Digital Book Model for Mangrove Ecotourism Development

I Gede Sujana Eka Putra[1], Ni Luh Putu Labasariyani[2], I Wayan Jepriana[3]

[1]Doctoral Program in Engineering Sciences Faculty of Engineering, Udayana University, Denpasar, Bali
sujanaekaputra@gmail.com
[2]Information Technology Department, STMIK STIKOM Indonesia, Denpasar, Bali
labasariyani@gmail.com
[3]Information System Department, ITB STIKOM Bali, Denpasar, Bali
jepriana.id@gmail.com

Abstract The tourism sector is the sector most affected by the COVID-19 pandemic. Bali as one of the provinces that depends on the tourism sector, with economic growth in the third quarter of 2020 reaching -12.28%. One of the tourism sectors in Bali is the Kampoeng Kepiting mangrove ecotourism located in Tuban Village, Kuta - Badung District, which is developed and managed by the Wanasari fishing group. Kampoeng crab mangrove ecotourism offers several tour packages such as mangrove tours by canoe and boat, fishing, education, mangrove nurseries and planting, crab cage tours and culinary tours. Since its establishment in 2008 until before the pandemic, this ecotourism received tourist visits who wanted to enjoy the natural scenery of mangroves, culinary tours and mangrove education, but since the COVID 19 pandemic hit in 2020, this ecotourism began to lack visitors, impacting the economy of the fishing community. The research problem is how to design model of digital book to develop mangrove ecotourism. This research uses a descriptive qualitative method, to develop mangrove ecotourism by using digital book. This digital book is developed using the html and JavaScript web language, which is designed to improve web appearance as viewing information in a book. This ecotourism digital book can be accessed online, displaying the tour packages offered, information on tour packages and mangrove planting activities as an educational medium for mangrove conservation. The development of this digitalization model is expected to support the promotion of mangrove ecotourism during the COVID-19 pandemic.

Keywords — **Digital Book, Ecotourism, Mangrove, Tour Package, Kampoeng Kepiting**

I. INTRODUCTION

THE tourism sector is the sector most affected by the COVID-19 pandemic. Bali as one of the provinces that depends on the tourism sector, with economic growth in the third quarter of 2020 reaching -12.28% [1]. One of the Bali tourism sectors is the Kampoeng Crab mangrove ecotourism which is located in Tuban Village, Kuta District - Badung. This ecotourism is developed and managed by the Wanasari fishing group for tourism based on mangrove nature tourism. One of the government's programs as Bali tourism development is to apply a green zone tourism model in 3 areas, namely Nusa Dua, Sanur and Ubud [2], moreover the government's discourse to open a tourism area by the end of 2021 [3] provides new hope for the tourism sector. In the context of economic recovery in Bali's tourism sector, a new habit strategy breakthrough is needed, tourists prioritize cleanliness, health, safety and the environment, so a strategy is needed to develop ecotourism with digital-based modeling. The Kampoeng Kepiting Mangrove Ecotourism is located on Segara Beach in the Tuban Traditional Village, Kuta Badung, which was started to be developed for the

empowerment of fishermen with 95 members, formed on August 7, 2008, with the inauguration number 306/Kpts/Org/5/2008[3]. Wanasari fishermen in managing mangrove areas themselves have several sub-activities, namely crab cultivation, mangrove education, mangrove processing and marketing groups, mangrove monitoring community groups, cultural arts activities, water tourism and culinary tourism[4]. Kampoeng Kepiting mangrove ecotourism has been opened since 2008 for tourism and from 2012 to 2019, the level of visits to ecotourism is quite high[3].

Since the COVID-19 pandemic hit in 2020, this ecotourism has begun to empty of visitors. So that the problem encountered is the absence of tourists and visitors visiting mangrove ecotourism due to the impact of the COVID-19 pandemic. This has an impact on the welfare / economy of the Tuban Wanasari fishing group, which partly depends on this mangrove ecotourism economy. To increase tourist visits to the Kampoeng Kepiting mangrove ecotourism, it is deemed necessary to carry out tourism promotions that still consider health protocols [4]. This research problem is how the model of digital book to develop

mangrove ecotourism. This research uses a descriptive qualitative method, to develop mangrove ecotourism by using digital book. This digital book is developed using the html and JavaScript web language, which is designed to improve web appearance as viewing information in a book. This ecotourism digital book can be accessed online, displaying the tour packages offered, information on tour packages and mangrove planting activities as an educational medium for mangrove conservation. The development of this digitalization model is expected to support the promotion of mangrove ecotourism during the COVID-19 pandemic. COVID-19 pandemic had the impact of decreasing tourist visits. The digital book application model is expected to support the promotion of ecotourism in the recovery of ecotourism.

II. LITERATURE REVIEW

A. Review Stage

The United Nations World Tourism Organizations (UNWTO) stated that tourism is a leading sector which is one of the important keys for regional development and increasing welfare for the community. UNWTO data (2013), shows that the tourism sector's contribution to world GDP is 9%, 1 out of 11 jobs are created by the tourism sector, the contribution to the world export value is USD 1.4 trillion or equivalent to 5% of exports that occur in the world [6]. Ecotourism is the face of the future of sustainable and environmentally friendly tourism. This arises because of the tendency and development of lifestyles and a new awareness of the community for a deeper appreciation of the values of relationships between humans and their natural environment. In principle, ecotourism is a tourism trip that is responsible for environmental sustainability and the welfare of the local community. This active role in managing ecotourism potential is important because knowledge of nature and cultural potential has a selling point as an ecotourism attraction. The development of ecotourism ultimately has a close relationship with the community in ecological, social, and economic aspects [5]. According to him, the Industrial 4.0 era affects various sectors, including the tourism sector. For example, now travelers simply rely on digital platforms to search, order and even make payments. Tourism 4.0 is also known as Millennial Tourism. Currently, the growing traveler portfolio is the millennial generation where, 50 percent of inbound travelers are millennials [6]. This is reinforced by data from Deloitte Consulting Southeast Asia 2019 which states that 40 percent of global tour and booking activities are carried out online [7] .

Several studies related to ecotourism are described in this section.

Research from [8] examined the Kampoeng Kepiting mangrove ecotourism as fishermen empowerment focused on the utilization of the mangrove area and mangrove ecosystem. The form of management of the Kampoeng Kepiting Mangrove Ecotourism is that fishermen are divided into several groups and given their respective tasks in managing the program that they have formed together. The socio-economic impacts that occur do not look significant, but with this ecotourism, the fishermen's economy is getting better. The socio-economic impacts that occur are, the existence of community income, being able to build the fishermen's economy, the availability of jobs, changes in livelihoods, changes in mindset, and capacity development.

Research from [9] states that the four components possessed by Kampoeng Kepiting ecotourism are the attractions of Kampoeng Kepiting Ecotourism, tour packages are Crab Seed Release Tours, Cage Packages and MangroveTours, Mangrove Education Tours, Canoe Tours and Clean Mangroves, Mangrove Tours, Canoe Fishing Mangroves. The facilities at the Kampoeng Kepiting Ecotourism are a floating restaurant that provides food and drinks with traditional and typical local menus, bathrooms, gazebos, fishing equipment, as well as traditional canoe and boats used to take tourists for tours. Ecotourism management involves the community starting from the planning stage, making and directing policies, the implementation stage, the evaluation stage is carried out by conducting discussion about obstacles in the field, the stages to improvement are carried out by mutual cooperation by the Kampoeng Kepiting Ecotourism owner. Participation in management directly in policy making, in operations, and in supervision.

Research from [10] states that the implementation of CSR (Corporate Social Responsibility) PT. Pertamina (Persero) through an empowerment program consisting of mangrove crab cultivation and forest conservation in Wanasari Integrated Ecotourism. This study uses a qualitative descriptive method to describe the flow of empowerment and the influence of the crab cultivation program through observation, interviews and secondary data analysis as data collection methods. Adaptation of empowerment starts from social mapping to exploration of the potential of local communities. The success of mangrove crab cultivation has given new influence to the Wanasari Tuban Integrated Ecotourism Program, namely mangrove forest education programs, culinary tourism, cultural arts and ecotourism. Community empowerment of the Wanasari Tuban fishermen group has given authority to the community in making decisions and adjusting to community needs by conducting social mapping first to find out the community's potential, through the bottom up concept so that the program has a positive impact and opens job opportunities and creates jobs for the Wanasari fishermen community. Tuban.

Research from [11] examined the mangrove ecotourism of Bandar Bakau as a natural tourist destination in the city of Dumai. Data analysis was analyzed descriptively, and to formulate a development strategy was carried out using a SWOT analysis approach. For the development of mangroves in Bandar Bakau Dumai, there are 4 development strategies, namely Development of Mangrove Ecotourism Supporting and Supporting Facilities in Bandar Bakau Dumai, development of Mangrove Ecotourism products, strengthening the role of stakeholders in the development of Mangrove ecotourism and development of environmental

conservation and mitigation of ecotourism.

Research from regarding the development of community-based mangrove ecotourism attractions in the coastal area of Tateli Dua Minahasa village. The research aims to help the community for sustainability in developing a mangrove ecotourism area in Tateli Dua Village which is supported by Manado State Polytechnic students. This research method uses a demonstration method that demonstrates activities through demonstration as a demonstration stage. The results showed that the local community of Tateli Dua Village had local knowledge about their own area as a coastal area suitable for planting mangroves for the development of mangrove ecotourism. mangrove ecotourism in their own area.

Research from [12] regarding the ecotourism development strategy of Pantai Sari, Kelurahan Pakis, Banyuwangi. This study aims to determine the development of community-based ecotourism and natural resources in Sari Beach. The results showed that the strategy for developing ecotourism was through increasing knowledge and technology in the community, improving supporting facilities and infrastructure, managing mangrove ecotourism, fauna diversity and maintaining turtle conservation, uniting interests involving stakeholders in Sari Beach.

Research from [13] on communication governance in the development of mangrove ecosystems as ecotourism creative economy Bengkalis district. The results show that integrated management through various communication sources has an impact on improving the community's economy independently, through the process of planning, implementing, and controlling various elements of communication in accordance with the goals that have been set. Various socialization, mentoring and counseling activities have used information and technology media, but tourism has not been implemented properly, there is still room for improvement in each area based on an integrated development approach.

Research from [14] regarding the management strategy of mangrove forest ecosystems in Amahai country. This study identifies the uses made by the community and recommends a strategy for managing mangrove ecosystems in Amahai Country. The results of the study obtained five forms of utilization carried out in the mangrove area of Amahai State, namely fishing, sea cucumber collection, bameti, tourism (recreation), and research. There are eight management strategies produced, namely 1) implementing government policies to maintain the potential of mangrove ecosystem resources, utilizing the potential of mangroves for ecotourism, supporting the development of science and technology, revitalizing traditional institutions for environmentally sound mangrove management, processing resources, and increasing community income. increasing monitoring, controlling and surveillance, improving coordination between stakeholders and increasing public knowledge and awareness about the function of mangrove ecosystems.

Research from [15] regarding the Study on Formulation of Marine Ecotourism Management Strategies in Manado City in the Industrial Revolution Era 4.0 Based on SWOT Analysis. The results of the study obtained 4 strategic formulations (key success factors), namely: increasing law enforcement in the field of marine ecotourism, waste management on land and sea, public awareness of environmental cleanliness both on land and sea, empowerment of coral reef biodiversity resources, mangroves in parks. to develop marine ecotourism through digital applications, and manage and develop resorts, coastal culinary tourism spots, dive points, and tourism ports. The results of the SWOT curve show that threats to the development of marine ecotourism are more dominant than opportunities, but there is the strength of a reliable tourism organization, which needs to be supported by all stakeholders.

The ecotourism potential is categorized as good if supported by the potential for tourist attractions, availability of accessibility, facilities that support the development of the area into ecotourism [16]. Community empowerment is categorized as high and good enough so that people who are always involved in planning, monitoring, management, entrepreneurs'/ecotourism actors who also support good management. Several issues for kepiting ecotourism such as limited crab fishing gear, weather conditions that affect crab quality, the process of processing mangrove fruit which takes a long time, the difficulty of marketing, the difficulty of obtaining a National Agency of Drug and Food Control permit, reduced marine life, the occurrence of sedimentation, garbage shipments and the lack of public awareness of disposing of waste.

III. RESEARCH METHODS

This study uses a descriptive qualitative method, which was carried out in Mangrove Ecotourism Kampoeng Kepiting Tuban Badung Bali. Data collection was carried out through visits to ecotourism to collect tour package data, conducting interviews with ecotourism package managers. The method of digitizing ecotourism areas is carried out by applying digitization using digital books. The digital book contains information and photos about tourism objects such as a mangrove forest review, mangrove nurseries and seed planting activities, conservation of mangrove forests, and culinary tours and other activities. This information can be accessed by tourists online. The research stage describes in Fig. 1.
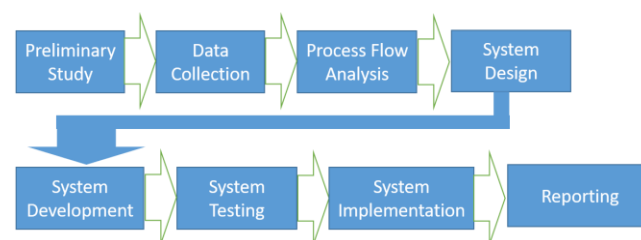

Fig. 1. Research Flow

The system process flow started with the initial stage phase, a preliminary study is carried out (preliminary study) on mangrove ecotourism. The next stage is collecting data on tourism objects, conducting interviews with ecotourism managers. Then continue to next stage is to analyze the process flow (process flow analysis), designing a digital book system, developing a digital book system according to the planned design. Furthermore, testing the digital book system, and implementing the system. The final stage is the preparation of the final research report. The development activity of digital books describes in Table 1.

TABLE I
PLAN ACTIVITY OF DEVELOPMENT DIGITAL BOOK

No	Description	W1	W2	W3	W4
1	Mangrove site review, data collection	√			
2	System design of digital book		√		
3	Develop digital book		√	√	
4	System testing			√	√
5	System implementation / training				√
6	Reporting				√

The research stage consisted of a preliminary study, visit research location to find out the current conditions. Data collection was carried out through site visits, conducting interviews with the Kampoeng Kepiting mangrove ecotourism manager. Next, analyze the data to design a digital book system. Digital book design consists of designing digital book displays, materials and narratives that will be included in digital books, video links that will be displayed, so that digital books can attract potential ecotourism visitors. Prospective visitors get a complete picture of the products and services provided by the tourism object to be visited. Contact number of mangrove ecotourism is listed on the digital book application. The next phase is system development and system testing.

IV. DATA COLLECTION ACTIVITY

Data collection activity conducted by visiting research location in Kampoeng Kepiting Ecotourism Bali to collect research data to develop digital book.

Fig.2. Current Condition Ecotourism

Fig. 2 shows condition of the Kampoeng Kepiting canoeing tourism object. It could be seen that the canoe equipment put in place because no visitors come to Kampoeng Kepiting

ecotourism. During the pandemic, the condition of the tourist attraction and Kampoeng Kepiting culinary was deserted.

Fig. 3. Interview With Fisher Association Head

Fig. 3 shows an interview with fisher association coordinator. On that occasion, the Head of the Kampoeng Kepiting Association explained about the breeding of mangrove crabs and the ecotourism tour packages offered. At the location of the crab cages, temporarily put the crabs around 3 until 6 months old, so that the crabs temporarily grow in the cages provided. Once the crab has around 6 months old, then it could support Kampoeng Kepiting cullinary while visitors could choose by themselves the fresh crab for crab dish menu.

V. RESULT AND DISCUSSION

A. *Development Digital Book Application*

The digital book application developed to promote Kampoeng Kepiting tour packages via online, both mangrove tour packages by canoe and boat, and Kampoeng Kepiting culinary.
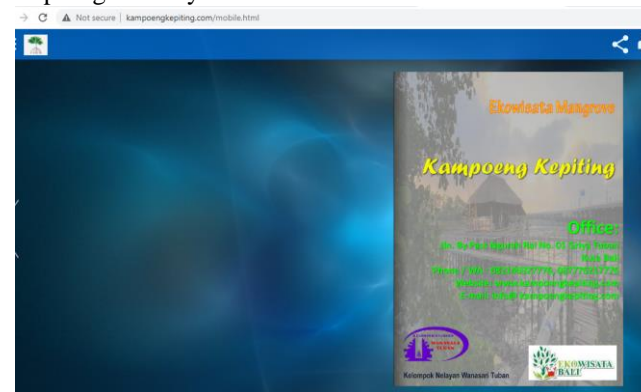

Fig. 4. Digital Book Cover

The digital book application as seen in Fig.4 begins with information containing location of the Kampoeng Kepiting mangrove ecotourism, contact number and email. This is important as information on ecotourism locations targeted by visitors, and ecotourism contact information.

Fig. 5. Scope of Work and Canoe Tour Packages

Fig.5 shows a scope of work of mangrove ecotourism and canoe tour packages. Guests can play a fun canoe while picking up and carrying plastic waste found around the mangrove waters. After doing activities as a reward for the collected garbage, visitors get mangrove juice. This activity related to the environment concern. Digital books provide information to prospective visitors to find out canoe tours with environmental awareness activities.

Fig. 6. Tour of Crab Cage

This tourism activity as seen in Fig. 6, aims to find out information about crab cultivation and the process of crab breeding to crab rearing in terraced cages. Tourists will be invited to see firsthand the cultivation process carried out by Wanasari Fishermen. In addition, tourists can also release crab seeds to their natural habitat in the mangrove forest. The digital book provides information to potential visitors about crab cultivation in Mangrove ecotourism.

Fig. 7. Mangrove Plantation And Canoe Fishing Tour

The activity in Fig.7 shows that mangrove planting activities do not only invite tourists planting trees. Before planting, tourists will be given information about mangrove trees both in terms of functions and benefits. The planting technique that will be carried out is clumps, system technique 1 bamboo 2 trees. Treatment will be carried out by officers of the Wanasari Fisherman Association. Each participant will be given 2 mangrove tree seedlings to be planted immediately. While this canoe fishing tour offers a different sensation in fishing around the mangrove forest. Activities in the form of fishing using canoes and accompanied by fishermen, and equipment and bait for fishing will be prepared by the Bali Ecotourism manager. The digital book application provides information about fishing packages that can be enjoyed by visitors.

Fig. 8. Fishing Tour Using Traditional Boat

The digital book application provides information on fishing packages around mangroves using traditional boats owned by Wanasari fishermen as seen in Fig.8. Fishing activities can be done in the morning, afternoon or evening depending on wheater conditions. Fishing locations around mangrove forests and the Bali Mandara toll road or in the Benoa Bay area. This activity provides a pleasant sensation to visitors, which is tools and bait for fishing will be prepared by the Bali Ecotourism management.
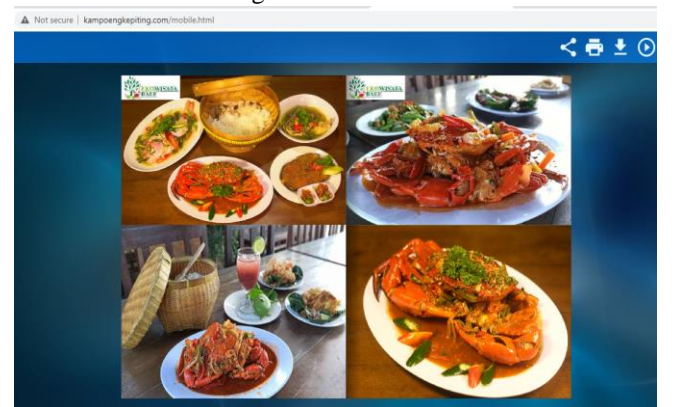

Fig. 9. Culinary Menu Kampoeng Kepiting

Fig. 9 shows digital book application presents delicious culinary picture in Kampoeng Kepiting. This could be very attractive to tourists who visit the Kampoeng Kepiting ecotourism. After enjoying the mangrove tour game or fishing with canoes and fishing boats, visitors can stop by to enjoy the delicious crab-based dishes at the culinary kampoeng crab restaurant, which is accompanied by a very interesting sea view.

From the digital book application mentioned above, it

looks very attractive, providing clear information to potential visitors about ecotourism. This digital book application presents the sensation of reading a website online that feels like reading a book, because the book looks per page like we read books like in general. The ecotourism digital book application displays interesting and informative tourist information. It even displays information about the food menu in the Kampoeng Kepiting culinary tour, with dishes in the form of processed crabs, the menu looks delicious and delicious.

B. System Testing

Some methods of system testing conducted in this research they are:

- *Functional Testing*

This test conducted to check the product conforms to the specifications and functional requirements. Web page link testing is working fine, including internal links and outgoing links. The website can be accessed and displayed within 1.5 seconds. This shows access to the website is quite fast.

- *Usability Testing*

The usability testing for this digital book application is done through site navigation test. Menus, buttons or links to various pages on the site work fine. Content can be read without spelling or grammatical errors.

- *Compatibility Testing*

Testing is done through compatibility tests to ensure that the web application runs well. The testing conducted by browser compatibility test. The same website in different browsers will display differently. Testing on the Chrome browser, the web application display can perform well. Testing on the Mozilla Firefox browser, the web application display can perform well. Testing on the Internet Explorer browser, the web application appears partially, the text narration could not have displayed. This is because there is a JavaScript component that cannot run automatically in internet explorer browser.

- *Performance Testing*

The response time of a website application on the google chrome browser takes 1.5 seconds using the internet at a speed of 20 Mbps. While response time using mozilla firefox and internet explorer, it takes 2 – 2.5 seconds using the internet at a speed of 20 Mbps. This illustrates that the response time of this web is quite fast even though it displays images with high resolution.

VI. CONCLUSION

The conclusion of this research as below:

a. The digital book designed to improve web information appearance.
b. The use of digital book applications as one of the promotional media that can be used during the COVID19 pandemic and can provide added value for the development of ecotourism.

c. The digital book application provides complete information about the tour packages offered for potential visitors.
d. System test results such as functional testing, usability testing, compatibility testing, and performance testing shows the system has good performance to be used as a digital based ecotourism promotion media.

REFERENCES

[1]   Badan Pusat Statistik Provinsi D.I Yogyakarta, "Berita Resmi Statistik," *Bps.Go.Id*, no. 27, pp. 1–8, 2019, [Online]. Available: https://papua.bps.go.id/pressrelease/2018/05/07/336/indeks-pembangunan-manusia-provinsi-papua-tahun-2017.html.

[2]   kompas, "Sanur, Ubud, dan Nusa Dua Disiapkan sebagai "Green Zone" di Bali," 2021.

[3]   N. W. N. S. Wardani and I. G. A. Wesnawa, "Potensi Ekowisata Kampoeng Kepiting Di Desa Tuban, Kecamatan Kuta, Kabupaten Badung," *J. Pendidik. Geogr. Undiksha*, vol. 6, no. 1, pp. 1–12, 2018, doi: 10.23887/jjpg.v6i1.20678.

[4]   www.cnnindonesia.com/, "Sandiaga Bakal 'Buka Pintu' Bali Bagi Turis Asing Pada Juni," *https://www.cnnindonesia.com/*, 2021.

[5]   E. H. dan R. Mardiana, "Pengaruh Ekowisata Berbasis Masyarakat Terhadap Perubahan Kondisi Ekologi, Sosial Dan Ekonomi Di Kampung Batusuhunan, Sukabumi," *J. Sosiol. Pedesaan*, vol. 2, no. 3, pp. 146–159, 2014.

[6]   Indonesiainside.id, "50 Persen Wisatawan Indonesia Adalah Kelompok Milenial," 2019.

[7]   B. Rhama, "Peluang Ekowisata Dalam Industri 4.0 di Indonesia," *J. Ilmu Sos. Polit. dan Pemerintah.*, vol. 8, no. 2, pp. 37–49, 2019, [Online]. Available: https://e-journal.upr.ac.id/index.php/JISPAR/article/view/1036.

[8]   I. G. M. I. S. Wardani and I. P. Anom, "Dampak Sosial Ekonomi Pengelolaan Ekowisata Mangrove Kampoeng Kepiting Terhadap Nelayan Desa Tuban Kabupaten Badung pengorganisasian , pengendalian , penempatan , pengambilan keputusan yang dilakukan oleh setiap organisasi dengan tujuan untuk mengkoordina," *J. Destin. Pariwisata*, vol. 5, no. 1, pp. 72–77, 2017.

[9]   W. Putu, S. Parama, A. I. Gusti, and O. Mahagangga, "Pengembangan Pariwisata Berbasis Masyarakat (Studi Kasus di Ekowisata Kampoeng Kepiting Tuban , Bali)," *Jounal Destin. Pariwisata*, vol. 5, no. 1, pp. 144–149, 2017.

[10] P. Dppu *et al.*, "Tuban Melalui Implementasi CSR PT . Pertamina," pp. 1–13.

[11] A. Mulyadi, E. Efriyeldi, and B. Marbun, "Strategi pengembangan ekowisata mangrove Bandar Bakau Dumai, Riau," *Din. Lingkung. Indones.*, vol. 8, no. 1, 2021, doi: 10.31258/dli.8.1.p.48-56.

[12] M. Yuniartik, A. T. K. Dewi, and M. P. Nugrahani, "Strategi pengembangan ekowisata Pantai Sari, Kelurahan Pakis, Kecamatan Banyuwangi, Kabupaten Banyuwangi," *J. Aquac. Sci.*, vol. 6, no. 1IS, 2021, doi: 10.31093/joas.v6i1is.186.

[13] N. Nurjanah, Y. Yasir, N. Yohana, and H. Susanti, "Tata Kelola Komunikasi Dalam Pengembangan Ekosistem Mangrove Sebagai Ekowisata Ekonomi Kreatif Dan Kearifan Lokal Kabupaten Bengkalis," *J. Ranah Komun.*, vol. 5, no. 1, 2021, doi: 10.25077/rk.5.1.41-51.2021.

[14] A. J. Ely, L. Tuhumena, J. Sopaheluwakan, and Y. Pattinaja, "Strategi Pengelolaan Ekosistem Hutan Mangrove di Negeri Amahai," *Trit. J. Manaj. Sumberd. Perair.*, vol. 17, no. 1, 2021, doi: 10.30598/tritonvol17issue1page57-67.

[15] B. E. Si. Lagarense and M. U. Pesik, "Pengembangan Atraksi Ekowisata Mangrove Berbasis Masyarakat Di Kawasan Pesisir Desa Tateli Dua, Kabupaten Minahasa, Sulawesi Utara," *J. Hosp. dan Pariwisata*, vol. 4, no. 1, 2021, doi: 10.35729/jhp.v4i1.59.

[16] D. R. Tanaya and I. Rudiarto, "Potensi Pengembangan Ekowisata Berbasis Masyarakat Di Kawasan Rawa Pening, Kabupaten Semarang," *Tek. Perenc. Wil. Kota*, vol. 3, no. 1, 2014.