

GREEN TECHNOLOGY AS A MARKETING STRATEGY IN IMPROVING COMPETITIVE ADVANTAGES OF COMMUNITY-BASED TOURISM MSMES IN INDONESIA (SUSTAINABILITY OF CMC PANTAI TIGA WARNA)

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Abstract: Information technology advancements have occurred in the government sector, tourism-supporting industry, and the community-based economy, including digital-based tourism marketing. The digital-based marketing approach helps managers of tourism objects to innovate their promotional activities. This study aims to: (1) examine the types of digital branding media used to promote CMC Pantai Tiga Warna; (2) analyze trends in visitor numbers following the implementation of digital media in site management; (3) assess the origins of visitors; (4) evaluate the site's accessibility; and (5) assess visitor satisfaction after their visit. This study employed a mixed-methods design, combining both quantitative and qualitative approaches. Quantitative data included visitor statistics from 2022 to 2024, including the number and origin of visitors, collected through documentation and interviews with site managers. Information on the use of digital media for promotion and communication was also obtained from interviews with management. Visitor satisfaction data were gathered through structured interviews with visitors and supporting documentation. The findings confirm that CMC Pantai Tiga Warna effectively utilizes digital platforms such as an e-commerce website, Instagram (@cmctigawarna), WhatsApp, and Facebook, contributing to a steady increase in visitors from 2022 to 2024. Visitors come from Malang, other regions of Indonesia, and abroad, particularly those interested in coastal ecosystem management and mangrove conservation. The site is easily accessible by both private and rented vehicles. Visitors express high satisfaction with the range of ecotourism activities offered, including mangrove nursery programs, mangrove planting, snorkeling, diving, canoeing, and eco-brick production. A key feature is the waste management policy, which requires visitors to manage their own waste, reinforcing the site's commitment to sustainability. The study concludes that high visitor satisfaction is strongly linked to a higher likelihood of return visits to CMC Pantai Tiga Warna. Managed by the Sendang Biru community under Green Technology Marketing, the site integrates environmental sustainability with digital innovation. This community-based approach has given the site a competitive edge, making it a leading example of sustainable ecotourism in South Malang.

Keywords: competitive advantage, community-based, green technology marketing, tourism management, digital media

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INTRODUCTION

Tourism plays a significant role in improving the economy and welfare of the people. Tourism development can sustainably elevate the people's economy, and its strength in improving the economy has been proven at the national level (Ferreira et al., 2020; Zhang et al., 2020). Indonesia is one of the countries where tourism has become a central pillar of economic improvement (Sumarmi et al., 2022). Indonesia offers many tourism opportunities, and one of the most attractive tourist sites is the coastal area because 2/3 of the country is made up of the sea (Marlina et al., 2020). Most of Indonesia's coastal areas are located in rural areas, so coastal tourism development will positively affect the economy of rural people (Zamzami et al., 2025). Pantai Tiga Warna is a beach located in the southern region of Malang, within the Clungup Mangrove Conservation (CMC) area in Tambakrejo Village, Sumbermanjing Wetan District, Malang Regency (Islamiyah, 2020). Situated approximately 50 kilometers from Malang City, it is now easily accessible due to the development of the Jalur Lintas Selatan Malang, a roadway connecting Pantai Sendang Biru and Pantai Modangan. Although situated within a conservation zone, Pantai Tiga Warna has been developed as a site for tourism, recreation, and environmental education. The management model integrates ecotourism with nature conservation education (Sumarmi et al., 2022). The beach belongs to the area of rehabilitation and conservation of mangroves, coral reefs, and protected forests of Sitarjo Village, Sumber Manjing Wetan District, Malang Regency.

Pantai Tiga Warna is managed as an ecotourism destination by the local community of Sendang Biru Village through the Yayasan Bhakti Alam Sendang Biru (Sumarmi et al., 2020). Historically, many local residents were involved in environmentally harmful practices, including forest encroachment and unsustainable fishing, which led to marine pollution.

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Through educational initiatives on environmental conservation, these communities underwent behavioral change (Marlina et al., 2020). Today, local residents are actively involved in tourism-related roles such as tour guides and coast guards. The management of the beach is based on ecological, social, and economic sustainability. As a sustainable tourism destination, Pantai Tiga Warna offers activities such as banana boating, canoeing, snorkeling, diving, and mangrove planting. The destination employs both direct and indirect communication strategies to build its brand image, involving visitors as part of its promotional efforts (Christou, 2015; Godey et al., 2016).

As an ecotourism site, Pantai Tiga Warna combines mangrove forests with underwater landscape conservation. Visitors to the CMC area experience a sense of safety and connection to nature, while also enjoying opportunities for social gatherings. In addition, tourists are encouraged to engage with local guides involved in coastal conservation, allowing them to gain educational insights into environmental preservation alongside leisure activities (Islamiyah, 2020). Designated as a Marine Protected Area (MPA), Pantai Tiga Warna enforces strict environmental regulations. Daily visitation is limited to 100 people, and all visitors are subject to inspection upon entry. Littering is prohibited, and tourists must take all their belongings and waste with them upon departure. Violators are subject to fines. Recreational activities include swimming, snorkeling, diving, boating through mangrove areas, visiting floating houses, and participating in conservation efforts such as mangrove planting, baby turtle release, and artificial coral cultivation (Sumarmi et al., 2022; Zamzami et al., 2025).

Environmental preservation is central to the site's management approach. Tourists are required to report their belongings at designated checkpoints to monitor potential waste generation (Sumarmi et al., 2022). The route to the beach offers scenic views and fresh air, reflecting the area's well-maintained environment. The beach operates daily, except on Thursdays and religious holidays, to allow for ecological recovery. Visitors are typically given approximately two hours to enjoy the site, which helps limit overcrowding and enhances the visitor experience. Pantai Tiga Warna is named for its distinctive three-colored seawater—red, green, and blue. The red hue results from sunlight penetrating water up to 20 meters deep; green arises from a mix of silt and plankton; and blue signifies deeper waters. The interplay of these colors with the brownish sand creates a striking visual effect. Facing Sempu Island, the beach benefits from calm waves, ideal for snorkeling and swimming. Visitors can also enjoy banana boat rides and scenic views from a nearby hilltop observation post, which offers panoramic views of neighboring beaches and the grandeur of Sempu Island.

The surrounding protected forest is managed collaboratively by Yayasan Bhakti Alam and the local community (Sumarmi et al., 2020). Pantai Tiga Warna lies south of Pantai Sendang Biru, the main access point to the Sempu Nature Reserve and surrounding conservation areas. The area's long coastline makes it a desirable destination for relaxation and eco-friendly tourism. Tourism development at Pantai Tiga Warna includes: (1) enhancing tourism attractions, (2) improving facilities and infrastructure, (3) marketing and promotion (Kohli et al., 2015), and (4) human resource development. These efforts emphasize environmental beauty while ensuring visitor comfort and service quality.

Indonesia is home to many coastal areas with high ecological and economic value. The development strategies used at CMC Pantai Tiga Warna align with broader community-based tourism initiatives across the country. The CMC area comprises Pantai Clungup, Pantai Gatra, Pantai Mini, Pantai Batu Pecah, and Pantai Tiga Warna. By promoting ecological sustainability, the area offers long-term environmental and economic benefits (Sumarmi et al., 2021). To ensure continued balance between tourism and conservation, a community-based management model supported by green technology and environmentally responsible marketing is essential. The Malang coastal area, particularly CMC Pantai Tiga Warna, features a diverse range of attractions, including coral reefs, rich marine ecosystems, mangrove forests, and natural landscapes. These elements appeal to both domestic and international tourists. Given its ecological richness, tourism in the region follows an ecotourism framework that emphasizes environmental sustainability (Darmansyah et al., 2021).

Development efforts within the CMC area are site-specific: Pantai Clungup focuses on mangrove education through nurseries and planting; Pantai Gatra emphasizes beach conservation and canoeing; Pantai Mini and Pantai Batu Pecah are dedicated to coastal preservation; and Pantai Tiga Warna specializes in coral reef conservation, snorkeling, and photography. All activities are coordinated by the Sendang Biru community under the oversight of Yayasan Bhakti Alam Sendang (Sumarmi et al., 2022). Yayasan Bhakti Alam Sendang represents a Micro, Small, and Medium Enterprise (MSME) engaged in tourism management and is therefore required to implement innovative strategies to support sustainable tourism development (Abed, 2020; Ahmed, 2020; Ioannides & Gyimóthy, 2020). One such innovation is the application of Green Technology marketing, which plays a significant role in fostering sustainable business practices (Al Hadwer et al., 2021; Awa et al., 2016; Sulisty, 2021). Strategies based on Green Technology offer several advantages, including the preservation of environmental sustainability within local communities (Dewailly, 1999; Tzoulis et al., 2018; Vázquez Loaiza et al., 2019). Tourism site managers must continuously innovate (Dearing, 2009) and seek opportunities to create and promote sustainable tourism (Brouder, 2020). Green Technology-based approaches not only enhance the visitor experience but also contribute to the long-term sustainability of tourism destinations (Cranmer et al., 2020).

Furthermore, Green Technology marketing provides an engaging way for tourism managers to offer unique experiences that encourage repeat visits (Pratika & Sutikno, 2017). The use of technology facilitates the rapid dissemination of information, including details about CMC Pantai Tiga Warna (Sanjaya, 2009). Strengthening destination branding through technological advancements and social media can significantly improve the visibility and reputation of CMC Pantai Tiga Warna. Additionally, marketing technologies such as e-commerce offer strategic solutions for tourism development and support the growth of associated MSMEs (Baker, 2012; Ramdani et al., 2013). Given the strict visitor regulations—limited to 100 individuals per day, with groups of up to 10 people allowed a maximum stay of two hours—e-commerce has become essential for business operations. Online booking systems prevent visitor dissatisfaction by ensuring that quotas are managed effectively (Raj & Jeyaraj, 2023). Moreover, e-commerce promotes transparency in managing tourist activities and services.

Tourism enterprises must remain responsive to environmental changes and leverage emerging Green Technologies to support sustainable production and consumption. These innovations aim to reduce environmental impacts while maximizing economic benefits (Thomassen et al., 2019). The adoption of environmentally friendly technologies is critical to achieving long-term positive outcomes for both tourism development and ecological preservation (Moosa & He, 2022).

MATERIALS AND METHODS

This study was conducted at CMC Pantai Tiga Warna, located in Tambakrejo Village, Sumbermanjing Wetan District, Malang Regency. A mixed-methods approach was employed, integrating both qualitative and quantitative methods (Ferreira et al., 2020; Sumarmi et al., 2022). Quantitative data included the number of visitors from 2022 to 2024 and their origin; data were collected through interviews with managers and documentation. Data on the digital media used came from managers of the site. Data on visitors' origins and satisfaction were collected using a Google form (Nguyen et al., 2022).

Quantitative data included the number and origin of visitors from 2022 to 2024. These data were obtained through interviews with site managers and through existing documentation. Information regarding the digital media used for promotional purposes was gathered from site managers. Additionally, visitor data related to origin and satisfaction were collected via an online Google Form. Data collection methods included observations, interviews, and documentation. Field observations were conducted to assess road access to the site. Semi-structured interviews were held with various stakeholders, including managers from Yayasan Bhakti Alam Sendang Biru, tour guides, checkpoint staff, mangrove planting assistants, local drivers, and visitors. Documentation comprised photographs, videos, and maps obtained through drone, camera, and satellite imagery. A Focus Group Discussion (FGD) was also conducted with site managers and members of the local community to gather deeper insights.

Quantitative data focused on elements such as branding media, visitor occupations, visitor numbers and origins, and estimated annual income. These data were analyzed using tabulations, percentages, and graphical representations (Low et al., 2022). For qualitative data analysis, Computer-Assisted Qualitative Data Analysis Software (CAQDAS) was employed, specifically MAXQDA 2020 and Gephi version 0.9. MAXQDA was used to analyze interview transcripts and descriptive responses collected via Google Forms. Gephi was utilized for generating interactive graphs and performing network analysis for data visualization (Priyanto & Farida, 2022). The qualitative results obtained through MAXQDA were subjected to further statistical analysis before being visualized using Gephi. To examine interrelations among the studied variables, data collection, processing, and visualization were undertaken. This analysis enabled the identification of connections between key influencing aspects related to sustainable ecotourism management at the study site (Zhang et al., 2020).

RESULTS AND DISCUSSION

Digital Branding Media Used for Tourism Promotion at CMC Pantai Tiga Warna

Strategies to increase the popularity of CMC Pantai Tiga Warna are crucial, as the tourism sector is a key pillar of Malang Regency's economy. Malang Regency boasts promising natural and cultural potential, with the local government planning to develop 1,000 beaches as new tourist destinations.

Technology—particularly e-commerce—has become a core component of the site's tourism marketing. A Participatory Rural Appraisal (PRA) approach was used to involve the community of Sendang Biru, while the AIDA model (Attention, Interest, Desire, Action) guided efforts to build public awareness around sustainable tourism and community-based empowerment. Branding and e-commerce initiatives, including an online reservation system, were strengthened based on empirical research findings (Baker, 2012; Gupta et al., 2022; Low et al., 2022; Nguyen et al., 2022).

While most tourism and economic activities in Malang Regency are still managed offline, CMC Pantai Tiga Warna has adopted digital technologies since 2020. The following strategies were implemented to optimize the use of digital branding media: (1) increasing the use of e-commerce technology as a supporting medium for tourism in CMC Pantai Tiga Warna; (2) enhancing operational knowledge and skills regarding e-commerce management for youth groups in CMC Pantai Tiga Warna; (3) empowering youth groups to have better knowledge and skills to manage e-commerce accounts according to research results (Raj & Jeyaraj, 2023; Ramdani et al., 2013). These initiatives have contributed significantly to the site's growing popularity. Online bookings are now mandatory for all visitors. Of the 75 respondents in the study, 70 reported making an online booking before their visit, while only five arrived without a prior reservation (Figure 1).

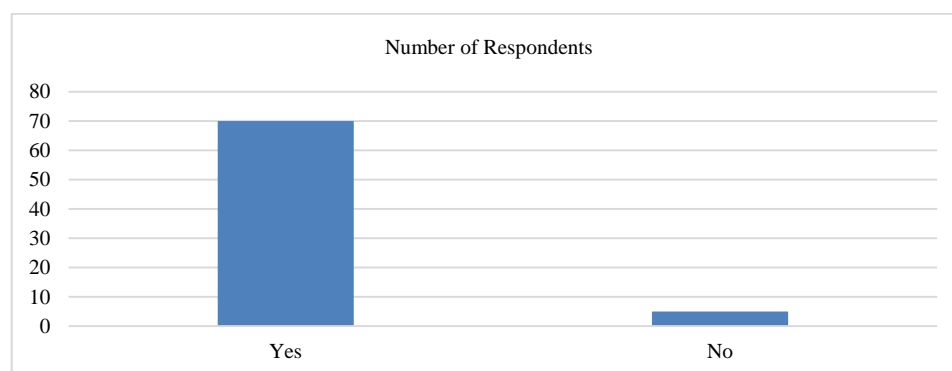


Figure 1. Digital Information-seeking Behavior Before Visiting CMC Pantai Tiga Warna

Survey data show that 90% of respondents (70 individuals) had previously visited CMC Pantai Tiga Warna and had sought information online before their trip. This underscores the critical role of digital media in tourism development. These findings align with the Technology-Organization-Environment (TOE) framework proposed by Baker (2012) and support the assertion by Kohli et al. (2015) that digital platforms are now essential for tourism marketing. This also corroborates Christou (2015) and Godey et al. (2016) who emphasized the influence of social media in shaping visitor perceptions and travel decisions. Furthermore, these results reflect Pratika & Sutikno's (2017) conclusion that digital engagement enhances pre-visit anticipation, ultimately motivating real-world visits. The findings are also consistent with Low et al. (2022) who argue that digitalization is key to the sustainability of conservation-oriented tourism destinations such as CMC Pantai Tiga Warna. Visitors used multiple platforms to access information about the site. These results are shown in Figure 2.

Respondents reported using various platforms—Facebook, official websites, WhatsApp, and Instagram—to find information. The website was the most utilized source (42 respondents or 56%), primarily due to its detailed information on travel routes, entrance fees, site regulations, and facilities. Instagram followed closely (40 respondents or 53%), appreciated for its visual content, such as real-time photos and videos of the destination. These results demonstrate the effectiveness of multi-platform digital branding in tourism development and support the application of Green Technology marketing at CMC Pantai Tiga Warna. The preference for websites—used by 42 respondents (56%)—aligns with Sanjaya's (2009) findings on the role of technology in disseminating detailed and reliable tourism information. Instagram was used by 40 respondents (53%), reinforcing the arguments of Christou (2015) and Godey et al. (2016) regarding the persuasive power of visual content in shaping travel behavior and enhancing destination appeal. The simultaneous use of multiple platforms, including Facebook and WhatsApp, aligns with Kohli et al. (2015) who emphasize the importance of integrated digital marketing ecosystems. Furthermore, the implementation of Green Technology marketing at CMC Pantai Tiga Warna illustrates the technological readiness framework proposed by Zhang et al. (2020) and the Technology-Organization-Environment (TOE) model introduced by Baker (2012), demonstrating how digital platforms facilitate sustainable tourism management. These results also echo the conclusions of Thomassen et al. (2019) and Al Hadwer et al. (2021) who highlight how digital innovations contribute to effective strategies such as visitor capacity control and transparent reservation systems.

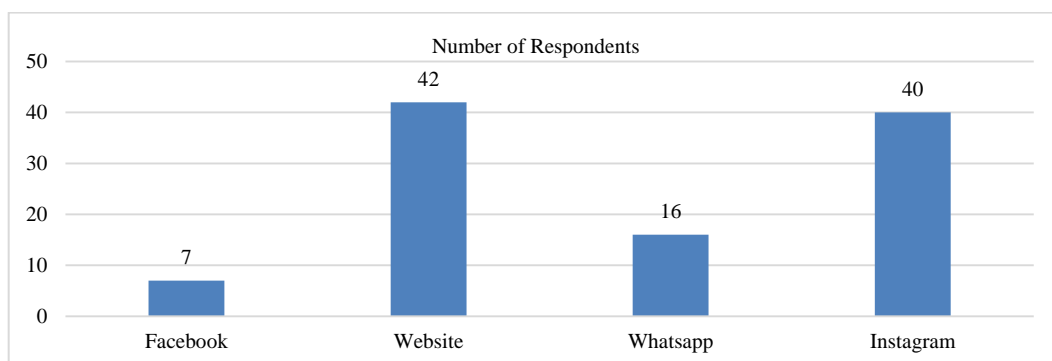


Figure 2. Digital Media Used to Look for Information Before Visiting CMC Pantai Tiga Warna

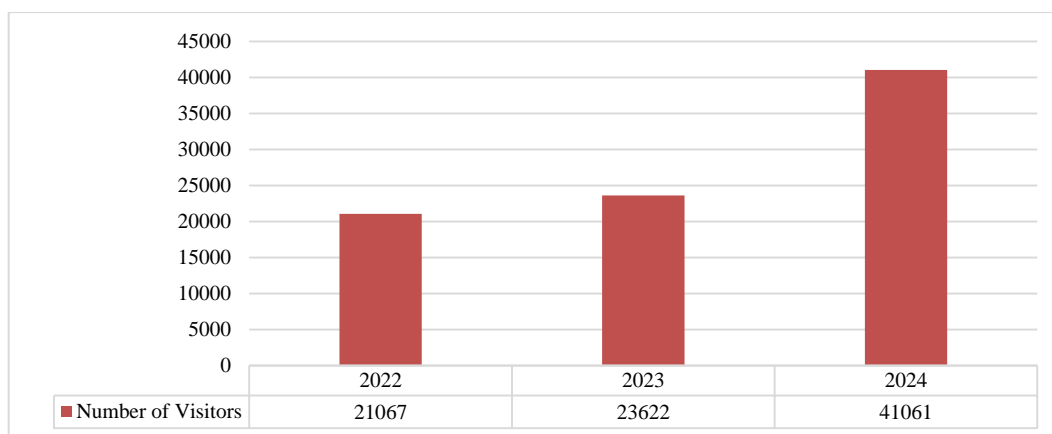


Figure 3. Total Visitors of CMC Pantai Tiga Warna from 2022 to 2024

Visitor Trends at CMC Pantai Tiga Warna Following the Implementation of Digital Media Strategies

CMC Pantai Tiga Warna is strategically located within a designated coral reef conservation area. To preserve its ecological integrity, visitor access is strictly regulated. Unlike mass tourism destinations, CMC Pantai Tiga Warna deliberately limits its visitor numbers to ensure sustainable use of natural resources. Entry is only permitted via advance online booking, and daily visitor quotas are enforced. Figure 3 presents the annual visitor numbers from 2022 to 2024, following the implementation of digital media in site management. Figure 3 shows a clear upward trend in annual visitation. In 2022, CMC Pantai Tiga Warna recorded 21,067 visitors, increasing to 23,622 in 2023—a 12.1% rise. The most notable

growth occurred in 2024, with 41,061 visitors, reflecting a 73.8% increase from the previous year. Over the three-year period, the total increase was 94.9%, nearly doubling the number of visitors. This growth suggests successful digital marketing efforts, improved site recognition, and enhanced visitor management practices.

These increases align with theoretical frameworks in sustainable tourism. The 94.9% growth from 2022 to 2024, especially the 73.8% surge in 2024, reflects the effective adoption of Green Technology marketing strategies Al Hadwer et al. (2021). The findings support Brouder (2020), who mentioned that conservation-based differentiation enhances destination appeal. The data also confirms Sumarmi et al. (2020), who concluded that restricted access may boost desirability by creating a sense of exclusivity. These results align with the Technology-Organization-Environment framework (Baker, 2012), illustrating how digital tools elevate the competitiveness of community-based tourism while maintaining ecological sustainability. Figure 4 illustrates the total revenue earned by CMC Pantai Tiga Warna from 2022 to 2024, corresponding with the increase in visitor numbers during this period.



Figure 4. Total Revenue of CMC Pantai Tiga Warna from 2022 to 2024

The revenue growth parallels visitor numbers, confirming the economic benefit of integrating digital media with conservation strategies. Green Technology marketing has effectively conveyed CMC Pantai Tiga Warna's identity as a conservation-first destination. When visitor quotas are reached, the reservation system automatically closes, helping limit environmental strain. The beach is closed every Thursday and on religious holidays, including New Year's Day, to allow for natural ecosystem recovery. Figure 5 highlights monthly visitor fluctuations from 2022 to 2024

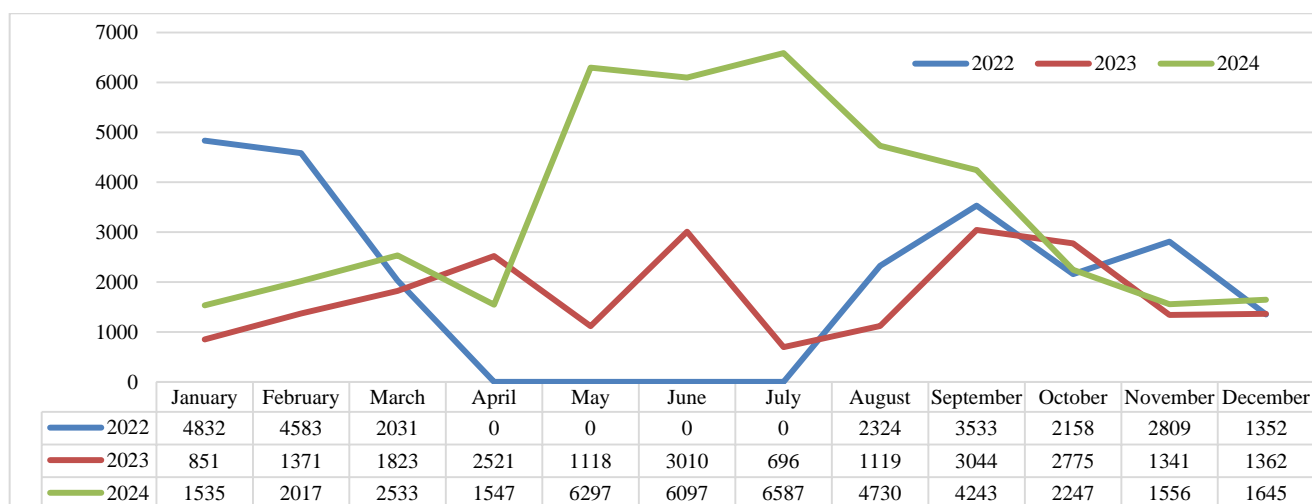


Figure 5. Number of Monthly Visitors from 2022 to 2024

The line graph (Figure 5) illustrates monthly visitor numbers at CMC Pantai Tiga Warna from 2022 to 2024, highlighting significant shifts in visitation patterns over the three-year period. In 2022 (blue line), visitation started strong in January and February with approximately 4,800 visitors, but ceased entirely from April through July. Activity resumed in August, with a secondary peak in September (3,533 visitors). In contrast, the 2023 data (orange line) show consistent year-round visitation, with moderate fluctuations and notable peaks in June (3,010 visitors) and September (3,044 visitors). By 2024 (gray line), a marked transformation occurred, characterized by significantly higher mid-year visitation. The peak was recorded in July, with 6,587 visitors—the highest monthly total across the entire three-year span. These evolving trends indicate a shift in peak seasonality from early in the year (2022) to mid-year (2024), suggesting changes in site management, promotional strategies, or broader external influences shaping visitor behavior. The transition from partial operations in 2022 to continuous service with concentrated peak seasons in 2024 reflects CMC Pantai Tiga Warna's

adaptive development as an ecotourism destination. These shifting visitation patterns underscore the successful application of adaptive management strategies within a conservation-based tourism framework. The progression from limited access and seasonal peaks to consistent, strategically managed operations is consistent with the framework of tourism transformation pathways by Brouder (2020). It also reflects the concept of strategic operational reconfiguration discussed by Ioannides & Gyimóthy (2020) aimed at maintaining sustainability while enhancing visitor experience.

The significant rise in visitors by 2024, especially the July peak, supports findings by Christou (2015) and Godey et al. (2016) regarding the role of digital branding in increasing destination appeal. This transformation illustrates the relevance of the Technology-Organization-Environment (TOE) framework described by Nguyen et al. (2022), emphasizing how digital technologies can improve visitor management. According to Zhang et al. (2020) technological readiness is essential for enabling green innovation in environmentally sensitive areas. The experience at CMC Pantai Tiga Warna reflects this, as the site continues to balance conservation objectives with growing tourist demand (Sumarmi et al., 2021; Thomassen et al., 2019).

Occupations and Origins of Tourists Visiting CMC Pantai Tiga Warna

Questionnaire results on the occupations and origins of people visiting CMC Pantai Tiga Warna are elaborated as follows. Questionnaire data collected from 75 respondents revealed a diverse visitor profile regarding occupation and origin. Most respondents were university students (30 individuals) and lecturers (28 individuals), highlighting a strong academic connection to the site. Other respondents included civil servants, private employees, teachers, and laboratory assistants. The prominence of students and lecturers is understandable given that Malang is widely known as a center of higher education, with numerous universities and academic institutions. This concentration of academic professionals suggests that CMC Pantai Tiga Warna is not only a recreational destination but also serves educational purposes, particularly in environmental studies and conservation awareness. Figure 6 shows that university students make up the largest group of visitors, totaling 30 people (39.5%), followed closely by lecturers at 28 people (36.8%). Civil servants accounted for 8 visitors (10.5%), while teachers represented 7 visitors (9.2%), and private employees comprised only 3 visitors (3.9%). Students and academic professionals collectively represented over three-quarters of all respondents (76.3%). This occupational profile indicates that CMC Pantai Tiga Warna is an informal learning environment, likely used for field studies, research, and environmental education activities. The low proportion of private-sector employees suggests that the site may have limited appeal to recreational tourists with no educational intent.

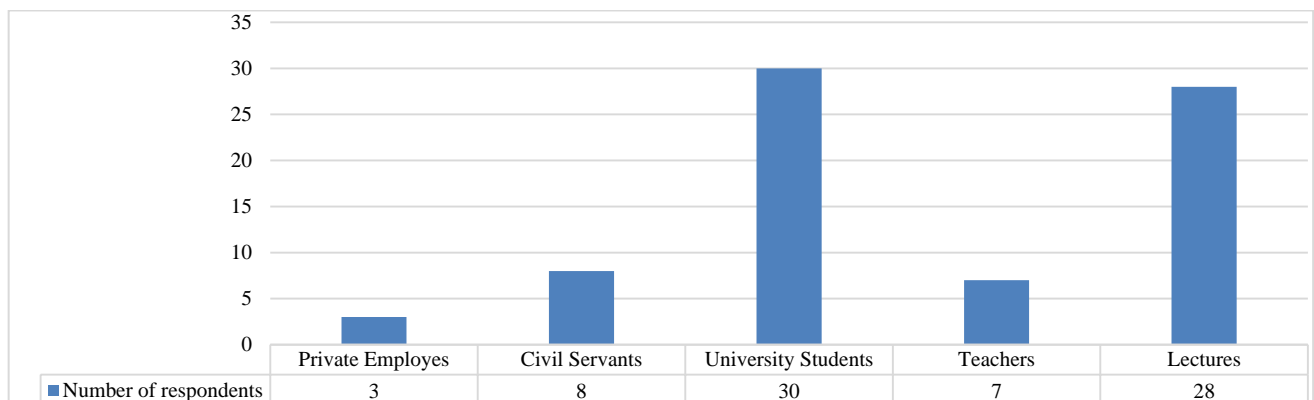


Figure 6. Occupations of Respondents Visiting CMC Pantai Tiga Warna (Source: Research Data, 2024)

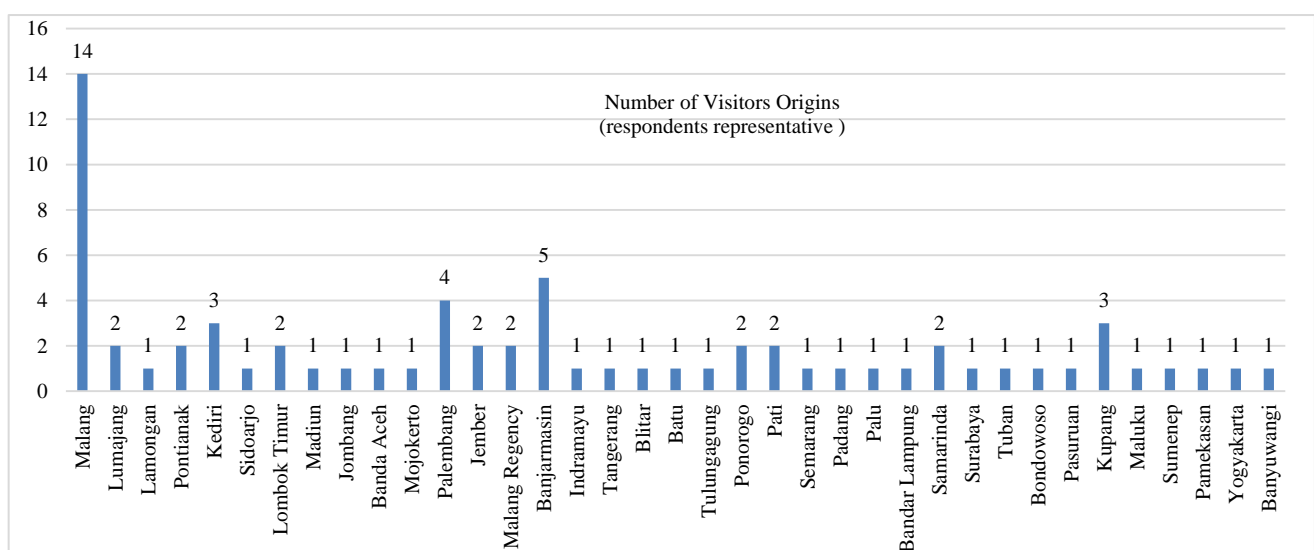


Figure 7. The Origin of Respondents Visiting CMC Pantai Tiga Warna (Source: Research Data, 2024)

As shown in Figure 7, most respondents to CMC Pantai Tiga Warna came from Malang, consistent with the city's role as a regional education hub. However, respondents also reported coming from other areas across Indonesia, including West Kalimantan, East Kalimantan, South Kalimantan, Aceh, Palembang, Palu, and East Nusa Tenggara. One respondent indicated they were visiting from Malaysia, highlighting the site's growing international visibility. Many of these non-local respondents visiting the site were likely students studying in Malang, further emphasizing the educational function of the site.

These findings suggest a clear opportunity for strategic marketing to reach wider regional and international audiences. Digital media and online branding platforms can play a pivotal role in promoting the site's dual identity, as both a conservation area and an educational destination, thereby attracting a more diverse visitor base in the future.

Visitors' Satisfaction with Accessibility at CMC Pantai Tiga Warna

Visitor satisfaction is a crucial indicator of a tourist site's long-term appeal. Based on survey responses, the majority of respondents expressed high satisfaction with their experience at CMC Pantai Tiga Warna (Figure 8).

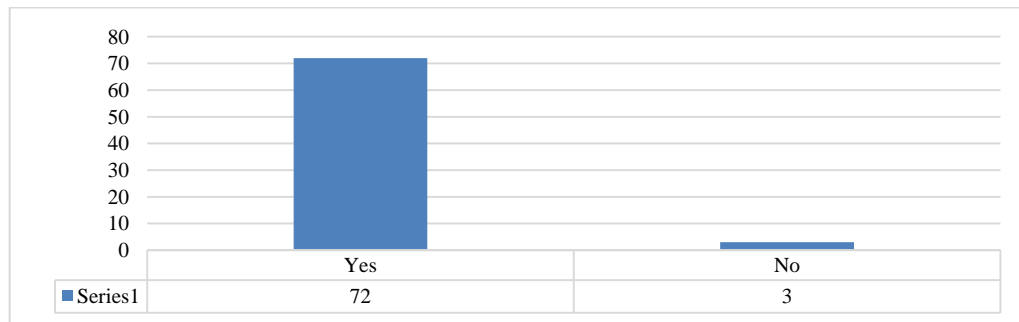


Figure 8. Respondents' Opinions on Accessibility of CMC Pantai Tiga Warna

Figure 8 presents respondents' responses to the question: "Did you have a good time while visiting?" Out of 75 respondents, 72 (96%) answered "Yes," while only 3 (4%) responded "No." This overwhelming majority reflects exceptionally high satisfaction levels, suggesting the site consistently meets their expectations. The minimal negative feedback implies that while some aspects may require improvement, any issues are likely minor and not widespread.

Accessibility remains a key area of concern to ensure continued satisfaction, especially since ease of access affects the overall experience. Table 1 summarizes visitors' feedback on various accessibility aspects. This table offers a detailed view of respondents' perspectives on accessibility. The most frequently cited positive feature was the availability of a spacious parking lot (16.38%), followed by easy access to the site and the option to take a boat from Sendang Biru (both 12.07%). These three features accounted for over 40% of the responses, underscoring their importance in shaping the visitor experience.

Table 1. Accessibility of CMC Pantai Tiga Warna (Source: Primary Data by Maxqda (Source: Research Data, 2024)

	Segments	Percentage
There is a spacious parking lot	19	16.38
The site has an easy access	14	12.07
We can take a boat from the parking lot in Sendang Biru	14	12.07
It is easy to reach the site by private vehicle	9	7.76
We have to walk rather far from the parking lot	9	7.76
The route of <i>Jalur Lintas Selatan</i> (JLS) is available	9	7.76
The roads to the site are good	7	6.03
Guides are available to show directions	7	6.03
The site is accessible through google maps	6	5.17
There are several damaged roads to the beach	6	5.17
It is only a tiny entrance to the parking lot	5	4.31
There are lots of directional signs	4	3.45
There are precise tourist itineraries	3	2.59
There is no public transport	2	1.72
It is easy to reach the site by using a rental car	2	1.72
TOTAL	116	100.00

The ease of reaching CMC Pantai Tiga Warna by private vehicle (7.76%) and the availability of the *Jalur Lintas Selatan* (JLS) route (7.76%) are important factors that enhance the site's accessibility. However, respondents also identified several challenges. These include the need to walk a relatively long distance from the parking area to the beach (7.76%), damaged road sections along the route (5.17%), and a narrow entrance to the parking area (4.31%).

The lack of public transportation (1.72%) is another obstacle, particularly for those without private vehicles. On the positive side, supporting features such as clear directional signage (3.45%), the presence of local guides (6.03%), and access through Google Maps (5.17%) help improve the visitor experience. These insights are valuable for site managers in identifying priorities for improving infrastructure and ensuring more convenient access to the destination. The specific factors influencing accessibility are further illustrated in Figure 10.

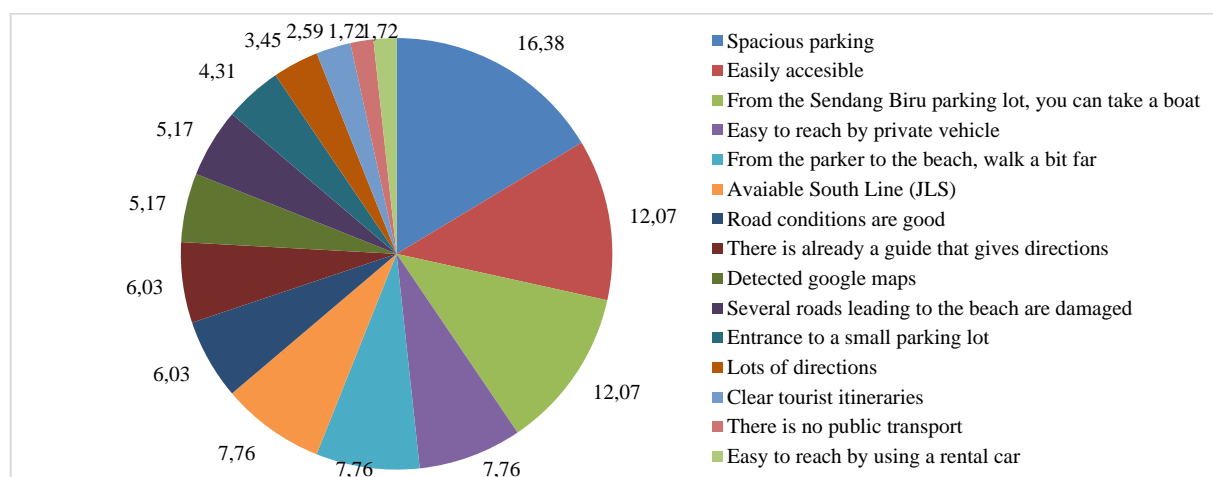


Figure 9. Subcodes Statistics on Accessibility to CMC Pantai Tiga Warna (Source: Primary Data by Maxqda; Research Data, 2024)

Figure 9 presents a detailed breakdown of accessibility features at CMC Pantai Tiga Warna based on respondents' perceptions. The visualization categorizes the various factors that shape the site's accessibility profile. The most prominent feature identified is the availability of spacious parking facilities, cited by 16.4% of respondents. This is followed by two equally significant factors: ease of access (12.1%) and the option to take a boat from the Sendang Biru parking lot (12.1%). Together, these three key elements account for over 40% of all accessibility-related responses, underscoring their importance in shaping the visitor experience. Three additional factors—easy access by private vehicle, the need to walk from the parking area to the beach, and the availability of the South Line (JLS) route—each received 7.8% of responses. Road conditions and the availability of guides were noted by 6.0% of respondents, indicating a moderate level of importance. Digital navigation via Google Maps and concerns about damaged road conditions were each mentioned by 5.2% of respondents. Less frequently mentioned but still relevant features include the small parking lot entrance (4.3%), directional signs (3.4%), clear tourist itineraries (2.6%), lack of public transportation (1.7%), and accessibility via rental cars (1.7%). This distribution indicates that while CMC Pantai Tiga Warna offers several strengths in terms of accessibility, particularly regarding parking capacity and transportation options, areas such as road infrastructure, public transport availability, and directional signs require further attention. These findings provide valuable input for strategic planning aimed at improving overall visitor accessibility to this coastal destination. Figure 11 shows detailed insights into visitor satisfaction.

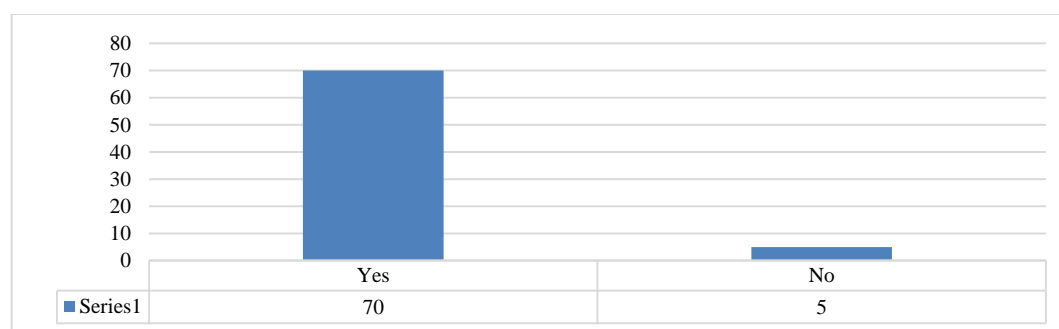


Figure 10. Respondents' Satisfaction after Visiting CMC Pantai Tiga Warna (Source: Research Data, 2024)

Figure 10 illustrates the levels of visitor satisfaction at CMC Pantai Tiga Warna, based on responses to the direct question: "Are you satisfied after visiting CMC Pantai Tiga Warna?" The survey collected feedback from 75 respondents. An overwhelming majority—70 respondents (93.3%)—indicated satisfaction by answering "Yes," while only 5 respondents (6.7%) expressed dissatisfaction by responding "No." This highly positive distribution suggests that CMC Pantai Tiga Warna is largely successful in meeting visitor expectations across multiple dimensions of the tourism experience. The exceptionally high satisfaction rate serves as a strong indicator of effective site management and service provision. The minimal level of dissatisfaction, representing fewer than 7% of responses, likely reflects isolated concerns rather than widespread issues affecting the overall experience. These results are consistent with findings in contemporary tourism research, which indicate that high visitor satisfaction is closely associated with increased likelihood of repeat visits and favorable word-of-mouth recommendations, both of which are essential for the sustainable development of coastal tourism destinations. Table 2 presents further details regarding the factors influencing visitor satisfaction. Table 2 provides a detailed analysis of the key factors contributing to visitor satisfaction at CMC Pantai Tiga Warna, offering a nuanced understanding of the elements that shape the overall visitor experience. Among the various satisfaction drivers, the site's natural beauty is the most significant, cited by 20.86% of respondents. This is closely followed by cleanliness (19.42%), which respondents attributed to the site's policy requiring visitors to manage their own waste. Combined, these two factors—both related to environmental quality—account for over 40% of responses, highlighting the central role of nature and cleanliness in shaping positive visitor experiences.

Table 2. Satisfaction after Visiting CMC Pantai Tiga Warna (Source: Primary Data by Maxqda (Source: Research Data, 2024)

	Segments	Percentage
Nature is beautiful	29	20.86
The site is clean because visitors are required to clean their trash	27	19.42
The management is very good with an excellent service	16	11.51
The guides are very competent	16	11.51
There are environmental conservation activities, such as planting mangroves	11	7.91
It is for educational and recreational tourism	9	6.47
The atmosphere is very comfortable because of the limited number of daily visitors	8	5.76
The site has complete facilities	5	3.60
There must be reservations to limit the number of visitors	4	2.88
Tourist attractions are available	4	2.88
There are many choices for objects to visit	3	2.16
It has lots of photo spots	3	2.16
The managers are friendly	1	0.72
Interesting tracking is available	1	0.72
It costs little to visit	1	0.72
The information is clearly presented on boards or signs	1	0.72
TOTAL	139	100.00

Service-related aspects also feature prominently. Both effective site management and the competence of guides were each mentioned by 11.51% of respondents. Environmental conservation activities, particularly mangrove planting, contributed 7.91% to overall satisfaction, while the site's dual function as both an educational and recreational destination accounted for 6.47%. Controlled visitor management—specifically the limitation on daily visitor numbers—was identified by 5.76% of respondents as enhancing comfort and overall enjoyment. This strategy is supported by the reservation system, which accounted for 2.88% of satisfaction-related responses. In terms of infrastructure and amenities, factors such as the availability of complete facilities (3.60%), diverse attractions (2.88%), a variety of sites to explore (2.16%), and numerous photo spots (2.16%) together make up approximately 11% of satisfaction responses. Overall, the data suggest that visitor satisfaction at CMC Pantai Tiga Warna is primarily driven by its natural environment and effective management practices, particularly those related to environmental cleanliness and conservation. In contrast, built infrastructure and conventional tourism amenities play a secondary role. A visual representation of these contributing factors is provided in Figure 11.

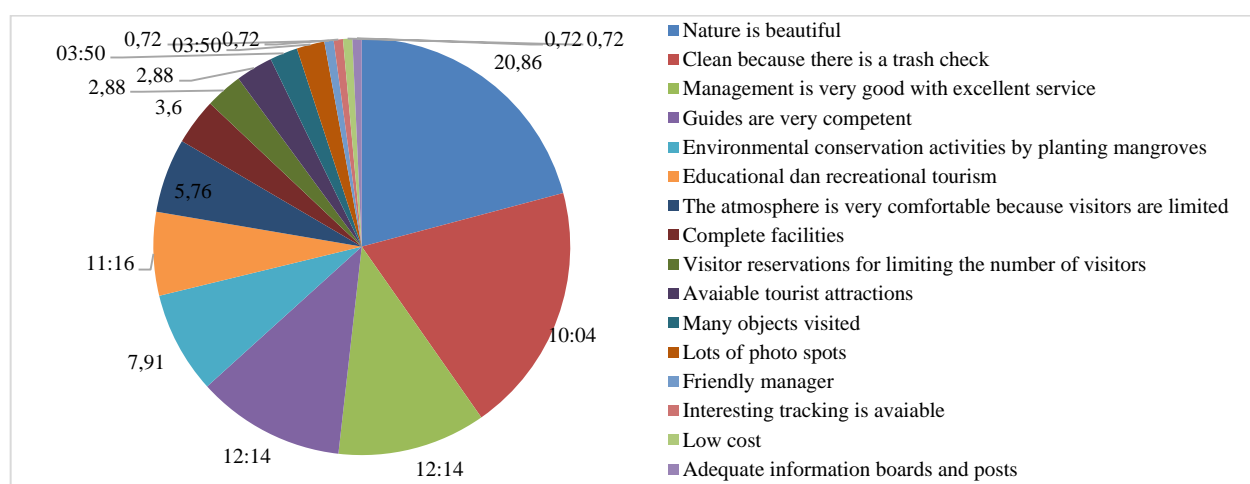


Figure 11. Subcodes statistics on satisfaction after visiting CMC Pantai Tiga Warna (Source: Primary data by Maxqda Maxqda; research data, 2024)

Figure 11 presents a detailed breakdown of the factors contributing to visitor satisfaction at CMC Pantai Tiga Warna. The visualization effectively categorizes the key elements that collectively shape the visitor experience. Natural beauty emerges as the most significant factor, cited by 20.9% of respondents. This is closely followed by cleanliness (19.4%), which respondents specifically linked to the site's trash check policy. Together, these two environmentally focused factors account for over 40% of all satisfaction-related responses, highlighting the critical importance of environmental quality in shaping positive visitor experiences. Service quality also plays a prominent role, with both effective site management and the competence of guides each mentioned by 11.5% of respondents. Environmental conservation efforts, particularly mangrove planting activities, contribute an additional 7.9%, while the site's dual function as an educational and recreational tourism destination accounts for 6.5%. Visitor management strategies, including limits on daily visitors, were noted by 5.8% of respondents as enhancing comfort and experience, a system further supported by the reservation policy (2.9%). Infrastructure- and amenity-related factors played a less dominant role, with complete facilities (3.6%), the availability of tourist attractions (2.9%), diversity of visitable sites (2.2%), and photography opportunities (2.2%) making modest contributions to satisfaction. Several additional elements, though less frequently mentioned, still registered as relevant contributors: approachable and courteous management (0.7%), engaging trekking routes (0.7%), affordability

(0.7%), and clear informational signage (0.7%). Overall, the findings indicate that visitor satisfaction at CMC Pantai Tiga Warna is primarily driven by its natural environment and effective site management, particularly concerning cleanliness and conservation, rather than traditional infrastructure or standard tourism amenities.

Social Analysis of Network Accessibility and Visitor Satisfaction at CMC Pantai Tiga Warna

Figure 12 presents a concept map or network diagram that visualizes the interconnections among various factors contributing to the visitor experience at CMC Pantai Tiga Warna. The diagram highlights the relationships between key elements such as trekking routes, parking, cleanliness, the trash check policy, guide services, and other related components. These interconnected factors collectively shape both accessibility and visitor satisfaction, offering a comprehensive view of how site management strategies and physical features work together to influence the overall visitor experience.

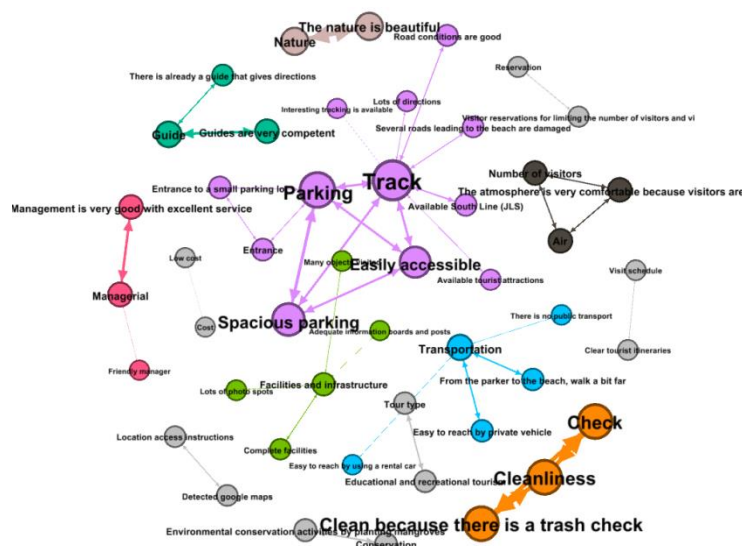


Figure 12. Factors Influencing Visitor Satisfaction at CMC Pantai Tiga Warna (Source: Research Data, 2024)

The questionnaire results confirm that the majority of respondents enjoyed their experience at CMC Pantai Tiga Warna, with 72 out of 75 individuals (96%) stating that they were satisfied with their visit. Visitors particularly appreciated the site's natural beauty and the management approach that prioritizes environmental preservation through limited daily access. This strategy fosters a peaceful atmosphere, allowing visitors to fully enjoy their time at the destination.

As an ecotourism site, Pantai Tiga Warna offers a unique combination of mangrove forests and underwater landscape conservation. These characteristics not only promote a sense of safety and harmony with nature but also support meaningful experiences for visitors, including private gatherings in a serene environment. The site is managed by 107 members of the local community. Notably, many of these individuals previously worked as forest encroachers or practiced unsustainable fishing methods that contributed to marine pollution. Through sustained environmental education initiatives, significant behavioral changes have been observed within the surrounding community. Today, local residents actively contribute to tourism operations as tour guides, coastal guards, and other support roles. The management of CMC Pantai Tiga Warna is guided by three core principles: ecological sustainability, social inclusion, and economic empowerment. In recognition of its commitment to sustainable tourism, the Ministry of Tourism and Creative Economy designated the site as part of the *Towards Climate Positive Tourism through Decarbonization and Ecotourism* program, which was officially launched on July 6, 2022. The program seeks to promote environmentally friendly tourism practices to mitigate global warming.

While many organizations pursue green innovations in support of sustainable development, not all initiatives achieve success. Drawing on the Technology–Organization–Environment (TOE) framework, this study examines the readiness of businesses, including micro, small, and medium-sized enterprises (MSMEs), to adopt green innovations in terms of technological, organizational, and environmental preparedness (Zhang et al., 2020). The framework suggests that necessary and sufficient conditions within each dimension facilitate the successful implementation of green innovation, thereby contributing to competitive advantage and improved environmental and organizational performance.

In alignment with this framework, we adopted a general model incorporating specific technological, organizational, and environmental factors to examine the adoption of green technologies by businesses in various contexts (Aboelmaged, 2018; Chege & Wang, 2020; Ferreira et al., 2020; Hue, 2019). Unlike traditional technology adoption, green innovation is a long-term process that involves substantial changes and associated risks. Organizations that are well-prepared in terms of technological capacity and internal and external environments are more likely to manage these risks effectively.

As reflected in feedback from respondents, the visit to CMC Pantai Tiga Warna reinforces the importance of environmental conservation. Visitors widely agree that nature must be protected and that individuals are responsible for managing their own waste during and after their visit. Based on the analysis and discussion, it can be concluded that tourist motivation, destination image, and ecotourism experience are significant predictors of revisit intention. A more favorable image of CMC Pantai Tiga Warna, combined with a positive ecotourism experience, increases the likelihood that visitors will return. Moreover, the ecotourism experience and visitors' environmental concerns serve as mediating factors between

motivation and revisit intention. The most influential factor in this study was the direct relationship between ecotourism experience and revisit intention. However, the mediating effect of environmental concern suggests that tourist motivation can also enhance revisit intention when supported by memorable and meaningful ecotourism experiences.

These findings further support the Theory of Planned Behavior (Huang & Liu, 2017), which posits that while environmental concern may not be the primary reason tourists choose ecotourism destinations, it plays a crucial mediating role between motivation and behavioral intention in such contexts.

CONCLUSION

The findings of this study confirm that CMC Pantai Tiga Warna has effectively utilized a range of promotional and marketing platforms, including an e-commerce-based website, Instagram (@cmctigawarna), WhatsApp, and Facebook. Visitor numbers have shown a notable increase from 2022 to 2024, attracting not only tourists from Malang but also from other regions of Indonesia and abroad—particularly individuals interested in coastal environmental management and mangrove conservation. Questionnaire responses indicate that the destination is easily accessible by private or rented vehicles. Respondents expressed high satisfaction with their visit, citing various engaging activities such as mangrove nursery and planting programs, snorkeling, diving, canoeing, eco-brick demonstrations, and opportunities for relaxation. One distinctive feature of the site is its policy requiring visitors to manage their own waste, reinforcing environmental responsibility as part of the ecotourism experience. The high satisfaction levels reported by respondents suggest a strong likelihood of repeat visits. The local community of Sendang Biru manages CMC Pantai Tiga Warna under a Green Technology Marketing framework, which has given it a competitive advantage over other beaches in the South Malang region. The successful implementation of this strategy has significantly contributed to increased visitor numbers and enhanced satisfaction, particularly through effective digital media engagement.

These findings underscore the potential of community-based tourism destinations to achieve sustainable competitive advantage by integrating environmental conservation with high-quality visitor experiences. The case of CMC Pantai Tiga Warna demonstrates that a balanced approach—grounded in local participation, digital innovation, and ecological responsibility—can drive both tourism development and long-term sustainability.

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