



## Study of Sustainable Nautical Ecotourism Management on Kepulauan Seribu Jakarta

Linda Noviana<sup>1\*</sup> and Laila Febrina<sup>1</sup>

<sup>1</sup>Environment Engineering Unit, Sahid University, Jakarta, Indonesia.

### Authors' contributions

This work was carried out in collaboration between both authors. Author LN designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors LN and LF managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

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### ABSTRACT

Kepulauan Seribu has nautical ecotourism potential that locates in the entire island. That potential become primary tourism activities in development of Kepulauan Seribu nautical ecotourism. In the last ten years, growth of tourists number occurs cause serious environmental degradation. Therefore, nautical tourism management studies are needed in order to be sustainable. Based on that data, objectives of this study are research for strengths, weaknesses, opportunities and threats; and most best management strategy for Kepulauan Seribu nautical tourism development. Research area located at Taman Nasional Kepulauan Seribu. The SWOT analysis strategy data concluded that: higher value of strenghts is affordable and economic accomodation and transportation (0.06); higher value of weaknesses is disintegrated management system (0.07); higher value of opportunities is growth of tourist number (0.05); and higher value of threats is limit of tourist capacity (0.07). The best management strategy for Kepulauan Seribu nautical tourism development are strengthening coordination between sectors, zonation based on tour.

*Keywords:* Ecotourism; sustainable; SWOT.

\*Corresponding author: E-mail: [lindanoviana@gmail.com](mailto:lindanoviana@gmail.com);

## 1. INTRODUCTION

Kepulauan Seribu is located in South Jakarta, consist of sea and 110 small islands spread from northwest to southeast of Jakarta Bay (SK Gub. DKI No.1986 tahun 2000). As unique areas that different with other are in Jakarta, management of Kepulauan Seribu is stated administratively as one of Region Level II in Jakarta as Kabupaten Administrasi Kepulauan Seribu in 2001. This area well known as the one alternative tourist destination in Jakarta. Coastal waters and existence of special sea tourism object such as coral reefs are the main reason why tourism sector of Kepulauan Seribu is developed. In the Kepulauan Seribu region, there are some areas that have been assigned to conservation in the form of conservation areas, wildlife reserves and national parks which of course can be a valuable asset in order to improve the tourism sector in the region [1].

Taman Nasional Kepulauan Seribu (TNKpS) is one of the conservation area, this area is in the northern part of the Kepulauan Seribu region whose has been established since 1995 and confirmed as a national park in 2002 by SK Mehut No. 6310/Kpts-II/2002. Kawasan Taman Nasional Laut in juridical and legally are areas of conservation and protection as well as a tourism area with small islands that serve the resort. As conservation area which aims to do for biological natural resources management and utilization must be done wisely to ensure the continuity of supplies of natural resources while maintaining and improving the quality and diversity of its value requires proper planning and management. One thing that is important when tourism will be developed in a conservation area, to put the framework for the management and strategy, so that tourism can support and guarantee of protected values remain stable [2].

There is one condition that can not be avoided which is the activity of visitors such as diving, snorkling, fishing, panting mangrove and seagrass which can affect ecosystem quality. This will reduce the aesthetic value of the travel / ecotourism them. Since it was developed as a tourist destination, there was many tourists that come to visit, local and abroad. A high tourism activity for nearly fourteen years is triggering a study of the management of the marine ecotourism. This study was intended to be the optimal level of ecotourism activities, so that the management of the conservation of natural resources in the region can continue to support

tourism activities and able to provide welfare for the society in a sustainable way.

According to the research on the first phase of the four islands (Pulau Payung Besar, Sekati, Sebaru, and Kelapa) in Kepulauan Seribu, it give results for natural resource potential, carrying capacity, economic value and public perception as well as tourists who visit the island. The first stage results of the study should examine in further to find out an effective management system in maintaining the value of the nature conservation. For the second year, this research very expected to go according to plan in order to continue the research in the first year which aims at the marine ecotourism sustainable management strategies.

The purpose of this research are analyze the factors strengths, weaknesses, threats and opportunities of nautical tourism management based on SWOT analysis and understanding the nautical tourism management strategies in Kepulauan Seribu.

## 2. MATERIALS AND METHODS

### 2.1 Location and Data Collecting Methods

The research location is on three islands in the Taman Nasional Kepulauan Seribu, which is Pulau Sepa, Pulau Bira, and Pulau Perak. Methods of data collection used interview method, questionnaire on tourists, residents, stakeholders and tourism entrepreneurs' method with SWOT data analysis.

### 2.2 Nautical Tourism Development Strategy Analysis

AHP method (Analytical Hierarchy Process) required obtaining the opinions of experts who understand the research object so acquired a proper referral based on the reasoning. The SWOT analysis is a tool to support strategic decisions based on four components: strengths, weaknesses, opportunities and threats. The purpose of applying AHP and SWOT (A'WOT) is to develop and adopt a strategy that fits in between these four factors, which SWOT provides a basic framework to analyze the situation and the decision while AHP assist in implementing SWOT to be more analytical [3].

Those factors were obtained by conducting a survey in the field, interviews and study of literature. Overall AHP and SWOT analysis

results are then combined into A'WOT analytical methods used to determine the strategy of development of nautical tourism in the Kepulauan Seribu. This method aims to reduce subjectivity of assessment of internal factors (strengths and weaknesses) and external (opportunities and threats) [4]. These four factors are then organized into a hierarchy that illustrates how every element of the chart are interconnected to form a system [5]. A'WOT framework presented in Fig. 1.

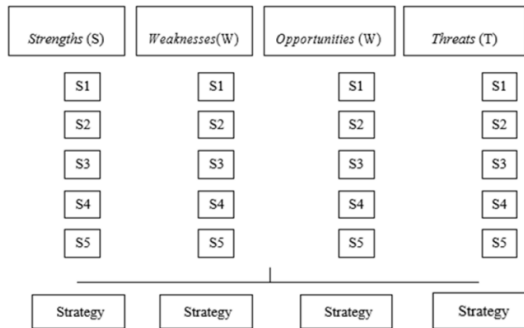


Fig. 1. Hierarchy structure of A'WOT matrix

### 2.3 Rating Each SWOT Factors

Then each of the factors given more values through the results of the questionnaire, and then counted the values of overall score. After that, do a SWOT analysis. Each factor is then given values through the results of the questionnaire, and then counted the number of overall values in Table 1.

### 2.4 SWOT Analysis

SWOT matrix is a matrix that integrates internal and external strategic factors. This matrix can clearly describe how the opportunities and threats (external) encountered can be connected to the strengths and weaknesses (internal) owned as presented in Table 2 [6].

Table 1. Rating SWOT factors values

Parameter	Weight	AHP weight analysis	
(Strengths) S1			
Sn (Weaknesses) W1	...	.....	.....
Wn (Opportunities) O1	...	.....	.....
On (Threats) T1	...	.....	.....
Tn	...	.....	.....

Table 2. SWOT analysis matrix strategy

External	N	Opportunities	Threats
Internal	...		
(Strengths)			
-	...	(SO) - 1	(ST) - 1
-	...	(SO) - 2	(ST) - 2
...	...	...	...
N	...	(SO) - n	(ST) - n
(Weaknesses)			
-	...	(WO) - 1	(WT) - 1
-	...	(WO) - 2	(WT) - 2
...	...	...	...
N	...	(WO) - n	(WT) - n

## 3. RESULTS AND DISCUSSION

### 3.1 SWOT Analysis Result

#### 3.1.1 Internal and external factors

Nautical tourism development strategy formulation on this research considers strengths, weaknesses, opportunities and threats associated with development of nautical tourism activities. The results of the analysis of the four factors that are present in Table 3.

Factors in Table 3 obtained by conducting surveys, interviews, and literature studies. Number of strengths, weaknesses, opportunities and threats from interviews was selected, and resulted five factors. Strengths and weaknesses belong to the internal factors, while opportunities and threats are included in external factors. Internal and external factors are analyzed with the SWOT method which in this method, subjectivity factors (opportunities and threats) can be reduced [4].

#### 3.1.2 SWOT factors rate values

Rate values obtained from the questionnaire distributed to stakeholders to get an assessment of their respective internal SWOT factors that have been formulated at the previous steps. The overall result of the rate values of each factor SWOT presented in Table 4.

Based on the results of calculation of rate values indicates that the highest value of strength is the potential of nature resources potential (0.06) and transportation and access are easy to find (0.06). The highest value of weakness is travel management system that has not been integrated (0.07), then for opportunity is

Increased the interest of nautical tourism (0.05). As for the threat is in number of tourist that are too high and exceed the carrying capacity and poor coordination between stakeholder and legislator (0.07). From overall data, it can be seen that the highest value is on the weaknesses and threats. This means that a factor of weakness and a threat to dominate the tourism conditions in the Kepulauan Seribu.

**3.1.3 Decision-making stage with a SWOT analysis**

Management strategies for nautical tourism in this study is based on a consideration of all factors and their SWOT rate value. This strategy is taken also based on field conditions and based on the literature and the results of interviews and information gathered during the research conducted. Based on the results of the SWOT analysis obtained four strategies SO (strategy; consider strengths and opportunities), five strategies ST (strategy consider factored strength and threat), the three strategies WO (consider the weaknesses and opportunities), and three strategies WT (consider the weaknesses and threats). The results of the SWOT analysis in the whole can be seen in Table 4.

After considering all the factors, then the next step is to create a strategy sequence. The order of the strategy based on the values of each strategy has been prepared in the previous step. The values of each strategy are sorted from the large to the small. This is done to determine who will advance the strategy implemented by the manager so that the development of marine

tourism in the Kepulauan Seribu that can be run in a sustainable manner.

The forms of the overall strategy in nautical tourism activities is through these efforts:

- 1) Strengthening coordination between sectors, policy makers, and the public
- 2) Integrated zoning should be set between land and sea
- 3) Limiting the number of tourists in accordance with the carrying capacity and improve quality of service, not only to follow the demand
- 4) Create tourism zoning based on the type of tour
- 5) Record the number of investors and tour operators
- 6) Firmness in applying the PNBP dues for tourists coming into the area and granting TNLKPS strict sanctions for offenders
- 7) Local resident who became a tour guide directing tourists to not commit an offense
- 8) Cooperation between travel managers, governments, and investors in improving the quality of facilities and infrastructure
- 9) Encouraging people to be proactive in their own areas
- 10) Build marketing units and promotion of local products
- 11) Develop a manual / brochure / like for tourists on ethics and local culture
- 12) Control the number of ships coming into the Kepulauan Seribu from around the dock port
- 13) Improving human resource capacity through education and certification training

**Table 3. Internal and external factors**

<b>Strenghts</b>	<b>Weaknesses</b>
1. Natural resources potential	1. Travel management system that has not been integrated
2. Unique and exclusive tourism object	2. Inadequate facilities and infrastructure
3. Active participation and support from local residents community	3. There are no <i>fomestic waste management</i>
4. Friendliness of local residents	4. The carrying capacity of small island travel is limited
5. Transportation and access are easy to find	5. Human resources is not developed
<b>Opportunities</b>	<b>Threats</b>
1. Increased the interest of nautical tourism	1. Number of tourist that are too high and exceed the carrying capacity
2. The role of investors and tour operators	2. Negative influence from foreign
3. Government support in the deve lopment of tourism	3. Lack of conservation supports and efforts from tourists or travellers
4. Growth of information technology	4. Conservation support efforts
5. Awareness of tourists in support of conservation	5. Activities around the Teluk Jakarta cause degradation of aquatic environments
	6. Poor coordination between stakeholder and legislator

**Table 4. SWOT factors values**

Priority group	SWOT factor	Priority factor in group	Priority factor
<b>Strengths</b>			
0.27	1. Natural resources potential	0,22	0,05
	2. Unique and exclusive tourism object	0,18	0,05
	3. Active participation and support from local residents community	0,18	0,05
	4. Friendliness of local residents	0,20	0,06
	5. Transportation and access are easy to find	0,22	0,06
<b>Weaknesses</b>			
0.26	1. Travel management system that has not been integrated	0,22	0,07
	2. Inadequate facilities and infrastructure	0,18	0,05
	3. There are no <i>fomestic waste management</i>	0,18	0,04
	4. The carrying capacity of small island travel is limited	0,20	0,06
	5. Human resources is not developed	0,22	0,05
<b>Opportunities</b>			
0.27	1. Increased the interest of nautical tourism	0,22	0,05
	2. The role of investors and tour operators	0,18	0,03
	3. Government support in the development of tourism	0,18	0,04
	4. Growth of information technology	0,20	0,04
	5. Awareness of tourists in support of conservation	0,22	0,03
<b>Threats</b>			
0.28	1. Number of tourist that are too high and exceed the carrying Capacity	0,22	0,07
	2. Negative influence from foreign	0,18	0,04
	3. Lack of conservation supports and efforts from tourists or Travelers	0,18	0,06
	4. Activities around the Teluk Jakarta cause degradation of aquatic environments	0,20	0,04
	5. Poor coordination between stakeholder and legislator	0,22	0,07

Once sorted, then from the entire strategy was chosen four top strategies. This election is so that implementation can be done in focus, although it is possible also for strategies with the next sequence to do. The four priorities of the strategy are:

**(1). Strengthening coordination between sectors, policy makers, and the public**

Natural conditions is a major capital owned tourist activity Kepulauan Seribu, where this capital by [7] consists of the availability of natural resources and conservation efforts made by the government with the locals. Some outreach activities have actually been carried out either by the BTNLKpS, District Government of Kepulauan Seribu, Regional Government of DKI Jakarta, as well as from NGOs concerned. However, people still need to be encouraged to keep the environment as well as being implementers and service providers in the tourism activities.

Cooperation between Governments and the relevant parties, including the community is indispensable for the sustainability of nautical tourist business at this location. Related differences in the development of tourism is conducted in the area TNLKpS and carried out TNLKpS, local governments and Balai TNLKpS need to jointly undertake counseling on a regular basis to the operator / tour guide on the principles of ecotourism and implementation, especially for operators / tour guides that make the region TNLKpS as area of operation. It is necessary to remember the difference TNLKpS regional status that can not be freely used for nautical tourism like any other region outside TNLKpS.

Coordination should also be done through conservation efforts that can do tourists in line with the tourist activities. For example, through the participation program rating in the preservation of nature embodied by making a

**Table 5. SWOT analysis results**

Internal Exsternal	Strengths S1, S2, S3, S4, S5	Weaknesses W1, W2, W3, W4, W5
	SO Strategy	WO Strategy
Opportunities (O) O1, O2, O3, O4, O5	<ol style="list-style-type: none"> <li>1. Implement nature conservation program (S1, S2, S3, O1, O2, O3, O5)</li> <li>2. Build marketing units and promotion of local products (i.e. souvenir, etc.)</li> <li>3. Encourage local residents to become business pioneer in their area (S3,S4,O3,O4)</li> <li>4. The firmness in applying the PBNP dues for tourists coming to the TNLKpS region (S1, S2, S3, O1, O2, O3, O5)</li> </ol>	<ol style="list-style-type: none"> <li>1. Improve human resources capacity with training and certification (W5, O3)</li> <li>2. Collecting data about tour destination and involve it in travel management (W1, W2, W3, O1, O2, O3, O4, O5)</li> <li>3. Cooperation between travel managers, governments, and investors in improving the quality of facilities and infrastructure (W1, W2, W3, O3)</li> <li>4. Create tourism zoning based on the type of tour (W1, W2, W3, O1, O2, O3, O4, O5)</li> <li>5. Integrated zoning should be set between land and sea (W1, W2, W3, O1, O2, O3, O4, O5)</li> </ol>
	ST Strategy	WT Strategy
Threats (T) T1, T2, T3, T4, T5	<ol style="list-style-type: none"> <li>1. Develop a manual / brochure / like for tourists on ethics and local culture(S3,S4,,T2)</li> <li>2. Local resident who became a tour guide directing tourists to not commit an offense (S3,S4,T1,T3)</li> <li>3. Control the number of ships coming into the Kepulauan Seribu from around the dock port (S5,T1)</li> </ol>	<ol style="list-style-type: none"> <li>1. Limiting the number of tourists in accordance with the carrying capacity and improve quality of service, not only to follow the demand (W1, W2, W5, T1, T3)</li> <li>2. Strengthening coordination between sectors, policy makers, and the public (W1, W2, W4, W5, T1, T2, T3, T4, T5)</li> </ol>

rule requiring for the tourist / traveler groups to plant some seeds of mangrove or coral trasplantation implemented through regulations or regulations in TNLKpS. Coordination in conservation efforts is necessary, because if preservation is not conducted jointly between the parties, then there is a chance of the emergence of a clash between the government as a regulator with the local residents [8].

Related to that, the Ministry of Tourism should conduct promotion like explanation program and marine tourism comservation of Kepulauan Seribu, so that tourism will understand and be able to raise tourism interest in Kepulauan Seribu

**(2). Integrated zoning should be set between land and sea**

As has been explained previously that the marine area is divided into sub marine conservation

zones (sub zone pp 1) and general use zone waters (sub zone PP2). Regional Regulation of Special Province of Jakarta No. 1 of 2014 to the sub zone PP1 are emphasized as a protection area waters. However, for setting the sub zone of the islands that are in the waters PP1 sub zone is specified as a zone of offices, trade and services in the areas of the island, a residential zone in the region of the island, as well as public and social services zone. This is a contradictory policy, so that needs to be reviewed again by doing a deal between Indonesia's policy in managing authorities of the Kepulauan Seribu, for the management of land and waters of the region particularly in small islands must be based on the principles of alignment, in line with the statement of Cambers [9] mentions that the management strategies of small islands should be able to associate the entire activities and stakeholders that are on small islands, using a coordinated system.

**(3). Limiting the number of tourists in accordance with the carrying capacity and improve quality of service, not only to follow the demand**

Kepulauan Seribu is the alternative way for economic tour destination. Do not far away from Jakarta, transportation is easy to find, and have a unique ambient unlike the other tourist sites in urban areas in general. Therefore, the enthusiasm of people to visit this location cannot be avoided. A positive impact is for open jobs for local people, such as tour guides, catering, provider of homestay, rent snorkel, rent boats provider, even as the agency coordinating all activities and tourist activities.

The positive impact is economically quite well, but as has been discussed in the previous section that the overall number of tourists have now exceeded the carrying capacity of travel. If the capacity of the infrastructure is exceeded, there will be a deterioration of resources, reduced visitor satisfaction, and ultimately harmful to society, economy, and culture [10]. The existence of the tour package price is cheaper if the number of travelers on a single tour group more, thus indicating a declining service, including against the availability of clean water, food, and tourist facilities (limited). Such conditions should be taken into consideration for the other parties so that the number of tourists should be limited according to the real carrying capacity so that tourist activity, including these services can be maintained and sustain.

**(4). Create tourism zoning based on the type of tour**

Travel zoning should be made to facilitate the control of the tourist area and is also an activity that runs in the area. Determination recreation zone serves as a barrier recreation area for tourists and can define access door entrance / exit way (port / harbor). It is intended to allow tourists to enjoy the tourist sites with optimal and focused their activities in the area without interfering with other uses [11].

**4. CONCLUSION**

Based on the analysis and discussion can be concluded that: The identification results have shown that there is a difference between land and water with an area of existing lands and waters listed on the SK Gubernur DKI Jakarta Nomor 1986 Tahun 2000. Internal and external

factors of the most high value of strength transportation and access are easy to find (0.06), the weakness is travel management system that has not been integrated (0.07), then for opportunity is increased the interest of nautical tourism (0.05) and the threat is number of tourist that are too high and exceed the carrying capacity area (0.07). The priority strategy in the development of nautical tourism in the Kepulauan Seribu are (1) Strengthening coordination between sectors, policy makers, and the public; (2) integrated zoning should be set between land and sea; (3) limiting the number of tourists in accordance with the carrying capacity and improve quality of service, not only to follow the demand; and (4) create tourism zoning based on the type of tour. The suggestion of this research are The maximum limit of rating should be considered by the manager, where it is based on a study of tourism carrying capacity. There should be further studies on the carrying capacity of travel to all tourist sites in the Kepulauan Seribu. Large population and building on some islands should encourage managers to implement firmly the rule of maximum limit buildings that could be built on an island with actual current conditions Regional development both land and sea in the Kepulauan Seribu should be based on zoning and planning department conducted comprehensive and integrated manner, so that the need for priority action by conducting a more detailed spatial planning in the islands and sea waters. (5). Ministry of tourism can conduct promotion based on SWOT analysis.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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