Mangrove Ecotourism-Based Community Empowerment Model and Local Wisdom in Development Sustainable on Ketam Island

Elfitra Desy Surya, Sri Rahayu, Rashdan Bin Rashid, Muhammad Faishal Annas

Abstract

This research aims to analyze and formulate an effective community empowerment model in developing mangrove ecotourism on Pulau Ketam, focusing on the integrative role of local wisdom to support sustainable development. The main problem faced is how to optimize the ecological and socio-cultural potential of mangroves to become a sustainable source of income, while preventing environmental degradation due to tourism activities. This study uses a qualitative-descriptive approach supported by quantitative data analysis related to sustainability indicators. Data was collected through participatory observation, in-depth interviews with indigenous leaders, ecotourism managers, and local communities, and document review. The results of the study show that an effective empowerment model is an integrative and participatory model that emphasizes three dimensions: 1) Economic Empowerment through the diversification of ecotourism-based businesses (homestays, local guides, mangrove culinary); 2) Social Empowerment through strengthening local institutions (Pokdarwis and customary institutions); and 3) Ecological Conservation imbued with local wisdom.

It was found that Local Wisdom on Pulau Ketam (for example, norms on the use of marine resources and the practice of mutual cooperation in maintaining the cleanliness of the area) functions as a critical social capital and internal control mechanism that ensures sustainability aspects. The integration of local wisdom has succeeded in encouraging community participation in mangrove conservation while increasing income. In conclusion, the empowerment model based on mangrove ecotourism and strengthened with local wisdom has proven to be able to balance economic, social, and environmental pillars so as to support the achievement of Sustainable Development on Ketam Island. This study recommends replicating similar models in other coastal areas by taking into account the peculiarities of local wisdom.

Keywords: *Mangrove Ecotourism, Community Empowerment, Local Wisdom, Sustainable Development, Crab Island*

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Introduction

Sustainable development has become a global paradigm that emphasizes integration between economic, social, and environmental aspects to ensure the fulfillment of today's needs without sacrificing the capabilities of future generations(Shuvo & Ahmed, 2025) In Indonesia, coastal areas have a strategic role, but often face complex challenges in the form of environmental damage (especially mangrove forest degradation) and community welfare issues (Wadei et al., 2025)

Ketam Island, as a coastal area with a significant mangrove ecosystem, reflects these challenges. The island's mangrove ecosystem is highly vulnerable to the impacts of human activities and climate change, even though it serves as a vital fortress, an ecosystem service provider (such as a fish spawning ground), and a livelihood support for local communities (Rodríguez-Pose & More, 2024) To overcome environmental degradation and at the same time improve welfare, an innovative development strategy based on natural potential and the values of the local community is needed (Chen, 2025; Fan et al., 2020; Nikjoo et al., 2025; Rocca & Zielinski, 2022, 2022; Ruiz-Ballesteros & González-Portillo, 2024)

Mangrove ecotourism has emerged as one of the development models that has the potential to be a solution. Ecotourism, in contrast to mass tourism, offers opportunities to: Environmental Conservation: Making mangrove forests an asset that must be maintained because of its economic value(Aunchistha, 2025; Cáceres-Feria et al., 2021; Dao et al., 2025; Nikjoo et al., 2025). Community Empowerment: Actively involve local communities in planning, managing, and obtaining economic benefits. However, the success of the ecotourism model cannot be separated from the role of local wisdom. Local wisdom includes the values, knowledge, and traditional practices of the Pulau Ketam people that have been tested in interacting harmoniously with nature. Integrating local wisdom (e.g. in cultivation techniques, the use of natural resources, or customary rituals) into the ecotourism model will ensure the sustainability of conservation practices and promote authentic tourism (Environment Agency, 2024).

Although the potential of ecotourism and local wisdom is recognized, the main challenge lies in the formulation of a structured and tested model of community empowerment. The fundamental question is: What is the best mechanism to integrate the potential of mangrove ecotourism and local wisdom in order to empower the community in a sustainable manner on Crab Island. So far, development efforts have often been partial, without a comprehensive model that binds three main pillars: conservation (mangroves), economy (ecotourism), and socio-culture (local wisdom). Therefore, this study is urgent to formulate and pilot a Community Empowerment Model Based on Mangrove Ecotourism and Local Wisdom that is adaptive and replicable, so as to ensure the achievement of sustainable development goals on Ketam Island (Cruwys et al., 2025; MariaLaura Di DomenicoDjebali, 2025; Samekin et al., 2025; Shi, 2025; Suriyankietkaew et al., 2025; Worley & Smith, 2026).

Urgency of Environmental and Economic Issues in Coastal Areas (Problems Faced) Degradation of Mangrove Ecosystems**:** Pulau Ketam, like many other coastal areas, faces a real threat of mangrove forest destruction due to uncontrolled exploitation, land conversion, and pollution. In fact, mangroves are vital assets to protect the island from abrasion, resist seawater intrusion, and provide fishery resources (economic buffer). Limitations of Development Models**:** So far, development efforts have often been *top-down* or only focused on resource exploitation without considering sustainability aspects. A new model is needed that places conservation as a prerequisite for economic development (Greig et al., 2026; Hoover & Krupka, 2025; Kelleher & Murphy, 2025; Loustau, 2025; Mulyadi et al., 2024; P. Budrugeac, n.d.; Worley & Smith, 2026).

Tourism Paradigm Shift: Ecotourism offers a more sustainable alternative to mass tourism. On Pulau Ketam, mangrove ecotourism has the potential to become a new source of

income that *diversifies* (not only dependent on fisheries), as well as providing economic incentives for communities to protect their forests. Community Empowerment: Ecotourism requires the active involvement of local communities. This research wants to find out the most effective model so that the community is not only the object, but the main subject who manages, enjoys the benefits, and makes decisions in the development of tourism(Pijet-Migoń & Migoń, 2022; Pintossi et al., 2023).

The Crucial Role of Local Wisdom (Ensuring Cultural and Natural Sustainability) A bridge between Conservation and Culture: The long-term success of ecotourism cannot be achieved by formal regulation alone, but must be supported by the traditional values and practices of local communities. Local wisdom on Pulau Ketam (e.g., customary rules on harvesting, or marine resource management techniques) is an important social capital for maintaining the balance of nature. Authenticity of Tourism Products**:** The integration of local wisdom will make ecotourism products on Pulau Ketam unique, different from other regions, and have high cultural added value, which ultimately increases tourist attraction(Ayşe Esra İşmen, 2025; Paijan et al., 2024; Yulianti et al., n.d.).

Search for a Comprehensive Model: Although many studies have addressed ecotourism and local wisdom separately, it is rare to find studies that explicitly formulate an integrated model that simultaneously binds three elements: Mangrove Ecotourism (Economic/Environmental), Local Wisdom (Social/Cultural), and Community Empowerment (Social/Institutional) within the framework of Sustainable Development. Practical Relevance: This research is not only academic, but also practical, which is to produce a prototype model that can be used as a guide (blueprint) by local governments, community groups, and stakeholders in real efforts to achieve welfare and sustainability on Pulau Ketam(Ambatali, 2024; Hu et al., 2025; Kuang, 2025; Martínez-Sánchez et al., 2020; Picaud-Bello et al., 2024; Shamzzuzoha et al., 2022; Sørensen & Torfing, 2025; Verspieren, 2024).

Literature Review

Environmental Quality

In the context of your research on the Mangrove Ecotourism Empowerment Model, Environmental Quality (KL) is a crucial variable that functions as a basic capital (input) as well as an indicator of sustainability (output) of the model(Arai, Soichi. Toshiko, 2021; Gorat et al., 2022; Nasution et al., 2021; Saebah & Merthayasa, 2024; Wijaya et al., 2024). In general, Environmental Quality refers to the physical and biological environmental conditions and characteristics of an area that affect human life and ecosystems. The concept of Environmental Quality (EQ) has become a foundation in the study of sustainable development and natural resource management. In general, EQ is defined as environmental characteristic conditions that reflect the degree of suitability of the ecosystem to support human life and other biota (Liu & Lin, 2018). Environmental quality refers not only to the absence of pollution, but also to the aesthetic, ecological, and social value that an environment has.

The literature distinguishes between two main dimensions in assessing EQ (Mitchell, 1999; Sarrion et al., 2012): Objective Environmental Quality (Objective EQ): The assessment is based on empirical, measurable, and scientific data from the physical, chemical, and biological conditions of the environment. Indicators include air, water, soil, and biodiversity quality (Heer & Hagler, 2021). For example, in the context of mangrove forests, this includes water salinity, sediment deposition levels, and mangrove stand density. Subjective Environmental Quality (Subjective EQ): Assessments are based on an individual's perception, experience, and satisfaction with their environment, often measured through surveys or interviews. It includes dimensions such as aesthetic value (scenic beauty), comfort (absence of odor, noise), and cultural or spiritual value (Ritchie & Crouch, 2003). The success of an

ecotourism destination relies heavily on the alignment between a healthy objective EQ and a subjective EQ that appeals to visitors (Hall & Lew, 2019).

In the tourism sector, especially ecotourism, environmental quality is a core asset and a determining factor of attractiveness (Theobald, 2005). EQ as Core Attractiveness. Research by Orams (1999) confirms that the main motivation of ecological tourists is to seek authentic and unspoiled experiences in a high-quality natural environment. Therefore, the health of ecosystems (e.g., lush mangroves) directly determines the intrinsic and commercial value of the destination(Achmad Fauzi et al., 2023; Ferine et al., 2017, 2021; Jufrizen & Sitorus, 2021; Nufus, 2021; Rini Astuti & Suhendri, 2019; Tinambunan, 2019).

The literature shows a strong correlation between the high perception of environmental quality and the level of satisfaction of tourists (Kozak, 2001). A clean, well-maintained, and aesthetically and physically satisfying environment will result in a positive image of the destination, which is crucial for repeat visits and word-of-mouth promotion. Carrying Capacity. The theoretical framework for environmental quality is always related to the concept of Environmental Carrying Capacity. This theory emphasizes that tourism development must be managed below certain threshold limits to prevent EQ degradation. O'Reilly (1986) identified the relevant types of carrying capacity: physical, ecological, and social. If ecotourism on Pulau Ketam exceeds the ecological carrying capacity of mangrove forests, the quality of the environment will decline drastically, damaging tourism products themselves(Bustomi et al., 2024; Islamiyah et al., 2021; Setiawan et al., 2020; Suhanta et al., 2022; Wakhyuni et al., 2017; Widayati et al., 2017).

EQ has a dual role in mangrove ecosystems, especially in coastal areas such as Pulau Ketam. The quality of a healthy mangrove environment ensures the continuity of the provision of Ecosystem Services (Costanza et al., 1997), which includes: Regulatory Services: Protection of coasts from waves and storms, filtering of water pollutants, and carbon sequestration (climate mitigation). Supply Services: Fish and firewood resources for the local community. Cultural Services: The value of recreation and education that is the basis of ecotourism. EQ degradation (e.g., pollution or illegal logging) directly reduces the value of these ecosystem services, leading to economic and social losses for coastal communities (Primavera, 1195).

According to Cohen's (1988) research, integrating local wisdom in environmental management can be an effective strategy to maintain environmental quality. On Pulau Ketam, the wisdom of local fishermen in fishing and mangrove forest management can be a critical instrument in maintaining objective EQ, as well as adding value (subjective EQ) through the cultural experiences offered to tourists. In the study of destination attractiveness (Destination Attractiveness Model), environmental quality is often positioned as an independent variable that influences destination imagery (Murphy et al., 2000). Conceptually, this study will use environmental quality as the main mediating variable or independent variable.

Environmental Carrying Capacity

Environmental Carrying Capacity was originally an ecological concept derived from population biology, referring to the maximum number of individuals of a species that can be sustainably supported by an environment without damaging the ecosystem. This concept was later adopted and significantly expanded in the study of environmental management and tourism(*1cf42623-Aec0-4e48-B8b8-5b5b88ad0a57*, n.d.; Dewi, 2014; Jerez, 2023; Motoki et al., 2023; Rambu Atahau et al., 2020; Vitasurya, 2016, 2016; Zhao et al., 2024).

In the context of tourism, Carrying Capacity is defined as the maximum limit development, number of visitors, or activities that an area can accommodate over a period of time without causing physical degradation, environmental damage, or a decrease in the quality of visitors' recreational experiences, as well as social impacts that are unacceptable to local

communities (O'Reilly, 1986; WTO, 2025). Tourism studies break down Carrying Capacity into several dimensions for a more comprehensive analysis (Middleton & Hawkins, 2024):

The application of the Carrying Capacity concept is very important in the planning and management of Sustainable Ecotourism. Ecotourism aims to minimize negative impacts and maximize conservation benefits; Therefore, knowing ecological and social thresholds is key. Decision-making: Carrying capacity serves as a threshold that helps managers determine policies on resource allocation, zoning (areas that are accessible and those that must be protected), and restrictions on the number of visitors (Ceballos-Lascuráin, 1996). Spatial Planning: By assessing the physical and ecological carrying capacity, the location and size of the infrastructure (e.g., docks and *boardwalks* in mangrove forests) can be determined so as not to interfere with vital ecological functions.

Although vital, Carrying Capacity measurement is a complex task. Pustaka notes that:

Variability: Carrying capacity limits are dynamic and variable depending on time (season, holidays) and environmental conditions (tides, weather). Social Subjectivity: Social carrying capacity is highly dependent on the perceptions of local communities and tourists, which is difficult to measure purely quantitatively (Butler, 1980). A decline in tourist satisfaction is often the first indicator that social carrying capacity has been exceeded(Andhiyani Rahmasari Putri & Ari Susanti, 2022; Surya et al., 2022).

In the context of vulnerable ecosystems such as Mangrove Forests, Ecological Carrying Capacity has a very high significance. Mangrove forests function as water filters, spawning habitats, and carbon sinks. Research by Spalding et al. (2010) emphasizes that human activities, no matter how small, in sensitive areas (such as mangrove roots or muddy areas) can have a long-term impact on ecosystem health. Therefore, the determination of the Carrying Capacity should be based on the lowest tolerance of the most vulnerable ecological components (e.g., noise-sensitive aquatic animals)(Aisyah & Rachmadi, 2022; Calvi & Hover, 2021; Saragih & Surya, Elfitra Desy, B, 2021; Sirajuddin et al., 2022; Surya & Suwarno, 2023a; Микрюков, 2015).

For mangrove ecotourism, indicators of Ecological Carrying Capacity include (Buckley, 2003) the level of water pollution produced from ships. The degree of erosion or damage to vegetation in the boat path. The degree of disturbance to the behavior of wildlife (birds, monkeys, fish). Violations of these thresholds directly degrade the environmental quality of the destination, damage the ecotourism products themselves, and thwart the conservation goals. The latest literature integrates cultural and social dimensions in the assessment of Carrying Capacity (Sofield, 2003)(Fadilah & Huda, 2024; Grigorieva, 2022; Huang et al., n.d.; Mara, 2023; Rahman et al., 2023; Serrat, 2008; Zakaria & Yusof, 2024).

The concept of Environmental Carrying *Capacity* and Mangrove Forest Conservation has a synergistic and fundamental relationship in the context of sustainable ecotourism. Carrying capacity acts as a management tool to ensure that tourism activities do not damage the vital ecological asset of the mangrove forest itself so that conservation goals can be achieved.

Environmental Education

Environmental Education (EL) is a crucial component in sustainable development and conservation efforts. This concept goes beyond just disseminating information; it aims to develop the awareness, knowledge, attitudes, skills, and participation needed to manage environmental issues responsibly (UNESCO, 2021)(Akbari et al., 2022; Mesra et al., 2023; Siregar, 2018; Ye et al., 2024). The modern definition of EL has its roots in the Tbilisi Conference in 1977, which affirmed that EL is a process that aims to promote the awareness, knowledge, skills, attitudes, motivation, and commitment of individuals and communities to

work individually and collectively in solving current environmental problems and preventing new ones (UNESCO-UNEP, 2021).

Environmental Education has evolved from a focus on pure nature conservation (*Nature Study*) to Education for Sustainable Development (ESD). ESD expands the scope by integrating social, economic, and cultural dimensions into environmental learning, recognizing that environmental issues are inseparable from social and economic issues (UNESCO, 2005). In tourism, EL acts as a bridge between conservation and visitor experience, directly influencing the social and ecological dimensions of the Environmental Carrying Capacity. Ecotourism is defined as responsible travel to natural areas that protect the environment and improve the well-being of local communities (TIES, 990). Education and interpretation are mandatory components of ecotourism(Elfitra et al., 2020).

Improved Knowledge and Attitudes: An effective interpretive program (e.g., a guided tour of a mangrove forest) can transform passive experiences into active learning. Orams' (1995) research shows that educational interventions in nature attractions significantly increase tourists' knowledge of conservation issues and encourage pro-environmental behavior after visits. On Pulau Ketam, EL is not only about mangrove ecology, but also involves teaching about local wisdom in natural resource management. The integration of local culture in education strengthens the subjective appeal of the destination and at the same time promotes respect for local conservation traditions(Amalia et al., 2023; *Destination 7.Pdf*, n.d.; Rahayu et al., 2023; Retno Santi Sumardi, Mukhamad Najib et al., 2023; Zhou, 2023).

The mechanism of implementing EL in ecotourism can be done through various mechanisms (Hvenegaard, 2002). Trained local guides use narration to explain the ecological function of mangroves and the importance of their conservation. The use of information boards, visitor centers, and digital media that explain local flora, fauna, and culture. Engaging tourists in conservation activities (e.g., planting mangrove seedlings) to foster a sense of belonging. Environmental Education is a strategic tool to achieve sustainable mangrove forest development through two main pathways. Effective Environmental Education is not only aimed at providing information, but also forming behavioral intentions. Theory *of Planned Behavior* (Ajzen, 1991) posits that a person's intention to act is driven by attitudes, subjective norms, and perceived behavioral control(Edukasi & Desa, n.d.; Hidayatullah et al., 2021; Kristen et al., 2023; Sumardi et al., n.d.; Surya et al., 2022).

In this context, EL should help tourists and local communities understand that mangrove conservation (attitudes) are socially valued (subjective norms), and that they have the means to contribute (control of perceived behaviors). This is important to ensure tourists comply with Environmental Carrying Capacity rules (e.g., not throwing garbage). Lingungan Education provides knowledge and skills to local communities to develop competence as tour guides or managers of interpretation facilities(Amalia et al., 2023; Králiková et al., 2020; Obas & A, 2023; Susila et al., 2024; Vukolić et al., 2023; Zulvianti et al., 2023).

Understand the ecological and economic value of mangroves, which ultimately increases their willingness to participate in replanting and area protection projects. On Pulau Ketam, EL can be a catalyst to change the role of communities from passive resource users to active managers and stewards of mangrove forests, which is a key goal of sustainable development. Environmental Education is an integral component in the Ecotourism Attraction model. The success of mangrove forest conservation efforts in Pulau Ketam Village is highly dependent on the ability of the EL program to: (1) increase awareness and appreciation of tourists towards the quality of the local environment and culture, and (2) empower local communities to manage and protect their mangrove assets in a sustainable manner(Eri Samah, Ramadha Yanti Parinduri, Muhammad Razali, 2022; Maya Citra, 2022; Santosa & Priyono, 2012; Surya et al., 2018; Surya & Suwarno, 2023b).

Local Wisdom

Etymologically, "local wisdom" consists of two words: Wisdom, which means the ability to act wisely and use knowledge, experience, understanding, and common sense; and Local, which refers to the scope or limitations of a particular place. Terminologically, Local Wisdom is defined as noble values that apply in the order of life of local communities to regulate the relationship between humans and God, humans and nature, and humans and others (Keraf, 2010; Sartini, 2004). Local wisdom has fundamental properties: sustainable, adaptive, and integrative. Its forms can be classified into: Tangible: Includes traditional buildings, traditional agricultural systems (*Subak* in Bali), cultural heritage objects, and local herbal medicines. Intangible: Includes values, norms, ethics, customary procedures (*Awig-Awig* in Lombok), folklore, and traditional songs that contain life advice. Local wisdom not only serves as a cultural heritage, but also has a practical and strategic role in facing contemporary challenges.

Local wisdom plays a role as the first fortress in the conservation of natural resources. The value system adopted often reflects the harmonious relationship between humans and nature (ecological cosmology). For example, the concept *of Tri Hita Karana* in Bali balances the relationship between human-God, human-other, and human-environment, which is manifested in the management of *subak* rice fields. These practices result in globally recognized food and water security (Berkes, 2012).

Local wisdom serves as a social control mechanism that maintains order and prevents conflict. Customary norms provide a framework for dispute resolution through deliberative or customary courts. By prioritizing the principles of collectivity and mutual cooperation, local wisdom strengthens social cohesion and minimizes dependence on the formal legal system in certain issues(Suhartanto et al., 2020).

Local wisdom is a source of value and character education. Through fairy tales, proverbs, or traditional rituals, values such as honesty, responsibility, and mutual respect are internalized from an early age. The integration of local wisdom into the local curriculum (*local content*) is believed to produce students who are rooted in the culture of their nation (Tena et al., 2023)

Sustainable Development

The concept of Sustainable Development began to strengthen in the 1970s, driven by awareness of the limitations of natural resources and the negative impact of economic development on the environment(Purnami & Oka Suryawardani, 2018).The most authoritative and often cited definition comes from the Brundtland Report (Our Common Future) published by the United Nations *World Commission on Environment and Development* (WCED) in 1987. Sustainable Development is defined as development that meets the needs of today without sacrificing the ability of future generations to meet their own needs.

Sustainable Development is based on the **principle of the "**Triple Bottom Line" (Elkington, 1997), which affirms that development must be balanced between three main dimensions: Economic, Social, and Environmental (Ecology). Focus on efforts to maximize income by maintaining or increasing capital reserves. The goal is to achieve sustainable and sustainable economic growth, which includes: Job creation, Equitable distribution of prosperity, Efficient infrastructure development(Carrascosa-López et al., 2021; X. Chi et al., 2020; Kristen et al., 2023; Pujiastuti et al., 2023; Rais, 2020; Surbakti, 2022; Vukolić et al., 2023). Focus on efforts to maintain the stability of social and cultural systems, as well as ensure social justice in the distribution of wealth and services. Key aspects include: Poverty and hunger alleviation. Improvement of health and quality of education. Gender justice and protection of minority rights. Effective participation of the community in decision-making.

Focus on the protection and maintenance of physical and biological systems, as well as the wise management of natural resources. The goal is to maintain carrying capacity lingkungan

dan keanekaragaman hayati. Aspek penting meliputi: Pengurangan pollution and carbon emissions (climate change mitigation). Conservation of non-renewable natural resources. Responsible waste and water management. The implementation of the PB is guided by several fundamental principles, most notably: The obligation to ensure that today's development actions do not damage the potential of resources and the well-being of future generations. Equitable distribution of development benefits and costs among all groups of society today, including the elimination of poverty and social inequality. If there is a threat of serious or irreversible environmental damage, a lack of scientific certainty should not be used as an excuse to delay effective preventive measures. The incorporation of environmental, social, and economic aspects in every development policy and planning. The Sustainable Development Goals (SDGs) are a detailed global blueprint for achieving the UN goals. The SDGs consist of 17 Goals and 169 Targets that are universal, integrated, and interdependent(N. T. K. Chi & Pham, 2022; Elfitra Desy Surya, 2023; Kanwel et al., 2019; Liang & Lai, 2023; Savitri et al., 2023; Setiawan & Shiratina, 2023; Thi et al., 2024; Tiwari & Hasmi, 2022).

Research Conceptual Framework

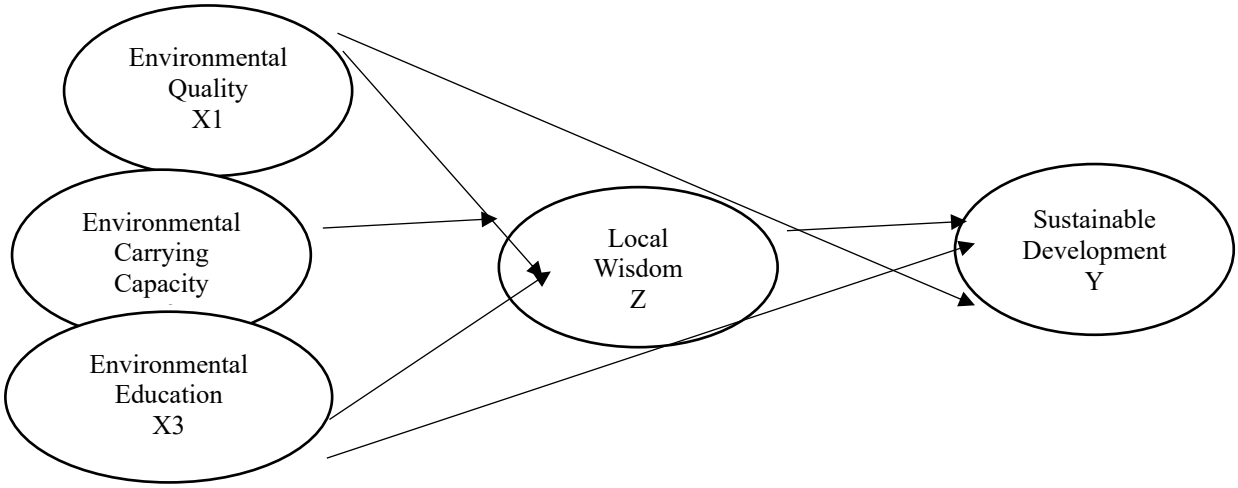

Figure 1. Research Conceptual Framework

Research Hypothesis:

H1: Environmental quality has a positive and significant effect on wisdom in the Sustainable Development of magrove ecotourism on Ketam Island

H2: Environmental Carrying Capacity has a positive and significant effect on wisdom in the Sustainable Development of magrove ecotourism on Ketam Island

H3: Environmental education has a positive and significant effect on wisdom in the Sustainable Development of magrove ecotourism on Ketam Island

H4: Local Wisdom has a positive and significant effect on wisdom in the Sustainable Development of magrove ecotourism on Ketam Island

H5: Environmental Quality has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island

H6: Environmental Carrying Capacity has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island

H7: Environmental Education has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island

H8: Environmental Quality has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island through local wisdom

H9: The carrying capacity of the environment has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island through local wisdom

H10: Environmental Education has a positive and significant effect on the Sustainable Development of magrove ecotourism on Ketam Island through local wisdom

Research Methodology

Research Approach

This study uses a quantitative approach with an associative study design, because the main goal is to understand in depth how the role of storytelling and visualization affects the formation of the image of ecotourism destinations among the millennial and Gen Z generations. Types and Design of Research Case study designs were selected to gain a rich understanding of storytelling practices and visual utilization in the context of specific ecotourism destinations.

The Data Analytics approach will be collected through in-depth interviews with millennial and Gen Z travelers, destination managers, and local content creators. Participatory observations were also carried out on promotional materials, social media, and tourism activities in the field. Content analysis is used to examine visual content (photos, videos, illustrations) and destination promotional narratives. Data analysis is carried out using thematic analysis techniques to find patterns, themes, and meanings that emerge from the data. Research Subjects Millennial Tourists (born 1981–1996) and Gen Z (born 1997–2012) who have visited or have an interest in Crab Island. Ecotourism destination managers and local stakeholders. Content creators who produce digital promotional materials related to Crab Island.

Research Location and Context

The research was carried out on Ketam Island, Malaysia, which is known as an ecotourism destination with local cultural potential and unique mangrove ecosystems. This location was chosen because it has a strong visual appeal and a potential cultural narrative to build the image of the destination.

Population and Sample

The research population is Millennial (born 1981–1996) and Gen Z (born 1997–2012) individuals who have visited Pulau Ketam in the last 24 months *or* plan to visit in the next 6 months, Consuming narrative/visual content about Pulau Ketam (Instagram, TikTok, YouTube, blogs, destination websites) as many as 350 tourists. Then by using the slovin formula, a research sample of 187 tourists was obtained.

$$n = \frac{N}{1 + N\,(e)^2}$$

$$n = \frac{350}{1 + 350(0{,}05)^2}$$

$$n = 187 \text{ tourists}$$

Data Collection Techniques

Data Collection Techniques In-depth interviews to explore perceptions and experiences. Focus Group Discussion (FGD) with millennial and Gen Z groups to understand collective dynamics. Documentation is in the form of social media analysis, brochures, and the official website of the destination. Direct observation at the destination to see the real form of Environmental quality, environmental carrying capacity and environmental education. Data

Validity and Validity Use triangulation of sources and methods to compare data from interviews, observations, and content analysis. Member checks are carried out by asking for confirmation from respondents on the results of the researcher's interpretation.

Data Analysis Methods

This study uses quantitative analysis with a thematic analysis approach. This approach was chosen because of the data collected in the form of interview narratives, group discussion results (FGDs), field observations, and rich visual content analysis. Thematic analysis allowed researchers to find patterns, themes, and relationships between variables from the perspective of Millennials and Gen Z. This research was analyzed using SMART PLS. Smart PLS is suitable if your research wants to measure relationships between latent variables.

Results

Research Results

Table 1 shows that of all respondents, 65 (65%) were male and 35 (35%) were female. By age, respondents 16-25 (5%) were aged 26-35, (10%) were aged 36-45 (35%) and between 37-45 (25. And > 45 (5%) Based on their recent education, respondents had a Bachelor's degree (40%) had a high school diploma (15%) had a graduate degree (20%) had a diploma (25%). Based on respondents' income, >respondents earn between IDR 13,000,000 (5%), earn between IDR 9,000,000-12,000,000 (35%), earn between 4,000,000-8,000,000 (40%), earn between 1,000,000-3,000,000 (20%).

Table 1. Characteristics of respondents

Characteristics	Options	Respond	
		N	%
Gender	Male	65	65
	Female	35	35
Age (years)	16-25	5	5
	26-35	10	10
	36-45	35	35
	37-45	25	25
	>45	5	5
Education	Diploma Degree	25	25
	Postgraduate's Degree	40	40
	Bachelor's Degree	20	20
	High School Degree	15	15
Income	> IDR 13,000,000	5	5
	> IDR 9,000,000 up to 12,000,000	35	35
	> IDR 4,000,000 up to 8,000,000	40	40
	IDR 1,000,000 up to 3,000,000	20	20

The first evaluation is to assess the loading factor. This evaluation aims to determine the relationship between indicators and latent variables. The value of the loading factor must have a value of (λ) > 0.7. The model is recalculated if the loading value (λ) < 0.7, and if the loading factor value (λ) is 0.7, then the variable indicator is considered valid. Indicators with high loading factors greatly contribute to explaining latent variables. If the value of

the loading factor for the variance inflation factor

Table 2. Loading factors, CR, AVE, and CA

Indicator	Loading Factor	Composite Reliability	AVE	Cronbach's Alpha
Environmental Quality		0,925	0,777	0,905
Water Quality Index	0,817			
Air Quality Index	0,734			
Soil Quality Index	0,775			
Environmental Carrying Capacity		0,935	0,745	0,924
Water carrying capacity	0,842			
Air Carrying Capacity	0,844			
Soil Bearing Capacity	0,828			
Environmental Education		0,945	0,766	0,938
Environmental Attitudes	0,835			
Environmental Ethics	0,838			
Environmental Behavior	0,834			
Local Wisdom		0,978	0,768	0,918
Local Knowledge	0,719			
Local Skill	0,744			
Local Social Process	0,758			
Sustainable Development		0,946	0,747	0,926
Economics	0,868			
Social	0,869			
Environmental	0,838			

(VIF) less than 5, there is no multicollinearity between indicators. Further, the AVE value for the checked variable was above the minimum value of 0.5. The results are shown in Table 2. There are three criteria for assessing convergent validity: (1) all loading factor > 0.60, (2) composite reliability (CR) must be greater than 0.70, and (3) the mean of extracted variance (AVE) must > 0.50. In addition, all Cronbach's Alpha (CA) values must be greater than 0.70 to indicate good measurement reliability. The discriminant validity of all constructs is also sufficient because the square root of the AVE of each construct (diagonal entry of each column) is greater than its correlation with other constructs (Prebensen & Xie, 2017).

Discriminant validity refers to the degree to which the construct differs of a particular model. There are several tests of discriminant validity, such as the Fornell- Larcker Criterion, cross-loading, and the Heterotrait-Monotrait Ratio (HTMT). This study uses HTMT because all HTMT ratios are less than the maximum value and maximum limit of 0.93, which proves that HTMT is the superior method in assessing discriminant validity (Su et al., 2020). Therefore, this study uses HTMT analysis to assess discriminant validity, as summarized in Table 3.

Table 3. Discriminant validity

Variable	TRS	AUS	EEG	MCY	SEI
Environmental Quality	0,865				
Environmental Carrying Capacity	0,853	0,854			

Environmental Education	0,836	0,846	0,834		
Local Wisdom	0,827	0,835	0,830	0,824	
Sustainable Development	0,815	0,833	0,815	0,816	0,812

Table 4 shows the hypothesis testing. This study found that the quality of the environment had a positive impact on the sustainable development ($\beta = 0.865$, $p < 0.000$). Environmental carrying capacity significantly affected the sustainable development ($\beta = 0.853$, $p < 0.000$). Environmental education had a positive impact on sustainable development ($\beta = 0.836$, $p < 0.001$). Local wisdom mediates the relationship between environmental quality, environmental carrying capacity and environmental education to sustainable development $\beta = 0.815$, $p < 0.000$).

Table 4. Direct and mediated influence on the variables

Hypotesis	B	*p*-value	Decision
H1: Environmental quality has a positive effect and significant to wisdom in Sustainable Development Magrove ecotourism on Ketam Island	0,634	0,000	Accepted
H2: Environmental carrying capacity affects positive and significant to wisdom in Sustainable Development	0,572	0,000	Accepted
H3: Environmental education has a positive effect and significant to wisdom in Sustainable Development	0,167	0,001	Accepted
H4: Local wisdom has a positive effect and significant in Development Sustainable	0,474	0,000	Accepted
H5: Environmental quality has a positive effect and significant to the development of Sustainable	0,435	0,000	Accepted
H6: Environmental carrying capacity affects positive and significant to wisdom in Sustainable Development	0,436	0,000	Accepted
H7: Environmental education has a positive effect and significant to wisdom in Sustainable Development	0,348	0,000	Accepted
H8: Environmental quality has a positive effect and significant to wisdom in Sustainable Development Inspired by local wisdom	0,344	0,000	Accepted
H9: Environmental carrying capacity affects positive and significant to wisdom in Sustainable Development Inspired by local wisdom	0,349	0,000	Accepted
H10: Environmental education has a positive effect and significant to wisdom in Sustainable Development Inspired by local wisdom	0,344	0,000	Accepted

Discussion

The results of the study show that the development of Mangrove Ecotourism on Ketam Island significantly opens up new opportunities for the local community. This is supported by increased community participation (as tour guides, *homestay* managers, or souvenir sellers) and increased household income involved. This model emphasizes the core concept of ecotourism, namely that conservation and the economy can go hand in hand (*triple bottom line*). Mangrove ecotourism functions as a mediating variable that transforms natural resources (mangroves) from just conservation objects to sustainable economic assets. This is in accordance with the literature that states that successful ecotourism is one that transfers direct economic benefits to the people who protect the area. This success shows that the ecotourism framework implemented on Pulau Ketam is not only focused on visitors, but also on equitable distribution of benefits, which is the key to the survival of the empowerment program.

Local Wisdom in Sustainability

It was found that indicators of Local Wisdom (e.g., customary rules on the use of marine resources or the practice of mutual cooperation in environmental cleanliness) had a strong positive correlation with the level of mangrove conservation and active participation of communities in ecotourism. Local wisdom serves as a filter that ensures ecotourism practices do not damage the environment.

This reinforces the theory that local wisdom is a social capital that is very important in sustainable development. Customary rules and traditional values serve as internal norms that limit overexploitation. For example, if there are local rules not to cut down mangroves in a certain area, this automatically supports the sustainability of ecotourism without the need for strict government oversight. The empowerment model should explicitly integrate customary institutions and local knowledge. Ecotourism training that is only technical (managerial and marketing) will not be effective without the support of legitimacy from local wisdom values.

Community Empowerment Model

The empowerment model developed (*e.g., through the stages of socialization, skills training, institutional formation, and mentoring*) is effective in increasing the institutional capacity of the community (mediator variables). Strong local institutions (such as Tourism Awareness Groups/Pokdarwis) serve as a bridge between the government/investors and community members. This model adopts a *bottom-up* approach. The success of empowerment is measured not only by the number of trainings, but also by the extent to which the community has achieved independence in decision-making and financial management (empowerment indicators). The transition from reliance on seed funding to self-sustaining operations suggests that the model has reached a stage of institutional sustainability. The formation of formal institutions (Pokdarwis, BUMDes) that are filled by local leaders and supported by local wisdom is a crucial component. This model proves that integrated empowerment (economic, social, and environmental) produces stronger impact than empowerment that focuses on only one aspect.

Sustainable Development Achievement

This achievement fulfills the three pillars of Sustainable Development (*Sustainability*): *People, Planet, Profit* (or *Social, Ecological and Economic Sustainability*). Development on Ketam Island is considered sustainable because the increase in welfare (profit) is achieved without sacrificing ecological functions (planet), and is supported by a cohesive social structure (people).

Conclusion

The Mangrove Ecotourism-Based Community Empowerment Model that strongly integrates Local Wisdom has proven to be an effective framework in achieving Sustainable Development on Crab Island. The synergy between local wisdom as a *conservation norm* and ecotourism as a *source of income* creates an economically independent and ecologically responsible model.

References

[1] Achmad Fauzi, Hutajulu, L., M. Rijal, Hendrik Moses, Indra Samuel, & Muhammad Sidik. (2023). Analisis Pengaruh Kepuasan Kerja, Beban Kerja, Serta Lingkungan Kerja Pada Performa Pegawai (Literature Review Metodologi Riset Bisnis). *Jurnal Ilmu Multidisplin*, *1*(4), 874–885. https://doi.org/10.38035/jim.v1i4.130

[2] Aisyah, S., & Rachmadi, K. R. (2022). Digitalisasi Pemasaran Melalui Sosial Media Marketing Pada Pelaku Umkm Guna Peningkatan Pendapatan. *RESWARA: Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 442–448. https://doi.org/10.46576/rjpkm.v3i2.1866

[3] Akbari, M., Foroudi, P., Zaman Fashami, R., Mahavarpour, N., & Khodayari, M. (2022). Let us talk about something: The evolution of e-WOM from the past to the future. *Journal of Business Research*, *149*(June), 663–689. https://doi.org/10.1016/j.jbusres.2022.05.061

[4] Amalia, R., Wibisono, N., & Elliott-White, M. (2023). Increasing Tourist Revisit Intention in Garut Tourist Attractions: The Role of Destination Image and Tourist Satisfaction. *Journal of Marketing Innovation (JMI)*, *3*(2), 130–147. https://doi.org/10.35313/jmi.v3i2.74

[5] Ambatali, C. D. (2024). Human resource development and management in the Philippines' national space capacity building program. *Advance in Space Research*.

[6] Andhiyani Rahmasari Putri, & Ari Susanti. (2022). Pengaruh E-Commerce, Sosial Media, Dan Kepercayaan Konsumen Terhadap Minat Beli Pada Aplikasi Belanja Shopee. *JRMSI - Jurnal Riset Manajemen Sains Indonesia*, *13*(01), 20–33. https://doi.org/10.21009/jrmsi.013.1.02

[7] Arai, Soichi. Toshiko, O. et al. (2021). Tingkat Loyalitas Pelanggan Ditinjau dari Kualitas Pelayanan Melalui Variabel Moderating Kepuasan Konsumen. In *Fuctional Food Science* (Vol. 65, pp. 1–13).

[8] Aunchistha, P. U. D. B. A. (2025). Resilience and reinvention: knowledge management strategies for community-based tourism in Post-Pandemic Thailand. *Sustainable Futures*, *9*(December 2024). https://doi.org/10.1016/j.sftr.2025.100772

[9] Ayşe Esra İşmen, Ş. B. G. Y. H. (2025). Development and Factorial Structure of the Green Crescent Life Skills Scale for Turkish Adolescents. *Internasional Journal Mental Health Promotion*.

[10] Bustomi, T., Aliah, N., Kasmita, M., Asmar, & Syarifuddin. (2024). Kepemimpinan transformasional sebagai basis pelayanan publik di Indonesia Transformational leadership as the basis of public. *PALLANGGA PRAJA*, *6*(1), 75–80.

[11] Cáceres-Feria, R., Hernández-Ramírez, M., & Ruiz-Ballesteros, E. (2021). "Depopulation, community-based tourism, and community resilience in southwest Spain." *Journal of Rural Studies*, *88*(September), 108–116. https://doi.org/10.1016/j.jrurstud.2021.10.008

[12] Calvi, L., & Hover, M. (2021). Storytelling for Mythmaking in Tourist Destinations. *Leisure Sciences*, *43*(6), 630–643. https://doi.org/10.1080/01490400.2021.1908193

[13] Carrascosa-López, C., Carvache-Franco, M., & Carvache-Franco, W. (2021). Perceived value and its predictive relationship with satisfaction and loyalty in ecotourism: A study

in the posets-maladeta natural park in Spain. *Sustainability (Switzerland)*, *13*(14). https://doi.org/10.3390/su13147860

[14] Chen, H. S. (2025). Sustainable tourism and ecological challenges in Taiwan's southwest coast national scenic area: An ecological footprint and carrying capacity assessment. *Environmental and Sustainability Indicators*, *27*(August). https://doi.org/10.1016/j.indic.2025.100863

[15] Chi, N. T. K., & Pham, H. (2022). The moderating role of eco-destination image in the travel motivations and ecotourism intention nexus. *Journal of Tourism Futures*, 1–17. https://doi.org/10.1108/JTF-01-2022-0014

[16] Chi, X., Lee, S. K., Ahn, Y. joo, & Kiatkawsin, K. (2020). Tourist-perceived quality and loyalty intentions towards rural tourism in China. *Sustainability (Switzerland)*, *12*(9), 1–18. https://doi.org/10.3390/su12093614

[17] Cruwys, T., Haslam, S. A., Steffens, N. K., Haslam, C., & Reicher, S. D. (2025). Nothing is so impactful as good theory: Evidence for the impact of the social identity approach to health on policy and practice. *Social Science and Medicine*, *379*(December 2024). https://doi.org/10.1016/j.socscimed.2025.118164

[18] Dao, K. T., Nguyen, D. D., Van Nguyen, D., Nguyen, D. N., & Pham, H. T. L. (2025). Survey data on perceived sustainability and revisit intention of tourists to community-based tourism. *Data in Brief*, *61*. https://doi.org/10.1016/j.dib.2025.111773

[19] *destination 7.pdf*. (n.d.).

[20] Dewi, L. K. Y. (2014). Modeling the Relationships between Tourism Sustainable Factor in the Traditional Village of Pancasari. *Procedia - Social and Behavioral Sciences*, *135*, 57–63. https://doi.org/10.1016/j.sbspro.2014.07.325

[21] Edukasi, W., & Desa, D. I. (n.d.). *Pendahuluan*. *8*, 607–624.

[22] Elfitra, D. S., Bunga, A., & Saragih, M. G. (2020). The Effect of Experiential Marketing on Customer Loyalty with Satisfaction as an Intervening Variables. In *Enrichment: Journal of Management* (Vol. 11, Issue 1, pp. 103–108).

[23] Elfitra Desy Surya. (2023). Unique Culinary Success in Medan City as a Tourism Destination. *International Journal of Management, Economic and Accounting*, *1*(2), 94–100. https://doi.org/10.61306/ijmea.v1i2.14

[24] Eri Samah, Ramadha Yanti Parinduri, Muhammad Razali, M. S. (2022). Sosialisasi Strategi Menarik Minat Pengunjung di Kawasan Wisata Petik Buah Tanah Karo Sumatera Utara. *JJournal Liaison Academia and Society (J-LAS)*, *2022*(4), 90–95.

[25] Fadilah, N. L., & Huda, M. (2024). Pengaruh Storytelling Marketing dan Citra Destinasi terhadap Minat Berkunjung Kembali dengan Tourist Satisfaction sebagai Variabel Intervening pada Pengunjung Tanaria Park. *AKADEMIK: Jurnal Mahasiswa Humanis*, *4*(3), 1136–1147. https://doi.org/10.37481/jmh.v4i3.1053

[26] Fan, S., Wykes, M. S. D., Lin, W. E., Jones, R. L., Robins, A. G., & Linden, P. F. (2020). Jo ur l P re of. In *Building and Environment*. https://doi.org/10.1016/j.buildenv.2020.107386

[27] Ferine, K. F., Aditia, R., Rahmadana, M. F., & Indri. (2021). An empirical study of leadership, organizational culture, conflict, and work ethic in determining work performance in Indonesia's education authority. *Heliyon*, *7*(7). https://doi.org/10.1016/j.heliyon.2021.e07698

[28] Ferine, K. F., Ermiaty, C., & Muda, I. (2017). The impact of entrepreneurship and competence on small medium enterprises Tangan Di Atas (TDA) Medan entrepreneurs' work performance. *International Journal of Economic Research*, *14*(17), 365–376.

[29] Gorat, R. H., Waruwu, A. A., & Robain, W. (2022). The Effect of Training, Work Motivation and Work Discipline on Employee Performance at PT. Indofood CBP Sukses Makmur Tbk. Medan Branch. *Edumaspul: Jurnal Pendidikan*, *6*(2), 1820–1828.

https://doi.org/10.33487/edumaspul.v6i2.4469

[30] Greig, S. M., Hippel, C. Von, & Okimoto, T. (2026). *Journal of Experimental Social Psychology How diversity and disadvantage frames shape employee reactions to affirmative action : Social identity threat , stereotype threat , and fairness perceptions*. *122*(July 2024).

[31] Grigorieva, A. (2022). International Architecture News. In *Проект Байкал* (Vol. 2, Issue 71). https://doi.org/10.51461/projectbaikal.71.1931

[32] Hidayatullah, S., Windhyastiti, I., Aristanto, E., & Rachmawati, I. K. (2021). Peran Cleanliness , Health , Safety Dan Environment Sustainability (CHSE) Terhadap Minat Orang Berkunjung Ke Destinasi Wisata Yang Ada Di Kota Batu Pasca Pandemic Covid 19. *Seminar Nasional Kepariwisataan*, *2*(1), 161–170. https://seminar.unmer.ac.id/index.php/senorita/senorita2/paper/viewFile/1178/488

[33] Hoover, H., & Krupka, E. (2025). Different norms of sexual activity and consent seeking among college students: Social identity and statistical discrimination. *Journal of Economic Behavior and Organization*, *235*(January 2024). https://doi.org/10.1016/j.jebo.2025.107028

[34] Hu, B., Na-Nan, K., & Kittichotsatsawat, Y. (2025). Toward sustainable farming: Assessing and validating green skills for agricultural professionals in China. *Environmental Challenges*, *18*(October 2024). https://doi.org/10.1016/j.envc.2024.101067

[35] Huang, T. K., Ferraro, F., Mostafazadeh, N., Misra, I., Agrawal, A., Devlin, J., Girshick, R., He, X., Kohli, P., Batra, D., Zitnick, C. L., Parikh, D., Vanderwende, L., Galley, M., & Mitchell, M. (n.d.). *Visual Storytelling*. *Dii*.

[36] Islamiyah, A. N., Alyas, & Parawu, H. E. (2021). Pengaruh Kinerja Pegawai Terhadap Kualitas Pelayanan Publik Di Kantor Dinas Tenaga Kerja Dan Transmigrasi Kabupaten Gowa. *Jurnal Unismuh*, *2*(5), 1874–1891.

[37] Jerez, M. R. (2023). Tourism marketing of the Autonomous Communities of Spain to promote gastronomy as part of their destination branding. *International Journal of Gastronomy and Food Science*, *32*(April). https://doi.org/10.1016/j.ijgfs.2023.100727

[38] Jufrizen, J., & Sitorus, T. S. (2021). Pengaruh Motivasi Kerja dan Kepuasan Kerja Terhadap Kinerja Dengan Disiplin Kerja Sebagai Variabel Intervening. *SiNTESa : Seminar Nasional Teknologi Edukasi Dan Humaniora*, *1*(1), 841–856.

[39] Kanwel, S., Lingqiang, Z., Asif, M., Hwang, J., Hussain, A., & Jameel, A. (2019). The influence of destination image on tourist loyalty and intention to visit: Testing a multiple mediation approach. *Sustainability (Switzerland)*, *11*(22). https://doi.org/10.3390/su11226401

[40] Kelleher, S., & Murphy, M. (2025). Variations in suicidality across multiple social identities in asexual people: An intersectionality analysis. *Journal of Affective Disorders Reports*, *21*(April). https://doi.org/10.1016/j.jadr.2025.100921

[41] Králiková, A., Peruthová, A., & Ryglová, K. (2020). Impact of destination image on satisfaction and loyalty. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *68*(1), 199–209. https://doi.org/10.11118/actaun202068010199

[42] Kristen, U., Wacana, S., Diterima, N., & Disetujui, N. (2023). **1 , 2 1,2*. *48*, 1–12.

[43] Kuang, K. Y. (2025). How artificial intelligence applications enhance enterprise green total factor productivity? A perspective on human-machine matching and labor skill structure. *Economic Analysis an Policy*.

[44] Liang, S. H., & Lai, I. K. W. (2023). Tea tourism: Designation of origin brand image, destination image, and visit intention. *Journal of Vacation Marketing*, *29*(3), 409–427. https://doi.org/10.1177/13567667221099952

[45] Loustau, T. P. F. (2025). Social identity complexity mitigates outgroup derogation in

moral judgment. *Journal of Experimental Social Psychology*.

[46] Lovelock. (2023). Airline and hotel loyalty programme diversity and choice: effects of personality, cultural, and socio-demographic factorsNo Title. *Marketing, Journal Travel and Tourism*, *40*.

[47] Lu, C. S., Weng, H. K., Chen, S. Y., Chiu, C. W., Ma, H. Y., Mak, K. W., & Yeung, T. C. (2020). How port aesthetics affect destination image, tourist satisfaction and tourist loyalty? *Maritime Business Review*, *5*(2), 211–228. https://doi.org/10.1108/MABR-12-2019-0056

[48] Mara, U. T. (2023). *Erosion Rate Estimation in Kuala Terengganu*. *21*(6), 29–41.

[49] MariaLaura Di DomenicoDjebali, M. N. K. S. Z. (2025). How diversity and disadvantage frames shape employee reactions to affirmative action: Social identity threat, stereotype threat, and fairness perceptions. *International Journal of Entrepreneurial Behavior & Research*, *31*(9).

[50] Martínez-Sánchez, A., Vicente-Oliva, S., & Pérez-Pérez, M. (2020). The relationship between R&D, the absorptive capacity of knowledge, human resource flexibility and innovation: Mediator effects on industrial firms. *Journal of Business Research*, *118*(July), 431–440. https://doi.org/10.1016/j.jbusres.2020.07.014

[51] Maya Citra. (2022). The Effect of Prior Experience and Trust on Customer Loyalty with Satisfaction as an Intervening Variable. *International Journal of Community Service (IJCS)*, *1*(1), 112–131. https://doi.org/10.55299/ijcs.v1i1.219

[52] Mesra, Ferine, K., Astuti, D., & Sentosa, I. (2023). Website Quality, Social Media and Satisfaction on Choosing Decisions Private Universities. *Trikonomika*, *22*(2), 93–99. https://doi.org/10.23969/trikonomika.v22i2.10349

[53] Motoki, K., Park, J., Pathak, A., & Spence, C. (2023). Creating luxury brand names in the hospitality and tourism sector: The role of sound symbolism in destination branding. *Journal of Destination Marketing and Management*, *30*(August). https://doi.org/10.1016/j.jdmm.2023.100815

[54] Mulyadi, B., Sirojuzilam, S., Lubis, S., & Purwoko, A. (2024). the Role of Caldera Geopark in Tourism Development of Lake Toba Super Priority Destinations, Indonesia. *Geojournal of Tourism and Geosites*, *55*(3), 1426–1437. https://doi.org/10.30892/gtg.55342-1314

[55] Nasution, M. Y., Andri, & Robain, W. (2021). Top Five Ranking of Sharia Financial Acades with the Potential of Fraud (Case Study of Three Sharia Commercial Banks) In North Sumatera. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *4*(1), 552–562. https://doi.org/10.33258/birci.v4i1.1638

[56] Nikjoo, A., Seyfi, S., & Saarinen, J. (2025). Annals of Tourism Research Empirical Insights Promoting gender inclusivity through community-based tourism. *Annals of Tourism Research Empirical Insights*, *6*(1), 100181. https://doi.org/10.1016/j.annale.2025.100181

[57] Ningtiyas, E. A., & Alvianna, S. (2021). Analisis Pengaruh Attraction, Accessibility, Amenity, Ancillary terhadap Minat Berkunjung Wisatawan melalui Loyalitas Wisatawan sebagai Variabel Mediasi. *Media Wisata*, *19*(1), 83–96. https://doi.org/10.36276/mws.v19i1.69

[58] Nufus, H. (2021). Pengaruh Iklim Organisasi Terhadap Kinerja Karyawan Pada Alfamart Di Bintaro. *Jurnal Tadbir Peradaban*, *1*(3), 182–188. https://doi.org/10.55182/jtp.v1i3.68

[59] Obas, P. omo, & A, T. A. D. (2023). Cognitive-affective-motivation factors influencing international visitors' destination satisfaction and loyalty. *Journal Hospitality Tourism Insight*, *6*. https://www.emerald.com/insight/publication/issn/2514-9792

[60] P. Budrugeac. (n.d.). Jurnal 2.Pdf. In *Journal of thermal analysis*.

[61] Paijan, P., Anah, S., & Sugiharjo, R. J. (2024). Pengembangan Kompetensi Sumber Daya Manusia Berkarakter Technopreneurship pada UMKM di Kelurahan Meruya Utara. *Jurnal Pengabdian Masyarakat Singa Podium (JPMSIPO)*, *2*(1), 54–60. https://doi.org/10.58965/jpmsipo.v2i1.29

[62] Pamulardi, B. (2016). Studi Kasus Desa Wisata Tingkir, Salatiga. *Program Magister Ilmu Lingkungan Program Pascasarjana Universitas Diponegoro Semarang*.

[63] Papadopoulou, N. M., Ribeiro, M. A., & Prayag, G. (2023). Psychological Determinants of Tourist Satisfaction and Destination Loyalty: The Influence of Perceived Overcrowding and Overtourism. *Journal of Travel Research*, *62*(3), 644–662. https://doi.org/10.1177/00472875221089049

[64] Picaud-Bello, K., Schiele, H., Koch, V., & Francillette, M. (2024). Innovation through sustainability: Identifying purchaser skills fostering green innovation. *Cleaner Logistics and Supply Chain*, *10*(January 2022). https://doi.org/10.1016/j.clscn.2023.100136

[65] Pijet-Migoń, E., & Migoń, P. (2022). Geoheritage and Cultural Heritage—A Review of Recurrent and Interlinked Themes. *Geosciences (Switzerland)*, *12*(2). https://doi.org/10.3390/geosciences12020098

[66] Pintossi, N., Ikiz Kaya, D., & Pereira Roders, A. (2023). Cultural heritage adaptive reuse in Salerno: Challenges and solutions. *City, Culture and Society*, *33*(March). https://doi.org/10.1016/j.ccs.2023.100505

[67] Pujiastuti, E. E., Joko, H., Utomo, N., Nurharumi, L. L., & Widowati, D. (2023). Tourist Loyalty Based On Destination Image , Tourist Motivation , and Tourist Satisfaction. *Jurnal Bisnis Dan Manajemen*, *10*(1), 97–108.

[68] Purnami, N. N. A., & Oka Suryawardani, I. G. A. (2018). The Effect of the Quality of Services on the Visitors' Satisfaction and Desire to Pay a Revisit to the Bali Pulina Agrotourism. *E-Journal of Tourism*, *5*(2), 62. https://doi.org/10.24922/eot.v5i2.42590

[69] Rahayu, S., Vedy, N. K., & Gumanti, M. (2023). Driving ecotourism loyalty through destination image, satisfaction and motivation. *Journal of Business and Information System (e-ISSN: 2685-2543)*, *5*(1), 123–135. https://doi.org/10.36067/jbis.v5i1.183

[70] Rahman, A. F. M. A., Islam, M. A., Idris, M. H., Bhuiyan, M. K. A., Chowdhury, M. M., Abualreesh, M. H., & Kamal, A. H. M. (2023). Species Diversity and Assemblage of Mangroves at Setiu Wetland, Terengganu, Malaysia. *Borneo Journal of Resource Science and Technology*, *13*(1), 173–190. https://doi.org/10.33736/bjrst.5109.2023

[71] Rais, S. (2020). Agrowisata Kampung Terih Sebagai Pengembangan Desa Pariwisata Di Batam. *INVOTEK: Jurnal Inovasi Vokasional Dan Teknologi*, *20*(2), 19–26. https://doi.org/10.24036/invotek.v20i2.734

[72] Rambu Atahau, A. D., Huruta, A. D., & Lee, C. W. (2020). Rural microfinance sustainability: Does local wisdom driven - governance work? *Journal of Cleaner Production*, *267*. https://doi.org/10.1016/j.jclepro.2020.122153

[73] Retno Santi Sumardi, Mukhamad Najib, A. S. B. M., Dardanella, D., & Sneesl, and R. (2023). *Factors Affecting Sustainable Agro-tourism: A Review StudyNo Title*.

[74] Rini Astuti, & Suhendri. (2019). Pengaruh Kompensasi Dan Motivasi Terhadap Kinerja Karyawan Pada PT. Tunas Jaya Utama. *Jurnal Manajemen Bisnis Eka Prasetya : Penelitian Ilmu Manajemen*, *5*(2), 1–9. https://doi.org/10.47663/jmbep.v5i2.22

[75] Rocca, L. H. D., & Zielinski, S. (2022). Community-based tourism, social capital, and governance of post-conflict rural tourism destinations: the case of Minca, Sierra Nevada de Santa Marta, Colombia. *Tourism Management Perspectives*, *43*(January). https://doi.org/10.1016/j.tmp.2022.100985

[76] Rodríguez-Pose, A. T. K. c, & More, S. (2024). NoLocal empowerment through economic restructuring in Brazil: the case of the greater ABC region Title. *Geoforum*.

[77] Ruiz-Ballesteros, E., & González-Portillo, A. (2024). Limiting rural tourism: Local

agency and community-based tourism in Andalusia (Spain). *Tourism Management*, *104*(November 2023). https://doi.org/10.1016/j.tourman.2024.104938

[78] Saebah, N., & Merthayasa, A. (2024). The Influence of Organizational Culture on Employee Performance with Organizational Commitment as an Intervening Variable. *International Journal of Social Service and Research*, *4*(03), 744–751. https://doi.org/10.46799/ijssr.v4i03.685

[79] Samekin, A., Bolatov, A., & Kotzur, P. F. (2025). What shapes the social perception of immigrant groups in Kazakhstan? The role of ethnic- and language-based identities and underlying threat and benefit perceptions. *International Journal of Intercultural Relations*, *109*(May). https://doi.org/10.1016/j.ijintrel.2025.102274

[80] Santosa, I., & Priyono, R. E. (2012). Diseminasi Model Pemberdayaan Masyarakat Desa melalui Pengelolaan Agrowisata. *Mimbar*, *28*(2), 181–190.

[81] Saragih, M. G., & Surya, Elfitra Desy, B, M. (2021). Kajian Dasar Pariwisata. In *Researchgate.Net* (Issue September).

[82] Savitri, N. M., Mubarokah, M., & Roidah, I. S. (2023). Development Strategy of Padusan Strawberry Picking Agrotourism, Pacet District, Mojokerto District. *International Journal of Multidisciplinary Research and Literature*, *2*(5), 672–683. https://doi.org/10.53067/ijomral.v2i5.159

[83] Serrat, O. (2008). *Storytelling*. *October*.

[84] SETIAWAN, A., & SHIRATINA, A. (2023). The Role of Small and Medium Enterprises (SME) Innovation and Lifestyle in Enhance Revisit Intention Through Destination Image at Tourist Attraction of Untung Jawa Island. *International Journal of Environmental, Sustainability, and Social Science*, *4*(6), 1702–1713. https://doi.org/10.38142/ijesss.v4i6.906

[85] Setiawan, N., Wakhyuni, E., & Siregar, N. A. (2020). Recruitment Analysis on Employee Performance With Variable Control As Moderating On Manufacturing Company. *Ilomata International Journal of Management*, *1*(3), 102–111. https://doi.org/10.52728/ijjm.v1i3.69

[86] Shamzzuzoha, A., Cisneros Chavira, P., Kekäle, T., Kuusniemi, H., & Jovanovski, B. (2022). Identified necessary skills to establish a center of excellence in vocational education for green innovation. *Cleaner Environmental Systems*, *7*(August), 1–10. https://doi.org/10.1016/j.cesys.2022.100100

[87] Shi, D. (2025). Advocacy fit and social identity in corporate social advocacy: A multigroup analysis of public responses. *Public Relations Review*.

[88] Shuvo, M. I. M., & Ahmed, T. (2025). Sustainable clicks: exploring Gen Z's e-commerce engagement and value perceptions for sustainable tourism. *Sustainable Futures*, *10*(August). https://doi.org/10.1016/j.sftr.2025.101147

[89] Sirajuddin, GS, A. D., Saragih, M. G., Surya, E. D., & Sandoval, M. R. B. (2022). Communicating about sustainability on @greenpeaceid. *Jurnal Studi Komunikasi (Indonesian Journal of Communications Studies)*, *6*(3), 739–752. https://doi.org/10.25139/jsk.v6i3.4518

[90] Siregar, N. (2018). Analisis faktor-faktor yang mempengaruhi minat beli konsumen dalam menggunakan indihome sebagai penyedia jasa internet di kota medan (studi kasus kantor plaza telkomcabang iskandar muda no. 35 medan baru. *Jurnal Manajemen Tools*.

[91] Sørensen, E., & Torfing, J. (2025). Private-sector actors initiating and driving local green co-creation partnerships. *Cities*, *163*(May 2024). https://doi.org/10.1016/j.cities.2025.106062

[92] Suhanta, B., Jufrizen, & Pasaribu, F. (2022). Pengaruh Kepemimpinan Dan Komunikasi Pegawai yang Dimoderasi Lingkungan Kerja Terhadap Kinerja. *Jurnal Ekonomi & Ekonomi Syariah (Jesya)*, *5*(2), 1396–1412.

https://doi.org/https://doi.org/10.36778/jesya.v5i2.736

[93] Suhartanto, D., Brien, A., Primiana, I., Wibisono, N., & Triyuni, N. N. (2020). Tourist loyalty in creative tourism: the role of experience quality, value, satisfaction, and motivation. *Current Issues in Tourism*, *23*(7), 867–879. https://doi.org/10.1080/13683500.2019.1568400

[94] Sumardi, R. S., Najib, M., Shah, A., & Mahomed, B. (n.d.). *Factors Affecting Sustainable Agro-tourism : 2*, 80–91.

[95] Surbakti, N. B. (2022). Analisis potensi agrowisatadi kabupaten karo. *Skripsi*.

[96] Suriyankietkaew, S., Krittayaruangroj, K., Thinthan, S., & Lumlongrut, S. (2025). Creative Tourism as a Driver for Sustainable Development: A Model for Advancing SDGs through Community-Based Tourism and Environmental Stewardship. *Environmental and Sustainability Indicators*, *27*(March), 100828. https://doi.org/10.1016/j.indic.2025.100828

[97] Surya, E. D., Rini, E. S., & Setiawan, N. (2018). *The Effect of Halal Destination Image and Visitors Satisfaction on Tourist Loyalty (Object In Bukit Tinggi City Of West Sumatera)*. *46*(Ebic 2017), 558–564. https://doi.org/10.2991/ebic-17.2018.88

[98] Surya, E. D., Saragih, M. G., & Siregar, N. (2022). Analysis of the Effect of Tourism Objects and Tourism Infrastructure on the Satisfaction of Muslim Tourists Visiting Halal-Based Tourist Destinations in the Lake Toba Tourism Area. *1st Virtual Workshop on Writing Scientific Article for International Publication Indexed SCOPUS*, 540–545. https://doi.org/10.2478/9788366675827-094

[99] Surya, E. D., & Suwarno, B. (2023a). Memorable Tourism Experience : Building Satisfaction and Loyalty of Tourists (Case Study of Medan City , Indonesia). *International Journal of Economics Development Research*, *4*(2), 507–522.

[100] Surya, E. D., & Suwarno, B. (2023b). Memorable Tourism Experience : Building Satisfaction and Loyalty of Tourists (Case Study of Medan City , Indonesia). *International Journal of Economics Development Research (IJEDR)*, *4*(2), 507–522.

[101] Susila, I., Dean, D., & Harismah, K. D. P. A. S. M. (2024). Does interconnectivity matter? An integration model of agro-tourism development Title. *Asia Pacifik Manajemen Review*, *29*. https://www.sciencedirect.com/journal/asia-pacific-management-review/vol/29/issue/1

[102] Tena, M. A. M., Hernandez Lobato, L., Carlos, J. F. R., & Magdalena, M. S. R. (2023). Destination image and tourist motivations as antecedents of tourist engagementNo Title. *Internasional Journal Of Tourism Cities*.

[103] Thi, N., Yen, H., Thi, N., Quynh, T., Dinh, T. D., Thi, T., Mai, H., Thi, N., Duyen, H., Hong, P. N., & Duc, B. M. (2024). The impact of destination quality and image on tourists ’ Nguyen Thi Hai Yen , b Nguyen Thi Thuy Quynh , c Truong Duc Dinh , d Tran Thi development of the tourism sector . The provinces on the North Central Coast of Vietnam possess immense tourism potenti. *Journal Of Law Sustainable*, 1–19.

[104] Tinambunan, A. K. (2019). Analisis Iklim Organisasi PT.Sharon. *Prosiding FRIMA (Festival Riset Ilmiah Manajemen Dan Akuntansi)*, *6681*(2), 1057–1066. https://doi.org/10.55916/frima.v0i2.143

[105] Tiwari, R., & Hasmi, H. (2022). Integrating concepts of destination image, travel motivations, expectation, and future behavior to create a model of wellness travel intentionsNo Title. *Internasional Journal SPA and Wellness*.

[106] Verspieren, C. D. A. (2024). No Title. *Advance in Space Research*.

[107] Vitasurya, V. R. (2016). Local Wisdom for Sustainable Development of Rural Tourism, Case on Kalibiru and Lopati Village, Province of Daerah Istimewa Yogyakarta. *Procedia - Social and Behavioral Sciences*, *216*(October 2015), 97–108. https://doi.org/10.1016/j.sbspro.2015.12.014

[108] Vukolić, D., Gajić, T., Petrović, M. D., Bugarčić, J., Spasojević, A., Veljović, S., Vuksanović, N., Bugarčić, M., Zrnić, M., Knežević, S., Rakić, S. R., Drašković, B. D., & Petrović, T. (2023). Development of the Concept of Sustainable Agro-Tourism Destinations—Exploring the Motivations of Serbian Gastro-Tourists. *Sustainability (Switzerland)*, *15*(3). https://doi.org/10.3390/su15032839

[109] Wadei, B., Owusu-Addo, E., Bonuedi, I., Yeboah, T., Tetteh, R. O., Antoh, E. F., & Mensah-Odum, N. (2025). Groundnut processing and women's economic empowerment: Insights from a qualitative analysis. *Social Sciences and Humanities Open*, *12*(April). https://doi.org/10.1016/j.ssaho.2025.101631

[110] Wakhyuni, E., Nurafrina, S., & Ningsih, L. (2017). Pengaruh sumber-sumber stres kerja dan disiplin kerja terhadap kinerja anggota polres binjai sumut. *SENASPRO 2017 | Seminar Nasional Dan Gelar Produk*, *5*(061), 890–901.

[111] Widayati, C., H. Rahardjo, T., & Febriyanti, M. (2017). Pengaruh Gaya Kepemimpinan Transformasional, Motivasi Dan Kompensasi Terhadap Kinerja Karyawan. *Jurnal Ekonomi*, *22*(3), 466–485. https://doi.org/10.24912/je.v22i3.286

[112] Wijaya, N., Sudarijati, S., & Samsuri, S. (2024). The Effect of Training, Work Motivation and Work Discipline on Employee Performance at PT Maya Gapura Intan Bandung. *West Science Interdisciplinary Studies*, *2*(05), 975–983. https://doi.org/10.58812/wsis.v2i05.902

[113] Worley, J. T., & Smith, A. L. (2026). *Psychology of Sport & Exercise Positive peer relationships , social identity , and adaptive sport motivation in youth athletes*. *82*(April 2025).

[114] Ye, X., Hou, R., Wang, S., & Omar, N. A. B. (2024). Social media, relationship marketing and corporate ESG performance. *Finance Research Letters*, *63*(December 2023). https://doi.org/10.1016/j.frl.2024.105288

[115] Yulianti, S., Nuraini, A., & Ismaya, S. B. (n.d.). *Pengaruh Model Kepemimpinan Transformasional Perilaku Inovatif Terhadap Orientasi Entrepreneurship bagi Kinerja Bisnis UMKM Mekarjaya , Kota Depok Pendahuluan Kewirausahaan saat ini menghadapi beragam tantangan dalam memasuki era digitalisasi . Era ini pu*. 332–351.

[116] Zakaria, M. S., & Yusof, Z. B. (2024). Mangrove Ecotourism and Conservation Centre at Pulau Ketam, Klang, Selangor. *Design Ideals Journal*, *6*(1), 1–11. https://www.researchgate.net/publication/382365256

[117] Zhao, X., Elahi, E., Wang, F., Xing, H., & Khalid, Z. (2024). Sustainable tourism development for traditional Chinese drama's intangible cultural heritage. *Heliyon*, *10*(3), 1–13. https://doi.org/10.1016/j.heliyon.2024.e25483

[118] Zhou, X. (2023). Examining the Relationships of Destination Image, Memorable Tourism Experience and Tourists' Behavioral Intentions in Ancient Towns. *Social Space*, *3*.

[119] Zulvianti, N., Aimon, H., & Abror, A. (2023). Perceived Environmental Value, Destination Image, and Tourist Loyalty: The Role of Tourist Satisfaction and Religiosity. *Sustainability (Switzerland)*, *15*(10), 1–13. https://doi.org/10.3390/su15108038

[120] Микрюков, В. (2015). No Тяжелое бремя АмерикиTitle. *Независимое Военное Обозрение*, *16.1.2015*, 139–148.