Metaverse in Tourism as a Medium for Conservation of Maritime Area in Karimunjawa National Park

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Abstract
Conservation of marine areas in Indonesia has so far been carried out conventionally on the original objects. Responding to the development of industry 4.0 and society 5.0 which leads to increasingly rapid virtual technology, the conservation of maritime areas on the island of Karimunjawa by utilizing the metaverse platform is very relevant for discussion. The method used in this paper is a qualitative method with a descriptive analysis approach based on data sourced from several kinds of literature. The results show that maritime area conservation is in line with the metaverse concept using the virtual replication of aquatic ecosystems. In this metaverse, visitors will be able to enjoy several activities and benefits such as gaining knowledge related to maritime area conservation and conducting virtual tours, conducting virtual visit simulations before visiting in person, making buying and selling transactions, and also forming social communities and tourist communities.

Keywords: Conservation, Maritime, Metaverse, Tourism.

Abstrak
Konservasi kawasan bahari di Indonesia selama ini masih dilakukan secara konvensional pada objek aslinya. Menyikapi perkembangan industry 4.0 dan society 5.0 yang mengarah ke teknologi virtual semakin pesat, sehingga konservasi kawasan bahari pada pulau Karimunjawa dengan memanfaatkan platform metaverse menjadi sangat relevan untuk diwacanakan. Metode yang digunakan dalam tulisan ini adalah metode kualitatif dengan pendekatan analisis deskriptif berdasarkan data yang bersumber dari beberapa literatur. Hasilnya menunjukkan bahwa konservasi kawasan bahari yang sejalan dengan konsep metaverse adalah dengan cara replikasi ekosistem perairan secara virtual. Dalam metaverse ini nantinya pengunjung dapat menikmati beberapa kegiatan dan manfaat seperti mendapatkan pengetahuan terkait konservasi kawasan bahari dan melakukan wisata virtual, melakukan simulasi kunjungan virtual sebelum berkunjung langsung, melakukan transaksi jual beli, dan juga membentuk komunitas sosial maupun komunitas wisatawan.

Kata Kunci: Bahari, Konservasi, Metaverse, Pariwisata.
INTRODUCTION

The wealth of natural resources is supported by the existence of biological and non-biological resources which makes the potential for maritime tourism to be of high value. Based on data from the Directorate General of Marine Spatial Management, Ministry of Maritime Affairs and Fisheries (2017), Indonesia is recorded as having 16,056 islands with names and coordinates and these numbers have been registered with the United Nations through the United Nations Group of Experts on Geographical Names (UNGEGN). Maritime tourism activities have taken place in various Kawasan Konservasi Perairan (KKP) and Taman Nasional (TN) which have contributed to improving the economy and development in various coastal areas. On the other hand, irresponsible maritime tourism activities run the risk of damaging coral reefs or causing overcrowding of tourists in a maritime tourism destination.

Conservation in Indonesia has been implemented in this case, Kawasan Konservasi Perairan (KKP) are water areas that are protected, and managed by a zoning system, to realize sustainable management of fish resources and their environment (UU No. 45/2009). Generally managed by the Ministry of Maritime Affairs and Fisheries, and the provincial government. Types of MPAs include Maritime Nature Reserves (SAP), Kawasan Konservasi Laut dan Pulau-Pulau Kecil (KKP3K), and Taman Wisata Laut (TWL) with different designations from one type to another. The most common form of marine conservation is to regulate the maximum number of visitors that can be physically accommodated in the area without causing disturbance to nature. In addition to aspects of the number of visitors that can be managed, tourism carrying capacity also allows the area manager to be able to regulate spatial planning and responsible activity procedures. Marine area conservation in Indonesia has been carried out conventionally several times, as summarized in the research results (Mulyadi et al., 2017), there are several case studies of marine area conservation in Trikora Seagrass, Bintan, and the Riau Archipelago. In the context of developing conservation methods, currently, the preservation of natural resources is no longer only carried out physically, but can also be carried out non-physically by utilizing information technology.

Current and future generations will be increasingly connected to digital technology. Therefore, it is important to preserve the archipelago’s architecture by utilizing digital technology so that it can be passed on to the next generation without reducing the value contained in it through digitization. One of the digital technologies currently being developed is the 3D virtual world which is often heard as the metaverse. This metaverse can be used for virtual activities, such as working, online shopping, online travel or vacation, and others, including activities in the field of maritime conservation and tourism. Metaverse has the potential as a communication medium related to information technology-based conservation concepts that can be developed through the development of application models that present text, images, sound, and video by prioritizing easy access to data, user interaction, and being able to liven up the original atmosphere of the object is conserved. Digital marketing strategies that use technology such as virtual tours, cloud data, and other technologies need to be optimally implemented in the tourism sector. One application of the metaverse in the tourism sector is in America, to be precise in Manhattan. Implemented in several overseas travel service industry players such as a travel agent in England, Thomas Cook, who is experimenting with experiences from VR equipment, this tool provides customers with the opportunity to try various tours, including helicopter tours (Haliding, 2022).

This concept should also be used as a potential for conserving maritime areas through metaverse media so that everyone can enjoy it without being limited by space and time. Thus users can travel online and gain knowledge related to marine area conservation virtually through the metaverse. The purpose of this research is to find potentials and problems, as well as develop a strategic plan for the utilization of the metaverse conservation of the Karimunjawa maritime area which is a tourism area as a response to the
development of digital technology that is currently developing and is predicted to become a major part of human technology in the future.

LITERATURE REVIEW
METAVERSE RESEARCH
Today a new development appears in internet technology with the name metaverse. Times defines the metaverse as the world of the internet presented in 3D and virtual form (Pratama, 2021). Meanwhile, Mark Zuckerberg as CEO of Meta, describes the metaverse as a virtual world that can be entered by its users. In the metaverse, user can feel life in meta by "entering" the ecosystem. So it can be concluded that the metaverse is an interconnected virtual community with no end. In metaverse, users can work, socialize, shop, and play using special technology. Some of these technologies include virtual reality headsets, augmented reality glasses, and special applications for smartphones and/or other devices.

The metaverse picture is a set of virtual spaces, where users can create and explore worlds with other internet users. Metaverse as a virtual environment, also known as MUVE (Multi-User Virtual Environments), has a format derived from MMORPG (Massive Multiplayer Online Role-Playing Games) which allows everyone to meet avatars in 3D video games by combining virtual reality, and augmented reality. (AR), virtual reality (VR) and the internet. So real virtual environment (Díaz et al., 2020). This can not only be used for video games or other entertainment activities (U.-K. Lee, 2022).

Metaverse is based on technology that enables multisensory interaction with virtual environments, digital objects, and people. The representational fidelity of the XR System is enabled by a stereoscopic display capable of conveying the perception of depth (El Beheiry et al., 2019). This is made possible by a separate and slightly different display for each eye that mimics vision in the physical environment (El Beheiry et al., 2019). The high-resolution XR display enables a wide user field of view that can stretch from 90 to 180 degrees.

![Figure 1. Metaverse Element](sumber: Mystakidis, S. Metaverse. Encyclopedia 2022)

In the image above, it can be explained that in the context of Mixed-Reality (MR), which can bridge social media connectivity with the unique capabilities of VR and AR immersive technology. Virtual media is essential for articulating creative future visions and innovative solutions to complex problems with immersive technologies. This knowledge is essential for future Metaverse applications (Blascovich & Bailenson, 2011).
MARINE TOURISM
Marine Tourism or Marine Tourism is a branch of tourism that is oriented towards a tourism activity based on travel and experience in waters or sea areas. The National Trust Historic Preservation defines marine tourism as tourism activities supported by facilities and infrastructure for swimming, fishing, diving, and other sports, including facilities and infrastructure for accommodation, food, and drink (Suwena & Widyatmaja, 2017). According to Pandit (1999), Maritime tourism is one of the various types of tourism, which has been widely recognized today by trips made on the basis of sports destinations in water, lakes, beaches, bays, or beaches (Sastrawan & Sunarta, 2014). Activities that can be done include fishing, diving while taking photos, surfing, and rowing, besides that, going around seeing the marine park with beautiful views of the water surface, and various aquatic recreation. Marine tourism is a type of tourist attraction that has the potential to be developed for areas that have potential natural wealth in the form of seas or beaches (Adhiyaksa & Sukmawati, 2021). The existence of marine tourism is an alternative for an area to increase regional income sources that have marine natural wealth.

VISUAL COMMUNICATION WITH VIRTUAL REALITY MEDIA
In the book Introduction to Visual Communication Design, Visual communication design is a discipline whose goal is to study communication concepts and creative expressions through various media, the goal is to convey messages and ideas visually by managing graphic elements in the form of image shapes, color composition, typesetting, and layout (layout). The message or idea can be well received by the individual or group that is the target recipient of the message (Kusrianto, 2009).

From the description above, we clarify the points as follows: The concept of communication, Through creative expression, Through various media, visually conveying messages or ideas from certain parties to the target recipient of the message, Using graphic elements in the form of pictures, lettering, color, and layout. Communication design requires visual design in the process to be able to achieve the expected communication. The industrial revolution 4.0 is marked by the emergence of computerized systems, big data, artificial intelligence, robotics, and the Internet of things. The industrial revolution is not something that should be feared or even avoided, it has an impact on various things including communication media.

In essence, the world is changing day by day, making efforts that are getting easier in increasingly complex situations. Effective visual communication should also be able to create a situation that fosters curiosity and can change perceptions for the better. Visual communication media is currently developing very rapidly in line with the times. One of the technologies currently used is virtual glasses with virtual reality capabilities. This virtual reality media is being developed by various parties to provide new experiences for people.

Virtual Reality or abbreviated as VR is defined as the real world that is imagined, then projected onto a tool and becomes as real as it is in the mind (Zulfikasari & Adhi Windiyantono, 2021). Virtual reality media is often used in the gaming and healthcare industries or in companies that require advanced VR functionality. In the current generation, VR has great potential to enter the realm of the tourism industry as an alternative media in promoting digital tourism.

RESEARCH METHOD
The method used in this paper is a qualitative method with a descriptive analysis approach based on existing data (Sugiyono, 2018). Data is obtained from literature sources such as archives, books, and scientific articles published online. The data analysis stage begins with identifying data related to the
object of the Karimunjawa maritime area which is a tourism area, activities that can be carried out in the
metaverse and connecting them with conservation goals, organizing data based on objectives to find
potential, problems and develop strategic steps for utilizing the metaverse in tourism as a medium for
conservation of the Karimunjawa maritime area, and making a conclusion.

RESULT AND DISCUSSION

MARITIME AREA CONSERVATION

Conservation has been regulated in the Law of the Republic of Indonesia No. 5 of 1990 concerning
Conservation of Natural Resources and Ecosystems which defines Karimunjawa National Park as one of
the Nature Conservation Areas that have original ecosystems, managed with a zoning system that is
utilized for research, science, education, supporting cultivation, tourism, and recreation. Based on the
Decree of the Director General of PHKA No. SK 28/IV-SET/2012 concerning Zoning of Karimunjawa
National Park, there are currently 9 (nine) zones in the Karimunjawa National Park area which have their
respective designations. The zones of Karimunjawa National Park include (1) Core Zone; (2) Jungle Zone;
(3) Maritime Protection Zone; (4) Land Utilization Zone; (5) Maritime Tourism Utilization Zone; (6)
Marine Cultivation Zone; (7) Religion, Culture, and History Zone; (8) Rehabilitation Zone; and (9)
Traditional Fisheries Zone. The maritime tourism utilization zone in Karimunjawa is a zone developed
for the benefit of nature tourism activities, both maritime and other nature tourism, recreation,
environmental services, education, research and development that supports utilization, supporting
cultivation activities. Natural resources are everything available in nature and utilized for human welfare,
Soerianegara (1977) defines natural resources as elements of the natural environment, both physical and
biological, these elements are needed by humans to meet their needs and improve their welfare
(Darmayani et al., 2022). The context of maritime area conservation on the metaverse tourism platform
can be classified at the scale of making a twin (replication), which is a complete imitation of an
existing maritime area, in this case, a maritime object into a digital form so that later it can be enjoyed digitally or
virtually.

Determination of a marine area can be categorized as a natural resource, of course, must go through
an assessment by the authorities based on the criteria determined by law. According to Sarwono (2017),
maritime tourism is a tourism activity that utilizes the potential of maritime nature as a tourist attraction,
as well as a forum for tourism activities, carried out above the surface in the sea area which cannot be
separated from the existence of ecosystems rich in diversity of marine biota species. (Masjhoer, 2019).
Indonesia has a large potential for maritime natural resources, which is 75% of the territory of the Unitary
State of the Republic of Indonesia (NKRI), so far has contributed significantly to the success of national
development. These contributions include the provision of basic needs, increasing community income,
employment opportunities, foreign exchange earnings, and regional development. Next, it is just a matter
of choosing the right maritime area object in Karimunjawa to be replicated in the metaverse world.

One of the objectives of preserving cultural heritage according to Indonesian Law No. 11 of 2011 is
to promote Indonesia’s maritime areas to the world and the international community. The context of this
promotion can certainly be associated with tourism, in Indonesia itself has a variety of maritime tourism
sites that offer local natural beauty, both in the form of coral reefs, seagrass, and mangrove ecosystems.
The following is a list of locations of marine tourism utilization zones in Karimunjawa. The character of
the environment and waters has the potential to be included in the metaverse as one of the media for the
promotion of maritime tourism in Indonesia and the world, Table 1.
Table 1. Zoning of Maritime Tourism Utilization in Karimunjawa National Park

<table>
<thead>
<tr>
<th>No</th>
<th>Zoning of Maritime Tourism</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Menjangan Besar Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>2</td>
<td>Menjangan Kecil Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>3</td>
<td>Menyawakan Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>4</td>
<td>Kembar Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>5</td>
<td>Tengah Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>6</td>
<td>Southern part of Bengkoang Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>7</td>
<td>Northern part of Great Cemara Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>8</td>
<td>Tanjung Gelam</td>
<td>Aquatic</td>
</tr>
<tr>
<td>9</td>
<td>Northern part of Little Cemara Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>10</td>
<td>Katang Island</td>
<td>Aquatic</td>
</tr>
<tr>
<td>11</td>
<td>Krakal Besar Island in the south</td>
<td>Aquatic</td>
</tr>
<tr>
<td>12</td>
<td>Krakal Kecil</td>
<td>Aquatic</td>
</tr>
<tr>
<td>13</td>
<td>Cilik Island</td>
<td>Aquatic</td>
</tr>
</tbody>
</table>

Source: Karimunjawa National Park Center Statistics

Based on the maritime tourism zone in Karimunjawa aquatic contained in table 1 is an area with great potential for nature tourism activities. All areas are still untouched by technology and modernization. However, to experience directly to each of these water areas certainly requires time and money. Therefore, the concept of metaverse that offers a virtual experience of exploring maritime tourism in Karimunjawa National Park is interesting. At least it can provide an overview of tourist sites that can be enjoyed virtually for those who cannot visit directly, and provide simulations for those who plan to visit the National Park. In addition, it needs educational content and provides information related to each detail of maritime tourism.

METAVERSE IN TOURISM

In recent years the metaverse has become an interesting conversation around the world, although its development is still in its infancy, it has the potential to change human activity habits. According to research firm Gartner Inc, by 2026, 25% of the world's population will spend at least an hour in the metaverse for work, shopping, education, social, or entertainment (Dewi, 2022). Companies are competing to develop the metaverse, and even Mark Zuckerberg, the owner of Facebook social media, is willing to change the name of the Facebook company to meta because it can strengthen the company's position in the new world in the future (Ludwianto, 2021). The future metaverse will be the next human culture, will be a social technology, will be the main platform of digital computers, will change the society, will change the way people connect, connect digital assets to the economic world, thus concluding that the next generation of new technology and media from the internet is the metaverse (George et al., 2021).

One of the keywords of conservation is sustainability, the keyword is for people to live their lives for an unlimited period using limited natural resources, besides that as a means for education. The results of Endarto's research (2022) show the potential for the implementation of Metaverse technology in the field of education can be seen from the use of Augmented Reality and Virtual Reality as learning media, metaverse technology for the field of education is still in the development stage, the research describes the results of the application of metaverse technology on the concept of learning anywhere and anytime.
to be attractive and favored by generation Z and is predicted to enter many fields of human life in the future (Endarto, 2022).

![Three Layers Building the Metaverse](image.png)

Figure 2. Three Layers Building the Metaverse (Duan et al., 2021)

3-dimensional replication of the application of Augmented Reality technology as an educational media for Spiegel's historic building tour in Kota Lama Semarang (Endarto, 2022). The practical approach used is with 3D image modeling techniques using SketchUp and 3d max applications. In addition to the application of AR technology as an educational medium, the application of Virtual Reality technology shows that research, discussion, and development of metaverse in tourism is not something new anymore. So that the potential utilization of metaverse technology as a virtual media for the conservation and promotion of maritime tourism spread across the islands in Karimunjawa can be done. There needs to be a strategic plan for making and support from various parties related to experts in the fields needed.

What is the metaverse? The metaverse is the seamless convergence of physical and digital life, we can create a unified virtual community as a place to work, play, relax, transact, and socialize through our avatars (J.P. Morgan, 2022). The metaverse is the convergence of physical and digital life, creating a unified virtual community in which to work, play, relax, transact, and socialize. The metaverse is still in the early stages of its technological evolution, and there is no single definition that covers all human activities in the metaverse. The development of tourism in the metaverse is not an impossibility, many academics have discussed this topic, as well as practitioners who are trying to make it happen (U. K. Lee, 2022). The construction of the metaverse has been proposed by (Duan et al., 2021) consists of three layers of perspectives that include infrastructure, interaction, and ecosystem.

METAVERSE WEAKNESS

The metaverse technology is still in its early stages of development and there are certain issues that are the subject of multidisciplinary research and are already on the agenda (Dwivedi et al., 2022). First, considering that this new world will target 3 major activities of society, namely commerce, entertainment, and education. Each individual in the metaverse will be represented by an avatar that represents the character of the individual, so there must be clear rules and laws so as not to cause unwanted things in the virtual world. Secondly, related to the socio-economic conditions of people who are not all able to gain access to the metaverse, there are other important things that researchers think must be considered, namely regulating the use of supporting tools to enter this virtual world, such as VR and AR devices. In addition, regulations on who can use this tool, whether children can also use this tool or regulations for entering the metaverse world, and whether there are age restrictions. Things like this are the challenges of the metaverse as a new world that must be considered by the builders of this metaverse technology.
TOURISM STRATEGY THROUGH THE METAVERSE

The promotion of natural tourism, especially maritime tourism in Karimunjawa, certainly requires a strategy to make it happen. According to Hermawan (2012), product sales promotion is a short-term incentive to encourage the desire to try or buy a product or service, with the characteristics of using various approaches, attracting customer attention, offering the power of incentives to buy, and inviting and quickly rewarding consumer responses. (Priantana & Santoso, 2019).

From the potential and weaknesses that are currently known, a strategy is needed to answer the challenges of metaverse technology in the future. The metaverse technology that has been created until now is not to be used optimally because it is still in the early stages of development. Several strategic steps can be taken for natural resource conservation, namely developing general policy measures, determining the priority of objects to be conserved, determining scientific and technical measures, establishing study and training centers, and strengthening the synergy of the government, related parties, and local customary institutions (Zain, 2014). In the context of maritime tourism, it is necessary to limit the activities carried out in the metaverse itself, in accordance with the objectives of natural resource conservation such as educational purposes to provide experience and knowledge, as a virtual tourism promotion to provide experience or simulation for online visitors before visiting directly. The following are the steps that need to be taken for conservation using the metaverse media:

**Determine Tourism Activities**

Activities that can be done in the maritime tourism metaverse based on the article What Can You Do in the Metaverse! Inside the metaverse published by www.xrtoday.com, activities can be categorized as follows: gaming activities (play), enjoying performances and gaining virtual experiences (enjoy), working (work), shopping (buy), watching and creating daily activity content (watch), and social communities (socialize). The following things can be included in maritime tourism activities in Karimunjawa according to the activities available in the metaverse, following Table 2.

<table>
<thead>
<tr>
<th>Activities in the Metaverse</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playing Game</td>
<td>Sea games such as kite flying, banana boat, surfing, snorkeling, and underwater adventure diving.</td>
</tr>
<tr>
<td>Enjoy the show and gain a virtual experience</td>
<td>Visitors can enjoy music and art performances by existing traditions, as well as watching simulations.</td>
</tr>
<tr>
<td>Work</td>
<td>The metaverse provides stalls for tourism service providers such as transportation, accommodation, culinary, and souvenirs to promote services for virtual visitors who are simulating visits before visiting directly. In addition, it can market online products related to tourism in Karimunjawa.</td>
</tr>
<tr>
<td>Shopping</td>
<td>Visitors to the metaverse can do shopping activities from tour service providers, ranging from booking transportation and accommodation tickets, or tour packages. And also browse the souvenirs that can be visited at each stall seller.</td>
</tr>
</tbody>
</table>
Watch

Visitors to the metaverse can view multimedia, virtual and simulation videos related to the history, conditions, attractions, beauty of Karimunjawa islands and Karimunjawa maritime biota. As well as learning videos related to the conservation of Karimunjawa's natural resources, for example, flora, fauna, and ecosystems.

Social Community

Visitors to the metaverse can socialize, discuss and form a community for the conservation of Karimunjawa’s natural resources and the wider national scope.

Source: Author, 2023

The activities contained in the metaverse in Table 2, need to pay attention to 4 aspects of the metaverse concept that need to be prepared, including aspects of affordances, challenges, technologies and principle (Mystakidis, 2022). Based on these 4 aspects, it is necessary to consider the affordances for users who will visit this metaverse platform later, analyze future challenges and determine ways to achieve goals, must consider the availability of technology and tools that support the metaverse, and understand the principles of metaverse technology.

Determining Conserved Maritime Tourism Objects

Based on the United Nations Environmental Program (UNEP) in 2001, its provisions require that ecotourism activities must contain the following components: 1. Able to contribute to conservation activities and maintain biodiversity; 2. There is an increase in the welfare of the local population; 3. Tourists who come get experience and knowledge; 4. Participation of local communities to play an active role in tourism activities that are developed is highly emphasized. Conservation of maritime natural resources into the metaverse can be done by replicating the coastal and ocean areas within the Karimunjawa region. The scale of the area can include replicated sea boundaries, conditions, and landscapes, landscapes, and maritime ecosystems that show maritime ecotourism. The visualization scale is in the form of a display of underwater ecosystems within the Karimunjawa maritime area such as coral reefs, fish in the depths of the sea, grass forests and swimming with turtles. Exploring into the sea to enjoy the experience of diving in the depths of the sea or just on the surface of the sea by snorkeling. The elements of marine tourism become material for marine ecotourism knowledge and as a medium for promoting Karimunjawa tourism.

Equipment and Technology Support

The utilization of the metaverse as a medium for Karimunjawa maritime tourism needs the support of hardware and software equipment to realize virtual travel through metaverse technology such as virtual reality equipment, augmented reality, and smart glasses. Starting from the process of programming and creating 3d modeling of maritime tourism areas and objects, to the process of transferring data to the metaverse platform. The metaverse platform used must also be determined, whether using existing platforms such as sandbox, Roblox, and others, or developing their platforms.

Policy Support

Policy support from related parties is also needed to realize the idea of making this metaverse. Starting from the Karimunjawa National Park management, the directorate of natural resource conservation as the party that regulates conservation, the ministry of tourism for the benefit of Karimunjawa promotion,
and IT experts who understand the development of metaverse. Support policies for the availability of equipment and technology that is easily accessible, and a system that is open to all communities is also very important so that the idea of maritime tourism metaverse can be useful and can be used by all classes.

CONCLUSION
Metaverse in tourism as a medium for the conservation of maritime areas in Karimunjawa in this study is still limited to discourse or ideas in order to respond to technological advances in the era of industry 4.0 and society 5.0. Metaverse is currently still not the main commodity of technology because it is still in the early stages of development, but it is predicted that it will become the main technology in the future in aspects of human activities. Natural resource conservation efforts can be carried out in various ways, one of which is by replicating. Replication of maritime areas is considered in accordance with the concept of metaverse, a replication that is visualized in the form of 3D virtual that can be enjoyed in virtual reality or augmented reality. The elements of Karimunjawa's marine waters that can be virtualized include areas, flora and fauna, and beaches found on each of the islands spread across Karimunjawa National Park. Conservation of maritime areas in the metaverse can provide opportunities for all groups to visit virtually to Karimunjawa and enjoy the beauty of the sea, as well as simulate before visiting directly to the island in Karimunjawa that they want to go to. With this metaverse concept, it is expected to be one of the media for the promotion of maritime tourism in Indonesia to attract more local and foreign tourists. To realize the concept of utilizing the metaverse as a tourism media, of course, support from all parties is needed, both in the form of policy support, technology, network affordability and even funding support from both the private sector and related governments.

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REFERENCE


