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Strategic Planning of Ecotourism Management System Using Ward and Peppard Framework

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Abstract

The strategic planning of the Dodola Island, Tourism destination management system is the development of previous research concerning transformation in the vegetation index value of the mangrove ecotourism area and recommendations for the rehabilitation of mangrove zones to maintain the ecological sustainability of mangroves. In addition to the environmental, socio-economic, and socio-cultural aspects, it is also necessary to develop a destination management system. This research uses the Ward and Peppard framework to design the system by considering the existing ecological, socio-economic, socio-cultural conditions, resource availability, tourist behaviour, and destination management capabilities. The instruments used in the Ward and Peppard framework analysis are Value Chain Analysis, Porter's Five Force Model, SERVQUAL, PESTEL and SWOT Analysis, Ecopreneurship Model, and IT Balanced Scorecard. The Ward and Peppard framework describe the need for information systems to mobilise the Small and Medium Enterprise activity in the mangrove ecotourism area. Furthermore, the amenity, accommodation, and local transportation accessibility are recommended. These systems are designed based on the ecopreneurship model to optimise the management of tourism destinations known as SIMANGROVE on Dodola Island, Morotai Islands Regency, Indonesia.

Keywords: Ward and Peppard, Information System, Ecotourism, Mangrove, Ecopreneurship

1. INTRODUCTION

The Tourism destination management system is a form of digital communication media innovation to increase the mobility of access to information based on the demand and interest of tourists as application users. Tourist behaviour in using digital applications shows different responses according to their goals and interests. Therefore, Indonesia's development of priority tourist destinations needs to utilise information systems or information technology to optimise product management and marketing. Meanwhile, the existing socio-ecological, socio-economic, and socio-cultural conditions and the availability of resources

indicate the contextual nature that determines the need for a management information system characteristic of tourist destinations on Dodola Island, Morotai Islands Regency, Indonesia. This study focuses on the strategic planning of the Dodola Island tourist destination management system using the Ward and Peppard framework.

Strategic planning of information systems in the Indonesian tourism sector is holistic and integrated with various other industries. Therefore, some researchers recommend information systems based on the existing system conditions, resource availability, and user needs. In animal park natural tourism destinations, political, economic, social, and technological matters influence the support and availability of resources in supporting facilities for tourism activities, labour, and destination marketing. Therefore, the existing condition of the system is analysed from the customer perspective, financial perspective, internal business perspective, and learning and growth perspective to design an application, such as animal collection applications, ticket sales, personnel, finance, DSS, Asset Management, websites, free internet service, to animal signage [1]. In addition to tourist destinations, strategic planning for tourist transportation companies is also analysed with various approaches that consider internal and external conditions of the business and system, such as Value Chain analysis, SWOT analysis, and PESTEL analysis [2].

Strategic planning of information systems focuses on developing tourist destinations and other sectors of tourist destination infrastructure. As is the case, the strategic planning of information systems at the Tourism Office is to identify the needs of system users based on the availability of resources to produce system development recommendations that can optimise the tourism office in determining tourism destination development policies [3]. In addition, strategic planning of information systems related to the tourism sector, such as the hotel business, is also essential to obtain an overview of the needed applications [4]. The analytical approach for information systems in the tourism sector is not limited to Value Chain analysis, SWOT analysis, and PESTEL analysis but also an IT Balanced Scorecard approach that facilitates the decision-making process for developing tourism information systems [5].

In addition to strategic planning of information systems in the tourism sector, several studies on strategic planning also discuss comprehensively related to education management [6]–[8] and business [9]. The existing condition of the system used, the availability of resources and the needs of system users in each sector indicate different opportunities and challenges. It reveals a niche or gap in the study of strategic planning of information systems for destination management in Indonesia. There has not been much research on the strategic planning of tourism information systems in National Priority Tourism Destinations Areas. In this research, Dodola Island, part of the Morotai Island Regency, has been

designated as part of ten National Priority Tourism Destinations in Indonesia. However, the support of technology infrastructure and tourism information systems is still minimal. It is necessary to recommend that the government and destination managers optimise information systems or information technology. It will make it easier for all parties (stakeholders), especially managers (hosts) and visitors (guests), to access various data and information related to the needs and provisions of travelling in the Morotai Island Regency, especially in the Dodola Island tourist destination.

2. METHOD

The framework used in the strategic planning of information system management of tourist destinations on Dodola Island, Morotai Island Regency, Indonesia is Ward and Peppard [10], as shown in Figure 1 below.

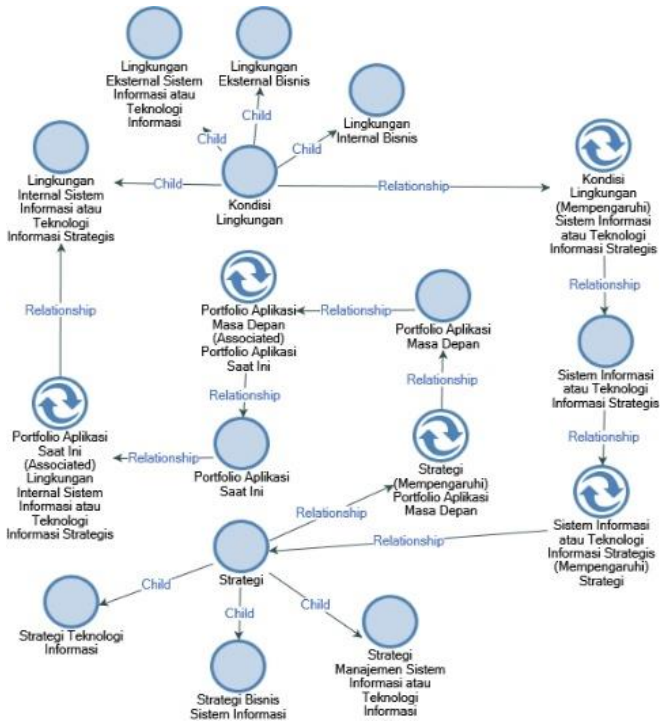

Figure 1. Ward and Peppard Framework for Information System Strategic Planning
Source: John Ward and Joe Peppard (2002)

Figure 1 is the framework of Ward and Peppard, which illustrates the influence of the business's internal and external factors, consisting of environmental conditions; as well as the information system or technology used today; the

information systems business strategy; information technology strategy; and information system management strategy or information technology. Ward and Peppard argue that external and internal driving factors help shape business strategy. External driving factors can be in the form of the economic environment, market demand, and competitors. Meanwhile, internal driving factors can be in the form of stakeholder demands, resources, and competencies. It requires achievements in operational excellence, customer intimacy, and product leadership that are optimised through information systems or information technology contextually. Several analytical approaches used to analyse the internal and external environments are Value Chain Analysis and Five Strength Model Analysis [11], *Service Quality (SERVQUAL), Political, Economic, Social, Technology, Environment, Legal (PESTEL)* [12] *and Strength Weakness Opportunities Threat (SWOT) Analysis* [13], *Ecopreneurship* [12], *and Information Technology Balanced Scorecard [13]. Meanwhile, the visualisation of the analysis results and the application interface design recommended in this study use Nvivo 12 Plus and Figma.*

3. RESULT AND DISCUSSION

3.1 Tourism Destination Value Chain: Case of Dodola Island

The value chain analysis process can be carried out by identifying and mapping supporting activities, infrastructure, and human resource management. In the context of Dodola Island Tourism Destinations, the identification and mapping of supporting activities, infrastructure, and human resource management can be seen in Figure 2 below.

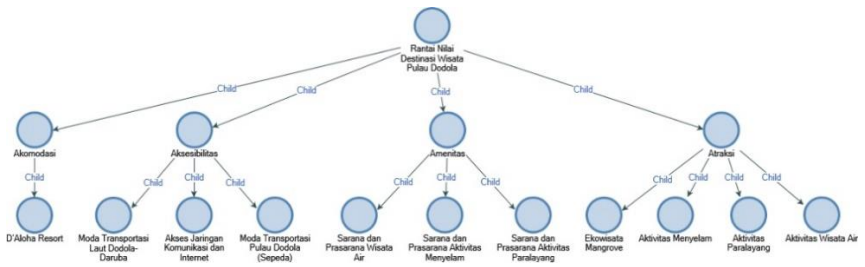

Figure 2. Value Chain Analysis on Dodola Island
Sources: Identification Result of the Value Chain of Dodola Island Tourism Destinations.

Figure 2 is the result of identifying the Dodola Island Tourism Destination value chain, which is classified based on 4 A's, namely Accommodation, Accessibility, Amenity, and Attractions. Specifically, the tourism supporting accommodation available on Dodola Island is D'Aloha Restot as a lodging facility for tourists. Public accessibility is communication and internet access. Local entrepreneurs

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provide the mode of transportation on Dodola Island to provide services such as bicycle rental for tourists to get around the mangrove area. The Dodola-Daruba sea transportation mode can rent to visit small islands around Dodola Island. In addition, the available amenities are very diverse based on the needs of tourists to dive, explore the island, and watersport to paraglide. Dodola Island tourist attractions are various, including diving, paragliding, water tourism, mangroves, and bird watching. It indicates that the Dodola Island value chain has advantages and uniqueness that distinguish it from various tourist destinations in Indonesia.

The development of research on value chains in the Indonesian tourism sector, especially in the Thousand Islands, shows that the stakeholders involved in the Global Value Chain are the community, government, and private companies [14]. Value chain analysis determines two strategies: a low-cost strategy and a differentiation strategy [15]. The various value characteristics of tourist destinations in Indonesia form a contextual chain so that process actors and consumers cannot be generalised. In the context of Gunung Mas agrotourism, [16] shows that the components in the value chain that need to be considered are input suppliers, primary producers, tour operators, retail travel agents, consumers and the government. In the context of tourism in East Sumba and Southwest Sumba, [17] points out that there is a fundamental difference between the value chain of the manufacturing industry and the tourism industry, namely that marketers follow products at their destination. The tourism value chain in East Sumba and Southwest Sumba can be classified into several sections, namely travel, accommodation, food, shopping, local travel, and tour operators. It indicates that each tourist destination in Indonesia has its own superior and competitive value chain.

In the Dodola Island tourist destination, primary and secondary activities need to be managed in a destination management system that optimises the control function to become a superior and competitive destination, as shown in Figure 3 below.

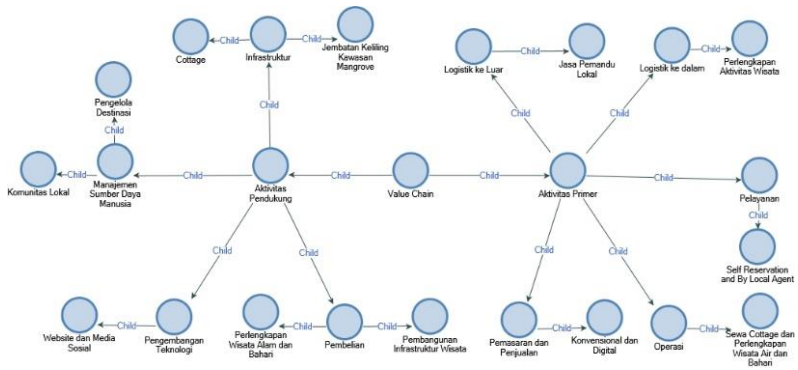

Figure 3. Value Chain of Dodola Island Tourism Destinations Based on 4A
Source: Modification of Michael E Porter's Value Chain Model [18]

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Figure 3 is a value chain model adapted to the context of managing Dodola Island tourist destinations. Based on the value chain model, primary activities determine the sustainability of tourism destination management by considering aspects of inward logistics, outbound logistics, operations, services, and marketing and sales. In addition, there are supporting activities that play an essential role in optimising the management of tourist destinations, namely infrastructure, Human Resources (HR) management, technology development and procurement/purchase systems. In the context of Dodola Island, the main and supporting activities of the value chain are inseparable from the management of accommodation, accessibility, attractions, and amenities. An integrated and contextual management system is needed for strategic program control based on the value chain model.

The existing condition of the value chain of Dodola Island tourism destinations shows that the context of primary entry logistics activities has a relationship with supporting activities in terms of procurement or purchasing where the need for water or marine tourism equipment and other supporting infrastructure. Meanwhile, outbound logistics emphasises local tour guide services distribution of diving points and island areas around Dodola tourist destinations. Furthermore, operationally services to tourists include the transaction process for using facilities related to amenities, accommodation and accessibility. Meanwhile, marketing and sales still use a mixed-method, conventional and digital. In supporting activities, procuring or purchasing supporting facilities for Dodola Island tourism needs to be balanced with the quality and quantity of Human Resources (HR) as managers and involving local communities. Likewise, technology infrastructure needs to be optimised in expanding or increasing access to foreign markets.

3.2 Five Strength Model Analysis Through the Case of Dodola Island

Porter's five strengths approach is used to analyse the competitiveness of Dodola Island tourist destinations in the Indonesian and international tourism markets. Porter's Five Strengths emphasise internal and external aspects such as the threat of new entrants, governments, suppliers, buyers, substitute products, and internal competition[19]. In achieving competitiveness, it is necessary to consider factors of demand conditions, related supporting industries, strategy and business competition, and the role of the government [20]. In the context of tourism destinations, competitive advantage is determined by optimising services to consumers, so the Strength Weakness Opportunity Threat (SWOT) and Service Quality (SERVQUAL) approaches can be used to balance Porter's five forces model [21]. It indicates that the competitive advantage of the Dodola Island tourist destination needs to be studied comprehensively in identifying existing conditions, such as Porter's Five Forces Model in Figure 4.

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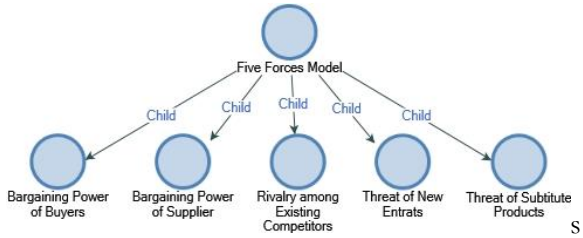

Figure 4. Dodola Island Tourism Destinations Based on the Five Forces Model

Figure 4 shows that the development of mangrove ecotourism on Dodola Island needs to be optimised to be competitive and superior in the local, national and international tourism markets. In the context of the bargaining power of buyers, the marketing manager of Dodola Island tourist destinations still needs to be developed. The existing condition of Dodola Island marketing still uses a conventional approach, namely words of mouth. At the same time, tourism information is still partial and has not been accommodated in an integrated system. Furthermore, the bargaining power of suppliers of Dodola Island tourist destinations is limited to individuals, communities to community institutions in the Morotai Island Regency. They intend to be entrepreneurs and then provide tourism products or services. Meanwhile, Rivalry among existing Competitors is a challenge in itself.

The diversity of tourism in North Maluku Province is very diverse, so Dodola Island needs to highlight its uniqueness or advantages that attract tourists to visit. On the other hand, the threat of new entrants shows that Dodola Island is not the only area with beautiful mangrove ecotourism. Around Dodola Island, various kinds of Small Islands have underwater natural beauty. Meanwhile, the threat of substitute products also occurred in the Tourism Market of Morotai Island Regency, where visiting tourists were faced with natural, marine and beach tourism products and services in several locations. In this case, Dodola Island is not the only attractive destination to see, so it needs to be adequately managed so that it becomes a consideration for tourists to stay longer on Dodola Island.

Researchers use Porter's five forces model to measure a company's competitiveness and estimate the challenges faced in the trade market according to the characteristics of the product or service being sold [22]. Porter's five forces model is used to analyse the competitive environment in the tourism business. Product development opportunities can be identified following market demand and improving the quality of destination management [23]. It reveals that the competitive market environment for tourism in North Maluku Province needs to be taken seriously by managers and stakeholders who work together to optimise the Dodola Island tourist destination. Thus, strategic information system planning is required for quality destination management.

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3.3 SERVQUAL, PESTEL and SWOT Analysis of Tourism Destination Through the Case of Dodola Island

In strategic planning to design a tourism information system, service quality needs to be measured to obtain an overview of the existing condition of the destination management system and the aspects that need to be developed. [24] showed that the SERVQUAL approach can identify tourist satisfaction with tourism products and services at a destination. In addition, [25] identified aspects of service quality that affect tourist comforts, such as tangibles, reliability, responsiveness, assurance, and empathy. It shows that in improving the quality of services in the tourism sector, there must be tangible evidence of the care and attention service providers give to tourists. In addition, reliability is a must-have capability for tourism products or service providers. Providers of tourism products and services must also be responsive and fast in providing services to tourists and offer guarantees in knowledge, attitudes, and behaviour to build tourist trust when using tourism products or services. Furthermore, the attention to tourists with different backgrounds is given sincerely full of sensitivity.

In the context of tourist services on Dodola Island, the availability of resources, accessibility, amenities, and accommodation is part of the Tangible aspect. Destination managers periodically maintain tourist facilities to ensure safety, convenience, and comfort when using tourist facilities on Dodola Island. However, the challenge in providing tourism products and services on Dodola Island is the availability of quality human resources that meet the standards of reliability, responsiveness, assurance, and empathy. The next challenge is the absence of good human resource management in increasing individual capacity to improve agility, responsiveness and speed in serving and having compassion for tourists. Meanwhile, providers of tourism products and services related to accessibility, amenities, attractions and accommodations are still partial. Therefore, an integrated information system is needed that can accommodate the interests of various parties.

Politics, Economics, Social, Technology, Environment, and Legal (PESTEL) also influence tourism development in Indonesia [26]. [27] shows a significant impact between the number of foreign tourist visits in ASEAN and political and social conditions. Specifically, social and political conditions affect tourists' attractiveness, safety, and comfort. Meanwhile, community social movements also describe social and political conditions that affect the image of tourism in the area. [28] shows that social movements can be an instrument to dissect the climate of the tourism industry that threatens sustainability in the social, economic and environmental fields. In addition, economic growth and technology also encourage accelerated tourism growth. [29] showed that the development of geographic information systems can be used as a tourism marketing communication medium. Furthermore, [30] argues that the use of technology is

also an excellent promotional strategy to maintain the image of tourism. Thus, the PESTEL approach can analyse the political, economic, social and technological conditions of tourism based on the context of the Morotai Island Regency, especially Dodola Island.

In Dodola Island, political and social dynamics are still dominated by a series of regional head election activities, the formation of organisations or community groups, and student movements and social movements formed as initiations to express aspirations and problems caused by government development programs. The implications of the demonstration movement can hinder the mobility of access to tourist destinations considering that road access and the modes of transportation used are minimal. Furthermore, the economic dynamics and people's livelihoods on Morotai Island are dominated by livelihoods as fishermen and subsistence farmers. Meanwhile, the development of technology and information systems is still limited to optimising good governance through the Smart City program, which prioritises the interests of the bureaucracy of local government administration. It shows that strategic planning of information systems for the benefit of tourist destination management on Dodola Island needs to be encouraged to optimise managerial aspects, especially the marketing of tourism products and services that attract foreign and domestic tourists.

The internal and external conditions of the management of Dodola Island tourist destinations can be described by SERVQUAL and PESTEL analysis. However, several previous studies have shown that Strengths, Weaknesses, Opportunities, Threats (SWOT) need to be classified to map the existing conditions (Internal and External) of a tourist destination [31]. The outcome of SWOT analysis is the recommendations for development programs of tourist destinations in the form of strategies that need to be prioritised by stakeholders. In the context of Dodola Island, a SWOT analysis is carried out based on indicators in the SERVQUAL and PESTEL models, as shown in Figure 5 below.

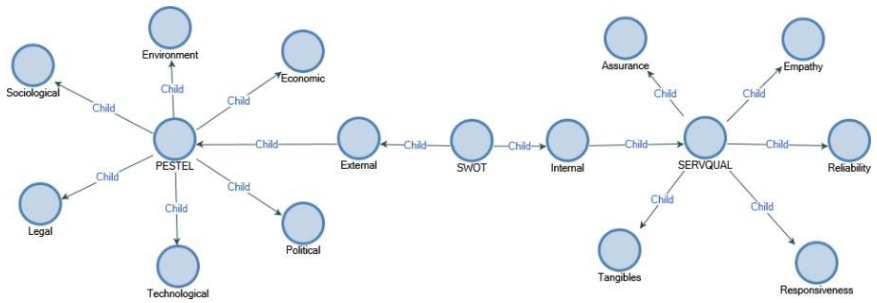

Figure 5. SWOT, SERVQUAL and PESTEL of Tourism Destination Management in Dodola Island

Figure 5 shows that the SWOT analysis's classification of strengths, weaknesses, threats, and opportunities refers to indicators in the SERVQUAL and PESTEL approaches. Analysis of internal conditions, namely strengths and weaknesses in managing the Dodola Island destination, consists of aspects of tangibles, assurance, responsiveness, empathy, and reliability. Meanwhile, the analysis of external conditions, namely opportunities and threats in managing the Dodola Island destination, consists of political, social, economic, technology, environment, and legal aspects. In the context of the management of Dodola Island, the strength possessed is still dominant in the substantial part where the supporting infrastructure for tourist attractions in the form of accommodation, accessibility, and amenities is available. In contrast, the weakness is the limitation of human resources in quantity and quality, which causes the aspects of assurance, responsiveness, empathy, and reliability to be subordinated in providing services to tourists. It indicates that the internal management of Dodola Island in the SERVQUAL approach needs to be optimised.

Opportunities and threats in managing Dodola Island tourist destinations describe from the PESTEL approach as a description of external conditions, namely political, social, economic, technology, environmental, and legal aspects. The existing state of Dodola Island places more emphasis on mangrove ecology, which was developed using a mangrove ecotourism approach. The threats faced in the development of Dodola Island tourist destinations can be seen in the context of the environment. The mangrove ecosystem of Dodola Island experiences changes in the vegetation index due to infrastructure development that threatens the sustainability of the mangrove ecology [32]. In addition, there are socio-cultural dynamics regarding the claims of the Kurung family's rights to inherited land on Dodola Island, which impact legal aspects or permits for tourism infrastructure development. In addition, there are opportunities to develop the community's economy and stakeholders involved in the development of mangrove ecotourism on Dodola Island, in line with political conditions with the G20 issue and National Tourism Destinations. Another opportunity is to develop information technology that integrates various platforms related to MSMEs, Accommodation, Amenities, Accessibility, Mangroves, and Partnerships.

Based on the SWOT, SERVQUAL and PESTEL analysis results, this study recommends a tourism destination management system that emphasises a participatory mangrove ecotourism approach. Information systems can integrate socio-cultural, economic, and environmental interests in optimising Dodola Island tourist destinations. The following recommendation is that the information system is designed based on a website to expand the reach of access to the tourism market, namely domestic and foreign tourists. Meanwhile, the usability system aspect does not make it difficult for tourists as system users to access information about accessibility, accommodation, amenities and attractions. Meanwhile, the security of system users must be protected, especially personal data and anonymous history

of visits to destinations. It shows that usability, information quality, and user security are essential in designing an information system for mangrove ecotourism management on Dodola Island.

3.4 Ecopreneurship model, SIMANGROVE System, and IT Balanced Scorecard for Mangrove Ecotourism in Dodola Island

The recommended information system based on the strategic planning of information system is the SIMANGROVE system, a mangrove ecotourism management system for Tourism Destination through the case of Dodola Island. SIMANGROVE system is designed based on the ecopreneurship model, namely the convergence between entrepreneurship and environmental ecology. Business unit management that does not only focus on economic benefits but also considers ecological sustainability can be categorised as ecopreneurship [12]. In the tourism business, adopting the ecopreneurship concept is part of education to broaden environmental insight to managers and visitors in a tourist destination [33]. Therefore, various tourism industries, including the construction of accommodation in hotels, should pay attention to the ecopreneurship model [34]. In Dodola Island, the decline in the value of the mangrove vegetation index due to the construction of tourism infrastructure in the form of bridges and resorts needs to be considered because it threatens environmental sustainability. Therefore, SIMANGROVE is designed by considering a participatory approach, mangrove ecosystem, local culture preservation, and tourism economy, as shown in Figure 6 below.

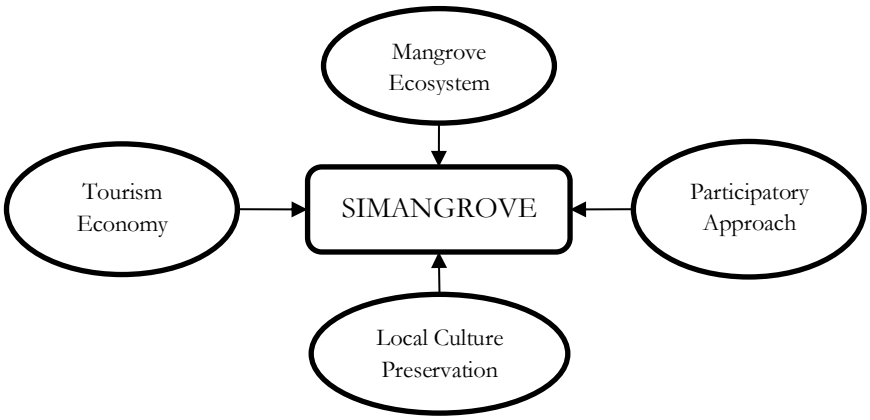

Figure 6. Ecopreneurship Model on SIMANGROVE System

Figure 6 illustrates the constructive ecopreneurship model developed in the SIMANGROVE system. Specifically, Simangrove is designed with complex

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business processes that six main actors can access. Each actor has different authentication based on the authority to add, delete, update and access information in the SIMANGROVE system. The classification of actors in the SIMANGROVE system can be categorised as follows: first, the user is a viewer, the user is a buyer member, the user is a seller member, administrator, operator and sub-operator. Each user of the system is set to be able to manage and utilise Dodola Island tourism information to meet the needs of product and service services. Meanwhile, the interface design of the recommended SIMANGROVE system can be seen in the following figure.

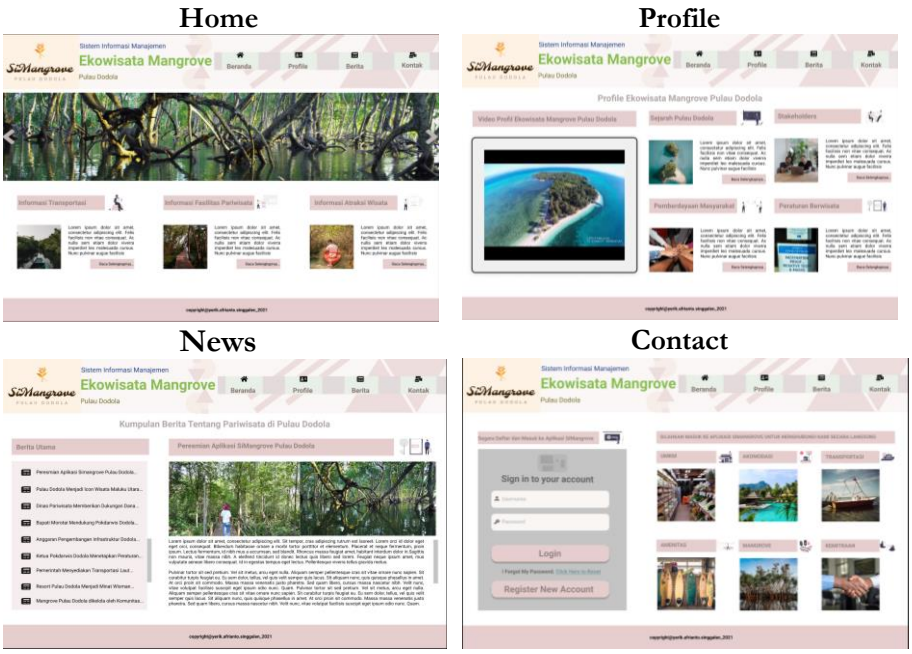

Figure 7. Mock-up Interface Design of SIMANGROVE Website

Figure 7 is a SIMANGROVE system design that accommodates information related to accessibility, accommodation, amenities, and attractions. Four pages are available on the SIMANGROVE informative website, namely home, profile, news and contact. On the home page, the information provided is related to accessibility to answer the question "how to get there?", tourism facilities to answer the question "how to stay there?", and tourist attractions to answer the question "what is in there?". Furthermore, suppose tourists want to obtain more specific information related to Micro, Small and Medium Enterprises, Tourism accommodations, Local Transportation, Mangroves, Amenities, and Partnerships. In that case, the system requires that they register first. Through the registration

process, managers will use user data to classify, associate, and predict the products and services needed by tourists.

In developing SIMANGROVE, the IT-Balanced Scorecard approach describes financial, consumer, human resources, and internal aspects. Based on an economic perspective, the SIMANGROVE system is managed with a mission to mobilise the needs of tourists in online transactions. The more specific objectives from the financial aspect are: optimising online transaction services through varied payment methods and optimising profits from product and service advertising services. Based on the customer's perspective, the SIMANGROVE system is managed with a mission to maximise information services and secure transactions according to the needs of tourists. The more specific objectives from the customer's perspective are: optimising information services according to the needs of tourists through the Frequent Ask Question, Video, and user review; adopting a customer relationship management system to obtain feedback related to usability and information quality, and security.

From a process perspective, the SIMANGROVE system is managed with a mission to excel in tourism information management through an integrated approach. More specific objectives from a process perspective are: developing a database system to classify, estimate, predict, and associate; creating interface design, copywriting skills, and thematic colours according to the tourism information category. From a learning perspective, the SIMANGROVE system is managed with a mission to increase the capacity of human resources to manage an integrated approach. From a learning perspective, the more specific objectives are: increasing the capacity of administrators, operators, and sub-operators through certification programs and workshops following respective fields; providing facilities and infrastructure needed by each division to increase employee productivity.

Based on the financial, customer, process and learning perspectives in managing the SIMANGROVE system, these findings show that the optimisation of the mangrove ecotourism management system on Dodola Island is supported by information technology in the tourism sector. Conceptually, the Information Technology-Balanced scorecard (IT-BSC) is used to evaluate the performance of a system that describes the development of an institution or business in the tourism sector from internal and external sides [35]. The balanced scorecard is not limited to evaluating the performance of information technology management but also business management or the management of an organisation [36]. It shows a significant difference between implementing the Balanced Scorecard (BSC) method and the Information Technology Balanced Scorecard (IT-BSC). In this research, the attention and methods used to emphasise IT-BSC to establish specific missions and objectives of the management of the SIMANGROVE system so that system performance can be evaluated or measured regularly.

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4. CONCLUSION

This study indicates that the strategic planning of an information system relevant to the Dodola Island mangrove eco-tourism destination is SIMANGROVE, designed based on the ecopreneurship concept of a participatory approach, preservation of local culture, mangrove ecology and tourism economy. The Ward and Peppard framework analysis outcome through various internal and external analytical methods such as Value Chain; Five Strength Model; SERVQUAL; PESTEL; SWOT; and IT-BSC used to reveal the host and the guest's needs optimised development of mangrove eco-tourism on Dodola Island. Thus, a strategic information system recommendation for tourism development that is contextual and relevant to Dodola Island is an integrated destination management system that connects Micro, Small and Medium Enterprises, Transportation and Accommodation Services, and Mangrove Ecological Information, Amenities, and Partnerships. Also, consider the usability, information quality, and user security aspects.

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