



# Development of Semut Island Ecotourism in Limbungan Village, Pekanbaru City: Pentahelix Model Approach

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## ABSTRACT

The tourism sector plays a vital role in enhancing the economic growth of a community. Effective tourism development requires collaboration not only from the government but also among academics, businesses, local communities, and the media. Such collaboration fosters public awareness of the importance of tourism and helps optimize existing tourism potential. Pekanbaru City, for example, possesses significant tourism development opportunities rooted in local culture, one of which is Semut Island. However, local communities face challenges in developing ecotourism, which can hinder their economic activities. This study addresses the urgent need to explore these obstacles. The aim of this research is to analyze the collaboration among the various stakeholders in the pentahelix model as they work towards developing ecotourism at Semut Island in Limbungan Village, Pekanbaru City. This study employs qualitative methods and involves stakeholders from academia, business, local communities, government, and the media as informants. Data is collected using purposive sampling, a technique that helps researchers select informants who are relevant to the study's theme. The findings indicate that collaboration among stakeholders in the pentahelix model is functioning effectively, with each group fulfilling its respective role in developing Semut Island's ecotourism. However, there is a need for improved collaboration and coordination among these actors to ensure the ongoing success of Semut Island ecotourism and to effectively stimulate the economic growth of the local community.

*Keywords: Ecotourism development; Semut Island; Limbungan Village; Pentahelix.*

## 1. Introduction

The tourism sector is one of the largest industries in the world (Ashoer, 2021) and serves as a key driver of economic activities in various regions. This is because each region has local potential or characteristics that can create business opportunities, increase income, and expand employment opportunities. As a country with rich and diverse tourism potential, Indonesia should maximize its tourism potential as much as possible for the welfare of the people as well as to increase foreign exchange through tourism development efforts. However, not all tourism development progresses smoothly, many communities face significant obstacles and challenges. One such area

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facing difficulties is the ecotourism development of Semut Island in Limbungan Village, Pekanbaru City.

Semut Island is one of the newest tourist attractions situated along the Siak River at the Pengambang River Estuary in Limbungan Village, Rumbai Timur District, Pekanbaru City. Located within the Pengambang Creative Tourism Village area, Semut Island emphasizes environmental education and nature conservation (SelarasRiau.com, 2024). Generally, Semut Island ecotourism offers an appealing alternative for the community, as it is the only island destination close to the city center. However, it faces several challenges in its development, including inadequate infrastructure, limited accessibility, and insufficient promotion (itb-ad.ac.id, 2024). Therefore, collaboration among various stakeholders is essential, as each actor brings unique skills to enhance the development of Semut Island ecotourism. According to Government Regulation No. 50 of 2011 regarding the National Tourism Development Master Plan for 2010-2025, tourism institutions are required to foster changes aimed at achieving goals in the tourism sector. This effort involves not only the central government but also local governments, the private sector, and the community (Arrasyid, 2021).

This study will answer the question "How is the development of Semut Island ecotourism in Limbungan Village in the pentahelix model?" This study aims to analyze the development of Semut Island ecotourism through collaboration between stakeholder actors in pentahelix model. The urgency of this research is motivated by the emergence of obstacles and challenges in the development of Semut Island ecotourism which has an impact on improving the economy of the local community. The pentahelix model plays a very important role because in its implementation it does not only involve the government, but also academics, businesses, communities and media, so that it is illustrated to what extent the relationship between five stakeholders is implemented.

This research needs to be done because Semut Island ecotourism is a highly potential tourist destination in the Pekanbaru City area where its location is very strategic not far from the city center, of course it will increase the number of tourists who will visit. In the economic aspect, the existence of Semut Island ecotourism is a solution for community business development and tourism awareness groups where the largest income for tourism awareness groups reaches Rp. 7,000,000 per month. In terms of the environmental aspect, the absorption of carbon dioxide (CO<sub>2</sub>) by 1,000 mangrove plants on Semut Island in 2024 is estimated to reach 26,030 kg (Rahma, 2024). Meanwhile, in the cultural aspect, the uniqueness of Malay culture which characterizes the culture of the community in the Semut Island ecotourism area can attract the attention of tourists.

Finally, this study aims to enhance the capacity of lecturers in conducting research and publishing in national journals. It is also expected to assist researchers in developing a roadmap for their research, aligning with the criteria and objectives anticipated from the proposed research framework.

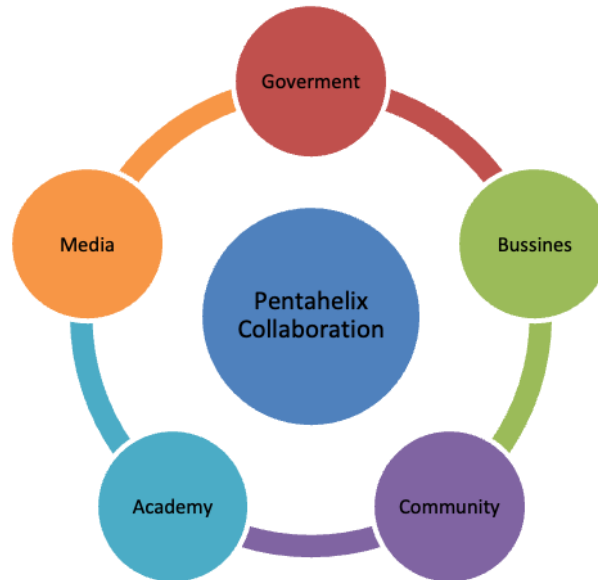
## **2. Literature Review**

The pentahelix model was first initiated by the Minister of Tourism for the 2014-2019 period, Arif Yahya, and codified in the Regulation of the Minister of Tourism of the Republic of Indonesia Number 14 of 2016 concerning Guidelines for Sustainable Tourism Destinations. This pentahelix model is an extension of the triple helix strategy, where the triple helix involves three actors in developing tourism, namely government, business and academics. While the pentahelix builds collaboration between five actors, namely government, business, academics, communities, and media in realizing tourism development in the region. The pentahelix model emphasizes the unique role of each actor so that it can overcome various existing tourism problems.

According This pentahelix model aims to create innovation in the tourism industry and motivate tourism development by increasing the role of Government, Business, Academician,

Community, and Media so that they can be well integrated and create quality activities, facilities, services, and experiences, and tourism benefits so that they can provide benefits and advantages to the environment and society (Saputra & Adiarto, 2024). By involving these five actors, it is hoped that it can accelerate the development of tourism potential in an area.

Figure 1. Pentahelix Model



Optimizing pentahelix in tourism development involves five actors, namely government, business, academics, community and media (Luceño-Sánchez, Díez-Pascual & Capilla (2019):

a. Government

The government acts as a regulator and controller, responsible for regulating business development and setting various rules. In the context of public-private partnerships, the government's role covers various aspects, from strategy formulation, implementation, monitoring, supervision, promotion, budget allocation, granting permits, to program development, legislation and knowledge transfer. Besides that, the government also has the responsibility to coordinate various stakeholders in supporting the growth of a region.

b. Academics

Academics act as designers or compilers. They are tasked with assessing potential, providing certification on various aspects, including human resource capabilities that support the development of a region's potential. Academics are also a source of knowledge, presenting ideas, theories and analyzes that are relevant to the conditions and development of the region.

c. Business

Business people act as facilitators. Their role aims to create added value and support sustainable development. Business professionals can contribute as infrastructure providers, both in the form of technology and funding. This role helps a region become more effective, efficient and productive, especially in facing developments in the digital era.

d. Communities

Community acts as a catalyst. Communities consist of individuals who have a common interest in encouraging the development of human potential and actively contribute to that progress. They facilitate the economic process by being a liaison or mediator between the various parties involved.

e. Media

Media acts as an expander. Media functions to support brand promotion and build image through various platforms. With this pentahelix concept, regional planning can be carried out in a structured manner if the actors in this model collaborate and form an integrated system.

Simultaneously, the five actors communicate with each other in building pentahelix collaboration. The government conveys regulatory information related to tourism to business groups, academics, and communities. Furthermore, the government also coordinates businesses, academics, communities and media in implementing empowerment and monitoring programs. Business groups also coordinate with the government, academics, and communities to work together in carrying out a series of training or outreach activities. Businesses also invite the media to explore various activities as a form of promotional efforts. Likewise, academics synergize with the government and businesses in implementing empowerment programs for the community. The community as a mediator that initiates communication to the government and business so that the implementation of tourism development can be realized. The media works as an actor that promotes tourism through communication with all pentahelix actors.

In line with geographical data, there is the only new island-shaped tourist attraction in Pekanbaru City, namely Semut Island. Semut Island is located on Jl. Pembina on the banks of the Siak River at the Pengambang River Estuary, Limbungan Village, Rumbai Timur District, Pekanbaru City. Semut Island is located in the Pengambang Creative Tourism Village area which offers horse riding, archery, and fishing village activities. Travel time from the city center is  $\pm$  30 minutes with a distance of 12.1 kilometers. Considering the distance and travel time, this means it is very easy to access for tourists coming from outside the area.

In its development, Semut Island has received an award from the Pekanbaru City Government and direct appreciation from the Minister of Tourism and Creative Economy, Sandiaga Uno for organizing the Riau Province Traditional Boat Racing Festival in 2023 (Mewani, 2023). The award for the development of Semut Island was also given by the Indonesia Green Awards (IGA) 2024 to PT. Pertamina which has succeeded in developing nature conservation tourism through Semut Island ecotourism program through the CSR program (Siregar, 2024).

Novelty serves to differentiate the research that will be conducted from previous research (Jeka et al., 2023). In relation to this research, there are new discoveries that can complement the results of previous writings carried out by previous researchers, namely Muthia Anggraini (2023) and Eno Suwarno (2022). Previous researchers only described the role of academics in developing Semut Island ecotourism. Substantively, this research will provide an overview of policy innovation between stakeholders in the development of the tourism sector. This pentahelix model can increase residents' awareness of the importance of collaborating in an effort to develop an area that has great potential to be developed into a tourist destination for local residents and foreign tourists, and can help improve the quality of life of the community by providing economic benefits through tourism development.

In the development of Semut Island ecotourism, integrated collaboration between parties is the key to the success of tourism development. Synergy between actors is essential in order to realize tourism development. This is in line with the Regulation of the Minister of Tourism of the Republic of Indonesia Number 14 of 2016 concerning The Sustainable Tourism Destination Guidelines state that in order for tourism to provide benefits and advantages to the community and its environment, there needs to be interconnectedness of systems, subsystems, sectors and dimensions so that an optimally integrated orchestration of the roles of business, government, community, academics and media is created, known as the pentahelix model. This article

describes the extent to which collaboration between actors has been implemented in developing Semut Island ecotourism.

### 3. Method

The research method used in this study is a qualitative method. According to Crasswell, a qualitative method is an approach that tries to explore and understand the meaning that a number or group of people consider a social or humanitarian problem. (Bakry, 2017). This method is highly appropriate for providing an in-depth analysis of the pentahelix model in the development of Semut Island ecotourism. Before interpreting the data, the researcher involves inductive data analysis questions and procedures. (Abdussamad, 2021). Researchers will collect data starting from specific things to general themes and build interpretations of meaning to the data. The approach to this research is through a descriptive approach, where researchers only focus on tracing one variable (independent variable) which will be described systematically, factually and in-depth. The independent variable to be traced is the pentahelix model in the development of Semut Island ecotourism.

This research was conducted in Limbungan Village, Pekanbaru City. The reason the author chose this location was because there were obstacles or challenges faced by the community in developing Semut Island ecotourism as an alternative choice for new tourist destinations in Pekanbaru City, on the other hand, a collaborative pattern of stakeholders has been running in developing the ecotourism together between the government, academics, business, communities, and media to synergize or collaborate in realizing the vision and mission of Pekanbaru City which is closely related to competitive and sustainable tourism based on Malay culture (*Pariwisata Provinsi Riau*, 2024).

Data or information collection in this study uses purposive sampling techniques. The use of this technique can help researchers to sort out who will be interviewed in accordance with the theme of this research (Lenaini, 2021). This is because not everyone can understand this phenomenon, especially the parties involved in the stakeholder collaboration analysis in developing Semut Island ecotourism. The references used are primary data obtained through interviews with research sources, namely government agencies, business sector representatives such as PT. Pertamina Patra Niaga, academics from Abdurrahman University, and Lancang Kuning University, communities and media representatives. The selection of informants was based on the research objective of exploring the five actors in the pentahelix model and having knowledge and information about the development of Semut Island ecotourism. Meanwhile, secondary data in this study are mainly books, journals, articles, news, and reports related to this study.

Data collection was done through observation, interviews and documentation. Direct observation with a type of passive participation was carried out in this research, namely coming to the location of the observed activities, but not participating in these activities. Obtaining additional information and confirming data was done through interviews with stakeholders. Then this research uses an interview guide in the form of a list of questions. Documentation was used by studying various documentation related to the purpose of this research.

The data will be analyzed using interactive analysis techniques developed by Miles and Hubberman. Miles and Hubberman divide several steps in this analysis that are intertwined or pursue each other, starting from data collection, data reduction, data presentation to drawing conclusions (Idrus, 2009). Data collecting is collected according to the phenomenon being studied. The achievement indicator, the researcher collects data related to the ecotourism potential of Semut Island based on the results of observations and interviews. Data reduction is present critical questions to facilitate data reduction. This means that not all data collected will be used by researcher. Researcher will only be able to reduce data if they have decided and focused on certain critical questions. The critical questions set by researcher at this stage are related to the policies of each stakeholder in developing Semut Island ecotourism through the pentahelix

model. The achievement indicator is the availability of data that has been systematically compiled. Data presentation is a presentation of information in a structured manner where researcher begin to see a picture of the conclusions (temporary findings). At this stage, researcher begin to focus on efforts to explore the findings. Researcher begin to see the realization of the pentahelix model in the development of Semut Island ecotourism. The achievement indicators are available data that has been organized into several categories. Drawing conclusions. Before researcher draw conclusions, data collection, data reduction and data presentation activities must still be carried out so that the configuration, meaning, flow, pattern and proposition of the information become clear and strong. At this stage, researcher will be able to see the conclusions (findings) convincingly. The achievement indicator is the availability of research report documents.

## 4. Results

### 4.1. Government

The government is one of the stakeholders who has regulations and responsibilities in developing Semut Island ecotourism in Limbungan Village, Pekanbaru City. In this case, Pekanbaru City Government has issued regulations on tourism in Riau Province through Pekanbaru City Regional Regulation Number 1 of 2021 concerning the Pekanbaru City Regional Tourism Development Master Plan for 2021-2036. This regulation outlines various aspects of regional tourism development, providing a framework for the sustainable development of Semut Island ecotourism.

In this regional regulation, the aspects of regional tourism development have been regulated as a guideline for the development of Semut Island ecotourism. Based on this regional regulation, Pekanbaru City Government through the Department of Culture and Tourism explores the tourism potential in Pekanbaru City. The Pekanbaru City Government sees Semut Island has a tourist attraction that if managed well, will have the potential to become a tourist destination that can increase tourist visits, both domestic and international. The Pekanbaru City Government as the main actor in implementing the policy encourages the Pekanbaru City Culture and Tourism Office to assist in the development of Semut Island ecotourism. This was emphasized by Muflihun, S.STP., M.AP (PJ Walikota Pekanbaru) who stated that he would bring in architects to organize and design Semut Island to make it even more attractive (Pekanbaru, 2023).

The Pekanbaru City Government through the Department of Culture and Tourism as the regulatory agent most responsible for implementing policies in the region has a significant role in building communication between actors who contribute to the development of Semut Island ecotourism. This is as conveyed by the Functional Officer for Tourism and Creative Economy in the field of tourism resources, Desman, ST in the following interview:

*“As an effort by the government to support the development of an ecotourism area such as Pulau Semut, we are trying to facilitate by building intense communication between parties who are helping to develop Pulau Semut ecotourism. So far, we have also invited managers from the Pulau Semut Pokdarwis to collect various aspirations, especially those related to creative ideas that support the development of Pulau Semut”. (interview: July 22, 2024)*

Tourism marketing and tourism institutions are forms of regional tourism development based on Pekanbaru City Regional Regulation Number 1 of 2021 concerning Pekanbaru City Regional Tourism Development Master Plan for 2021-2036. Both efforts to develop regional tourism were carried out by Pekanbaru City Government, involving the Department of Culture and Tourism in the context of developing Semut Island ecotourism. In terms of tourism marketing, Pekanbaru City Government promotes Semut Island through various activities such as traditional boat racing events, where these activities are also a form of government support and appreciation for the creativity of the community in managing Semut Island. Meanwhile, in terms of tourism institutions, Pekanbaru City Government has asked the community on Semut Island to create an

organizational structure so that the programs to be implemented are clearer and more focused. This is what Desman, ST said in the following interview:

*“There are many potentials on Semut Island, such as now there is horse riding, archery, a fishing village, and education on farming, namely rice fields or fields. Because for a long time the area in Limbungan Village has been the center of rice fields and fields. This will also be a tourist attraction, because it is on the banks of the Siak River. To manage Semut Island optimally, it requires organized management. We have asked the community to create an organizational structure for managing Semut Island to be clearer and more focused”.* (interview: July 22, 2024)

The Department of Culture and Tourism helps provide guidance to the community around the Pulau Semut area in implementing community empowerment programs through tourism as regulated in Pekanbaru City Regional Regulation Number 1 of 2021. In this policy, the government provides guidance to human resources to increase public awareness of the importance of maintaining and developing Pulau Semut ecotourism. For three years, the government has conducted various training and guidance specifically for the community and managers in coordination with relevant stakeholders. The monitoring and evaluation stage is also carried out in the development of Pulau Semut ecotourism by the Department of Culture and Tourism.

#### **4.2. Business**

The involvement of business entities in the development of Semut Island ecotourism is carried out by PT. Pertamina Patra Niaga Fuel Terminal Sei Siak through a Corporate Social Responsibility (CSR) program. The company wants the community to get feedback from the tanker ships that cross the Siak River as the company's main route that causes abrasion to Semut Island. The primary goal of this CSR program is to support the development of Semut Island ecotourism, which has significant potential, and to help improve the local economy. This was explained by Hanifah Aufia Rahma, the Community Development Officer at PT. Pertamina Patra Niaga Fuel Terminal Sei Siak, during an interview:

*“As we know, the potential of Semut Island in Pekanbaru City is very large. Semut Island became the first natural tourism in Pekanbaru City because it was created due to natural events such as abrasion from tanker ships, one of the tanker ships is from PT. Pertamina. Therefore, we have a social responsibility where the Siak River is the main route for tanker ships that pass through Semut Island. We want to provide feedback on the production processes, oil distribution, so that the community in the Semut Island area also benefits from Semut Island”.* (interview: July, 19 2024).

Semut Island ecotourism lasted for five years. In 2020, PT. Pertamina conducted social mapping and assessment first through FGD (Focus Group Discussion) activities together with the sub-district, Pekanbaru City Government, and all stakeholders involved to establish cooperation in efforts to develop Semut Island ecotourism. In 2021, the CSR program began with reforestation assistance in the form of planting 1,000 mangrove seedlings along the riverbank to prevent abrasion, 350 ketapang kencana seedlings along the tourist entrance road, and 1,700 fruit seedlings such as jackfruit, mangosteen, matoa, soursop and durian around the supporting area which is approximately 2 hectares support area. This greening initiative aims to enhance the beauty of the tourist entrance and provide shade, serving as a marker of the tourism area. The greening event was attended by the Deputy Mayor of Pekanbaru, Ayat Cahyadi, HSSE (Health, Safety, Security, and Environment) Supervisor Riyadiyanto, TBBM Sei Siak, Warsian SS GA, Dr. Eno Suwarno, an expert from Lancang Kuning University, and other relevant stakeholders (Pertamina, 2021). The construction of the educational pavilion is part of the CSR program initiated in 2021, which aims to provide facilities for training activities and to educate visitors about Semut Island, the Siak River, and Malay culture. In 2022, PT. Pertamina continued its CSR program by building several infrastructures, including the revitalization of an existing bridge

that did not meet standard operating procedures (SOP), extending 70 meters, as well as constructing retaining walls and gabions measuring 15x15 meters to protect the island from erosion caused by passing ships. In 2023, PT. Pertamina is focused on building additional supporting facilities, such as toilets, electricity and water installations, a wooden pier for boat docking, and stalls for small businesses or UMKM. All these facilities are designed to enhance the visitor experience. In addition to infrastructure development, the growth of Semut Island ecotourism also emphasizes improving community capabilities through various empowerment programs. PT. Pertamina conducts training sessions on various topics, including tourism management, business management, waste management, and UMKM development (Kurniawati, 2024). All assistance that has been provided by PT. Pertamina is in accordance with what was conveyed by the Community Development Officer of PT. Pertamina Patra Niaga Fuel Terminal Sei Siak, Hanifah Aufia Rahma in the following interview:

*“The CSR program in the development of Semut Island has now entered its fifth year. Starting from 2020, we did not immediately choose Semut Island, we conducted social mapping and assessment first through FGD together with the sub-district, Pekanbaru City Government, and all stakeholders involved. We attract stakeholders so that in the following year it will be easier to collaborate. Furthermore, in 2021 there was reforestation as our first step in establishing cooperation with stakeholders. Reforestation started by planting mangroves, ketapang kencana seedlings, and fruit seedlings. Furthermore, there is an educational pavilion which is indeed expected not only to be a place to sit, but also to be a means of education for Semut Island. In 2022, there was bridge revitalization, so the bridge that had been built by our community was revitalized again because it did not comply with SOP. Furthermore, there was the construction of gabion retaining walls, in the form of rocks around Semut Island, to withstand abrasion from ships as its main function. In 2023, we will build a toilet, electricity and water installations, a wooden dock for boats to dock, and an UMKM stand. In 2024, we will see that the level of human resources, education, and employment of the Limbungan Village community is still low, so changes are needed through community empowerment, namely various trainings, such as human resource training, such as tourism management, business management, waste management, and UMKM development.” (interview: July 19, 2024)*

**Figure 2.** Semut Island Ecotourism Program



Source: Researcher Documentation (2023)

In implementing its CSR program, overall, PT. Pertamina Patra Niaga collaborates with relevant stakeholders. In 2020, PT. Pertamina with government in this case the sub-district and Pekanbaru City Tourism and Culture Office have jointly identified the tourism potential on Semut Island through social mapping activities. After conducting social mapping, PT. Pertamina communicated with other stakeholders such as academics, Tourism Awareness Groups, Rumbai Bersatu Student Association, UMKM, and the mass media in order to maximize the development of Semut Island. This is what was conveyed by the Community Development Officer of PT. Pertamina Patra Niaga Fuel Terminal Sei Siak, Dwi Tya in the following interview:



*“Indeed, from the beginning, the development of Semut Island ecotourism was an initiative of the Limbungan Village community itself which was then communicated to PT. Pertamina. We cannot say that this is entirely from ourselves, but from the community and the results of collaboration between related stakeholders. The communication network was formed starting from the village, the Tourism and Culture Office, academics, pokdarwis, Himarusa, and the mass media in order to maximize the development of Semut Island. Social mapping was carried out together with the village, the Tourism and Culture Office. Various training activities involved academics, pokdarwis, Himarusa and UMKM. Then in 2023, there was a visit from AJP (Pertamina Journalism Award) which has an annual event. Every year there is a schedule of visits to each of Pertamina's CSR programs, and in 2023 it was selected in Sei Siak. Furthermore, we brought around 50 mass media to Semut Island to cover activities on Semut Island, especially the boat racing event yesterday” (interview: July 19, 2024)*

In 2024, following Focus Group Discussions (FGDs) with the Tourism and Culture Office, the Environmental Office, Basarnas, the Transportation Office, and other stakeholders, PT. Pertamina will initiate efforts to develop sustainable ecotourism on Semut Island. This development will involve the integration of tourism that connects three attractions: Semut Island, Artificial Lake, and Okura Flower Garden, utilizing boats for transportation.

Based on interviews conducted with the community in the Semut Island area, it was concluded that the community has greatly benefited from the initiatives taken by PT. Pertamina. The collaboration between PT. Pertamina, the government, and related parties has raised community awareness regarding the importance of effective cooperation among various stakeholders. The following excerpt is from an interview with the Head of Pokdarwis, Supardi:

*“Alhamdulillah, thanks to the assistance of PT. Pertamina, we can manage Semut Island as a tourist destination in Pekanbaru City. We feel very supported because, initially, we were uncertain about how to manage Semut Island” (Interview: July 19, 2024).*

According to the Head of Pokdarwis, the support and assistance from PT. Pertamina have positively impacted the local community, leading to increased community involvement in promoting Semut Island, thereby attracting more visitors. The community satisfaction index regarding the role of PT. Pertamina in developing Semut Island ecotourism is 91,2%, with the following detailed values:

**Table 1.** Public Satisfaction Index on the Role of PT. Pertamina

Aspect	Value
Planning	86,39% (A)
Funding	90,83% (A)
Accompanying	88,75% (A)
Program Implementation	91,18% (A)
Program Success	98,89% (A)

Source: PT. Pertamina Patra Niaga Fuel Terminal Sei Siak (2023)

Based on this table, the community satisfaction index towards the role of PT. Pertamina, from the planning aspect to program success in developing Semut Island ecotourism, reached an average of 91.2%. From the planning aspect, the community satisfaction index reached 86.39% due to the initial stages of developing Semut Island ecotourism, PT. Pertamina involves the community and other stakeholders. Meanwhile, from the financial aspect, the community satisfaction index was 90.83% due to the investment provided by PT. Pertamina in developing Semut Island ecotourism amounting to Rp. 84,500,000 in 2021, Rp. 140,000,000 in 2022, and Rp. 247,500,000 in 2023, bringing the total investment to Rp. 486,650,550. This amount of funding provides a benefit value for the Semut Island ecotourism program of Rp. 513,768,198 for 3 years (Rahma, 2024). During the development process, PT. Pertamina always accompanies residents to get benefits from the programs that have been implemented, so that the community satisfaction index for assistance is 88.75%, program implementation reaches 91.18% and program success is 98.89%.

### 4.3. Academics

Sustainable ecotourism development emphasizes the active role of local communities, as stated in Article 20 of the Regulation of the Minister of Home Affairs Number 33 of 2009, which outlines guidelines for ecotourism development in regions. According to this regulation, ecotourism development must empower local communities at every stage, including planning, utilization, and management. Observations in the Semut Island ecotourism area indicate that local community empowerment activities still require significant support from external parties, particularly from academics. Academics play a crucial role in providing ideas and innovations for the Semut Island area, and this support comes from teams at the Faculty of Forestry and Science and the Faculty of Engineering at Lancang Kuning University, as well as Abdurrahman University. These academic teams share their ideas and innovations through research and community service activities, which include outreach and assistance to the local community.

The academic team from the Faculty of Forestry and Science at Lancang Kuning University has identified the Semut Island ecotourism site as having great potential to become a significant natural tourism destination in Pekanbaru City. This potential is based on various factors, including geophysical features, natural resources, location, community characteristics, and cultural aspects. To enhance the ecotourism potential of Semut Island, the academic team conducts ongoing community service activities with a variety of programs. Additionally, the academic team collaborates with local government entities, non-governmental organizations (NGOs), such as the Human Initiative, and the Pekanbaru City Tourism and Culture Office to ensure that the planning and implementation of Semut Island ecotourism development aligns with the tourism policy of Pekanbaru City. This collaboration is consistent with the statement made by Dr. Eno Suwarno, Dean of the Faculty of Forestry and Science at Lancang Kuning University and head of the community service team, in the following interview:

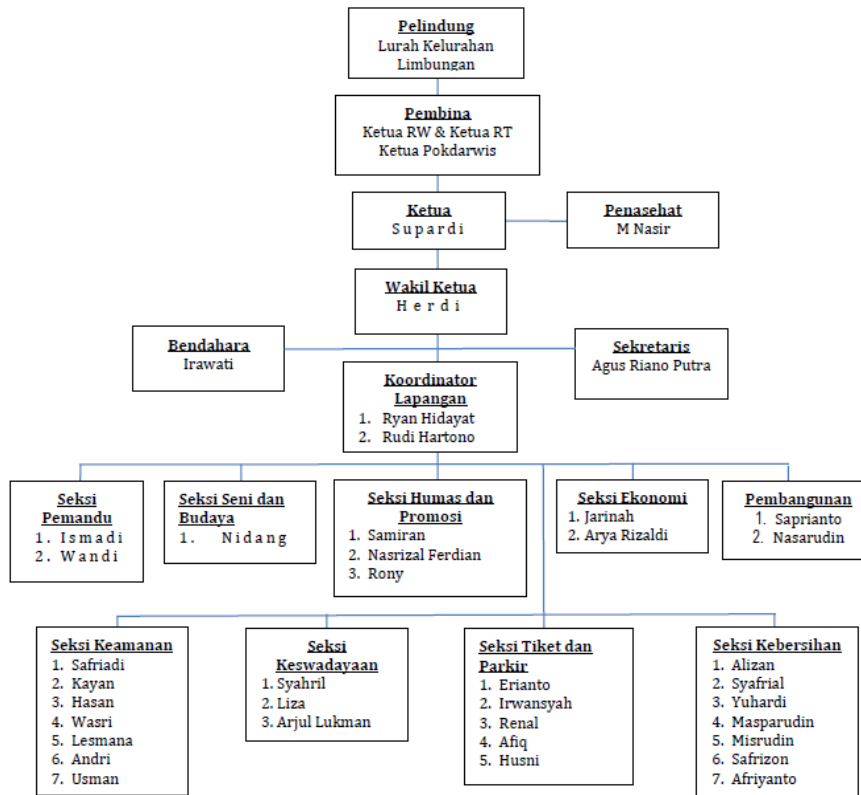
*“The Semut Island ecotourism object has great potential to be developed into one of the natural tourist destinations in Pekanbaru City. This can be seen from several aspects, especially from the geophysical aspect. The existence of Semut Island is on the edge of the Siak River, then naturally around Semut Island, there are mangrove plants. So, in a geophysical context, Semut Island can be one of the tourist attractions in the middle of the river which also has the potential to improve environmental quality by improving mangrove plants. Second, from the location side, Semut Island is relatively close to the center of Pekanbaru City. Third, from the characteristics of the community. Semut Island is more initiated by the local community, there are business and self-help activities, the community in the Semut Island environment is included in the Malay tribe, which is river-based, almost one group with Malaysia. So that there will be an integration between culture and ethnicity with the potential of natural resources. Approximately 3 years ago, at that time there was an NGO, Human Initiative came to Lancang Kuning University to invite collaboration with us. Then there was also the local government from the sub-district, and the Pekanbaru City Tourism Office” (Interview: July 15, 2024)*

Lancang Kuning University academic team collaborated with the government to create the organizational structure and institutional management of the Semut Island ecotourism object through mentoring activities for the community. The mentoring includes the preparation of the organizational structure of the Semut Island ecotourism object management through a deliberation process, where the management is filled by all active members. After the organizational structure is in place, the implementation of the duties and responsibilities of the members is in accordance with their respective fields. Then, in the mentoring activities, an institution has also been produced in the form of a draft regulation to be implemented by the Semut Island tourism awareness group which will later become the material for compiling the Articles of Association and Bylaws (Suwarno & Yanti, 2022).

Community mentoring activities carried out by Lancang Kuning University academic team continued after the formation of the Pokdarwis structure. Lancang Kuning University academic team provided counseling to the community about creating a profile of the Semut Island natural tourism object. The purpose of the counseling activity was to increase public knowledge and

understanding about how to compile natural tourism objects. The materials presented in the counseling were the definition of a tourism object profile, profile structure, profile design, profile elements, types of data and information used, profile descriptions and narratives, and the process of creating a profile. The results of this mentoring were two forms of Semut Island tourism object profiles in the form of brochures and short videos (Suwarno & Hadinoto, 2023).

Figure 6. Organizational Structure Chart of Semut Island Ecotourism Management



The next training activity was to create an ecotourism infographic of Semut Island which was carried out by Lancang Kuning University academic team through practical methods and field assistance. Infographics are an interesting information media today because they combine data with attractive designs. Due to these advantages, infographics can be developed into an information and promotion media for Semut Island ecotourism. The training activity began with the delivery of material to five Semut Island ecotourism managers in the form of understanding, benefits, types and examples of infographics, then continued with the practice of making infographics (Ikhsani, 2024). In general, this training has successfully trained managers to produce infographics about Semut Island ecotourism in accordance with the knowledge provided by academic team. Close collaboration between managers and Lancang Kuning University academic team is expected to provide sustainable contributions to the development of Semut Island ecotourism.

In 2021, Lancang Kuning University academic team with PT. Pertamina Patra Niaga provided assistance in planting 1000 mangrove trees on the riverbank, 350 ketapang kencana seedlings, and 1700 fruit seedlings on land. All types of plants planted on land mostly grew, but the types of mangroves planted on the riverbank eventually died. Therefore, Lancang Kuning University academic team took the initiative to conduct counseling on the preparation of procedures for making mangrove reforestation plans. Counseling was carried out through presentations and discussions. The materials presented were the urgency and systematics of plan documents, types of mangrove plants, the characteristics and suitability of their growing locations, methods for procuring or propagating mangrove seedlings, nursery planning, and

reforestation spatial plans. One year after providing assistance, Lancang Kuning University academic team collaborated with students from IAI DINIYAH, and Pekanbaru City Tourism and Culture Office, as well as the Pokdarwis Semut Island to carry out activities to plant more than 100 mangrove seedlings and other local tree species along the coast of Semut Island (Suwarno & Azwin, 2024). The goal is to preserve nature and protect coastal ecosystems from abrasion and restore the lives of threatened aquatic biota. Lancang Kuning University academic team also conducted monitoring through several visits to Semut Island to see its development.

Figure 7. Infographic Results of Partner Work



The mentoring activities by Lancang Kuning University academic team are still ongoing. In 2023, Lancang Kuning University academic team will provide assistance in creating an ecotourism map of Semut Island. In the early stages of the activity, the academic team conducted a direct survey to identify the ecotourism potential of Semut Island. After recording the potential designed in the form of a grand design, the academic team provided assistance in making a map using the sketchup technique. The purpose of making this map is to make it easier for tourists to access information and tourism potential in the Semut Island ecotourism (Muthia Angraini, 2023).

Not only the academic team from Lancang Kuning University who are actors in the development of Semut Island ecotourism, but the academic team and students from Abdurrab University also provide guidance to the community in the Semut Island environment. The guidance activities carried out are the development of Micro, Small and Medium Enterprises, one of which is the development of Rasau Fish Meatballs which have become a characteristic of

Semut Island food. The sale of Rasau Fish Meatballs can help improve the family economy. Meanwhile, the proceeds from the sale are mainly spent for operational cash for ecotourism management and the rest is divided according to the number of workers who participate in managing the meatballs (Alin Indra Jaya, 2023).

Figure 8. Semut Island Tourist Map Sign



Source: Eno Suwarno (2023)

#### 4.4. Community

Another important actor in the development of Semut Island ecotourism is the local community. The initiative to utilize the island-shaped land, formed due to the erosion of the Siak River, originated from the local community's recognition of its potential as a tourist attraction. They realized that with proper development, the unique characteristics of Semut Island could attract visitors. To actively participate in this development, the community established a tourism awareness group (Pokdarwis) dedicated to Semut Island. Currently, the Semut Island Pokdarwis has 35 members whose primary responsibilities include managing and maintaining the island. The Head of Pokdarwis Semut Island, Supardi, expressed this in a recent interview:

*“Previously, Semut Island was connected to the mainland, but after the abrasion of the Siak River, it looked like an island or a lump of land. Because the model was interesting and unique, based on the idea of RW, Herdianto, we agreed to make the island a tourist attraction. If it were to become a tourist attraction, it would not be enough for just a few people to manage the Semut island, many parties would be involved in controlling and maintaining the ant island, such as sweeping up garbage scattered on the road, around Semut Island, of course requiring regular mutual cooperation activities. On that basis, we formed a community, namely the Semut Island tourism awareness group (pokdarwis). Until now, there are 35 people” (interview: July 12, 2024)*

Pokdarwis plays a crucial role in raising public awareness about the importance of tourism development for enhancing community economic activities. In the development of Semut Island ecotourism, Pokdarwis emphasizes to the community that their involvement is vital for accelerating this development. Additionally, Pokdarwis encourages the community to participate in managing Semut Island as a tourist destination.

In an interview with Supardi, the Head of Pokdarwis Semut Island, it was revealed that while the community is actively working on developing ecotourism on Semut Island, they face challenges such as limited funding and inadequate infrastructure. Nevertheless, they are committed to continuing their efforts by involving other stakeholders. To this end, they prepared a proposal, signed by both the village and sub-district authorities, and submitted it to PT. Pertamina Patra Niaga to seek collaboration for the development of Semut Island ecotourism.

PT. Pertamina Patra Niaga responded positively to the proposal from the Semut Island Pokdarwis, agreeing to support the initiative through its Corporate Social Responsibility (CSR) program. Supardi shared the following in the interview:

*“Yes, the idea to make Semut Island a tourist spot came from RW. We agreed, but we were concerned about how to fund the necessary infrastructure development, as personal funds or donations from the local community would not be sufficient. So, we decided to prepare a proposal, which was signed by the sub-district and district, and submitted it to PT. Pertamina. Alhamdulillah, our proposal was accepted by PT. Pertamina after about a month. We were contacted by a representative named Rasyid from the Human Initiative, who informed us that PT. Pertamina had accepted our proposal and wanted to be a sponsor” (interview: July 12, 2024).*

Explained by the Communication, Relations, & CSR Regional Sumbagut Unit Manager, Taufikurachman, PT. Pertamina Fuel Terminal (FT) Sei Siak greatly appreciates the enthusiasm of residents who have participated in supporting the development of Semut Island ecotourism. He hopes that in the future, Semut Island can become an ecotourism pioneer that can be enjoyed by the community and tourists (Pertamina, 2021). This demonstrates that PT. Pertamina fully supports and shows a strong commitment to enhancing efforts to develop Semut Island ecotourism. PT. Pertamina further explained that in implementing its CSR program, Pertamina Patra Niaga collaborates with local governments, academics, and other relevant stakeholders to assist the community. This aligns with the expectations of Pokdarwis, who have expressed the need for support from the government and other parties to assist in managing Semut Island ecotourism. As stated by Supardi, the Head of Pokdarwis Semut Island:

*“We understand that managing a tourist destination is not easy. While we have the capability to manage it, the involvement and collaboration of other parties are essential. Therefore, at the beginning of Semut Island’s development, we hope the government and other stakeholders can provide support and assistance to strengthen the institutional management of Semut Island” (interview: July 12, 2024).*

In general, the role of Pokdarwis can be observed in three stages: planning, implementation, and supervision. In the planning stage, the community members who are part of Pokdarwis actively participate in meetings with other stakeholders to discuss the development of Semut Island ecotourism and to establish the Pokdarwis organization. During the implementation stage, Pokdarwis engages in various training, counseling, and mentoring activities organized by different parties, while also managing the Semut Island ecotourism site. In the supervision stage, Pokdarwis conducts monitoring efforts to improve the development of Semut Island ecotourism, taking into account suggestions and feedback from various stakeholders.

#### **4.5. Media**

One of the stakeholders involved in the efforts to develop tourism in the pentahelix is the mass media. The mass media acts as an expender, namely as a provider of external information (Putri Rizkiyah, Liyushiana, 2019). With the increasing development of Semut Island ecotourism, it encourages actors involved in ecotourism development to be able to provide extensive information that is easily accessible to the public so as to attract the interest of both local and foreign tourists. Based on an interview with local media Riau Television, Zidan al-Azhar concluded that there was a collaboration between PT. Pertamina and Riau Television where PT. Pertamina invited Riau Television to explore the ecotourism potential of Semut Island and help spread information to the entire community. Here is an excerpt from the interview:

*“Our arrival at Semut Island at that time was invited by PT. Pertamina in 2023. So we didn't go there directly. Previously there was communication between PT. Pertamina and us. This clearly shows that there is a collaboration between PT. Pertamina and us in developing Semut Island ecotourism. There are many media that were invited and involved in the collaboration with PT. Pertamina” (interview: July 24, 2024).*

The involvement of the mass media in disseminating information about Semut Island ecotourism is quite large. The media that have disseminated information include radio channels such as Radio Republik Indonesia (RRI), digital platforms such as *tribunpekanbaru.com*, *citizen.riau24.com*, *riaupos.com* to television such as Riau Television (RTV). Three media disseminate information about the appeal of Semut Island ecotourism to be used as an alternative tourist destination for outdoor tourism lovers.

In addition to being an expender, mass media also plays an important role as a means of promotion and socialization. A tourist destination will not develop and progress if it is not supported by massive promotional and socialization activities. Since Pulau Semut is currently developing in Pekanbaru City, the manager of Pulau Semut utilizes social media such as Instagram as a tool to promote the advantages or potential of Pulau Semut ecotourism. In addition to the manager, many people use Semut Island as an object for taking photos or videos to be used as content on social media.

Figure 9. Semut Island Instagram

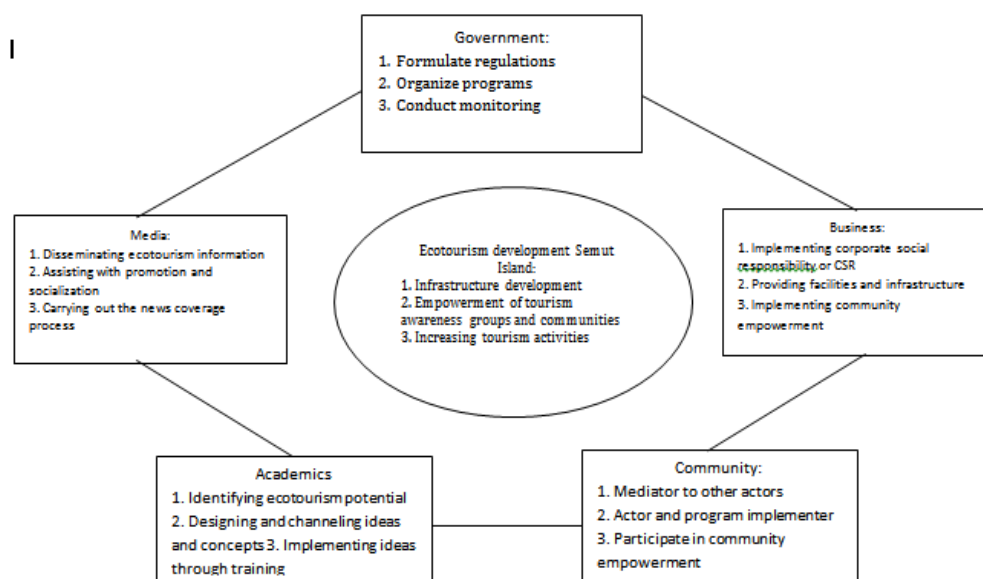


Source: Instagram (2024)

The promotion of Semut Island's potential has also been covered on official websites such as those of the Riau Provincial Tourism Office, Lancang Kuning University, the Indonesian Ministry of Finance, and PT. Pertamina. These websites feature news highlighting Semut Island ecotourism as a promising tourist destination in Pekanbaru City. The active engagement of these websites in showcasing Semut Island is further supported by various social media platforms, where visitors also contribute to promoting the island's ecotourism potential.

## 5. Discussion

Based on the description of each actor in the Pentahelix model for the development of Semut Island ecotourism, the following scheme illustrates their roles:

**Figure 10.** Semut Island Ecotourism Development Scheme in the Pentahelix Model

The collaboration among Pentahelix actors in developing Semut Island ecotourism has been successful. The five stakeholders, government, business, community, academics, and media communicate with one another to realize the Pentahelix model in developing Semut Island ecotourism. Each stakeholder, government, business, community, academics, and media has distinct roles in enhancing the potential of Semut Island. The government, which includes both local (provincial and city) and village authorities, serves as the regulatory body, creating tourism policies and overseeing programs and monitoring activities. Businesses, such as PT. Pertamina Patra Niaga Fuel Terminal Sei Siak, participate through corporate social responsibility initiatives and the implementation of empowerment programs. The community consists of local residents who actively engage as participants in various programs supported by the government, businesses, academics, and media. Academics contribute by mapping the potential of Semut Island and organizing training and counseling sessions that support the successful development of the area. Finally, the media plays a crucial role in promoting Semut Island ecotourism by disseminating information and maximizing promotional efforts.

## 6. Conclusions

Semut Island Ecotourism in Limbungan Village, Pekanbaru City has been successfully developed through the implementation of the pentahelix model. The collaboration and cooperation among government, businesses, communities, academics, and media have been well-established according to their roles. To maximize the potential and sustainability of Semut Island ecotourism, it is necessary to strengthen pentahelix collaboration, namely holding regular meetings between all pentahelix actors to evaluate developments, share information and plan next steps. The most important thing, the involvement of local communities is highly prioritized because the economic benefits of ecotourism were felt equally by all local communities.

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## 9. Conflicts of Interest

The authors declare no conflict of interest

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