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Policy Strategy for Sustainable Management of Mangrove Ecotourism in Siak Regency, Riau Province, Indonesia

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ABSTRACT

Siak regency, Indonesia, has more than two hundred-thousand-hectare mangrove areas. Local community for all this time has been developed mangrove areas as ecotourism, but they still lack sustainable management to maintain it. Therefore, this study aims to promote strategies' policy for the sustainable management of mangrove ecotourism in the Siak regency. The research was conducted from July 2019 to July 2020 at 3 locations of mangrove ecotourism, which involved 30 respondents, consisting of 21 people to assess the SWOT analysis and 9 experts to assess AHP. For generating the sustainable policy strategy, A'WOT, a combination of AHP (Analytical Hierarchy Process) and SWOT (Strengths, Weaknesses, Opportunities, and Threats), was applied. The SWOT data in mangrove ecotourism management includes strengths (2.797), weaknesses (-0.22), opportunities (3.668), and threats (0.149). The results showed that there were six policies needed to excuse. From these policies, the opening opportunities for investors for ecotourism development policy (0.243), improving facilities and infrastructure policy (0.194), providing business training on ecotourism policy (0.178), increasing ecotourism promotion policy (0.111), establishing cooperation between government and stakeholders policy (0.97), and maintaining mangrove ecosystem policy (0.79). It was concluded that mangrove ecotourism in Siak regency required priority funding to develop facilities and ecotourism's business training to cultivate sustainable management of mangrove ecotourism. Corporation between the government and stakeholders was needed to accelerate the realization of the policies.

1. INTRODUCTION

The unique ecosystem of mangroves is a natural resource that has the potential as an ecotourism site [1, 2]. Ecotourism is a sustainable tourism spot for tourists by paying attention to the surrounding nature preserved by the local communities as the stakeholder [3].

Indonesia has the potential to develop mangrove ecotourism [4-7]. Ecotourism development is one of the strategies to improve the economy and employment of local communities [8-11]. The highest portion of mangroves in Indonesia is in Sumatra, Kalimantan, and Papua [12, 13]. Siak Regency, located in Riau Province, Sumatra Island, has a mangrove area of 206,292,642 hectares, which is a very potential area for the development of mangrove tourism [13]. Related to its utilization, the Siak Government had issued Regional Regulation No. 12 of 2012 concerning the Master Plan for Tourism Development in the Siak Regency. This regulation states that tourism strategic area IV is used to develop ecotourism-based products and is supported by cultural tourism in a unified tourism development that covers the areas of Bunga Raya and Sungai Apit sub-districts.

Sungai Apit sub-district is a coastal area that can be a natural tourism object, equipped with a strategic location adjacent to an industrial and port (Tanjung Buton) area. This area is an alternative stopover for commercial ships and water transportation. Thus, it can attract local and international tourists. However, there are still mangrove sites that have not been managed optimally. Those locations are (1) Mengkapan mangrove ecotourism, (2) Rawa Mekar Jaya mangrove ecotourism, (3) Sungai Rawa mangrove ecotourism, and (4) Sungai Bersejarah mangrove ecotourism. Meanwhile, the Bunga Raya District has the Berembang Park. The areas of Rawa Mekar Jaya (RMJ), Sungai Rawa (SR), and Taman Berembang (TB) were chosen as research sites because they represent mangrove ecotourism in Siak Regency.

In the tropics, mangrove forests play an important role for the surrounding community as they use the natural resources to increase household income [14]. Mangrove ecotourism management requires community-based management by prioritizing the aspirations and initiatives of local communities. Therefore, the government gives authority, responsibility, and rights to local communities in managing natural resources. Every district is required to have managerial abilities in the ecotourism management process. However, local communities are still lacking in managing systems. Thus, it is necessary to involve the government and other stakeholders in maintaining the sustainability of ecotourism [15, 16].

Mangrove ecotourism management in Siak Regency is still not compatible and has many weaknesses. For example,

incomplete/damaged facilities and infrastructure, low public interest in ecotourism activities provided, and lack of promotion. Therefore, it is necessary to implement a proper management policy strategy in Siak Regency to attract more tourists. This strategy serves as a foundation and guideline so that the objectives can be achieved immediately. This research is expected to provide more insights into sustainable mangrove ecotourism and improve the welfare of local communities in the Siak Regency.

This study used A'WOT analysis that combines AHP (Analytical Hierarchy Process) and SWOT (Strengths, Weaknesses, Opportunities, and Threats), complementing each other shortages. Therefore, A'WOT can discuss both SWOT qualitative and AHP quantitative. A'WOT can be used to develop feasibility studies and strategies to generate decisions efficiently. The SWOT analysis results were followed by AHP [17, 18], which helps to improve the SWOT analysis in collaborating the consequences of situational decisions so that alternative strategic choices can be prioritized [19]. The most important stage of AHP is pairwise comparison assessment, which compares the hierarchical level of importance between components [20, 21].

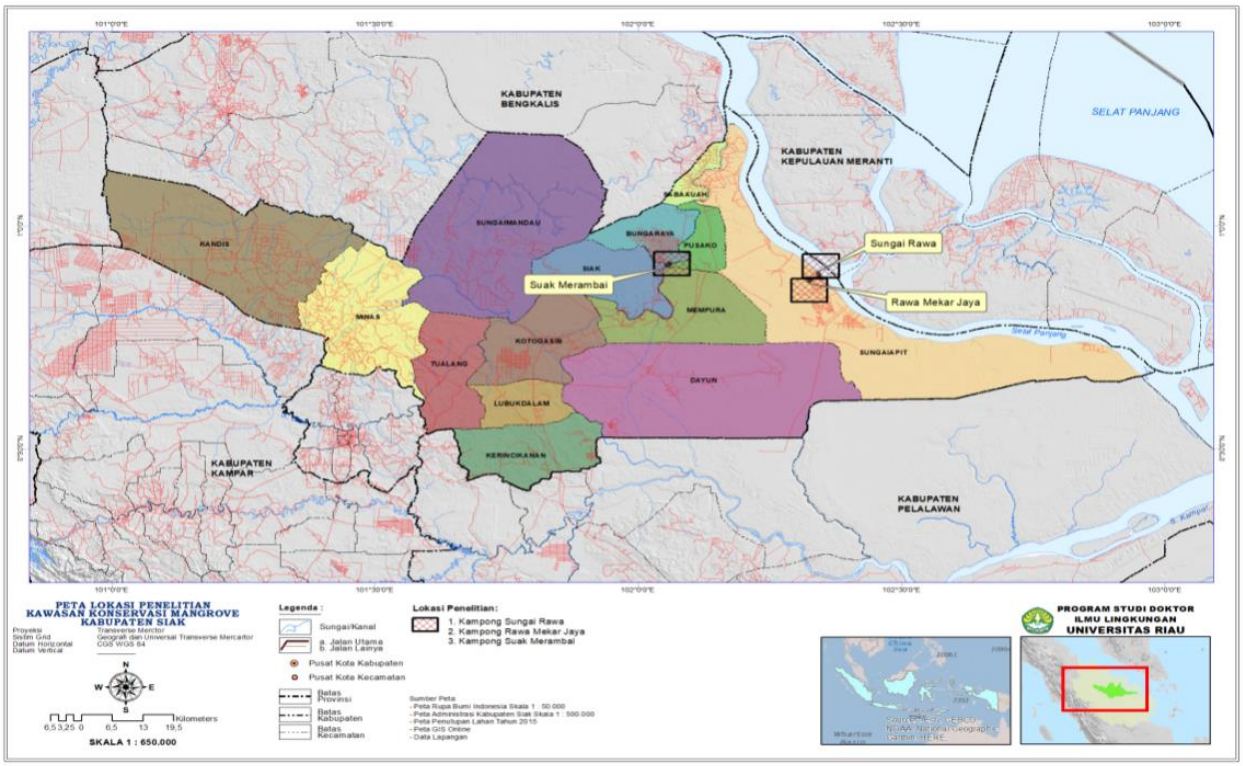
Briefly, in A'WOT analysis, there are three steps: identifying the strategy or factors that influence decision making used in the research, SWOT and AHP analyzing to select the factor used and compiling the hierarchy and calculating through pairwise comparisons [22].

2. METHODS

The research was carried out from July 2019 to July 2020 in three areas. Two of them were in Sungai Apit District, namely the Rawa Mekar Jaya (RMJ) ecotourism in Rawa Mekar Jaya village and Sungai Rawa (SR) ecotourism in Sungai Rawa village. The other one was in Taman Berembang (TB) ecotourism of Kampung Sauk Merambai, Bunga Raya District, Kabupaten Siak, Riau Province (Figure 1).

This research used all stakeholders associated with all research sites as the population. The total sample is 30 respondents, consisting of stakeholders, 21 respondents, and 9 experts. The sample was contained of 21 people, consisting of the Siak Tourism Office, Sungai Apit Sub-district Head, Bunga Raya Sub-district Head, Rawa Mekar Jaya Chief, Rawa River Chief, Suak Merambai Chief, RMJ Managers, SR Managers, TB Managers, three people from the industrial sector (restaurant/hospitality managers), Higher Education (Riau University), NGO Mitra Insani, three local tourists in the RMJ, SR, and TB areas.

In this research, four indicators of SWOT, quantitative analysis, were assessed, such as ecotourism potential, ecotourism attraction, ecotourism activity, and ecotourism policy [23, 24]. Twenty-one respondents from stakeholders were selected as samples. Each respondent was given a statement related to SWOT with four alternative answers and scores, which were described as follows: (1) strongly agree was given a score of 4, (2) agree was given a score of 3, (3) moderately agree was given a score of 2, (4) disagree was given a score of 1. Previously, the statement on the SWOT was given to the respondent, validity and reliability were first tested, which was then calculated by weight, rating, and score to determine the main quadrant. From the SWOT results, six strategists were found as follows: improving ecotourism promotion, opening investment chances for developing ecotourism, improving facilities and infrastructures, providing business training on ecotourism, increasing ecotourism promotion, establishing cooperation between government and stakeholders, and maintaining mangrove ecosystem.



Source: Map of Indonesia with the scale of 1:50,000, Administrative Map of Siak Regency with the scale of 1:500,000, Land Cover Map of 2015, Gis Online, and field data.

Figure 1. Research sites

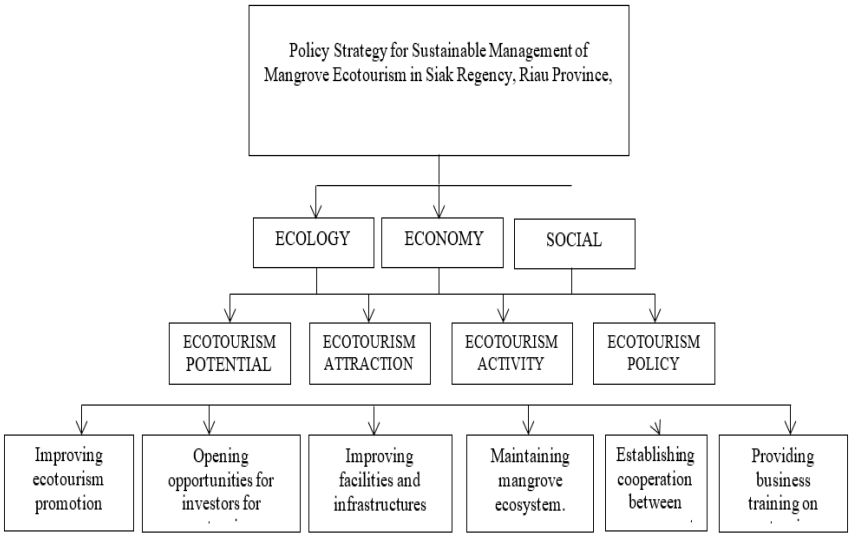


Figure 2. A hierarchy research method using A'WOT

The next step was continued by AHP, a quantitative evaluation, to determine priority strategists. AHP questionnaire was fulfilled by nine persons, who were consisted of ecotourism expert (2 persons), business economist (1 person), development economist (1 person), public policy expert (1 person), Siak Tourism Office (1 person), Sungai Apit sub-district head (1 person), Bunga Raya sub-district head (1 person) and the manager of Rawa MJ (1 person). Each respondence was prepared with paired questions based on the research hierarchy (Figure 2) by giving a 1 to 9.

3. RESULTS AND DISCUSSION

3.1 Overview of research sites

Sungai Apit and Bunga Raya sub-districts have a tropical climate with an air temperature of around 21.8 to 35.1°C and rainfall intensity of 1700 - 4000 mm per year. Figure 1, the rainfall in Riau Province is relatively high and has the potential for a flood disaster if the river flows and ditches cannot accommodate the high rainwater discharge and occur for an extended period.

Geographically, Siak Regency has a coastal area close to several neighboring countries and is included in the Indonesia-Malaysia-Singapore growth triangle [25]. The Siak district has a tropical climate with temperatures between 25-32°C with high humidity and rainfall.

Siak Regency stretches from 02º25'00 North Latitude to 01º15'00 South Latitude and 10000'00 to 105º05'00 East Longitude. The research area was located in Sungai Rawa Village and Rawa Mekar Jaya Village, Sungai Apit sub-district, located between 1º14´-0º34' North Latitude and 102º03´-102º53' East Longitude, with an area of 1,346.33 km². The total area of the Sungai Apit sub-district is 234.347 ha. Next, Bunga Raya sub-district is located between 0º39´-0º04' North Latitude and 101º58´-102º13' East Longitude with about 195.49 km².

3.2 Characteristics of respondents

Respondents who participated in this study were dominated by males than females, as presented in Table 1.

Table 1. Characteristics of respondents by gender

Gender	Number	Percentage (%)
Male	12	60
Female	8	40
Total	20	100

Source: Research Data, 2020

Characteristics of respondents based on education level are presented in Table 2.

Table 2. Characteristics of respondents by education level

Education	Number	Percentage (%)
High school/equivalent	3	14.5
Associate	2	1
Bachelor	13	70
Magister	3	14.5
Total	21	100

Source: Research Data, 2020

3.3 Mangrove type

Data on mangrove species (Table 3) were obtained from management documents and observations, including 17 in RMJ, 15 in SR, and 6 in TB. Species diversity is used to measure the ability of a community to protect itself against disturbance and to measure community wealth. Malik et al. [1] stated that the number of species is parallel with the diversity value. Mangrove diversity has the opportunity to become one of the attractions of ecotourism that can be promoted to various regions and abroad [26]. Thus, the existence of mangroves should be utilized and appropriately preserved by the community.

The location with the most public services is RMJ, with a souvenir stall and a Soka crab farming pond that other ecotourists do not have. Meanwhile, mangrove education (nurseries and planting) is only available in RMJ and SR ecotourism. Mangrove education only through the names of mangroves shown on the trees and the explanation by managers.

On the other hand, TB ecotourism sells more photo spots to attract tourists. The number of visitors in 2019 at RMJ ecotourism was 1,540 tourists, 3,000 tourists in SR, and

10,138 tourists in TB. Here are some pictures of facilities at those ecotourism locations (Figures 3-5).

Table 3. Mangrove diversity in three ecotourism locations

No.	Local Name	Scientific name	Ecotourism Location		
			RMJ	SR	TB
1.	Api-Api	*Avicennia marina*	√	√	
2.	Bakau Kurap	*Rhizophora stylosa*	√		
3.	Bakau Puteh	*Rhizophora apiculate*	√	√	
4.	Bangka Hitam/ Bangka Merah/ Belukap	*Rhizophora mucronate*	√	√	
5.	Baru-baru	*Hibiscus tiliaceus*			√
6.	Berus-berus	*Kandelia candel*	√	√	√
7.	Buta-buta	*Cerbera manghas*			√
8.	Betak-betak	*Excoecaria agallocha*	√	√	√
9.	Cingam	*Scyphiphora hydrophyllacea*	√	√	
10.	Dungun	*Heritiera globasa*	√		
11.	Kaneras	-		√	
12.	Kedabu	*Sonnetaria ovate*	√	√	
13.	Ketapang	*Terminalia catapa*			
14.	Koseng	-		√	
15.	Lenggadai	*Buguiera parviflora*	√		
16.	Nipah	*Nypa fruticans*	√		
17.	Nyireh	*Xylocarpus granatum*	√	√	
18.	Pedada	*Sonnetaria alba*	√		
19.	Perepat/ Berembang	*Sonnetaria casseolaris*	√	√	√
20.	Piyai Raya	*Acrostichum aureum*	√		
21.	Putat	*Baringtonia asiatica*			√
22.	Seno	-		√	
23.	Sesup	*Lummitzera racemose*		√	
24.	Singam	-		√	
25.	Ukam	*Flacourita rukam*		√	
26.	Rengas	*Gluta aptera*			
27.	Temusing	*Bruguiera sexangula*	√		
28.	Tumu	*Buguiera gymnorrhia*	√		
Total			**17**	**15**	**6**

Note: RMJ: Rawa Mekar Jaya, SR: Rawa River, and TB: Taman Berembang
*Source: Manager and Observations in 2019

Figure 3. Public facilities in RMJ ecotourism. (A) Homestay, (B) Rest area, (C) Treehouse

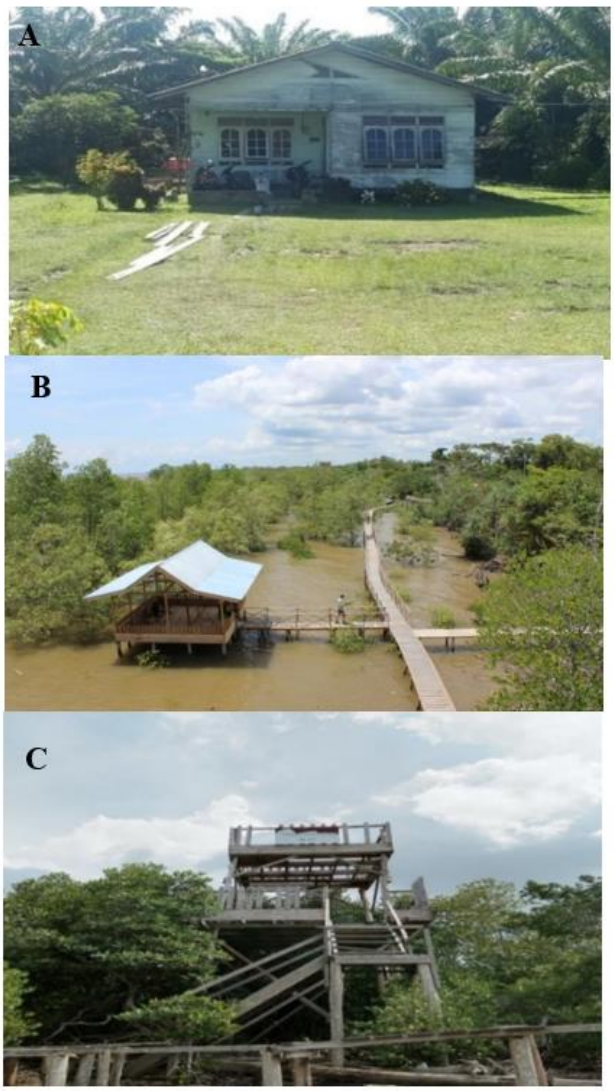


Figure 4. Public facilities in SR ecotourism. (A) Homestay, (B) Rest area, (C) Watchtower

Figure 5. Public facilities in TB ecotourism. (A) Rail bridge, (B) Photo spot, (C) Parking area

Table 4. Facilities and infrastructure available at three ecotourism locations

No.	Facilities and Infrastructure	Total
	RMJ	
1.	Mangrove track a. (480 m) and b. (500 m)	4 3
2.	Rest area	6
3.	Information board	19
4.	Treehouse	4
5.	Dwarf house	2
6.	Fishing spot	3
7.	Mangrove nursery	1
8.	Crab farming pond	1
9.	Canteen	1
10.	Souvenir stall	1
11.	Homestay	2
12.	Radio station	1
13.	Mushalla (Islamic Prayer Room)	1
14.	Toilet	2
15.	Parking lot	1
16.	Street light	8
17.	Trash can	7
	SR	
1.	Homestay	1
2.	Mangrove track (760 m)	3
3.	Rest area	2
4.	Mangrove signage	4
5.	Directions board	6
6.	Location nameplate	1
7.	Watch Tower (9m tall)	1
8.	Fishing spot	2
9.	Mangrove nursery	1
10.	Canteen	1
11.	Toilet	2
12.	Trash can	4
13.	Parking lot	1
	TB	
1.	Mangrove track (450 m)	4
2.	Rest area (a)3mx4m; (b) 4m x 4m dan (c)6mx6m	3
3.	Photo spot (a)1m x 1m; (b)1,5m x 2m dan (c)3m x 4m	3
4.	Toilet (1.5m x 1.5m)	2
5.	Fishing spot	2
6.	Parking lot	1
7.	Mangrove signage	6
8.	Location nameplate	2
9.	Trash can	4

Note: RMJ: Rawa Mekar Jaya, SR: Sungai Rawa, and TB: Taman Berembang.
*Source: Manager and observations in 2019

The availability of facilities and infrastructure in the RMJ ecotourism area receives more financial assistance than other ecotourism. For example, the construction of infrastructure in SR ecotourism has been assisted by the NGO Mitra Insani. Meanwhile, the development of public services in TB ecotourism is supported by village funds (Table 4).

3.5 Mangrove ecotourism management policy in Siak regency

Policies regarding mangrove ecotourism are covered in tourism policies in general. For instance, Law Number 10 of 2009 on article 8 paragraph (1) and (2), and article 9 paragraph (3) concerning tourism development is carried out based on the master plan under Regional Regulations. Next, Law Number 41 Article 3 of 1999 concerning Forestry, the functions of the forest are for conservation, protection, and production. Third, Law Number 23 of 2014 on the management of grand forest parks falls under the authority of districts/cities. Fourth, the management and development of mangrove forest ecotourism in Indonesia must comply with the principles as regulated in the Regulation of The Minister of Home Affairs Number 33 of 2009 Article 3 concerning the use of mangrove forest ecotourism are being a means of conservation, economy, education, and maintaining local wisdom. Fifth, the Siak Regency Regional Regulation No. 2 of 2012 concerning the Master Plan for Regional Tourism Development (RIPDA) of Siak Regency. Siak Regency stipulates a strategic tourism area in article 13 as follows: (1) Siak Regency is divided into five strategic areas; Article 14 (paragraph 2e) explained that the tourism strategic area IV is for the development of ecotourism-based products and is supported by a natural culture in a unified theme that covers the Bunga Raya and Sungai Apit Districts.

Tourism management, according to the Regional Regulation of Siak Regency No. 12 of 2012 Article 35, is as follows: (1) The Siak Regency Government is taking part in fostering, supervising, and securing tourism activities; (2) The

private sector plays a role in opening and operating tourist objects and attractions as well as tourism service facilities; and (3) The community participates in creating tourism awareness based on *Sapta Pesona* [27, 28], an Indonesia government concept about tourism conscious which promoting local community role in developing ecotourism.

The follow-up on ecotourism management policies at the village level is by forming a tourism awareness group. This is in line with village authority in Law Number 23 of 2014 Article 18, that village authority includes authority in village administration, implementation of village development, village community development, and village community empowerment based on community initiatives, rights of origin, and village customs.

Based on the description above, it can be concluded that tourism management policies are from the central government to local authorities. In particular, the development of mangrove ecotourism is regulated by the Minister of Home Affairs. However, the current management of mangrove ecotourism has not been managed optimally. The increased number of visitors is not equipped with adequate maintenance of public service. Thus, the facilities and infrastructure are prone to damage.

The dynamics of ecotourism regulations in Indonesia have not prioritized the objectivity of science and the application of a directed vision, one of which is because of sectoral egos [29]. Barriers to implementing effective ecotourism regulations are: (1) the necessary preconditions have not been created for the policy to be effective; (2) incomprehensive decision-making; (3) weak law enforcement; (4) the substance of the policy is not under conservation issues; and (5) the substance of the policy tends to be commands, regulations, and technical instructions [30, 31].

3.6 Mangrove ecotourism management policy strategy in Siak regency

The instruments used were tested for validity and reliability with SWOT variables of strengths, weaknesses, opportunities, and threats. Then, this indicator will be divided into two SWOT parts, namely in the weight and rating groups. The internal factor matrix and the external one are presented in Table 5 and Table 6, respectively.

Table 5. Internal factor matrix

No.	Strength (S)	Weight	Rating	Weighted score
1.	Siak Regency Regional Regulation Number 12 of 2012 concerning the Master Plan for Tourism Development in Siak Regency	0.144	2.857	0.411
2.	The diversity of mangrove species	0.107	2.952	0.316
3.	Diversity of fauna	0.123	2.762	0.339
4.	Relatively cheap ticket prices	0.138	2.667	0.368
5.	High community participation in the sustainability of mangrove ecotourism	0.128	2.762	0.355
6.	Moderate distance and travel time from the provincial capital	0.121	2.952	0.356
7.	Existence of tourism awareness groups/management	0.115	2.476	0.284
8.	Mangrove education	0.125	2.952	0.368
	Total			**2.797**
	Weakness (W)			
1.	Lack of funds for public services development	0.123	3.238	0.937
2.	Inadequate facilities and infrastructure	0.126	2.810	0.355
3.	Lack of maintenance	0.115	3.238	0.373
4.	Lack of cooperation between the manager and the village authorities	0.132	3.143	0.415
5.	Lack of promotion	0.121	3.143	0.380
6.	The community has not fully benefited from the ecotourism	0.125	3.286	0.409
7.	Lack of human resources for ecotourism managers	0.126	2.762	0.349
8.	Local cuisine and crafts have not been managed optimally	0.132	2.571	0.339
	Total			**3.018**
	The difference in Total Strengths – Total Weaknesses (X-Axis)			**-0.22**

Table 6. External factor matrix

No.	Opportunities (O)	Weight (Si)	Rating (Bi)	Total Weight (Si x Bi)
1.	Tourism is a sector of economic development	0.333	3.691	1.206
2.	Use of technology for promotion	0.338	3.810	1.287
3.	Nature tourism trend	0.329	3.571	1.174
	Total			**3.668**
	Threats (T)			
1.	Mangrove ecotourism has adequate and attractive attractions, amenities, accessibility, ancillary, and activities	0.340	3.667	1.245
2.	Environmental damage due to improper management	0.349	3.286	1.147
3.	Conflict of interest	0.311	3.619	1.127
	Total			**3.519**
	The difference in Total Opportunities – Total Threats (Y-Axis)			**0.149**

The calculation of the value and weight (Table 5 and 6) obtained the scores in determining the Cartesian coordinate for External Strategy (X) and Internal Strategy (Y). The score was pointed at -0.22 on the X-axis for external strategy (S-W)), while the internal strategy (O-T) was at 0.149 on the Y-axis. Thus, if it is plotted on Cartesian coordinates, the recommendation for a W-O strategy is located in the third quadrant, as shown in Figure 6.

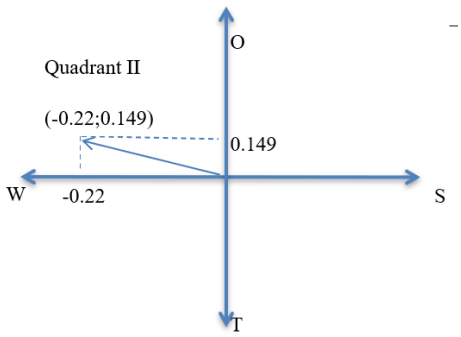


Figure 6. SWOT matrix diagram of mangrove ecotourism management policy

The ranking and priority scales generated by multiplying the position of the matrix for each SWOT component are presented in Table 7.

Table 7. Determination of ranking and priority strategy with SWOT analysis

Quadrant	Point Position	Matrix Area	Ranking	Strategy Priority
I	2.797 3.668	10.26	3	S-O
II	**3.018** **3.668**	**11.07**	**1**	**W-O**
III	2.797 3.519	9.84	4	S-T
IV	3.018 3.519	10.59	2	W-T

Source: Research Data, 2021.

Based on Table 7, the highest strategic priority in managing the mangrove ecotourism in Siak Regency was Weakness-Opportunities (W-O), in quadrant II, followed by S-O, W-T, and S-T strategies. The SWOT matrix for the formulation of alternative mangrove ecotourism management strategies is presented in Table 8.

Table 8. SWOT matrix

Internal / **External**	**S**	**W**
	1. Siak Regency Regional Regulation Number 12 of 2012 concerning the Master Plan for Tourism Development in Siak Regency 2. The diversity of mangrove species 3. Diversity of fauna 4. Relatively cheap ticket prices 5. High community participation in the sustainability of mangrove ecotourism 6. Moderate distance and travel time from the provincial capital 7. Existence of tourism awareness groups/management 8. Mangrove education	1. Lack of funds for public services development 2. Inadequate facilities and infrastructure 3. Lack of maintenance 4. Lack of cooperation between the manager and the village authorities 5. Lack of promotion 6. The community has not fully benefited from the ecotourism 7. Lack of human resources for ecotourism managers 8. Local cuisine and crafts have not been managed optimally
O	**S-O**	**W-O**
1. Tourism is a sector of economic development 2. Use of technology for promotion 3. Nature tourism trend	Increasing ecotourism promotion	1. Opening opportunities for investors 2. Improving the facilities and infrastructure 3. Provide training on businesses related to ecotourism
T	**S-T**	**W-T**
1. Mangrove ecotourism has adequate and attractive attractions, amenities, accessibility, ancillary, and activities 2. Environmental damage due to improper management 3. Conflict of interest	Maintenance of ecotourism and mangrove forests	Fostering collaboration between stakeholders

Source: Research Data, 2021

Based on Tables 7 and 8, the first alternative strategy priority is Weakness-Opportunities. This strategy can be applied by 1) First, opening up opportunities for investors to develop ecotourism by investing the necessary funds. This strategy is expected for ecotourism products to be more attractive for visitors [32, 33]. Investors come from foreign, domestic, and individual companies [34-36]. Currently, there is no routine budget allocated for developing public services for RMJ, SR, and TB. The majority of funds are obtained from NGOs and companies. 2) Second, improving public services provided. Through investors' participation, various facilities and infrastructure can be added, such as (a) Building eco-friendly lodging in ecotourism sites; (b) Development of mangrove education. Each ecotourism should have a special land for education on how to seed, plant, and maintain mangroves [37]; (c) Library enrichment by increasing book collection, especially on mangrove ecosystems and ecotourism [38, 39]; (d) Build canteens and souvenir shops selling food, beverages, and products typical of the tourist area [40-43]; (e) Build information facilities, such as the Mangrove Information Center in the forest park area that has exhibition halls, museums, and information rooms [44]; (f) Provision of accommodation facilities in natural tourism areas, including information services, telecommunications services, administration, transportation, money exchange, prayer rooms, health care, guard posts, watchtowers, fire hydrant systems, and cleaning services (Regulation of the Minister of Forestry Number: P.22/Menhut:II/2012). 3) Third, provide business training on ecotourism. The development of mangrove ecotourism can create new jobs, especially for local communities [41, 45]. However, qualified human resources are needed for employment to improve the economy [36, 46].

According to Law Number 9 of 1990, tourism businesses are classified into: (1) Tourism service business, consisting of travel agency, tour agent, tour guide, convention, incentive travel and exhibition, impresario, tourism consultant, and tourism information; (2) The exploitation of tourist objects and attractions are grouped into exploitation of natural objects and attractions; also cultural and particular interest; (3) The business of tourism facilities are grouped into; provision of accommodation, food and beverages, tourist transportation, water tourism facilities, and tourism areas.

Next, the second alternative strategy priority was the Weakness-Threats strategy by establishing cooperation between the government and stakeholders to gain optimal management of mangrove ecotourism [47]. The harmonization between communities, local authorities, and universities could create sustainable resources [23].

The third alternative strategy was Strengths-Opportunities, which is a strategy to increase ecotourism promotion. Promotion is crucial to do through print and social media [24]. Social media is a cheap, easy, and fast promotional medium [48]. Social media answer the challenges and opportunities to attract more audiences to promote tourism, especially social media users, which have increased significantly in this digital era. Advertisements through endorsers, influencers, and advertisers are strategies that can be chosen under several criteria, such as the level of attractiveness, credibility, and cost [47].

The fourth alternative strategy was Strengths-Threats, namely the maintenance of ecotourism and sustainable mangrove forests. For maintaining the mangrove forests, it is necessary to preserve local wisdom in the area by not doing illegal logging. According ref. [49] ecotourism has the highest potential to protect mangrove forests and the surrounding flora and fauna. Therefore, ecotourism activities should prioritize conservation. It is in line with the five basic principles of ecotourism development in Indonesia mentioned: conservation, education, tourism, economy, and local community participation.

Based on the SWOT analysis, six strategies can be applied for sustainable mangrove ecotourism. It was continued with the AHP method (A'WOT analysis) using the Expert Choice 9.0 software to strengthen the SWOT results. The priority hierarchy of mangrove ecotourism management policy strategies in the Siak Regency is presented in Table 9.

Table 9. Strategy priority hierarchy with AHP method

No	Strategy	Score
1	Opening opportunities for investors for ecotourism development	.243
2	Improving facilities and infrastructure	.194
3	Providing business training on ecotourism	.178
4	Increasing ecotourism promotion	.111
5	Establishing cooperation between government and stakeholders	.097
6	Maintaining mangrove ecosystem	.079

Source: Research Data, 2021

Based on Table 9, both SWOT and AHP results were similar, which the priority strategy was increasing investment opportunity currently, there has no routine budget allocated for developing public services for RMJ, SR, and TB. The majority of funds are obtained from NGOs and companies. Therefore, this strategy is expected to increase funding, thus the ecotourism products and services to be more attractive for visitors [50].

Ecotourism was considered as developing market because more people would visit natural habitat places.

Collaboration with local societies and authorities was a successful key factor. Moreover, applying this concept acquired good management skills and capacity to align all stakeholders and appropriate framework of law and politics to support a reliable investment environment.

In 2009, Tourism Sustainability Council was formed. It had a role as global accreditation for ecotourism programs that met standards. It was considered before that ecotourism was lag compared to other sectors in setting industry sustainability standards or certification schemes [15, 16, 23]. Mentioned several plans to spur investor opportunities to develop ecotourism, as follows: (1) By creating an attractive investment climate. To attract investors to invest their capital, it is necessary to have certainty, security, and a stable economic situation [12, 13].

(2) Simplifying procedures and providing convenience in accessing and investing their capital. (3) Expeditious service, investors could obtain information/pictures about the condition/image of the region/country regularly. (4) Supporting facilities and infrastructure, including consistent regulations guaranteeing the government's business certainty and investment security.

The second and sixth priority strategies were improving facilities and infrastructure, providing business training on

ecotourism, increasing ecotourism promotion, establishing collaboration between the government and stakeholders, and maintaining mangrove ecosystems. In the improving facilities and infrastructure policy term, education spots should be provided. It must have a special land for mangrove education on how to seed, plant, and maintain [23, 38]; it also includes a library that has a collection of mangrove ecosystems dan ecotourism books [16]. In addition, public facilities like canteen, information center, souvenir shops, telecommunications services, administration, transportation, money exchange, prayer rooms, health care, guard posts, watchtowers, fire hydrant systems, and cleaning services can be furnished [43].

The development of mangrove ecotourism can create new jobs to improve the economy, especially for local communities [32, 40]. The local people are involved in the mangrove ecotourism business are expected to advance their experience in the innovation of ecotourism services and build community participation. Therefore, it should be a business training program to improve human resources. They are trained to meet the standards as managers, instructors, and assistants, and the materials are involved operational management, foreign language (especially English), emergency and security management.

Promotion is crucial to do both through print and social media [24, 50]. Social media is a cheap, easy, and fast promotional medium [36, 44]. Social media answer the challenges and opportunities to attract more audiences to promote tourism, especially social media users, which have increased significantly in this digital era. Advertisements through endorsers, influencers, and advertisers are strategies that can be chosen under several criteria, such as the level of attractiveness, credibility, and cost [16, 24].

Cooperation between the government and stakeholders is vital for realizing sustainable mangrove ecotourism management plans [36, 39]. A common understanding must be built that consists of shared goals and a decision-making process. Even though they have different interests, both the government and stakeholders have the same goals of sustainable mangrove ecotourism and improving the welfare of local communities in the Siak Regency. Also, the decision-making is carried out through a discussion process attended by all stakeholders to consider decision-makers following the democratic principles [47, 50].

For maintaining the mangrove forests, it is necessary to preserve local wisdom in the area by not doing illegal logging. According to ref. [49] ecotourism has the highest potential to protect mangrove forests and the surrounding flora and fauna. Therefore, ecotourism activities should prioritize conservation. It is in line with the five basic principles of ecotourism development in Indonesia mentioned: Conservation, education, tourism, economy, and local community participation.

4. CONCLUSION

The six strategy policies for sustainable mangrove ecotourism management which were generated from A'WOT analysis were the following: opening opportunities for investors for ecotourism development, improving facilities and infrastructure, providing business training on ecotourism, increasing ecotourism promotion, establishing cooperation between government and stakeholders, and maintaining mangrove ecosystem. From the policies, funding was the important factor that should be realized. Further, to encourage these policies, the government and stakeholders should work together to improve the welfare of local communities in the Siak Regency and the sustainability of mangrove ecosystems.

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