Important-performance analysis of marine tourism development in Karimunjawa Island

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Abstract. Karimunjawa Island is a potential marine tourism attraction for Indonesian government to develop. Unfortunately, its development is prone to conflicts of interest related to tourism, conservation, and fisheries issues. Conservation programs should be performed along with improving the welfare of local people. This research investigated the condition of marine tourism on Karimunjawa Island and its development in relation to conservation. Primary data were obtained through interview and observation with 110 tourists and were analyzed using important-performance analysis (IPA). The results showed that the majority of tourists visiting Karimunjawa Island were not local tourists as many of them were international-tourists. Tourists were fond of enjoying beach views in the morning and evening, snorkeling (morning, afternoon, and evening), sunrise, sunset, relaxing, and enjoying culinary at night. The improvement of air transportation infrastructure and internet network should be prioritized. The friendliness of the local population, the beauty of nature (beaches, coral reefs, and mangroves) and the existence of culinary tourism showed the strongest performance that generated the highest tourist satisfaction. The results of this research proved that conservation and tourism can be synergized to obtain both short-term and long-term developmental goals.
Key Words: coastal tourism, conservation, IPA, Karimunjawa Island, sustainability.

Introduction. Karimunjawa Island stands out as a favored marine tourism destination that is targeted as potent tourism area by the government of Indonesia. Karimunjawa Island is part of the Karimunjawa Marine Protected Area (coordinates 5°40'39" to 5°55'00" S and 110°05'57" to 110°31'15" E) and is the largest island of Karimunjawa Islands. Renowned for its remarkable biodiversity (BTNKJ 2019; Wijayanto et al 2022) and captivating underwater landscapes, particularly its vibrant coral reef ecosystems, the island boasts an alluring appeal to tourists. Karimunjawa Island is the center of government and center of economic activity in the Karimunjawa Islands (BPS-Statistics of Jepara Regency 2022) and it is a sub-district of Jepara Regency (Central Java Province). Preceding the surge in tourism, the local community primarily relied on fishing and farming for sustenance on Karimunjawa Island. The development of the area as a tourist attraction has improved the welfare of the local people as the occupations become more diverse. Local people have created new sources of income from tour boat rentals, snorkeling and diving equipment services, guided tours, culinary ventures, souvenir crafting and vending, as well as lodging establishments.

On the other side, the conservation programs in the area are prone to failure unless the programs are capable of improving the community welfare as well (Rakotonarivo et al 2017; Sapoetra et al 2019; Ramadhan et al 2022; Wijayanto et al 2022). The successful conservation programs depend on their ability to enhance the well-being of the local populace. Therefore, the tourism development on Karimunjawa Island could to be synergized with water conservation program. In this context, local community can contribute to biodiversity conservation monitoring, given their vested interests. This research mapped the condition of marine tourism on Karimunjawa Island and its development priorities for the synergized conservation and marine tourism programs.

The mapping was performed using the importance-performance analysis (IPA). According to Marasinghe et al (2021), comprehension of tourist satisfaction is the key to the long-term sustainability of nature-based and coastal-based tourism activities.

Material and Method

Research location. The research took place at Karimunjawa Island (see Figure 1).

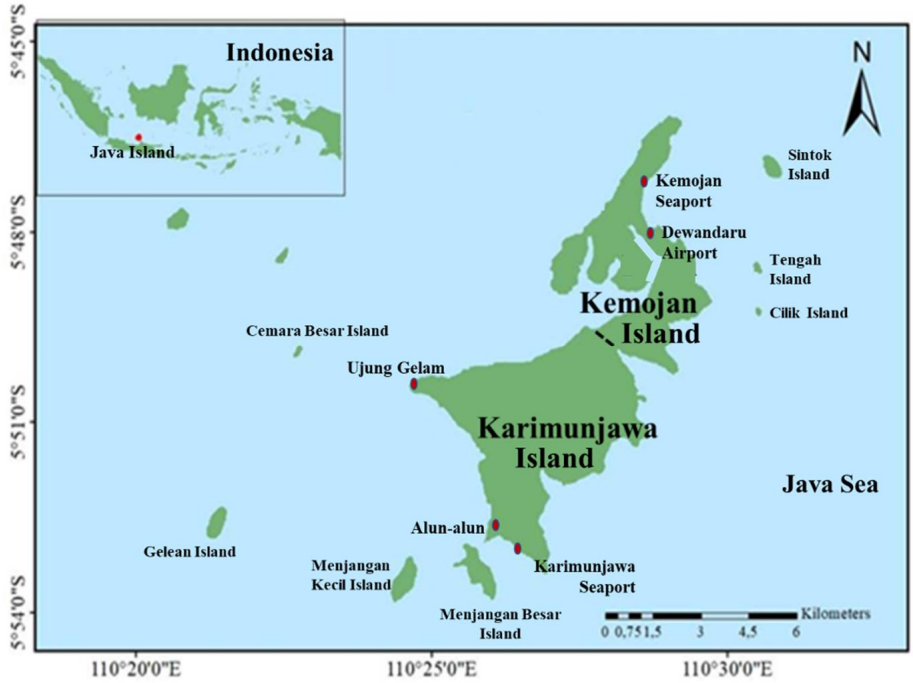

Figure 1. Karimunjawa Islands .

Research time. The survey of this research was performed between July and August 2023.

Data collection and analysis. Primary data were collected through interviews and observations involving 110 tourists. The observation process focused on the tourist attractions visited by these tourists. The objective of utilizing the IPA methodology was to identify and prioritize development areas that require attention. This process yielded four distinct quadrants, as depicted in Figure 2. Among these, quadrant I emerged as a crucial area for performance enhancement due to its combination of high importance and low current performance.

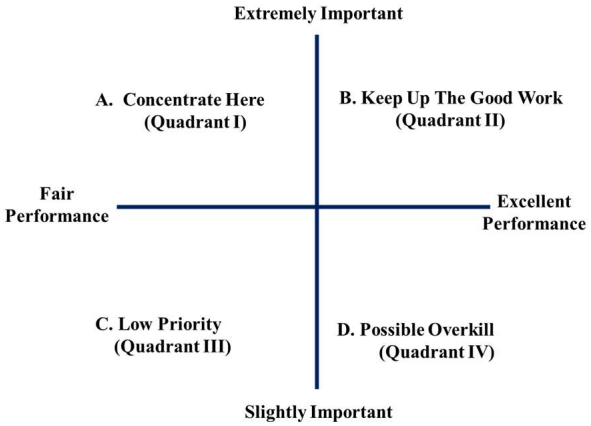

Figure 2. Important-performance analysis (source: Martilla & James 1977).

To comprehensively assess the determinants influencing the success of tourism activities, respondents were interviewed. This assessment involved evaluating the perceived importance and the current performance level of these determinants, utilizing a Likert Scale with a range of 1 to 5. In this scale, higher values corresponded to a greater impact or significance of the determinant for the success of tourism activities. The median score of 3 on both the importance (Y-axis) and performance (X-axis) scales served as the basis for delineating the quadrant axes (Martilla & James 1977; Musa et al 2010; Marasinghe et al 2021; Lankia et al 2022; Wibowo et al 2022).

Results and Discussion. The results of the survey and interviews show several locations frequently visited by tourists visiting Karimunjawa, including Menjangan Kecil Island, Menjangan Besar Island, Cemara Besar Island, Ujung Gelam Beach, Love Hill, Joko Tuo Hill, Bobby Beach, and Sunset Beach. The tourists who visit these small islands enjoy the view of the white sandy beaches, as well as doing snorkeling activities (Figure 3). At tourist sites in the hills, tourists enjoy the view of Karimunjawa from above. Some suitable locations to enjoy the sunset are Joko Tuo Hill, Love Hill, Karimunjawa Seaport, and Ujung Gelam Beach. While the sunrise can be enjoyed at Bobby Beach and Annora Beach.

(a) The view of Karimunjawa seen from the hills

(b) The beauty of the coral reefs on the coast of Menjangan Kecil Island

Figure 3. An example of Karimunjawa's natural beauty
(Note: photos are documents belonging to the researchers).

Characteristics of respondents. Based on the survey, tourists in Karimunjawa mostly came from outside Jepara Regency. International tourists reached 14.2% of the total visitors (Table 1). Java Island is the largest island closest to Karimunjawa Island where the central governance is carried out in the capital city of Indonesia (Jakarta City). Tourists hailing from the Central Java Province encompassed various areas such as Semarang (the provincial capital), Kudus, Rembang, Purwokerto, Sragen, Pati, Pekalongan, and Boyolali. Among these, the largest influx of tourists originated from Jakarta, constituting approximately 18.5% of the total. This can be attributed to the relatively greater purchasing power commonly found among Jakarta residents, surpassing the national average. Despite the considerable distances of 521 km from Jakarta to Jepara or 442 km from Jakarta to Semarang, followed by maritime travel to Karimunjawa Island or Kemojan Island, the prominence of Jakarta as a source of tourists remains substantial. Additionally, the international tourism spectrum witnessed visitors from countries including Australia, Austria, France, the Netherlands, Germany, and Portugal. The diverse array of tourism origins contributing to Karimunjawa exemplifies the island's robust appeal to travelers. Consequently, it necessitates comprehensive and sustained management efforts, encompassing aspects such as biodiversity preservation, infrastructural development, and the enhancement of human resources preparedness.

The cost of living for tourists during their stay on Karimunjawa Island is notably budget-friendly, as illustrated in Table 2. While the cost of living in Karimunjawa is comparatively higher than that of Jepara Regency, it remains affordable for tourists arriving from major urban centers like Jakarta, Surabaya, Bandung, and Semarang. Moreover, for visitors originating from developed nations such as Australia, the Netherlands, France, Japan, and Germany, the cost of living on Karimunjawa Island is

even more economical. Given the predominant presence of domestic tourists, it is imperative to establish service rates in accordance with national tariff standards, rather than those of developed countries. A research conducted by Deely et al (2022) revealed intriguing findings: marine tourists can experience a consumer surplus of up to three times the value they expend. This surplus emerges when the price paid by consumers for a product or service is lower than their willingness to pay, underlining the favorable economics of their experiences.

Table 1

Respondents (tourists)

Characteristics of respondents	*Number*
Origin of respondents	
• Jepara Regency (Local Tourist)	8.8%
• Central Java Province (Exclude Jepara Regency)	30.1%
• Java Island (Exclude Central Java Province)	46.0%
• Indonesia (Exclude Java Island)	0.9%
• International	14.2%
Average number of person in a group	
• Min	1
• Max	25
• Average	7
Age (years)	
• Min	17
• Max	30
• Average	72
Gender	
• Male	57%
• Female	43%

Table 2

Meal and accommodation costs spent by respondents

Cost types	*Number*
Breakfast (IDR day^{-1} person^{-1})	
• Min	15,000
• Max	50,000
• Average	27,363
Lunch (IDR day^{-1} person^{-1})	
• Min	15,000
• Max	75,000
• Average	29,044
Dinner (IDR day^{-1} person^{-1})	
• Min	15,000
• Max	75,000
• Average	35,106
Shopping for snacks and drinks (IDR day^{-1} person^{-1})	
• Min	20,000
• Max	100,000
• Average	60,398
Lodging (IDR day^{-1} person^{-1})	
• Min	60,000
• Max	700,000
• Average	198,655
Motorbike or car rental (IDR visit^{-1} person^{-1})	
• Min	75,000
• Max	500,000
• Average	109,314

Note: at the time of research, USD 1 was equivalent to IDR 15,000

The association of actors has established standardized rental rates for various services such as land transportation, tour boats, tour guide services, and tour equipment (including items like life jackets, underwater cameras, snorkeling, and diving gear). This standardized pricing approach aims to prevent price wars and ensure that tourists are not financially burdened. The total expenses that tourists encounter during their stay in Karimunjawa are shaped by several factors. These factors include personal preferences, the financial capability of the tourists, the size of the touring groups, and the duration of the trip. The diverse financial capacities of tourists visiting Karimunjawa contribute to their decisions regarding modes of transportation, types of accommodation, as well as food and beverage choices. The activities that tourists opt for are detailed in Table 3.

Table 3

Portfolio of tourism activities

Tourism activities	*% of respondents' answers*			
	Morning	*Noon*	*Afternoon*	*Evening*
Snorkeling	23%	49%	30%	
Enjoying the beach and sunrise	61%			
Enjoying the beach and sunset			50%	
Photograph	5%	12%	3%	
Relax and hang out (in Inns, Cafes)		55%	1%	52%
Culinary tourism				73%
Culinary in the 'Alun-alun'				48%
Sunbathing on the beach	3%	15%		

Note: 'Alun-alun' is a wide open grassy public square surrounded by roads and can be used for various community activities.

In accordance with Liu et al (2022), beach tourism capitalizes on the allure of sun, sea, and sand, which are the primary draws prompting tourists to choose beach destinations. The findings of their research reveal that on Karimunjawa Island, tourist activities exhibit distinct patterns throughout the day. In the morning, the predominate tourist pursuits involve relishing the sunrise, engaging with the beach environment, and participating in snorkeling activities. As the day progresses, snorkeling remains a prominent activity, complemented by leisurely periods spent at lodgings and cafes. In the afternoon, tourists continue to emphasize snorkeling, along with basking in the beach atmosphere and savoring the sunset. The evening sees a shift in dominant activities, characterized by relaxation, socializing within lodgings and cafes, and indulging in culinary experiences. Notably, the central hub for nighttime culinary options is the 'Alun-alun' area. The highest footfall in this locale occurs on Saturdays, as depicted in Figure 4. This phenomenon can be attributed to the tendency of some tourists to opt for short weekend getaways. They return to Java Island on Sunday, either in the morning or afternoon to resume work commitments on Monday.

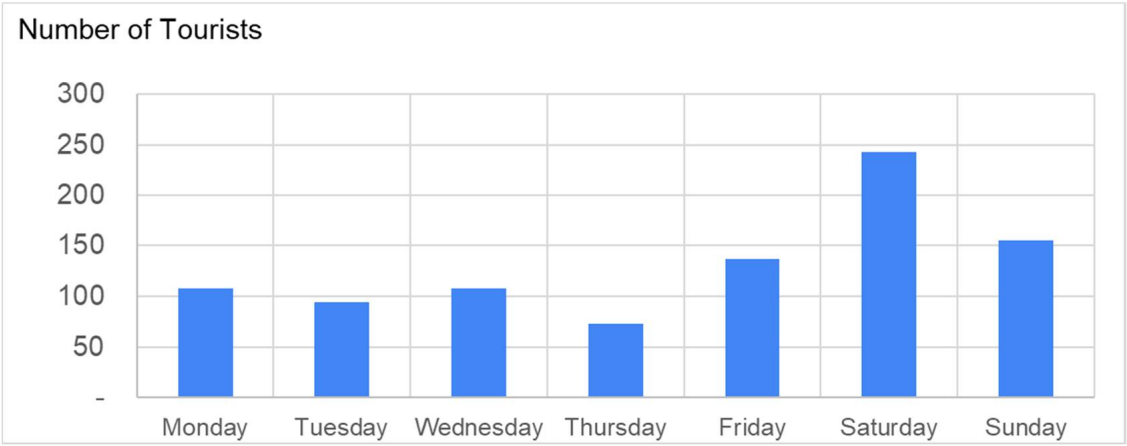

Figure 4. Average number of visitors to the 'Alun-Alun' during the study.

Regarding the selection of beach and snorkeling locations, the role of the tour guide is relatively significant. Tourguides encompass seeking out captivating locations that not only leave tourists content but also prioritize safety and overall comfort. Among the nearby isles to Karimunjawa Island, namely Menjangan Kecil Island, Menjangan Besar Island, and Cemara Besar Island, Karimunjawa Island and Kemojan Island stand out as the largest. These two islands are linked by a mere 10-meter-long bridge, as indicated by Wijayanto et al (2022). In the event that tourists opt to stay on Kemojan Island and are under the care of Kemojan Island's tour guides, a variety of island options and snorkeling sites come into play. Noteworthy among these selections are Sintok Island and Tengah Island. Presently, tourism activities on Karimunjawa Island have undergone significantly greater development compared to Kemojan Island.

The results of the IPA analysis show that air transportation facilities and internet communication fall within quadrant 1, necessitating them to be given precedence for enhancement (refer to Table 4 and Figure 5).

Table 4

Important-performance analysis

Factors	*Code*	*I*	*P*	*Q*
Friendliness of the local communities	A	4.91	4.94	2
The natural beauty of the beach	B	4.78	4.61	2
Underwater natural beauty (coral reefs)	C	4.74	4.52	2
The natural beauty of mangroves	D	4.66	3.97	2
Culinary	E	4.58	3.45	2
Tour guide	F	4.55	3.77	2
Environmental hygiene and waste management	G	4.52	3.11	2
Safety environment	H	4.51	3.71	2
The natural beauty of a tropical beach forest	I	4.46	3.99	2
Freshwater supply	J	4.43	3.56	2
Tourist information center facility	K	4.36	3.44	2
sea transportation infrastructure	L	4.29	4.04	2
Availability of energy sources (electricity, fuel)	M	4.28	3.76	2
Communication network and internet	N	4.25	2.98	1
Local art and cultural attractions	O	4.24	3.72	2
Land transportation facilities (local)	P	4.17	3.69	2
Thematic tourist facilities	Q	4.04	3.56	2
Lodging facilities	R	4.02	3.88	2
Medical facility	S	3.83	3.04	2
ATM and banking facilities	T	3.76	3.04	2
Air transportation infrastructure	U	3.50	2.37	1

Notes: I = important; P = performance; Q = quadrant, where quadrant 1 indicates high priority, quadrant 2 indicates the need for maintenance, quadrant 3 means less-priority, and quadrant 4 is considered less important.

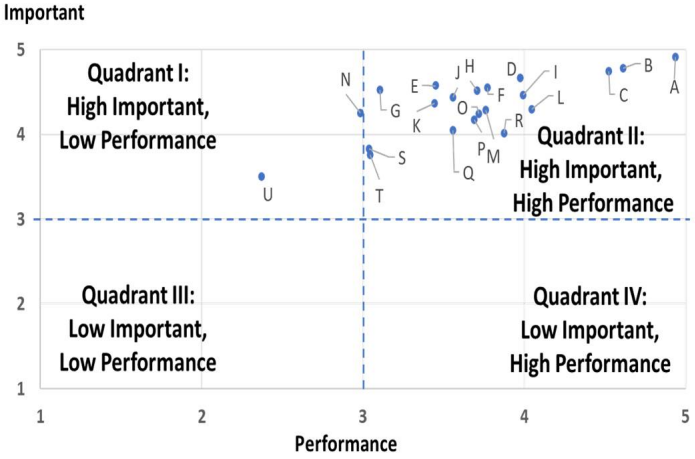

Figure 5. IPA matrix.

Dewandaru Airport on Kemojan Island has a runway of 1,200 x 30 meters. Before the Covid-19 pandemic, there was a flight schedule from Semarang to Karimunjawa with a travel time of 30 minutes. However, currently there are no scheduled commercial airlines serving the Karimunjawa Islands route and Dewandaru Airport only serves small charter flights at the present.

Discussion. Preserving the biodiversity within the waters of the Karimunjawa Islands is imperative, especially given that certain biota face the looming threat of extinction (BTNKJ 2019; Fafurida et al 2020). As a result, any strides made in advancing marine tourism on Karimunjawa Island must harmonize with conservation endeavors. The developmental landscape in the Karimunjawa Islands is intricate, due to the multitude of vested interests, ranging from conservation and fisheries to tourism (Kennedy et al 2020; Fafurida et al 2020; Prihantono et al 2021; Wibowo et al 2022). Globally, tourism stands as a pivotal economic pursuit in numerous coastal regions, underscored by its rapid growth and contribution to both the global GDP and local economies (Ghosh 2011; Garces-Ordonez et al 2020). In truth, the tourism sector stands out as one of the swiftest expanding economic segments, serving as a crucial cornerstone for both worldwide and local economic landscapes (UNWTO 2018; Lukoseviciute & Panagopoulos 2021).

The progress of tourism is strongly influenced by tourists' comfort and satisfaction. The results of this research indicate that comfort and satisfaction of tourists at coastal tourism sites are influenced by various factors, including natural beauty, infrastructure (transportation, roads, electricity, and communication), community friendliness, lodging, cuisine, tourism service providers, and mitigation of any disasters, accidents, and health problems. The research by Hai et al (2020) demonstrates that destination image and emotional value significantly affect tourist satisfaction and influence their intention to return. This research revealed that the friendliness of the local population, the natural beauty of the beach, the allure of the underwater world, the charm of the mangroves, and the availability of culinary tourism are the most crucial factors contributing to the main tourist attractions on Karimunjawa Island (Table 4). This implies that visitors to Karimunjawa Island are nature enthusiasts, underscoring the need for prioritizing the preservation and beauty of natural resources in the Karimunjawa Islands (including Karimunjawa Island) for all stakeholders, including the government, academics, researchers, environmentalists, and the local community. This signifies that marine conservation and tourism can be synergized.

According to the survey, the worst-performing aspects of tourism on Karimunjawa Island include air transportation infrastructure, communication and internet networks, health facilities, ATM and banking services, and environmental cleanliness (including waste management). Reactivating scheduled flights to Karimunjawa has the potential to pique the interest of tourists, especially those with higher purchasing power. The availability of air transportation could significantly improve the overall experience by reducing travel time to just 30 minutes from Semarang City to the Karimunjawa Islands. In contrast, taking a ship from Semarang City to Karimunjawa can be time-consuming, ranging from 7 to 9 hours depending on weather conditions and the type of vessel in service. Opting for a fast boat from Jepara to Karimunjawa would shorten the travel time to 2 to 3 hours. The distance between Jepara Regency (Java Island) and Karimunjawa Island spans approximately 94 km (BPS-Statistics of Jepara Regency 2022). Passengers who are susceptible to seasickness might experience discomfort due to the relatively pronounced swaying of the fast ship. Alternatively, taking the ferry from Jepara to Karimunjawa would take around 4 to 5 hours. As for the overland route from Semarang to Jepara, the travel duration typically ranges from 2 to 3 hours under normal traffic conditions.

The Community Health Centre ('Puskesmas') serves as a facility utilized by the local populace of the Karimunjawa Islands in cases of health issues. However, individuals seeking hospital care must travel to Java, as hospitals are not available on Karimunjawa. In terms of internet connectivity, only two providers operate on the islands, but their coverage does not extend to all areas of Karimunjawa and Kemojan. A solitary ATM is present in Karimunjawa, although numerous businesses there have embraced non-cash payment methods. Although strides have been made, there remains room for

improvement in environmental cleanliness and waste management, with ongoing waste processing facility construction in Karimunjawa. Notably, marine tourism activities have been identified as a key source of marine pollution in various studies (Portman & Brennan 2017; Garces-Ordonez et al 2020). Wijaya et al (2021) emphasize that addressing waste-related concerns is pivotal, considering that Karimunjawa's primary appeal lies in its natural beauty. Implementing the 3R principles (reduce, reuse, recycle) is imperative for effective waste management in Karimunjawa. Portman & Brennan (2017) underscore the importance of a persuasive approach to coastal waste management, coupled with long-term law enforcement efforts within local communities.

Ensuring a reliable supply of fresh water holds significant importance for Karimunjawa. The surge in population and tourist visits has escalated the demand for fresh water. Research by Prihantono et al (2021) reveals that groundwater in Karimunjawa has suffered seawater intrusion, rendering it unsuitable for consumption. Consequently, the development of water desalination technology is imperative. The primary source of electrical energy on Karimunjawa Island and Kemojan Island originates from the Legon Bajak Diesel Power Plant, boasting a capacity of 2 x 2.2 MW. Introducing solar and wind energy options can serve as alternative energy sources for the islands' inhabitants.

IPA used in this research proposed improvement priority for the marine tourism development, particularly concerning air transportation and communication-internet networks. Additionally, areas such as conservation, healthcare facilities, ATM and banking services, and environmental cleanliness necessitate attention. Marasinghe et al (2021) assert that IPA findings assist managers of natural tourist sites in setting service standards for tourism providers, while minimizing adverse effects on local wildlife. Lukoseviciute & Panagopoulos (2021) note that IPA can effectively identify gaps in service quality and recommend appropriate actions to enhance the management of beachfront tourist destinations.

Wibowo et al's research (2022) highlighted Karimunjawa community's realization that their well-being relies on natural resources. Favorable perceptions of conservation bear a positive impact on local support for conservation endeavors (Sapoetra et al 2019). Educating the public about conservation's significance is paramount. Given that fishing is the dominant profession on the islands, Wibowo et al (2023) mentioned the factors influencing fishermen's income, encompassing education, boat size, investment capital, fuel consumption, and travel duration. Several fishermen also double as tour service providers. Destructive fishing practices can diminish fish biomass and harm fish habitats (Johannesen 2007; Campbell et al 2013; Rakotonarivo et al 2017). Understanding fishermen's characteristics is pivotal for devising strategies involving local communities in conservation efforts (Awabdi et al 2018; Sapoetra et al 2019; Zhong et al 2019; Wijayanto et al 2022), as showcased in Wibowo et al's research (2022) highlighting fishermen's motives for supporting natural resource preservation, driven by economic reasons and a desire to preserve Karimunjawa's natural heritage for future generations.

Preserving Karimunjawa's natural resources is vital for the livelihoods of locals, including tour guides and fishermen. The rich aquatic diversity of the Karimunjawa Islands includes 412 fish species, 205 anthozoa species, 47 gastropod species, 8 bivalve species, 8 cephalopod species, 5 arthropod species, 31 echinoderm species, and 35 sponge species (BTNKJ 2019). Destructive fishing practices, as indicated by Kennedy et al (2020), pose a threat to coral reef areas. External elements, rather than Karimunjawa's native population, are often responsible for such environmental damage (Fafurida et al 2020). Cultivating an awareness of environmental sustainability from an early age through formal education is crucial.

Educational efforts should extend to tourists as well. Equipping tour guides with the competence and tools to supply information on nature conservation and maintaining environmental cleanliness to tourists is crucial. Liu et al (2022) underscore the importance of cultivating environmentally responsible tourist behavior for destination sustainability and nature preservation. Coastal cognitive image, encompassing coastal atmosphere, scenery, characteristics, and environment, warrants preservation through tourist engagement, as it significantly influences environmentally responsible tourist conduct.

The upsurge in tourism activities has heightened transportation demand, resulting in environmental impacts across land, sea, and air transportation. Air pollution contributes to greenhouse gases (GHG), while water pollution adversely affects marine life and human well-being. Ship and boat engines generate noise detrimental to marine ecosystems (WHO 2011; Di Franco et al 2020; Mejjad et al 2022). Without proper control, tourism's growth could negatively affect other sectors, such as fisheries, aquaculture, aquatic ecosystems, and public health (Mejjad et al 2022). Hence, it's crucial to advance marine resource management and sustainable planning to secure environmental, societal, and economic sustainability in coastal tourism regions.

Karimunjawa is inhabited by a diverse community, including Javanese, Bugis, Buton, Bajo, Mandar, and Madurese ethnicities. The populace is deeply religious (Wibowo et al 2022; Wijayanto et al 2022). Leveraging local wisdom can fortify conservation initiatives (Hamid et al 2021). Murhaini & Achmadi (2021) emphasize that conserving nature is synonymous with safeguarding the biota and inhabitants it supports, underscoring the need to incorporate longstanding local wisdom into community livelihood management. Harmonizing environmental, economic, and socio-cultural elements is pivotal for sustainable marine tourism development (Mejjad et al 2022). Synergy between fisheries, tourism, and conservation in the Karimunjawa Islands is imperative (Yuliana et al 2016; Wijayanto et al 2022).

Conclusions. The findings indicate that the major of tourists visiting Karimunjawa Island are not locals; rather, most originate from outside the Central Java Province, including foreign visitors. The cost of living on the island is relatively budget-friendly. The predominant tourist activities include admiring beach vistas during mornings and evenings, engaging in snorkeling throughout the day, experiencing sunrises and sunsets, unwinding, and indulging in nighttime culinary delights. Enhancing air transportation infrastructure and bolstering internet-communication networks stand as essential priorities for service enhancement. Notably, the warmth and hospitality of the local populace, the exquisite natural beauty encompassing beaches, coral reefs, and mangroves, alongside the availability of culinary tourism, exhibit the highest performance levels, contributing significantly to tourists' satisfaction with their Karimunjawa visit.

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Conflict of interest. The authors declare that there is no conflict of interest.

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