, weighs 0.16, representing 16% of the total weight. Changes in Infrastructure had a weight of 0.11, representing 11% of the total weight. At the same time, the residents who were not friendly were given a weight of 0.06, representing 6% of the total weighting. The total of these weights is 1.0, which is equivalent to 100%. With the weighting value set, the next step is to run the eigenvector calculations to continue a deeper analysis in making multi-criteria decisions.

4.2.3. Eigen Vector Calculation

Table 13. Eigen Vector Calculation

Criteria	LL	SG	MT	IC	LR	per line amount	Priority	Total
LL	0,41	1,63	1,34	1,39	1,65	6,43	0,41	6,84
SG	0,07	0,26	1,00	1,03	1,03	3,38	0,26	3,64
MT	0,05	0,04	0,16	0,59	0,59	1,43	0,16	1,59
IC	0,03	0,03	0,03	0,11	0,39	0,58	0,11	0,69
LR	0,01	0,01	0,02	0,02	0,06	0,12	0,06	0,17
							Total	12,93
							λ max	2,59
							CI	-0,48
							CR	-0,43

Source: Primary data, processed (2023)

1 Table 13 shows that the Consistency Ratio (CR) has a value of -0.43, lower than the limit of 0.1 (10%), indicating that the pairwise comparison matrix between sub-criteria on the social aspect has an acceptable level of consistency.

4.3. Environmental Dimension

Pairwise Comparison between Sub-Criteria

Table 14. Pairwise Comparison between Sub-Criteria

Criteria	Environmental pollution	Disturbance to the Ecosystem	Reduced Water and Energy Reserves	Lack of protection of Flora and Fauna	Tourist Area Damage	Extinction Rare Plants and Animals
Environmental pollution	1,00	2,38	2,44	2,13	2,25	2,50
Disturbance to the Ecosystem	0,42	1,00	2,25	2,00	2,13	2,38
Reduced Water and Energy Reserves	0,41	0,44	1,00	2,00	2,19	2,44
Lack of protection of Flora and Fauna	0,47	0,50	0,50	1,00	1,88	2,06
Tourist Area Damage	0,44	0,47	0,46	0,53	1,00	2,25
Extinction Rare Plants and Animals	0,40	0,42	0,41	0,48	0,44	1,00
Total	3,15	5,21	7,05	8,14	9,88	12,63

Source: Primary data, processed (2023)

Based on Table 14, it can be seen that the pairwise comparison matrix between the sub-criteria on the environmental aspect consists of Environmental pollution (EP), Disturbance (DE) to the Ecosystem, Reduced Water and Energy Reserves (RWE), Lack of protection of Flora and Fauna (LP); Tourist Area Damage (TAD); and Extinction Rare Plants and Animals (ER). From an environmental perspective, the criterion with the highest score was the Extinction of Rare Plants and Animals, which was 12.63. Furthermore, the lack of protection of Flora and Fauna had a score of 8.14, followed by Damage to Tourism Areas with a score of 9.88. The decrease in Water and Energy Reserves had a score of 7.05, whereas Environmental Pollution had the lowest score of 3.15. After the data are input, the next step is to determine the weight between the sub-criteria and environmental aspects.

4.3.1. Normalization of Pairwise Comparison Matrix of Sub-Criteria

Table 15. Matrix Normalization

Criteria	EP	DE	RWE	LP	TAD	ER	Total	Priority
EP	0,32	0,46	0,35	0,26	0,23	0,20	1,81	0,30
DE	0,13	0,19	0,32	0,25	0,22	0,19	1,29	0,22
RWE	0,13	0,09	0,14	0,25	0,22	0,19	1,02	0,17
LP	0,15	0,10	0,07	0,12	0,19	0,16	0,79	0,13
TAD	0,14	0,09	0,06	0,07	0,10	0,18	0,64	0,11
RE	0,13	0,08	0,06	0,06	0,04	0,08	0,45	0,07

Source: Primary data, processed (2023)

Based on Table 15, it can be observed that the weighting values that have been set describe the allocation of specific weights for each criterion. The environmental pollution criterion has a weight of 0.30, which represents 30% of the total weighted value. Meanwhile, Ecosystem Disturbance was given a weight of 0.22, equivalent to 22% of the total weighted value. The reduced water and energy reserve criteria have a weight of 0.17, reflecting 17% of the total weighting. The lack of protection of Flora and Fauna was

0.13, representing 13% of the total weighting. The weight of the Tourist Area Damage was 0.11, which is equivalent to 11% of the total weight. The criterion for Extinction of Endangered Plants and Animals was 0.07, representing 7% of the total weighting. The total of these weights is 1.0, which is equal to 100%. With the weighting value set, the next step is to run eigenvector calculations to continue a deeper analysis in multi-criteria decision-making.

4.3.2. Eigen Vector Calculation

Table 16. Eigen Vector Calculation

Criteria	EP	DE	RWE	LP	TAD	ER	Per line amount	Priority	Total
EP	0,30	0,71	0,73	0,64	0,68	0,75	3,82	0,30	4,12
DE	0,09	0,22	0,49	0,43	0,46	0,51	2,19	0,22	2,41
RWE	0,07	0,08	0,17	0,34	0,37	0,41	1,44	0,17	1,61
LP	0,06	0,07	0,07	0,13	0,25	0,27	0,85	0,13	0,98
TAD	0,05	0,05	0,05	0,06	0,11	0,24	0,55	0,11	0,66
RE	0,03	0,03	0,03	0,04	0,03	0,07	0,24	0,07	0,31
								Total	10,08
								λ_{max}	1,68
								CI	-0,72
								CR	-0,58

Source: Primary data, processed (2023)

Table 16 shows that the Consistency Ratio (CR) has a value of -0.58, which is lower than the limit of 0.1 (10%), indicating that the pairwise comparison matrix between sub-criteria on environmental aspects has an acceptable level of consistency.

After calculating the weighting values for each criterion and alternative (sub-criteria), the last step in the Analytic Hierarchy Process (AHP) analysis is to summarize the global priority weight values (aggregate) by comparing the criteria to all alternatives. The main objective of this stage is to reach the best decision for selecting sustainable tourism sustainability. The complete results of the weighting process or the overall priority value for each alternative are listed in Table 16.

Table 17. Global Priority Calculation

CRITERIA	WEIGHT VALUE (ERS)	RANK
Economy	0,67	First
Social	0,25	Second
Environment	0,08	Third

Source: Primary data, processed (2023)

The ranking results described previously can be effectively visualized as a graph, as shown in Figure 2. The graph illustrates the order of priority and provides a comparison between various criteria and alternatives in the context of this analysis.

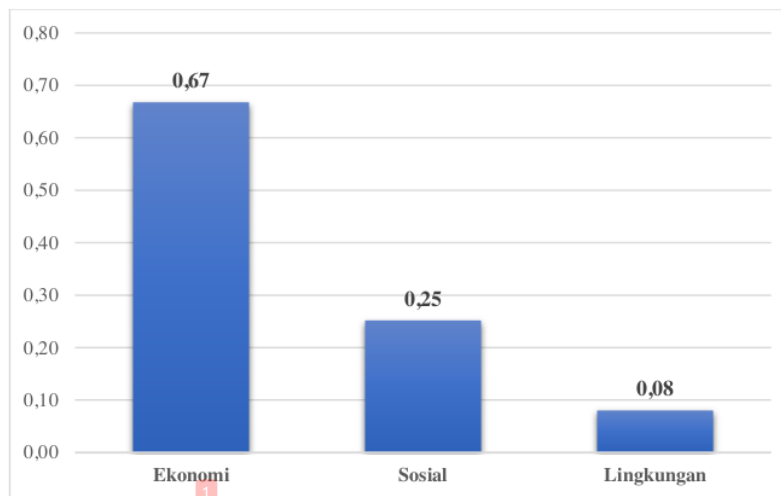


Figure 2. Final Results of Global Priorities
Source: Primary data, processed (2023)

It can be seen in Figure 2, which is the final result of selecting the impact of tourism on sustainability. The highest priority value is given to the economic aspect, with a percentage of 67%. Then followed by social aspects with a value of 25%, and the one with the lowest priority is the environmental aspect with a value of 8%.

These results indicate that in the context of the AHP analysis, tourists in the Nganjuk district perceive that tourism has the greatest impact on the economic sector, followed by the impact on society and the environment.

5. Conclusion

There are five types of tourists at four tourism destinations in the Nganjuk Regency. They are the type of Change found by 31%, Amusement 21%, Rapture 20%, Interest 15%, and Dedication 12%. Change-type tourists like to travel to nature to escape their daily stress and to avoid being around too many people. Nature inspires them to visit. Dedicated tourists type are people who are committed and motivated to seek out real experiences in different cultures. They want to find new places to visit, which will help them understand who they are. They care about the environment, meet and talk to local people, and experience traditional customs and culture during their travel. Tourists who have the "Interest" type are tourists who are interested in the tourist destinations they visit. The amusement type consists of individuals who do not want to be bothered by things they deem unimportant. Finally, Rapture-type tourists are excited or enjoy travelling. This kind of tourist enjoys taking on challenges; they travel to fulfil their passion. The ANOVA test provides a different view of the attitudes of the five types of tourists toward understanding the concept of sustainability. Furthermore, according to Nganjuk tourists' perceptions, tourism has the most impact on the economic sector, followed by society and the environment.

This research is only in the stage of evaluating tourist perceptions of sustainability matters, but has not yet discussed the role of tourists in achieving or implementing sustainable tourism. Based on the Indonesian cultural context, there may be other types of tourists than those studied in this research. Thus, future research should investigate these issues.

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