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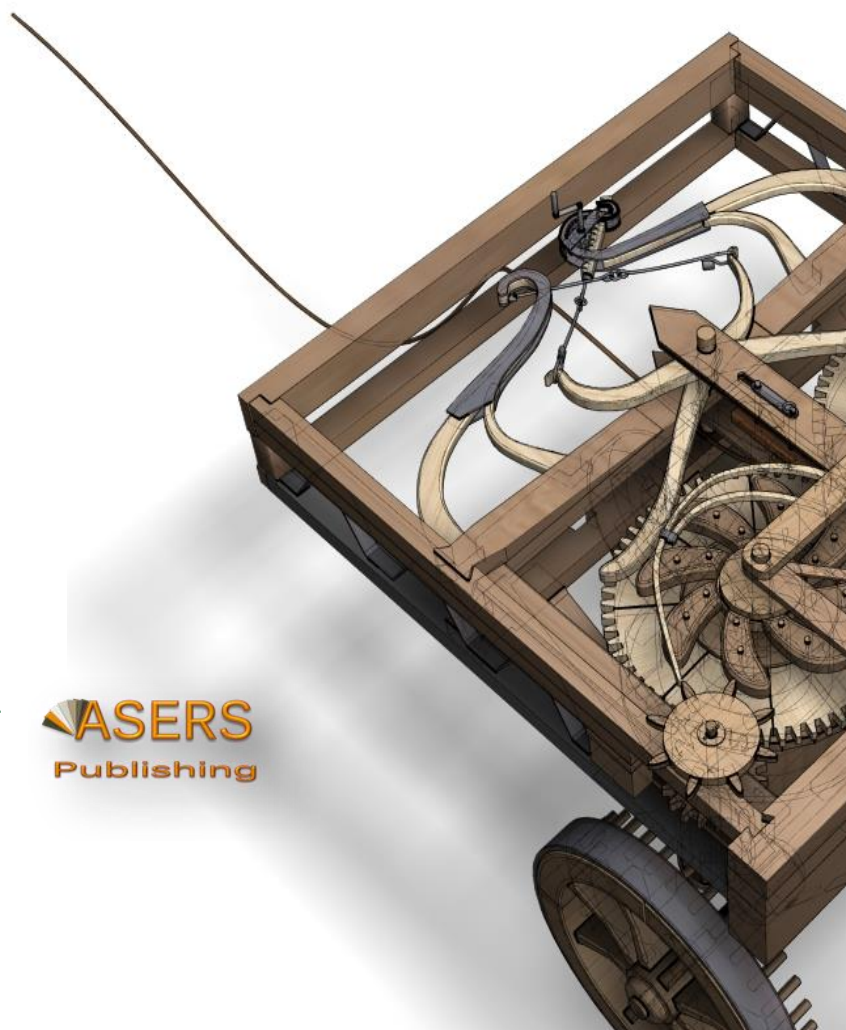
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Journal of Environmental Management and Tourism is an interdisciplinary research journal, aimed to publish articles and original research papers that should contribute to the development of both experimental and theoretical nature in the field of Environmental Management and Tourism Sciences.

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Development of Mangrove Ecotourism Based on the Tourist Perspective in Lembung Village, Indonesia

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Abstract:

Ecotourism development can be carried out using the Importance Performance Analysis (IPA) method. The community perception of ecotourism is very important in its development with the hope that involvement in the management will increase business opportunities and income. Furthermore, the community can preserve local arts and culture, as well as reduce the destruction of mangrove forest areas. The perception of tourism objects is very important in developing the Lembung Mangrove Ecotourism, especially the improvement of infrastructures such as suspension bridges and cleaning facilities. The recommendations for development strategies include (1) completing the supporting infrastructure for natural tourism activities, such as roads, bridges, cleaning facilities, and others. (2) carrying out intensive promotions (3) making special policies in the development of ecotourism, (4) synergizing with traditional arts and culture, as well as (5) empowering local communities in its activities. The Lembung Mangrove Ecotourism has a good natural potential as a tourist destination, and the availability of a fairly dense mangrove forest is the main factor for visit to this place. Therefore, this study aims to analyze the level of tourists' satisfaction using the Importance Performance Analysis (IPA) method, and to determine the Lembung Mangrove Ecotourism Development Strategy.

Keywords: development; mangrove; ecotourism; Pamekasan; Indonesia.

JEL Classification: L83; O00; Z32; R11.

Introduction

Ecotourism development can be carried out through the Importance Performance Analysis (IPA) method. The community perception of ecotourism is very important in its development with the hope that involvement in the

management will increase business opportunities and income. Furthermore, the community can preserve local arts, culture, as well as reduce the destruction of mangrove forest areas. The perception of tourism objects is important in the development of Lembung Mangrove Ecotourism, especially the improvement of infrastructures such as suspension bridges and cleaning facilities. The recommendations for development strategies include (1) completing the supporting infrastructure for natural tourism activities, especially ecotourism, such as roads, bridges, cleaning facilities, and others. (2) carrying out intensive promotions (3) making special policies in the development of ecotourism, (4) synergizing with traditional arts and culture, and (5) empowering local communities in its activities (Hidayat 2016).

Ecotourism combines the interests of the tourism industry with a love for the environment. Therefore, protection and preservation can only be achieved by involving the community that lives and depend on the developed area. It can also be carried out by making friends with the surrounding population in an effort to develop tourism (Directorate of Tourism Products, Directorate General of Tourism Destination Development, Ministry of Tourism Culture and Tourism, and WWF Indonesia 2009).

Ecotourism is becoming one of the most promising sectors for regional development on a global scale. Along with this development, it cannot be separated from tourists' presence, hence the role is very important in reference to the growth and strategy of ecotourism starting from good governance and adequate facilities. This effort aims to provide benefit both by presenting natural areas and developing the environment in terms of conservation (Tanaya and Rudiarto 2014).

The Lembung Mangrove has a good natural potential as a tourist destination, and the availability of a fairly dense mangrove forest is the main factor to visit this place. However, inadequate facilities are one of the reasons for poor management, such as fresh water shortage caused by limited sources on the coast of South Beach of Pamekasan, and the absence of lodging for tourists. This spot is still relatively new, consequently, it is not well known in other communities. Therefore, it is necessary to gain support from the local government to carry out promotional programs to introduce ecotourism-based conservation tourism (Ariesta 2012). This study aims to analyze tourists' satisfaction levels using the Importance Performance Analysis (IPA) method, and to determine the Lembung Mangrove Ecotourism Development Strategy.

1. Literature Review

Ecotourism is an activity of tourism travel, travel that is packaged professionally, trained, and contains elements of education, as an economic business sector, which takes into account cultural heritage, participation, and welfare of residents, as well as efforts to conserve natural resources and the environment (Prasadja and Singgalen 2022). As an economic venture, ecotourism service operations are very efficient and streamlined. Its characteristics are the low number of visitor groups, quality service, and generate high added value. Aspects of management that include (i) specific marketing towards ecotourism destinations, (ii) ecotourism markets are visitors from all over the world who master information technology, (iii) skills and services intensively, containing educational services on the environment and culture, and (iv) involvement residents as subjects of environmental and cultural conservation learning. Ecotourism institutions in Indonesia cannot be separated (Trimandala, Kiskenda, and Panca P 2022).

Eviana and Achmadi (2022) explains that customer satisfaction is the level where the product's Perceived Performance will match the expectations of a customer. Sundram and Abdul Gani (2022) states that satisfaction is the customer's response to the fulfillment of needs, which means that the customer's assessment of goods or services provides a level of comfort associated with fulfilling a need, including meeting needs that do not meet expectations or fulfillment that exceeds customer expectations.

Importance Performance Analysis (IPA) was first introduced by (Martilla and James 1997) explaining that the aim is to measure the relationship between consumer perceptions and product/service quality improvement priorities, also known as quadrant analysis. Importance Performance Analysis has been generally accepted and used in various fields of study because of its ease of application, and the display of analysis results which makes it easy to propose performance improvements (Trimandala, Kiskenda, and Panca P 2022). Importance Performance Analysis has the main function of displaying information related to service factors which according to consumers greatly affect their satisfaction and loyalty, as well as service factors which according to consumers need to be improved because current conditions are not satisfactory (Sundram and Abdul Gani 2022).

According to Farid, Rosi, and Arisandi (2022), there are 4 types of mangroves in the Lembung Mangrove Ecotourism area, Galis District, Pamekasan Regency, namely *Rhizophora mucronata*, *Rhizophora apiculata*, *Rhizophora stylosa*, and *Avicennia marina* with moderate diversity index values, high uniformity index values, and

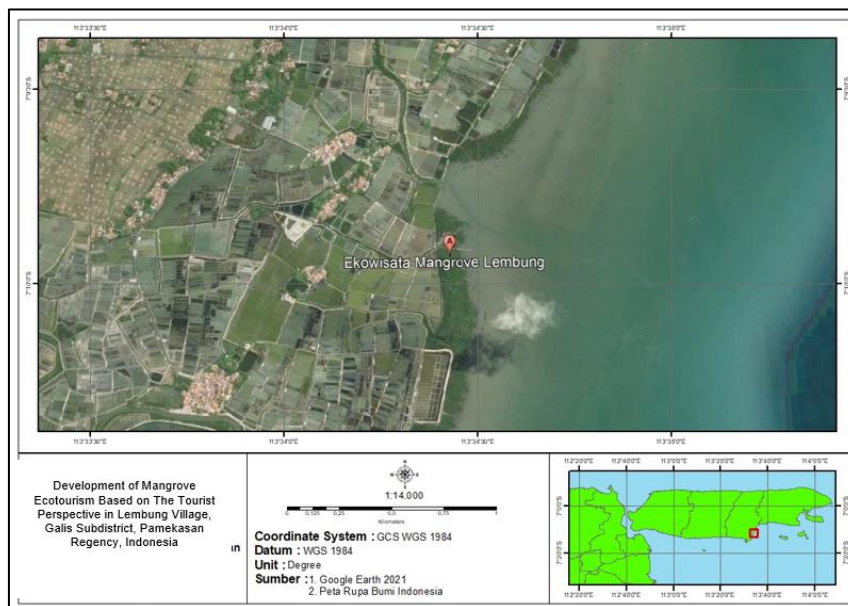
Low dominance index. *Rhizophora mucronata* is seen as more dominant than other commodities, it is suspected that the area has sufficient habitat, and this type of mangrove is better at utilizing its environment (well-adapted).

2. Methodology

Time and Location

This study was carried out in June - July 2021, at Lembung Mangrove Ecotourism, Galis Sub-district, Pamekasan District, East Java, Indonesia. Furthermore, data were collected through a questionnaire on weekends (Saturday and Sunday) for three weeks.

Figure 1. Research location



Data Analysis

The satisfaction level was analyzed to describe the opinions of tourists visiting the Mangrove. Furthermore, the Importance Performance Analysis (IPA) was used, which is an analytical method that combines the attributes of importance and satisfaction with service quality into two dimensions.

The stages include determining the observation variables, weighting, measuring the conformity level, and making a Cartesian diagram. The formula for the conformity level is as follows:

$$T_{ki} = \frac{X_i}{Y_i} \times 100\%$$

Description:

T_{ki} : Conformity level
 X_i : Perception/opinion assessment score
 Y_i : Importance level score

Table 1. Satisfaction and importance level assessment score

Measurement Scale	Satisfaction Level	Importance Level
1	Very Dissatisfied	Very unimportant
2	Not satisfied	Unimportant
3	Quite satisfied	Quite important
4	Satisfied	Important
5	Very satisfied	Very important

In formula simplification, each attribute affecting tourist satisfaction used the formula (Martilla and James 1997).

$$\bar{X} = \frac{\sum X_i}{n} \text{ and } \bar{Y} = \frac{\sum Y_i}{n}$$

Description:

n: The number of respondents

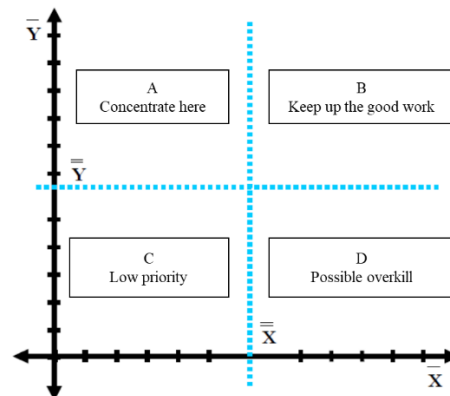
The following is the formula for objective limits in attribute mapping on a Cartesian diagram (Martilla and James 1997).

$$\bar{\bar{X}} = \frac{\sum_{i=1}^n \bar{X}_i}{K} \text{ and } \bar{\bar{Y}} = \frac{\sum_{i=1}^n \bar{Y}_i}{K}$$

Description:

K: Number of items/attributes rated by visitors

Figure 2. Quadrant division diagram for Importance Performance Analysis



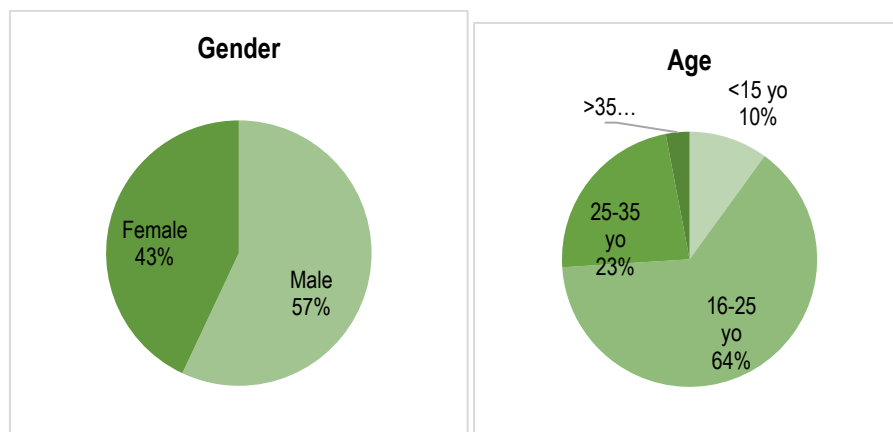
Source: Martilla and James (1997)

The Figure 2 consists of four quadrants which can be explained as follows: Quadrant I: Keep Up the Good Work (main priority), which contains tourism attributes that are considered important by tourists but do not meet their expectations. Quadrant II: Possible Overkill, which indicates that the attributes are important, have high performance, and need to be maintained. Quadrant III: Low Priority, the attributes contained in this quadrant are considered less important by tourists and the performance is not very special. Quadrant IV: Concentrate Here (Excessive), which contains attributes that are considered less important and felt to be too excessive.

3. Results and Discussion

The characteristics of potential tourists visiting Lembung Mangrove Ecotourism are as follows. The Figure 3 shows the proportion of tourist visits by gender in each destination. It is dominated by males and females with 57% and 43% respectively. Based on age, it is dominated by 16-25 years at 64%, 26-35 at 23%, >45 at 3%, and <15 at 10%.

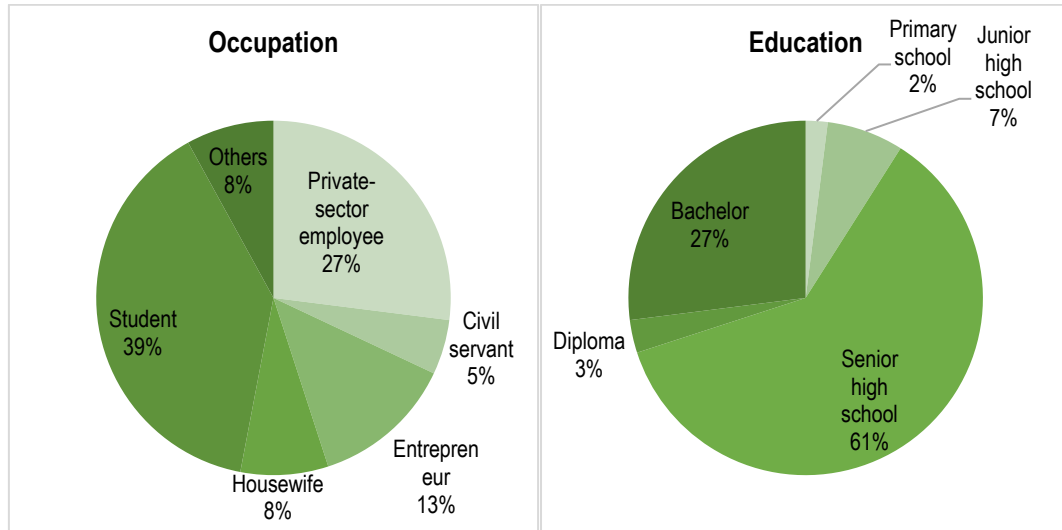
Figure 3. Diagram of Tourist Visits by Gender and Age



Source: Primary data analysis

The Figure 4 shows the proportion of tourist visits by occupation, and is categorized into five. The bulk of those visiting are predominantly civil servants at 5%, private employees at 27%, students at 39%, housewives at 8%, entrepreneurs at 13%, and others at 8%. Based on visits by level of education, it is more dominated by high school graduates/equivalent at 61%, undergraduates at 27%, junior high school/equivalent at 7%, diploma at 3%, and elementary school at 2%. Therefore, it was concluded that the highest proportion was high school educational level and the lowest was elementary.

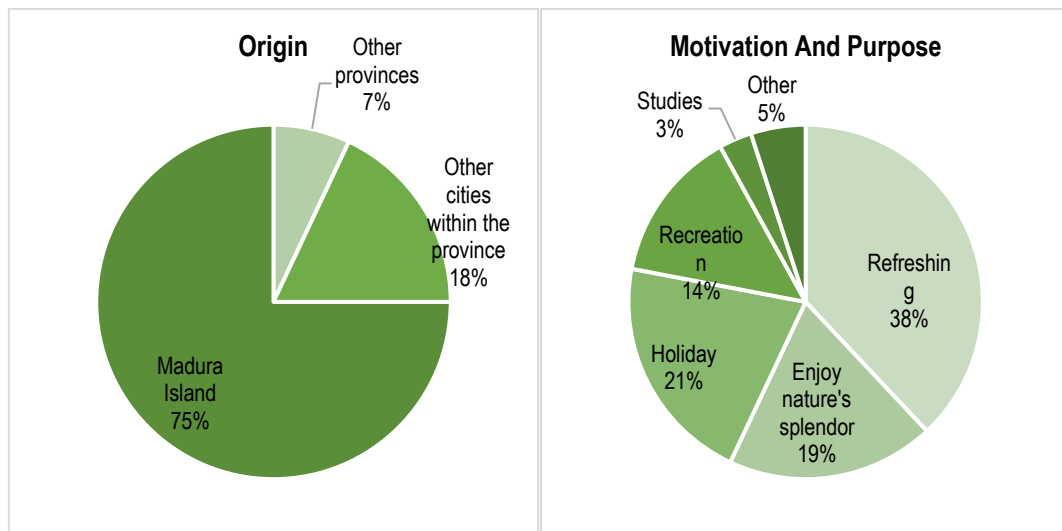
Figure 4. Diagram of Tourist Visits by Occupation and Education



Source: Primary data analysis

The Figure 5 shows the proportion of tourists based on their origin. The majority come from Madura Island with 75%, outside the city but within the province with 18%, and outside the province with 7%. Based on motivation and purpose, the majority wants to be refreshed, enjoy the beauty of nature, vacation, and recreation after long periods of busy activities, hence they need entertainment and fun tour.

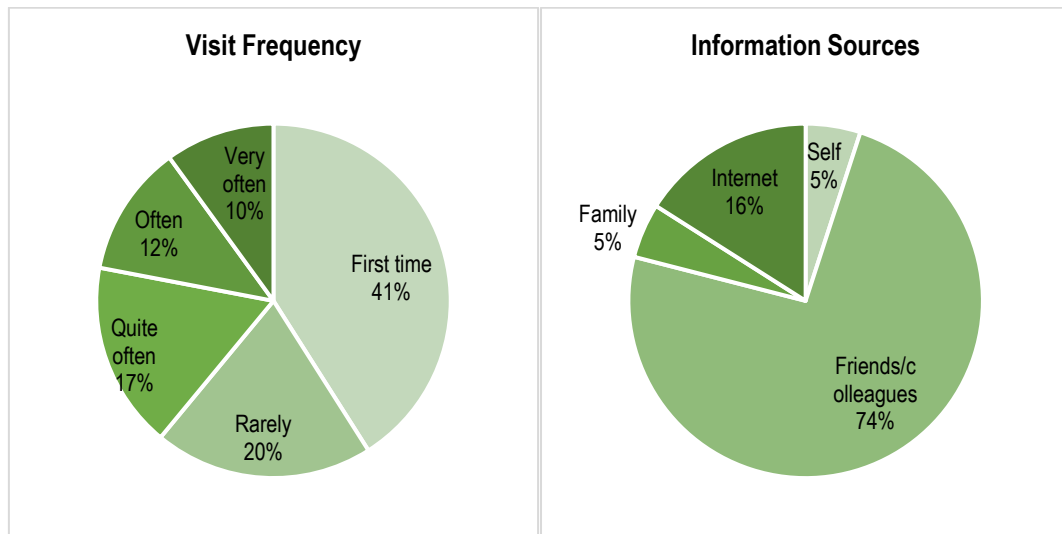
Figure 5. Diagram of Tourist Visits by Tourist Origin and Motivation and Purpose



Source: Primary data analysis

The Figure 6 shows visits based on the frequency. It is dominated by new visits for the first time at 41%. The frequency can be divided into five categories, namely first time, rarely (once a year), quite often (2-6 times yearly), often (regularly every month), and very often (more than once per month). Based on information sources, the most dominant information source comes from friends/colleagues at 74%, then the internet at 16%, family at 5%, and self-information at 5%.

Figure 6. Diagram of Tourist Visits by Visit Frequency and Information Sources



Source: Primary data analysis

Table 2. Importance performance analysis attribute based on conformity level and importance

No	IPA Attribute	X	Y	Conformity Level (%)
1	Water quality	204	278	73.4
2	Coral reef condition	191	272	70.5
3	Potential fish resources	181	267	67.8
4	Wave height	209	226	92.5
5	Water brightness	202	255	79.2
6	Diversity of fish species	192	250	76.8
7	White sand quality and quantity	208	242	86
8	Beach slope	193	259	74.5
9	Beach length	211	244	86.5
10	Air temperature	262	274	95.6
11	Water Current	198	261	75.9
12	The existence of the mangrove ecosystem	208	245	84.9
13	Security post availability	228	250	91.2
14	Availability of parking space	238	282	84.4
15	Availability of road signs and directions	246	272	90.5
16	Regular placement of tourist facilities and infrastructure	230	259	88.9
17	Availability of information and service centers	224	276	81.2
18	Cleanliness of the physical condition of the environment	223	285	78.2
19	Availability of sanitation facilities such as toilets and trash bins	232	286	81.1
20	The condition of the road network to tourist objects	209	261	80
21	Availability of transportation modes to tourist objects	168	258	65.1
22	Availability of accommodation facilities such as hotels and inns	144	264	54.5
23	Easy to reach tourist attraction	234	265	88.3
24	Availability of places to eat and drink	215	249	86.3
25	Availability of utilities such as electricity grid, clean water, and communication	135	281	48
26	Availability of travel agents	172	242	71
27	Affordable ticket fees	241	252	96
28	The beauty of natural objects	211	263	80.2
29	The beauty of artificial objects	209	255	82
30	Gives a feeling of pleasure and comfort	210	272	77.2
31	Suitable for gathering place with family or friends	225	262	85.9
32	Offering a variety of types of tours	208	253	82.2
33	The authenticity of natural objects	202	256	78.9
34	Special regional cultural arts attractions	189	251	75.3
35	Local specialties and drinks	165	257	64.2

No	IPA Attribute	X	Y	Conformity Level (%)
36	Unique regional souvenirs	182	251	72.5
	Total	7399	9375	2846.7
	Average			79.075

Source: Primary data analysis

In percentage, the conformity level shows 31%-45% of respondents are dissatisfied/not good, 46%-60% not satisfied/not good, 61%-75% quite satisfied/good enough, 76%-85% satisfied/good, and 86% - 100% very satisfied/good. Based on the Table 2, 64% to 96% of tourists visiting the Mangrove Ecotourism with respect to the attributes and variables are very satisfied. It exceeds the average conformity value of 79%.

Table 3. Importance performance analysis attribute based on conformity level and importance

No	IPA Attribute	X	Y	$\bar{Y}$
1	Water quality	204	278	3.40
2	Coral reef condition	191	272	3.18
3	Potential fish resources	181	267	3.02
4	Wave height	209	226	3.48
5	Water brightness	202	255	3.37
6	Diversity of fish species	192	250	3.20
7	White sand quality and quantity	208	242	3.47
8	Beach slope	193	259	3.22
9	Beach length	211	244	3.52
10	Air temperature	262	274	4.37
11	Water Current	198	261	3.30
12	The existence of the mangrove ecosystem	208	245	3.47
13	Security post availability	228	250	3.80
14	Availability of parking space	238	282	3.97
15	Availability of road signs and directions	246	272	4.10
16	Regular placement of tourist facilities and infrastructure	230	259	3.83
17	Availability of information and service centers	224	276	3.73
18	Cleanliness of the physical condition of the environment	223	285	3.72
19	Availability of sanitation facilities such as toilets and trash bins	232	286	3.87
20	The condition of the road network to tourist objects	209	261	3.48
21	Availability of transportation modes to tourist objects	168	258	2.80
22	Availability of accommodation facilities such as hotels and inns	144	264	2.40
23	Easy to reach tourist attraction	234	265	3.90
24	Availability of places to eat and drink	215	249	3.58
25	Availability of utilities such as electricity grid, clean water, and communication	135	281	2.25
26	Availability of travel agents	172	242	2.87
27	Affordable ticket fees	241	252	4.02
28	The beauty of natural objects	211	263	3.52
29	The beauty of artificial objects	209	255	3.48
30	Gives a feeling of pleasure and comfort	210	272	3.50
31	Suitable for gathering place with family or friends	225	262	3.75
32	Offering a variety of types of tours	208	253	3.47
33	The authenticity of natural objects	202	256	3.37
34	Special regional cultural arts attractions	189	251	3.15
35	Local specialties and drinks	165	257	2.75
36	Unique regional souvenirs	182	251	3.03
	Total	7399	9375	123.32
	Average			3.43

Source: Primary data analysis

There are 36 attributes in the table but only 25 are deemed appropriate/satisfied with the state of the tourism objects in the Mangrove Ecotourism, where 69% are satisfied with the attractions. The average satisfaction level then becomes the horizontal axis, while the average importance level becomes the vertical, as indicated by the coordinates (X, Y). Therefore, to improve the attributes, the process of calculating the average

satisfaction and importance level of the derived and variable attributes of visits was carried out. Table 4.3 shows the value of the objective limit of satisfaction ($\bar{X}$) is 3.43 and importance ($\bar{Y}$) is 4.34.

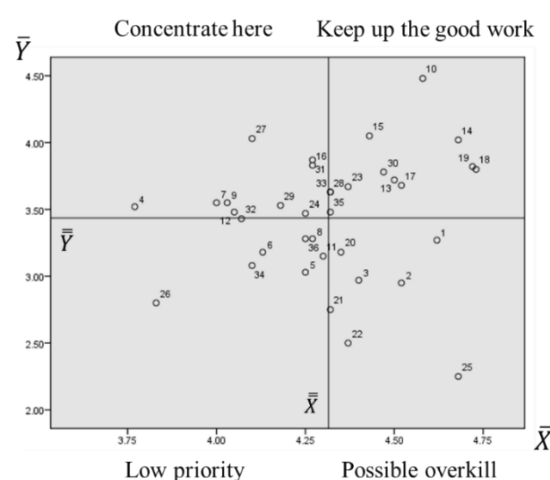
Table 4. Importance performance analysis attribute based on conformity level and importance

No	Attributes
1	Water brightness
2	Diversity of fish species
3	Water current
4	The existence of the mangrove ecosystem
5	Availability of parking space
6	The availability of an information and service center
7	Cleanliness of the physical condition of the environment
8	Availability of sanitation facilities such as toilets and trash bins
9	Road conditions to the tourist attraction
10	The beauty of natural objects
11	The beauty of artificial objects
12	Provides a feeling of pleasure and comfort
13	The variety of types of tours offered
14	The authenticity of natural objects
15	Wave height
16	White sand quality and quantity
17	Beach length
18	Air temperature
19	Availability of a security post
20	Availability of road signs and directions
21	Regular placement of tourist facilities and infrastructure
22	Ease of reaching tourist attractions
23	Availability of places to eat and drink
24	Affordable ticket cost
25	Suitable for gathering place with family or friends

Source: Primary data analysis

Based on the IPA matrix diagram (Figure 7), it can be grouped between attributes in quadrants I, II, III, and IV. The attributes' position in the diagram is used in prioritizing improvement and development. More details can be seen in Table 5.

Figure 7. Matrix of Importance Performance Analysis of Lembung Mangrove Ecotourism



Source: Primary data analysis

Attribute 12 (the existence of a mangrove ecosystem) has the lowest satisfaction level among others in the top priority quadrant. Although tourists place this attribute at a high level of importance, they feel its existence needs to be improved in terms of species diversity, density, and area of mangroves. This will enhance further exploration which is supported by the availability of bridge facilities to traverse the forest.

Table 5. Recapitulation of the position of the ipa attribute and quadrant in lembung mangrove ecotourism

No	IPA Attribute	IPA Quadrant
1	Water quality	Excessive
2	Coral reef condition	Excessive
3	Potential fish resources	Excessive
4	Wave height	Main priority
5	Water brightness	Low priority
6	Diversity of fish species	Low priority
7	White sand quality and quantity	Main priority
8	Beach slope	Low priority
9	Beach length	Main priority
10	Air temperature	Keep up the achievements
11	Water Current	Low priority
12	The existence of the mangrove ecosystem	Main priority
13	Security post availability	Keep up the achievements
14	Availability of parking space	Keep up the achievements
15	Availability of road signs and directions	Keep up the achievements
16	Regular placement of tourist facilities and infrastructure	Main priority
17	Availability of information and service centers	Keep up the achievements
18	Cleanliness of the physical condition of the environment	Keep up the achievements
19	Availability of sanitation facilities such as toilets and trash bins	Keep up the achievements
20	Road network to tourist objects	Excessive
21	Availability of transportation modes to tourist objects	Excessive
22	Availability of accommodation facilities such as hotels and inns	Excessive
23	Easy to reach tourist attraction	Keep up the achievements
24	Availability of places to eat and drink	Main priority
25	Availability of utilities such as electricity grid, clean water, and communication	Excessive
26	Availability of travel agents	Low priority
27	Affordable ticket fees	Main priority
28	The beauty of natural objects	Keep up the achievements
29	The beauty of artificial objects	Main priority
30	Gives a feeling of pleasure and comfort	Keep up the achievements
31	Suitable for gathering place with family or friends	Main priority
32	Offering a variety of types of tours	Low priority
33	The authenticity of natural objects	Keep up the achievements
34	Special regional cultural arts attractions	Low priority
35	Local specialties and drinks	Keep up the achievements
36	Unique regional souvenirs	Low priority

Source: Primary data analysis

Attribute 19 (availability of sanitation facilities and toilets such as trash bins) has the highest importance and it is in the "keep up the achievement" quadrant. This explains that tourists want proper sanitation facilities which during the COVID-19 pandemic required standard health protocols and a hygienic environment. Also, they are satisfied with the performance of sanitation facilities and toilets, such as adequate and clean trash cans, hence their achievements need to be maintained.

Attribute 5 (brightness of the waters) has a fairly high satisfaction level but is in an excessive quadrant and its benefits are not too felt. This is because most tourists just want to enjoy the beauty of the mangrove forest, sit back and relax while documenting their vacation in several photo spots.

The low priority quadrant is considered less important and the field performance is not very special. Furthermore, the benefits felt by tourists in this quadrant are very small. Attribute 26 (availability of travel agents) is in the low quadrant with the lowest level of importance. The unavailability of a travel agent is one of the factors they feel is not very important, because the location from the city center of Pamekasan is less than 10 kilometers and is not taken by the sea, hence it does not require an agent. Moreover, these agents require more expenses that are being incurred by tourists. Therefore, they assume that this attribute is not very important and the benefits obtained are not too good.

Attribute 11 (water currents) is in the low priority quadrant with the highest level of importance. However, tourists consider that the water currents in the Mangrove Ecotourism are relatively small due to the shallow depth.

Current is the horizontal movement of water masses which is caused by wind blowing on the sea surface, density differences, or the influence of tides. Due to these factors, a special current circulation pattern is formed (Ramadyan and Radjawane 2013).

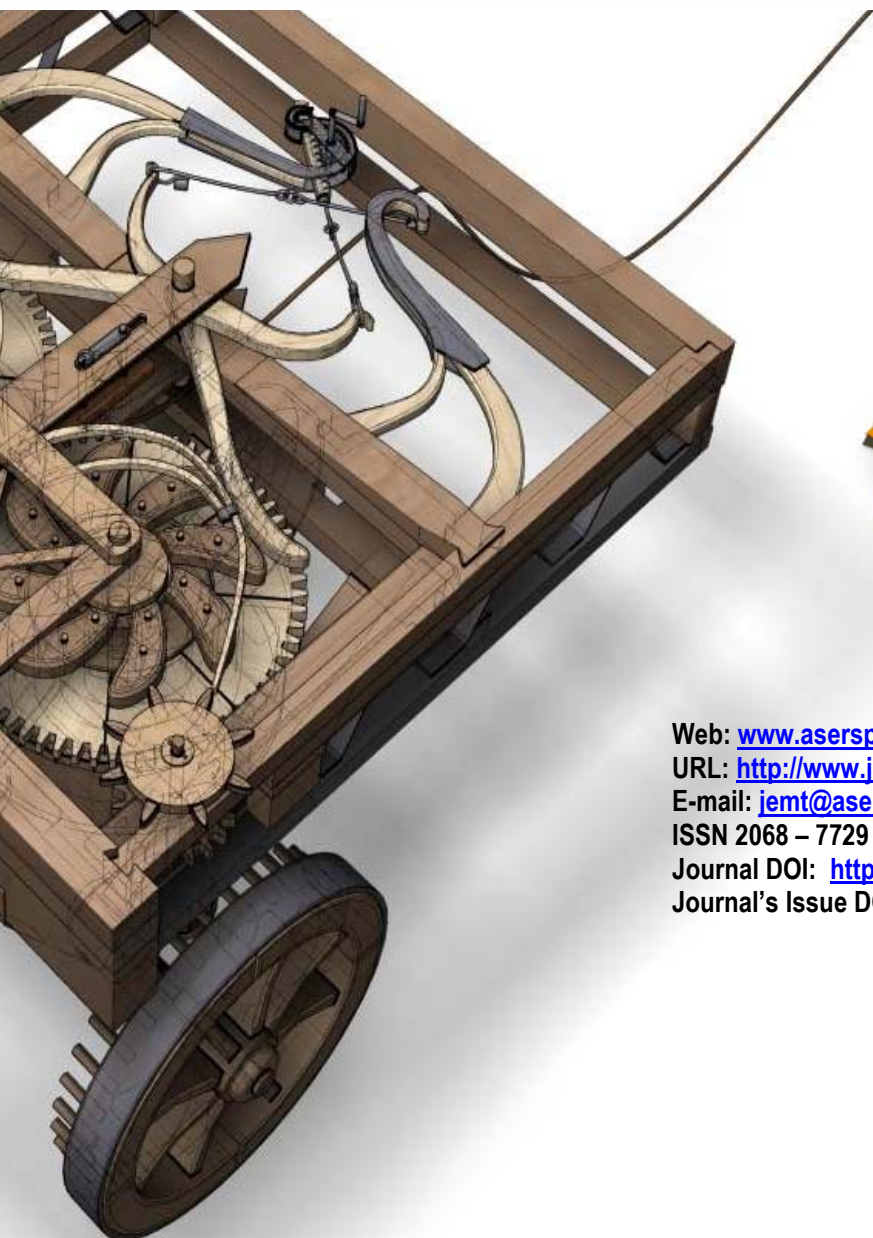
Conclusion

1. Based on the data, attributes of the variables in the Mangrove Ecotourism, namely the value of the objective limit of satisfaction (X) is 3.43 and that of interest level (Y) is 4.34.
2. The average satisfaction level is considered very satisfied by tourists with a value of 79%. Furthermore, out of 36 attributes, only 25 were considered satisfactory, therefore 69% of tourists are satisfied with the objects.
3. Attribute 12 (the existence of mangrove forests) is in the lowest level of satisfaction among others in the top priority quadrant. This explains that tourists feel the need for an increase in the existence of mangrove forests in terms of species diversity, density, and area.
4. Attribute 19 (availability of sanitation facilities such as toilets and trash) is in the highest importance level because it is in the "keep up the achievement" quadrant. Although the value of the highest level felt in this quadrant is in attribute 10 (air temperature).
5. Attribute 26 (availability of travel agents) is in the low priority quadrant with a less importance level.

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