

# Potential for eco-enzyme development as entrepreneurship in river ecotourism and mangrove conservation

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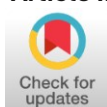
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### Abstract:

The development of tourism in Indonesia is currently experiencing rapid progress with the advancement of digital technology. The tourism sector is one of the factors that contributes greatly to the Indonesian economy. The biodiversity in Indonesia makes the tourism potential in Indonesia a source of pride, which is expected to become a more environmentally friendly tourism development. This study aims to determine the potential for eco-enzyme entrepreneurship in the Tegalsari Maritime Tourism Village by implementing ecotourism development and preservation strategies in Indonesia. Therefore, by doing entrepreneurship, it can improve the economy in the Tegalsari Maritime Tourism Village by making environmentally friendly superior products, one of which is eco-enzymes. This study is a qualitative research based on descriptive by analyzing the potential of entrepreneurship in the Tegalsari Maritim Tourism Village. This qualitative method based on descriptive is a type of research that describes in detail related to entrepreneurship studies in line with the aim of implementing ecotourism strategies. Based on the analysis conducted in this study, it can be concluded that the mangrove forest area in the Tegalsari Maritim Tourism Village has great potential to be used as a leading tourist destination in Malang Regency

**Keyword:** Ecotourism, Eco-enzyme, Entrepreneurship



## INTRODUCTION

The development of tourism in Indonesia is currently experiencing rapid progress with the advancement of digital technology. The tourism sector is one of the factors that contributes greatly to the Indonesian economy. The biodiversity in Indonesia makes the tourism potential in Indonesia a source of pride, which is expected to become a more environmentally friendly tourism development (Aliansyah & Hermawan, 2019). The beauty of natural and cultural diversity is of high value in the ecotourism market, the natural beauty of flora, fauna, and natural conditions that are still natural and beautiful (Dadi, 2022). Indonesia's cultural diversity can be in the form of diversity of art, language,

religion, traditional clothing, knowledge, to communities from community organizations to advance the Indonesian economy by growing tourism (Mulyani et al., 2021; Stronza et al., 2019).

The average growth of ecotourism in Indonesia is 10% per year. This figure is higher than the annual growth of tourism in general, which is 4.6% per year (Nurzaman, 2018). Ecotourism is a specific form of tourism, namely ecotourism that creates environmental conservation, environmental education, local welfare, and respects local culture. This ecotourism is starting to be in great demand by tourists because it is not just about playing, but it is necessary to learn insight into education and ethnology in maintaining the ecotourism environment by respecting local culture. Regulation of the Minister of Home Affairs Number 33 of 2009 concerning ecotourism is a potential natural resource, environment, to the uniqueness of nature and culture which is one of the leading sectors of the region that has not been optimally developed (Wungo, 2020). The development of ecotourism in this optimal area is a strategy for planning, utilization, control, strengthening institutions, and empowering communities with social, economic, ecological, cultural, and other sectors (Raymondus et al., 2024). The pandemic period also caused a decrease in the number of tourists in restrictions to maintain distance and recommendations to stay home (Wulandari et al., 2022; Harjanto et al., 2021).

Tegalsari Maritim Tourism Village is one of the tourism villages located in Malang Regency. This village is identical with its waste management in processing by its own residents. Seeing this potential, the Malang Regency Government is also interested in participating in developing the Tegalsari Maritim Tourism Village into a tourist attraction. This area has been supported by the Malang Regency Government to help manage and sort waste to be converted into something more useful, such as sorting organic and inorganic waste, composting, cultivating mangroves as waste decomposers, and making crafts from recycled waste. TPS 3R is a means of waste management based on the 3R concept, namely reduce, reuse, recycle by prioritizing the reduction of waste piles, reusing waste, and recycling waste. Waste that has been sorted according to type, namely organic and inorganic waste, is easier to reuse, such as inorganic waste which is used as Ecoprint and Ecobrick, while organic waste can be reused into Eco-enzyme.

Before the Covid-19 pandemic, the Tegalsari Maritim Tourism Village also had a Mangrove Planting activity. However, after the pandemic, the activity was closed with the management of TPS 3R. Tegalsari Maritim Tourism Village as a destination that prioritizes natural beauty and environmental sustainability with several aspects that must be considered in tourism activities before operating, such as cleanliness and sanitation. Not only focusing on the Tourism sector, cleanliness and sanitation are very important so that they do not have a negative impact on other sectors. However, in the Tourism sector, cleanliness and sanitation certainly consider public health which needs to be considered in the environment as the main attraction in managing waste properly by processing it into eco-enzymes (Suprayogi et al., 2022).

Eco-enzyme is an environmentally friendly product made from fruit peels, vegetables, or sugar which is fermented with the addition of water as a solvent and left for 3 months to be used as a cleaner, to control pests, improve soil, save water, and to make liquid organic fertilizer in order to reduce waste in the Tegalsari Maritim Tourism Village (Budiyanto et al., 2022). Eco-enzyme is a liquid extract produced from the

fermentation of vegetable and fruit waste with brown sugar or molasses substrate. Eco-enzyme also has various benefits, especially in making organic fertilizers. Eco-enzyme can also be an alternative material to replace chemicals that are harmful to the environment and human health. The raw materials for this eco-enzyme come from organic materials that are no longer used until they become waste that cannot be used. Organic materials that are usually found are fruit peels or vegetable waste which are the main raw materials in making eco-enzyme (Nurhamidah et al., 2021; Septiani et al., 2021).

The principle of the eco-enzyme manufacturing process itself is actually similar to the compost manufacturing process, but water is added as a growth medium so that the final product obtained is a liquid that is preferred because it is easier to use and has many benefits (Luthfiyyah et al., 2010). The specialty of eco-enzyme compared to composting is that it does not require a large area for the fermentation process like in the compost manufacturing process, and this product does not even require a composter tank with certain specifications. The only storage place needed is plastic packaging and has a lid that is still tight (Hasanah et al., 2022).

Eco-enzyme has multiple benefits. Then, by utilizing organic waste as its raw material, it is then mixed with sugar and water, the fermentation process produces O<sub>3</sub> gas (ozone), and the end result is an environmentally friendly cleaning fluid and fertilizer (Megah et al., 2018). The principle of the eco-enzyme manufacturing process is actually similar to the compost manufacturing process, but water is added as a growth medium so that the final product obtained is a liquid that is preferred because it is easier to use (Astra et al., 2021).

This study discusses the study of the potential for entrepreneurship in the Tegalsari Maritime Tourism Village in producing eco-enzymes which have many benefits for accelerating mangrove planting by providing liquid organic fertilizers, entrepreneurship by producing products for cleaning river water, to supporting the preservation of the ecotourism concept by helping to maintain the beauty of nature. Because the Tegalsari Maritime Tourism Village is a tourism with high-quality services while still maintaining the uniqueness of nature, social, culture, and its people to provide a high-value experience by paying attention to the concept of environmental conservation (Wulung, 2020).

The potential for mangrove ecotourism in Tegalsari Marine Tourism Village, Malang Regency is very large in analyzing mangrove resources with a sustainable mangrove ecotourism development strategy viewed from an entrepreneurial perspective. This study aims to determine the potential for eco-enzyme entrepreneurship in the Tegalsari Maritime Tourism Village by implementing ecotourism development and preservation strategies in Indonesia. Therefore, by doing entrepreneurship, it can improve the economy in the Tegalsari Maritime Tourism Village by making environmentally friendly superior products, one of which is eco-enzymes.

Tourism is a travel activity carried out temporarily from the place of origin to a certain destination with the aim of seeking entertainment, pleasure, and not to settle or find work. According to Law No. 9 of 1990 concerning Tourism, this tourism covers all matters relating to tourism management, tourism travel, and tourist attractions for all related businesses in the sector, one of which is the entrepreneurship and economic sectors. This tourism has an important role in expanding business opportunities and

employment by encouraging development in various regions in increasing national income in improving the welfare and prosperity of the surrounding community.

The tourism sector also builds a sense of love for the country, maximizes the potential of national culture, and strengthens the identity of a nation itself, so that infrastructure development is needed to preserve tourism with government cooperation in building facilities and access to these tourist attractions. Tourism can also improve an economy, both MSMEs and nationally by fostering an entrepreneurial spirit around (Damanik & Weber, 2006; Dian et al., 2024).

Ecotourism is a type of tourist trip in visiting a natural or cultural environment, either directly from nature or artificial with the aim of providing information and involving tourist participation in maintaining the preservation and sustainability of nature. Ecotourism also focuses on the sustainability of nature by involving socio-cultural life. The concept of ecotourism also focuses on 3 main aspects, namely nature conservation, creation of economic benefits, to appropriate integration in psychology for community life. Ecotourism is one form of alternative tourism whose goal is to build sustainable tourism. This includes tourism development that provides ecological benefits that are economically, socially, and normatively feasible for the local community.

One form of ecotourism that has great potential in preserving the environment, such as mangrove ecotourism. Mangroves are an attractive target in developing ecotourism due to the uniqueness of the conditions and models of the area that can be used as tourist destinations. Ecotourism also continues to pay attention to the authenticity of the mangrove forest ecosystem in the organisms that live in it. Mangrove forests are part of a tropical coastal community that can be dominated by several types of shrubs that can grow in salt waters (Nybakken, 1992).

Ecotourism is also a travel package that aims to enjoy the beauty of the environment without damaging the existing forest ecosystem. Mangrove ecotourism focuses on areas that are specifically maintained for tourism purposes. This mangrove forest area is located at the mouth of a river or estuary which plays a role in its own uniqueness in a unique and specific ecosystem in tropical and subtropical areas. Mangrove ecotourism also includes all the characteristics of organisms that live and socialize or work together to maintain the environment. The potential for ecotourism includes all objects, be it natural, cultural, or artificial aspects which of course are of special concern to the government in order to become a tourist attraction (Damanik and Weber, 2006).

Ecotourism is also a popular choice in promoting a unique and preserved environment to make an attractive tourist destination. Mangrove plants also have great potential in the development of ecotourism for the uniqueness of the conditions and models of areas that can be developed as tourist facilities while still paying attention to areas that can be developed as tourist facilities while still paying attention to the sustainability of forests and organisms that live in them. Several environmental parameters that are potential in the development of mangrove ecotourism with the density of mangrove species, mangrove thickness, and biota diversity in the mangrove ecosystem (Maulidiya and Hayati, 2020; Pandani, 2020).

Development refers to the process, method, or result that is attempted to improve from something to a positive direction with its desires. In Law No. 10 of 2009 Articles 6 and 7 concerning tourism development with tourism development must also consider

the diversity, uniqueness, and distinctiveness of culture and nature, so that human needs for tourism (Article 6). Tourism development includes the tourism industry, tourist destinations, marketing, and tourism institutions (Article 7). According to Sunaryo, (2013) regarding tourism development while still paying attention to the following main components:

1. Objects and attractions that focus on natural, cultural, or artificial wealth including special interest activities such as certain events.
2. Accessibility involving transportation systems, such as routes, terminals, airports, ports, and other modes of transportation.
3. Amenities that include tourism support facilities such as accommodation, restaurants, souvenir shops, entrepreneurship, and tourist information centers.
4. Supporting facilities such as banks and hospitals used by tourists.
5. Institutions that include the involvement and role of all parties involved in supporting tourism activities including local communities as hosts.

Definition of the principle of ecotourism by having a significant impact on tourists with travel service providers. Tourists are expected to not only have environmental awareness with high socio-cultural sensitivity by being able to apply it directly in the tourism activity. The environment also includes the empathy of tourists who encourage them to be willing to spend additional costs by supporting nature conservation (Wijaya et al., 2023; Wijaya et al., 2024). Therefore, ecotourism development is needed in the environment to maintain sustainability or through development to help maintain the environment around ecotourism.

The approach of local community participation and empowerment in ecotourism development must produce a strong anticipation pattern with the community. Ecotourism also involves local community participation from the early stages of planning, allowing them to contribute with different ideas and expectations by creating a planning approach that is oriented towards participation. A sustainable approach by emphasizing stakeholders in ecotourism development to maintain self-control by considering the benefits of nature and environmental conservation, as well as maintaining cultural balance. This aims to provide a positive impact holistically at the local, regional, national, and international levels including local indigenous communities (Berkes, 2021; Adom, 2019; Wijaya et al., 2023).

Next to SWOT analysis is a systematic identification of factors used in formulating company and community strategies (Wijaya et al., 2023). According to Dian et al., (2024) explains SWOT analysis as an effort to identify strengths, weaknesses, opportunities, and threats that affect the performance of companies and communities. According to Wijaya et al., (2024) regarding SWOT analysis, this is also an approach that provides direction without providing direct solutions to problems. Based on this definition, it can be concluded that this SWOT analysis is certainly an instrument that includes strengths, weaknesses, opportunities, and threats that can be important directions in determining the performance of company managers to be used to formulate company strategies. In this study, data analysis was carried out by applying SWOT analysis.

The approach that is usually used is an internal factor of weaknesses and strengths of the study area through the IFE (Internal Factor Evaluation) matrix analysis, and external factors in opportunities and threats with the EFE (External Factor Evaluation) matrix analysis. Thus, identifying points from the results of the IFE and EFE

matrices is carried out with a SWOT analysis in formulating recommendations related to research objectives.

## **RESEARCH METHOD**

This study is a qualitative research based on descriptive by analyzing the potential of entrepreneurship in the Tegalsari Maritim Tourism Village. This qualitative method based on descriptive is a type of research that describes in detail related to entrepreneurship studies in line with the aim of implementing ecotourism strategies in the development and preservation of the environment in Indonesia. The data sources in this study are previous research studies that are relevant to ecotourism strategies in entrepreneurship as the development and preservation of ecotourism in Malang Regency, Indonesia. The data collection technique in this study is the technique of reading sources that are relevant to the discussion of the research by determining the data to be entered.

The data analysis technique in this study uses a SWOT analysis related to ecotourism strategies in advancing entrepreneurship as the development and preservation of the environment in Malang Regency, Indonesia. The aim of this method is to present a systematic, factual and accurate description of several facts related to the object being studied with the relationship between the object and the variables being studied (Rungkuti, 2015; Risky, 2022; Sitorus et al., 2022). The data collection method in this study, namely literature study and field observation. Literature study was conducted by examining policies related to mangrove conservation with previous studies related to the concept of mangrove ecotourism (Kunjuraman et al., 2022).

Meanwhile, field observation was conducted to identify actual conditions related to the concept of mangrove tourism development. This data collection technique is used to strengthen the research results. After the data is collected, a discussion is carried out to determine internal and external factors related to the management of the mangrove area. Analysis of tourism planning strategies by evaluating assessment factors by selecting alternatives in strategic priorities using SWOT analysis. This analysis compares several external factors (opportunities and threats) with internal factors (strengths and weaknesses) (Huda, 2008; Kunjuraman et al., 2022; Moleong, 2011). The next step is to compare the internal and external conditions presented in the SWOT matrix to describe the relationship between the two.

## **RESULT AND DISCUSSION**

### **Ecotourism Potential in Tegalsari Maritime Tourism Village**

Tegalsari Maritime Tourism Village is the concern of the Malang Regency Government in developing village tourism in Bajulmati Village, Sidodadi Village, Gedangan District, Malang Regency. Tegalsari Maritime Tourism Village is also a tourist destination for tourists as an educational tourist spot about river tracing with a combination of conservation from planting mangrove plants in maintaining river sedimentation by helping to preserve the environment. After that, Tegalsari Maritime Tourism Village is classified as a tourism that still maintains the sustainability of nature with a beautiful, cool, and comfortable village atmosphere for local and foreign tourists to visit the tour, so that quality tour guides are needed to introduce activities in planting

mangrove plants around the river (Mejjad et al., 2022; Masud et al., 2017; Arsalan et al., 2018; Aneseyee et al., 2022; Risky, 2022; Aquino, 2022; Habibi et al., 2018).

Some of the potentials obtained from Tegalsari Maritime Tourism Village in implementing ecotourism-based tourism are by increasing the economy around Tegalsari Maritime Tourism Village with the concept of a green economy in caring for, maintaining, and preserving the environment. By implementing this concept, it will attract foreign tourists to visit the Tegalsari Maritim Tourism Village in improving the economy and entrepreneurship in the area. Tegalsari Maritim Tourism Village can also be accessed by land transportation via Turen to Sitiardjo. The highway facilities are quite good to access by making improvements and have been inaugurated by the Regent of Malang in 2023. Visitors can use two-wheeled and four-wheeled vehicles (Wungo et al., 2020).

However, until now there is still no access to city transportation buses to the location. The only means of transportation that can be accessed are motorbikes, motorized pedicabs, and four-wheeled vehicles in the tourist area. However, for visitors who drive four-wheeled motorized vehicles, the parking location is still inadequate until now (Benjamin et al., 2020). Thus, the government is needed to build transportation access to create a safe and comfortable tourist area for visitors, considering that visitors who come are also increasingly crowded to see the natural beauty by planting mangrove trees in the Tegalsari Maritim Tourism Village (Habibi et al., 2018; Sitorus et al., 2022; Carbone et al., 2020; Hultma et al., 2021; KC et al., 2021; Wulung et al., 2020; Kia, 2021). Eco-enzyme production in Tegalsari Maritim Tourism Village plays an important role in river ecotourism with mangrove conservation to create a sustainable approach with an environmentally friendly concept with waste management and ecological preservation. The contributions to both areas are as follows:

1. River Ecotourism; Improving air quality is the role of eco-enzyme in decomposing organic waste by neutralizing chemical waste that can pollute river water quality. Eco-enzyme can also clean river water from processed organic waste, so that the river can be well maintained to attract tourists in an effort to support a healthier ecosystem by improving the overall ecotourism experience. The involvement of local communities in producing eco-enzymes can also foster a sense of responsibility, both organic waste produced by Tegalsari Maritim Tourism Village into environmentally friendly products to keep the river clean.
2. Mangrove Conservation; Eco-enzyme production can also utilize organic waste materials by reducing the amount of waste around Tegalsari Maritim Tourism Village. In addition, the application of eco-enzymes can also help reduce soil and air pollution, create a better environment for mangroves to grow by supporting biodiversity and protecting the coastline from erosion. The production of eco-enzymes can also be an educational program for the importance of mangrove ecosystems with sustainable practices, because eco-enzymes can also be an effective fertilizer for mangrove plants.

### **SWOT Analysis Results**

From the results of the discussion related to natural conditions, population, to several policies related to mangrove ecotourism in the Tegalsari Maritim Tourism Village follows:

1. Strength

The Tegalsari Maritim Tourism Village community is distinguished by its unique and vibrant culture, deeply rooted in the traditions of fishing, mangrove planting, and crafting with natural materials, particularly those derived from the abundant mangrove trees in the area. This rich cultural heritage serves as a significant draw for tourists, offering them a glimpse into the local way of life and the community's creative use of natural resources. The presence of such local wisdom and cultural practices plays a crucial role in fostering public awareness about the importance of preserving mangrove ecosystems.

The mangrove plants in Tegalsari Maritim Tourism Village are notable for their density and healthy growth, contributing significantly to the environment by preventing coastal erosion and flooding, as well as regulating the local climate. These mangroves have the remarkable ability to store and absorb four to five times more carbon than tropical forests on the mainland, underscoring their vital role in climate change mitigation. Environmental studies conducted in the area highlight the mangroves' effectiveness in water and climate regulation, further emphasizing their ecological importance. Additionally, access to the village's tourist attractions is relatively well-developed, making it easier for visitors to explore the area and its offerings. The village also provides ample opportunities for entrepreneurship, particularly through eco-friendly ventures such as eco-enzymes, which not only boost the local economy but also enhance environmental quality.

2. Weakness

The Tegalsari Maritim Tourism Village faces several significant challenges that hinder the optimal development of its tourism potential. One of the primary issues is that land ownership in the tourist areas is predominantly in the hands of business entities or individuals, which can create barriers to equitable and sustainable tourism development. Furthermore, there is a notable lack of awareness among some members of the community regarding the critical role of the mangrove ecosystem, leading to underappreciation and, at times, the conversion of these vital areas for other uses. This deficiency in knowledge extends to a general lack of environmental awareness, particularly in relation to sustainable tourism practices. Such gaps in understanding contribute to a broader issue of insufficient public engagement in environmental preservation efforts.

Additionally, there are existing conflicts or differences in perspective between the local community and other stakeholders, which pose significant obstacles to the successful implementation of sustainable mangrove ecotourism strategies. Another pressing concern is that the mangrove forest within the Tegalsari Maritim Tourism Village has not been managed optimally, limiting its potential to support ecotourism activities effectively. This underutilization hampers the village's ability to fully capitalize on its natural resources for tourism purposes. Moreover, the concept of eco-enzyme entrepreneurship remains largely unfamiliar to the local residents, indicating a need for comprehensive socialization and assistance programs. These initiatives would be crucial in educating the community about the benefits of utilizing organic waste for environmental cleanliness, thereby fostering a more sustainable and economically beneficial approach to local development.



### 3. Opportunity

The Tegalsari Maritim Tourism Village presents a multitude of opportunities that can significantly boost its appeal and sustainability. One of the primary opportunities lies in the strong desire of both the local community and tourists to engage deeply with the culture of the surrounding area. This cultural curiosity offers a unique selling point for the village, especially as more people are increasingly seeking tourism experiences that prioritize recreation and cultural immersion. Furthermore, the support from government policies aimed at the development of sustainable ecotourism acts as a substantial catalyst for growth in this sector. These policies not only encourage the protection of natural resources but also promote sustainable practices that align with the long-term goals of the community.

A specific opportunity arises from the potential to designate the mangrove ecosystem within the village as a protected area in the regional spatial plan. The unique presence of this mangrove ecosystem, which is exclusive to the Tegalsari Maritim Tourism Village within Malang Regency, positions the area as a leader in the development of mangrove ecotourism, with no direct competitors. Additionally, the central government's recommendation to the regional government to include programs focused on the protection and management of mangrove ecosystems in the Regional Medium-Term Development Plan (RPJMD) further underscores the strategic importance of this natural asset. This alignment of local interests, government support, and unique ecological features presents a significant opportunity for the village to establish itself as a premier destination for sustainable ecotourism, particularly in the niche area of mangrove conservation.

### 4. Threats

The Tegalsari Maritim Tourism Village faces numerous threats that jeopardize the sustainability of its mangrove ecosystems and overall development. Key among these is environmental degradation, exacerbated by the over-exploitation of natural resources, which continues to threaten the delicate balance of the area's ecological systems. Furthermore, the village is in constant competition with more well-known tourist destinations, highlighting the urgent need for innovation to distinguish Tegalsari as a unique and attractive option for visitors. Climate change also poses a significant threat, particularly through the potential for rising sea levels and increased flooding, which could severely impact both the mangrove habitats and the village infrastructure. Additionally, there is a growing risk of environmental pollution along the coast, which could have far-reaching consequences for the local ecosystem and the tourism industry that relies on it. Despite these challenges, there remains a notable lack of comprehensive planning in the development and management of mangrove ecotourism in Tegalsari. This is further compounded by the absence of integration in the development of the tourism industry, creative economy, and entrepreneurship, all of which are crucial for the village's sustainable growth.

### **Formulation of SWOT Analysis Strategy**

The SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is a strategic planning method used to help individuals or organizations identify the strengths, weaknesses, opportunities, and threats associated with competition or a business

project. The primary purpose of SWOT analysis is to aid in strategic decision-making based on the internal and external realities faced by an organization or project.

1. **Strength-Opportunity Strategy (S-O);** The S-O strategy developed for the Tegalsari Maritim Tourism Village focuses on leveraging existing strengths to seize emerging opportunities. To begin with, the strategy emphasizes establishing cooperation with various stakeholders, including government entities, tourism institutions, and local communities. This collaboration aims to foster the sustainable development of mangrove ecotourism, which integrates local wisdom and culture, thereby enriching the visitor experience. Furthermore, the strategy includes a strong promotional component, utilizing both digital platforms and direct promotions facilitated by tourism managers and the Malang Regency Government. These efforts are designed to enhance tourist interest in the Tegalsari Maritim Tourism Village. Additionally, there will be a focus on promoting and socializing the rich cultural heritage of the surrounding Sitiardjo Village to incoming tourists, ensuring they gain a deeper understanding of the local community. Finally, the strategy outlines the importance of providing adequate facilities, such as accommodation, transportation, and other amenities, to enhance tourist comfort and satisfaction during their visit to the Tegalsari Maritim Tourism Village.
2. **Weakness-Opportunity Strategy (W-O);** The W-O strategy emphasizes overcoming challenges by leveraging existing opportunities to enhance the development of mangrove ecotourism. First, it is crucial to socialize the benefits of mangrove ecotourism to the surrounding community, highlighting its positive impacts on both the coastal environment and the local economy. This can foster greater community engagement and support. Additionally, improving the quality of local community resources is essential in ensuring that they can effectively contribute to and sustain the realization of sustainable mangrove ecotourism. This includes providing training and education that empower the community to take on a more active role in managing mangrove ecotourism initiatives. Moreover, the development of the Tegalsari Maritim Tourism Village as a key priority program by the Malang Regency Tourism Office should be clearly communicated to the community to ensure alignment and participation. Finally, promoting green economic entrepreneurship, particularly through the use of eco-enzymes, is vital for establishing environmentally friendly business practices that can contribute to the long-term sustainability of the region.
3. **Strength-Threat Strategy (S-T);** Strategy is designed to identify and leverage strengths within a research area to effectively mitigate or eliminate potential threats. This approach involves two key initiatives. Firstly, rehabilitating mangrove ecotourism areas that are currently experiencing environmental degradation. This effort not only restores the ecological balance but also strengthens the sustainability and appeal of these natural attractions. Secondly, the strategy advocates for changes in marketing or other relevant components within the tourism business. By adapting to the growing trend towards natural tourism, these changes can transform opportunities into entrepreneurial ventures, further supporting the development and sustainability of mangrove ecotourism. Through these actions, the S-T strategy aims to enhance the resilience of ecotourism initiatives against environmental and market-related threats.

4. Weakness-Threat Strategy (W-T); Strategy is employed to develop strategies that overcome internal weaknesses while reducing external threats. In the context of the Tegalsari Maritime Tourism Village, this strategy involves several key actions. First, it emphasizes the importance of conducting mangrove conservation and preservation activities in a manner aligned with the principles of sustainable mangrove ecotourism. This ensures that the natural environment is protected while promoting tourism. Secondly, the strategy calls for the provision of adequate facilities and infrastructure to support these conservation efforts. This includes establishing effective supervision, implementing waste management systems, and ensuring other necessary resources are available to maintain the sustainability of the mangrove ecosystem. Finally, the strategy highlights the need for collaboration with relevant stakeholders, such as sustainable environmental institutions, to further develop and enhance these activities. This cooperation aims to bolster mangrove planting and preservation efforts within the Tegalsari Maritime Tourism Village in Malang Regency, ensuring long-term environmental sustainability.

### **External Opportunities in Eco-enzyme Entrepreneurship**

The potential for eco-enzyme entrepreneurship in Tegalsari Maritime Tourism Village can be greatly influenced by various external opportunities, particularly market demand. The rising awareness of sustainable tourism, especially within the context of "going green," presents a unique opportunity. Tegalsari's integration of tourism with nature offers a fertile ground for promoting eco-friendly products such as eco-enzymes. Tourists and locals alike are increasingly seeking sustainable solutions that align with environmental conservation efforts. By tapping into this growing preference for environmentally friendly products, eco-enzyme entrepreneurs can establish a strong market presence that not only meets demand but also reinforces the village's commitment to ecological sustainability.

Government policies and incentives also play a crucial role in fostering the growth of eco-enzyme entrepreneurship in Tegalsari. Supportive policies that encourage investment in eco-friendly industries can significantly boost entrepreneurial activities in the region. This might include financial incentives, tax breaks, or grants aimed at promoting sustainable business practices. By aligning with government efforts to support green initiatives, entrepreneurs in Tegalsari can leverage these opportunities to enhance their production capabilities and market reach. The government's backing not only reduces financial risks but also legitimizes and amplifies the importance of eco-enzymes in the broader context of sustainable development.

The advancement of digital technology is another critical factor that can enhance the potential for eco-enzyme entrepreneurship in Tegalsari. Modern digital tools in waste management can improve the efficiency and effectiveness of eco-enzyme production, making it more competitive in the market. Technologies such as data analytics, automation, and digital monitoring systems can streamline production processes, reduce waste, and ensure consistent product quality. By adopting these technological advancements, entrepreneurs can optimize their operations, reduce costs, and increase the overall value proposition of their eco-enzyme products. This integration of technology not only bolsters productivity but also positions Tegalsari as a leader in innovative sustainable practices.

The availability of raw materials within Tegalsari Maritime Tourism Village provides a significant advantage for eco-enzyme production. The village's abundant natural resources facilitate easy access to the organic waste needed for eco-enzyme creation. However, to fully capitalize on this, there is a need for comprehensive training and mentoring programs aimed at developing a skilled workforce. By investing in human resource development, Tegalsari can ensure that local entrepreneurs are well-equipped with the knowledge and skills necessary to produce high-quality eco-enzymes. Such initiatives not only boost local employment but also contribute to the sustainability of eco-enzyme entrepreneurship by ensuring a consistent supply of skilled labor.

Lastly, establishing collaborative networks with educational and research institutions is vital for the ongoing innovation and development of eco-enzyme products in Tegalsari. These partnerships can provide entrepreneurs with access to cutting-edge research, technological advancements, and innovative practices that can enhance product quality and market competitiveness. Through collaboration, entrepreneurs can stay abreast of the latest trends and developments in eco-enzyme production, enabling them to continuously improve their products and processes. This networked approach fosters a culture of continuous learning and innovation, which is essential for sustaining the long-term growth and success of eco-enzyme entrepreneurship in Tegalsari Maritime Tourism Village.

## **CONCLUSION**

Based on the analysis conducted in this study, it can be concluded that the mangrove forest area in the Tegalsari Maritim Tourism Village has great potential to be used as a leading tourist destination in Malang Regency. However, the overall condition of the mangrove tourism potential, both in terms of physical and conceptual aspects, requires attention with further development. Further efforts are needed from related parties, both government and managers and the surrounding community in maximizing the tourism potential. The involvement of various stakeholders in the development of ecotourism needs to be increased, especially in terms of improving the quality and quantity of human resources. Socialization and special training for the local community are carried out as part of efforts to create sustainability. Development strategies that need attention and are a priority are implementing strategies from S-O and W-O. This maximizes the potential strengths while paying attention to opportunities, especially with mangrove conservation policies. Thus, it is hoped that mangrove ecotourism in the Tegalsari Maritim Tourism Village, Malang Regency can develop sustainably.

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