

Sustainable Tourism Development in Nusa Penida: Inclusive, Digital, and Sustainable Strategies

Putu Surya Laksana Rahjasa*, Made Darmiati, Made Artajaya, I Gede Ngurah Primanda S Rahadiarta, Ni Putu Evi Wijayanti, Putu Ayu Aryasih

Politeknik Pariwisata Bali, Indonesia

Email: rahjasasurya@ppb.ac.id*, darmiati@ppb.ac.id, artajaya@ppb.ac.id, adeprimanda@ppb.ac.id, evi@ppb.ac.id, ayuaryasih@ppb.ac.id

ABSTRACT

This study analyzes the potential, challenges, and strategies for sustainable tourism development in Nusa Penida through a SWOT approach supported by field observations and semi-structured interviews. It uses a descriptive qualitative method with data collected from field practice activities of students from the Travel and Tourism Business Study Program, Bali Tourism Polytechnic, in June 2025. The SWOT analysis was formulated into IFAS and EFAS matrices, and validated by triangulation using literature and reports from relevant agencies. The results show that Nusa Penida has key strengths in the form of iconic natural beauty and strong local cultural potential, but faces serious challenges such as limited infrastructure, minimal public facilities, limited human resource capacity, and environmental pressure. The IFAS and EFAS results place Nusa Penida in the aggressive quadrant, indicating the need to leverage internal strengths to capture significant external opportunities. Recommended development strategies include strengthening infrastructure and safety, digitizing tourism services, developing inclusive tourism packages, increasing local human resource capacity, and community-based environmental conservation. With a collaborative and sustainable approach, Nusa Penida has the potential to become a leading tourist destination that is resilient, inclusive, and adaptive to the dynamics of global tourism.

KEYWORDS Nusa Penida, SWOT, IFAS, EFAS, sustainable tourism, digitalization



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INTRODUCTION

Tourism is a strategic sector in Indonesia's economic development, particularly in Bali Province, which is known as an international tourist destination. In recent years, the focus of destinations has expanded from mainland Bali to island areas such as Nusa Penida, located in Klungkung Regency. Nusa Penida is known for its pristine natural beauty, such as dramatic karst cliffs, white sand beaches, and a biodiversity-rich marine ecosystem (Astawa et al., 2024; Suhardono & Suryawan, 2024). This makes Nusa Penida a significant attraction for domestic and international tourists seeking nature and adventure experiences (Bichler & Lösch, 2019).

However, the rapid growth of the tourism sector in Nusa Penida also presents significant challenges. Inadequate infrastructure, limited accessibility between tourist attractions, and a lack of public services hinder the delivery of optimal tourism experiences (Trianasari et al., 2019). Furthermore, the lack of integration of local businesses into digital marketing and service systems limits market reach and operational efficiency (Rahjasa et al., 2024). The heavy reliance on one-day tourists also raises concerns about environmental impacts and the unsustainability of the local economy (Palgunadi, 2024).

This small island also faces challenges typical of remote destinations. Previous studies have shown transportation to be a strategic issue: access is limited to ferry services, and intra-island transit (such as rental motorbikes) is suboptimal. Furthermore, literature suggests that small destinations are vulnerable to policy mistakes and socio-economic impacts if not managed carefully. Consequently, Nusa Penida's tourism potential may be underdeveloped without sustainable planning and active community participation (Chan Santana et al., 2023).

Several previous studies have highlighted the importance of collaborative and sustainable destination management. Astawa et al. (2024) stated that implementing inclusive tourism principles and collaborative governance can improve destination competitiveness and community well-being. Furthermore, research by Suhardono & Suryawan (2024) suggests that innovations in accessible infrastructure (e.g., beach elevators) can expand the tourist market and improve safety.

Against this backdrop, a comprehensive study is essential to evaluate the existing tourism situation in Nusa Penida. One relevant approach is a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis developed using the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices. This approach provides a comprehensive overview of the internal and external factors influencing destination development (Gürel & Tat, 2017; Popescu & Corboş, 2010). It allows for targeted and sustainable tourism development strategies. The focus is on collaborative approaches, environmental sustainability, and the use of technology. Recent literature (2018–2025) from scientific journals and reports suggests that collaboration between stakeholders and digital innovation can strengthen sustainable rural tourism development. A humanistic approach is also emphasized, including the needs of local communities and marginalized groups in tourism planning (Chan Santana et al., 2024).

This research is motivated by the field practice activities of students of the Travel and Tourism Business Study Program, Bali Tourism Polytechnic, which were held in Nusa Penida on June 29–30, 2025. Students conducted direct observations and interviews with tourism actors, local communities, and tourists. This research aims to: (1) identify the potential and challenges of tourism in Nusa Penida; (2) analyze SWOT factors through IFAS and EFAS; and (3) formulate strategies for developing inclusive and sustainable tourism packages and digitalizing tourism services. Hopefully, this article can contribute to academics, practitioners, and local governments in developing Nusa Penida as a leading community- and technology-based tourism destination.

METHOD

This research used a qualitative descriptive approach to understand the potential and challenges of developing the Nusa Penida tourism destination. Data were collected through two primary methods: field observation and semi-structured interviews. Observations were conducted by students of the Travel and Tourism Business Study Program, Bali Tourism Polytechnic, on June 29–30, 2025. Observation locations included key tourist attractions in Nusa Penida, such as Kelingking Beach, Angel's Billabong, Broken Beach, and Diamond Beach. Observations focused on the physical aspects of the destination, supporting facilities, tourist activities, the use of information technology, and interactions between tourists and the local community.

Interviews were conducted with tourists, residents, homestay or lodging managers, and transportation service providers. Interview questions covered perceptions of the destination's advantages, management challenges, and aspirations for technology-based and inclusive tourism development. The interview technique used was semi-structured to provide flexibility and allow for exploration of relevant topics that emerged during discussions (Creswell, 2014). Respondents were recruited purposively (using the snowball method) to capture diverse perspectives on tourism on the island. All interviews were audio-recorded and transcribed. Data were analyzed using a qualitative approach to identify key themes (infrastructure, socio-cultural, economic, and technological) as suggested in the SWOT analysis and phenomenological descriptive.

The data obtained were analyzed using a SWOT analysis approach. The IFAS matrix was used to summarize internal factors (strengths and weaknesses), while the EFAS matrix was used for external factors (opportunities and threats). This technique is considered adequate for strategic planning of tourism destinations because it integrates qualitative analysis with mapping of action priorities (Gürel & Tat, 2017; Helms & Nixon, 2010).

RESULT AND DISCUSSION

Tourism Potential of Nusa Penida

Nusa Penida has enormous tourism potential, particularly in its natural beauty and rich local culture. Several prime destinations, such as Kelingking Beach, Broken Beach, Angel's Billabong, and Diamond Beach, offer spectacular natural scenery and major draws for domestic and international tourists. The uniqueness of the region's cliffs, white sand, and clear blue sea has earned Nusa Penida a place on the global recommendation list by several international tourism platforms (Suhardono & Suryawan, 2024). Both local and international tourists consistently favour Nusa Penida's prime beach destinations due to their natural beauty, which is rare in other tourist destinations. Besides natural attractions, Nusa Penida has different potential, including traditions, temples, and ceremonies. Nusa Penida boasts various local traditions still preserved by its people from generation to generation. One example is the Nyepi Laut tradition, where all maritime activities are stopped for one day to honour the power of nature and maintain spiritual balance (Dodds, 2021). This tradition is a particular attraction for tourists because it demonstrates the community's closeness to nature and its belief in the balance of life. In addition, various forms of cooperation, the banjar system, and the people's way of life in traditional villages also provide an authentic cultural experience for tourists who want to learn more about traditional Balinese life (Gillovic & McIntosh, 2020).

As part of the province of Bali, Nusa Penida also boasts numerous temples that serve as centres of Hindu spirituality. One of the most famous is the Goa Giri Putri Temple, located within a large cave accessible only by ducking through a narrow gap in the rock. This temple is frequently visited by tourists, especially Hindus, for prayer and meditation. Furthermore, there is Ped Temple, which is believed to possess mighty spiritual powers and attract devotees from across Bali. These temples not only hold religious significance, but their unique architecture and sacred atmosphere also provide a spiritual experience for tourists. Religious ceremonies in Nusa Penida are held regularly and are essential to local life. Ceremonies such as Ngaben (cremation of the dead), Melasti (purification of oneself in the sea before Nyepi),

and Ngerupuk (exorcism of evil spirits the day before Nyepi) are examples of cultural activities that tourists can witness firsthand (Graci & Dodds, 2010; Sharma & Sharma, 2024).

These ceremonies are full of symbolism and profound spiritual meaning, accompanied by gamelan music, sacred dances, and beautiful traditional attire. During the ceremony, tourists will have a profound and unforgettable cultural experience. This supports the destination's narrative as a region that combines nature and spirituality in one cohesive experience. Geographically, Nusa Penida's proximity to mainland Bali offers accessibility advantages. Travel time from Sanur or Kusamba to Banjar Nyuh Harbour is only 30–45 minutes by fast boat. This allows for integration into cross-destination tour packages such as Bali–Nusa Penida–Nusa Lembongan, which have become increasingly popular recently (Trianasari et al., 2019).

In addition to its natural attractions, the marine tourism potential, such as snorkelling and diving in the waters of Crystal Bay, Manta Point, and Gamat Bay, also attracts tourists who enjoy underwater exploration. Nusa Penida's marine ecosystem is a protected marine conservation area, home to manta rays, reef sharks, and rare coral reef species. This potential supports the development of conservation-based tourism, or ecotourism, which is increasingly popular with global tourists (Astawa et al., 2024).

Another observed advantage is the island's quieter atmosphere than mainstream tourist areas in Bali, such as Kuta or Ubud. This is a plus for tourists seeking authentic experiences away from the crowds. Previous research also emphasises the importance of destinations that offer tranquillity, open views, and exploration opportunities for special interest tourists such as photographers, yogis, and spiritual travellers (Gani & Subadra, 2021). Overall, Nusa Penida's tourism potential can be further developed through a sustainable and community-based approach, so the local community feels the economic benefits from large businesses.

Challenges and Obstacles

Despite Nusa Penida's significant tourism potential, observations and interviews indicate that several challenges and obstacles remain obstacles to optimal development of this destination. The primary challenge identified in the field is inadequate infrastructure. Access roads to key tourist attractions such as Kelingking Beach and Angel's Billabong are often damaged and narrow, and they lack lighting and safety signs. This poses safety risks for tourists and detracts from the overall quality of the tourism experience (Trianasari et al., 2019).

Furthermore, the lack of public facilities such as toilets, trash cans, tourist information posts, and rest areas near tourist attractions means tourists must travel considerable distances to access basic services. This lack of supporting facilities directly impacts the comfort and length of stay of tourists in Nusa Penida, most of whom are still classified as one-day trips (Palgunadi, 2024). Another obstacle is the limited human resources (HR) capacity in the tourism service sector. Many local tourism businesses lack formal training in hospitality, destination management, and the use of digital technology for marketing and business management. This creates a disparity between the potential of destinations and the quality of services offered (Rahjasa et al., 2024). In this context, sustainable tourism becomes difficult without systematic training and community empowerment interventions (Astawa et al., 2024).

From an environmental perspective, increasing tourist visits harms the ecosystem's carrying capacity. Key issues identified include coral reef damage caused by tourist boat

anchors, plastic pollution on beaches, and a lack of oversight of potentially environmentally damaging tourist behaviour (Yasa et al., 2022). Research by Helmi and Purnomo (2021) emphasises the importance of local participation-based environmental management regulations for tourism destinations to maintain long-term sustainability.

Another equally significant threat is the community's economic dependence on tourism as its sole source of income. For example, in the COVID-19 pandemic, Nusa Penida experienced a drastic decline in tourist visits, impacting local incomes and the socio-economic stability of tourist villages (Amir et al., 2022). This situation highlights the need for regional economic diversification and the development of supporting sectors that can strengthen community resilience in the face of the tourism crisis. Therefore, tourism development in Nusa Penida requires a holistic approach that includes infrastructure improvements, human resource capacity building, institutional strengthening, and community-based environmental conservation for sustainable and inclusive growth.

SWOT Analysis (IFAS and EFAS)

Observations focused on the physical aspects of the destination, supporting facilities, tourist activities, the use of information technology, and interactions between tourists and local communities. Interviews were conducted with tourism business operators, tour guides, tourists, and community members involved in tourism management. Interview questions covered perceptions of the destination's strengths, management challenges, and aspirations for technology-based and inclusive tourism development. The interview technique used was semi-structured to provide flexibility and allow for exploration of relevant topics that emerged during the discussions (Creswell, 2014).

The results of observations and interviews generated data that was analyzed using a SWOT analysis approach. The IFAS matrix summarises internal factors (strengths and weaknesses), while the EFAS matrix was used for external factors (opportunities and threats). This technique is considered adequate for strategic planning of tourism destinations because it integrates qualitative analysis with mapping of priority actions (Gürel & Tat, 2017; Helms & Nixon, 2010).

Data from observations and interviews were triangulated with literature studies and reports from relevant agencies to increase validity. This ensures that the analysis results reflect the actual conditions on the ground and can be linked to the broader policy context and tourism development trends. Based on these observations and related literature, the following is a SWOT analysis of the Nusa Penida destination.

A SWOT analysis identified the strengths, weaknesses, opportunities, and threats of tourism destination management in Nusa Penida, particularly in popular locations such as Kelingking Beach, Angel's Billabong, Broken Beach, and Diamond Beach. The results of observations and interviews have been compiled into the following IFAS and EFAS matrices:

Table 1. SWOT Analysis: IFAS (Internal Factor Analysis Summary)

Internal Factors	Weight	Rating	Score	Information
Iconic views (cliffs, sand, sea)	0.15	4	0.60	All beaches have strong visuals
Limited public facilities	0.10	2	0.20	Lack of toilets, eating places, and trash cans
Damaged/slippery road access	0.15	2	0.30	Difficult to reach and not friendly to large vehicles
Additional attractions (flying fox, swing)	0.10	3	0.30	Adds value to the travel experience
Strategic location and integrated tour packages	0.10	3	0.30	Near other destinations, easy to reach on one route
Natural hazards (cliffs, waves)	0.15	2	0.30	Requires visitor education and supervision
Free entrance ticket	0.05	3	0.15	Become a competitive advantage
Economic dependence on tourists	0.10	2	0.20	Vulnerable during the low season or a disaster
Unable to swim due to sea conditions	0.10	1	0.10	Reduce water activity
Total	1.00		2.45	

Internal factor analysis includes elements of a destination's strengths and weaknesses. Based on the table above, the internal factor analysis can be outlined as follows:

Strengths

The dominant factor that makes the destination stand out is its iconic views (score 0.60), such as the T-Rex-shaped cliffs at Kelingking Beach and the unique coral formations at Broken Beach. These features are the main magnets for digital tourism visual promotion. Furthermore, its strategic location and easy access through integrated tour packages add value (score 0.30). Additional attractions such as the flying fox and paid swing spots further enhance the tourist experience (0.30).

Weaknesses

Significant internal challenges include damaged and unsafe road access (score 0.30), a lack of public facilities (0.20), and natural hazards such as large waves and cliffs (0.30). Furthermore, economic dependence on tourism makes communities vulnerable during low seasons or disasters (0.20), and water tourism activities are limited due to unsafe sea conditions (0.10).

Total IFAS score: 2.45

This value reflects that Nusa Penida's internal strength is dominant, but structural weaknesses still require strategic attention.

Table 2 SWOT Analysis: EFAS (External Factors Analysis Summary)

External Factors	Weight	Rating	Score	Information
Sustainable infrastructure and facility development	0.15	4	0.60	The construction of stairs, public facilities, and rest areas can increase comfort and safety.
Digital tourism promotion and social media	0.10	3	0.30	Global appeal potential through visual content on social media
Integrated tour packages between destinations	0.10	3	0.30	Combining popular destinations to extend tourists' stay
Sustainable and environmentally friendly tourism	0.10	3	0.30	Preserving nature while building facilities to keep them attractive and safe

External Factors	Weight	Rating	Score	Information
Increased digital promotion and marketing	0.10	3	0.30	Digital platforms can help reach new tourists widely
Potential for increased tourist visits and local employment	0.10	3	0.30	This popular tourist attraction can open up job and economic opportunities for the community.
Potential for developing more varied tourism services and products	0.05	2	0.10	Attractions such as flying foxes and swings could be further developed.
Weather instability and natural disasters	0.10	2	0.20	Extreme weather could disrupt visits and damage infrastructure.
Competition with other tourist destinations	0.10	3	0.30	Many similar destinations in Bali and its surroundings compete to attract tourists.
Environmental damage due to overdevelopment or weak regulation	0.10	2	0.20	Risk of loss of authenticity and attractiveness if development is uncontrolled
Lack of supervision and tourism safety education	0.05	2	0.10	Without supervision, tourists can have accidents in dangerous locations.
Tides that affect the safety and beauty of the location	0.05	2	0.10	High tides can make natural pools dangerous or less attractive.
The surge of tourists without management can damage the beauty and the ecosystem.	0.05	2	0.10	Without regulation, density can cause waste and environmental disturbances.
Extreme weather and rising sea levels threaten the sustainability of coastal tourism.	0.05	2	0.10	Long-term risks to the sustainability of marine tourism
Total	1.00		3.30	

Opportunities

The most potential external factors are sustainable infrastructure development (score 0.60), digital and social media promotion (0.30), and sustainable and environmentally friendly tourism (0.30). Cross-destination tour packages can also extend tourists' length of stay (0.30). Economic potential is also evident in local employment and the development of additional attractions (total 0.40).

Threats

The main threats come from unstable weather and natural disasters (0.20), competition between destinations in Bali, and environmental damage due to unregulated development (0.30 and 0.20, respectively). Other challenges include a lack of tourist safety supervision and sea tides affecting the comfort of the location (0.10). Dependence on tourists and an unmanaged visit surge are risks (0.20).

Total EFAS score: 3.30

These figures demonstrate significant external opportunities for Nusa Penida's development, but can only be maximised with rigorous risk management. The above analysis demonstrates the need for a holistic and integrated development strategy. The emphasis should be on sustainability and inclusiveness: maximizing strengths and opportunities, while addressing weaknesses and anticipating threats.

Strategic Implications of SWOT Analysis

Based on the SWOT analysis, three main strategic implications can be implemented for sustainable tourism development in Nusa Penida. First, the IFAS results indicate that one of

the main weaknesses is damaged road access and natural hazards such as cliffs and large waves. Therefore, the primary strategy is to build and improve safety infrastructure and strengthen visitor education regarding natural risks and tourism ethics. This includes the construction of safety fences, evacuation routes, the installation of warning signs, and providing digital-based safety information such as QR code boards or multilingual infographics. Local guides can also provide education to instill awareness of the importance of environmental and cultural preservation.

Second, the diversification of attractions and the digitalization of tour packages must be optimized to extend the length of stay for tourists. Developing thematic packages such as spiritual tourism, environmental education, photography tours, and digital technology for online booking and promotion will increase Nusa Penida's competitiveness as an experience-based destination. Furthermore, inter-island package collaboration also opens up opportunities for broader integration within the tourism network of Bali and the surrounding area.

Third, environmental conservation efforts and community-based visitor management must be strengthened to mitigate the pressures posed by the surge in tourism. This can be achieved through environmental awareness campaigns, limiting the number of daily visitors at specific locations, and involving local communities in conservation programs such as coral reef restoration or waste management. These three strategies complement each other and are highly relevant to realising inclusive, adaptive, and sustainable tourism on Nusa Penida.

Inclusive Tourism Development Strategy and Digitalization

Based on the IFAS and EFAS matrices analysis compiled from observations and interviews, a total IFAS score of 2.45 indicates that the destination's internal strengths are dominant. In contrast, a total EFAS score of 3.30 suggests that external opportunities are wide open. This condition places Nusa Penida in the Strength–Opportunity (SO) aggressive strategy quadrant, meaning the destination has a strong enough internal foundation to pursue development opportunities actively.

These results were confirmed through a triangulation approach: student observations noting natural advantages, cultural exoticism, and marine tourism potential were reinforced by interviews with tourism business owners who mentioned limited digital services, and supported by literature and local media reports highlighting the region's challenges and prospects (Palgunadi, 2024; Rahjasa et al., 2024; Astawa et al., 2024). In other words, development strategies must focus on leveraging the destination's visual strengths and digital market potential to address challenges related to infrastructure, human resources, and the unequal distribution of tourism benefits.

The recommended strategy is the development of inclusive tourism packages. This refers to IFAS data, which lists attraction diversity as a strength (score 0.30), while a lack of comfort and safety as a weakness (0.30). Inclusive tourism packages are designed to reach tourist segments with special needs, such as people with disabilities, older people, families, or travellers seeking spiritual and cultural experiences. Components that can be developed include accessible tourist routes, training local guides in inclusive hospitality, and developing local community-based itineraries that introduce Nusa Penida's traditions, cuisine, and spiritual values (Astawa et al., 2024).

The following strategy is the digitalization of tourism services, based on identified opportunities in the EFAS, particularly in digital promotion (score 0.30) and cross-destination collaboration (0.30). Digitalisation can include optimising online marketing (social media, tourism marketplaces), utilising cashless payment systems (QRIS), and integrating information through tourism village applications or websites. Rahjasa et al. (2024) showed that digital marketing training in tourist villages has increased the visibility and engagement of local actors. This approach is relevant for Nusa Penida to bridge the digital divide between large tourism players and micro-businesses in remote areas.

The development of Nusa Penida's tourism destination is inextricably linked to the need to improve the capacity of local human resources. Based on observations and interviews, most tourism businesses in Nusa Penida still operate conventionally, without formal training in tourism services, digital marketing, or destination management. Therefore, integrated training in hospitality, social media usage, and community-based tourism package development is essential. Such activities have proven effective in other areas of Bali in increasing village community involvement in tourism management (Rahjasa et al., 2024). The involvement of higher education institutions and training institutions in mentoring local communities will strengthen their competence and confidence in facing the ever-expanding tourism market.

Environmental sustainability must be a primary foundation for destination development amidst the pressure of soaring tourist arrivals. The EFAS results indicate that ecological threats, such as coral reef damage from ship anchors and increasing plastic waste, must be addressed immediately through strict conservation policies. Sustainability strategies can be implemented by limiting the number of daily visitors in sensitive areas, strengthening community-based environmental regulations, and organizing educational campaigns for tourists. Local communities should also participate in conservation programs such as reef restoration and waste bank-based waste management. This community-based approach has proven effective in maintaining the carrying capacity of the tourism ecosystem while creating new economic value (Helmi & Purnomo, 2021; Yasa et al., 2022).

Finally, collaborative policies and data-driven planning need to support this strategy. A SWOT analysis enables stakeholders to understand realistic and relevant development priorities. By integrating an inclusive approach and digitalization, supported by institutional strengthening and community education, Nusa Penida tourism development can be directed to be more equitable, resilient, and sustainable.

CONCLUSION

This study reveals that *Nusa Penida* possesses strong tourism potential grounded in its natural beauty, local culture, and strategic location, but development is hindered by infrastructure deficiencies, limited facilities, human resource challenges, and environmental pressures. A SWOT analysis using IFAS and EFAS matrices highlights dominant internal strengths and external opportunities, pointing to an aggressive development strategy focused on innovation and collaboration. Key priorities include creating inclusive tourism packages, digitalizing tourism services, enhancing local human resource capacity, and promoting environmental governance with community participation. Engaging local communities throughout development is essential for equitable and sustainable tourism, supported by collaboration among higher education, government, and industry stakeholders. Future research

could explore the long-term impacts of digitalization and community-led governance on tourist behavior, local welfare, and environmental sustainability in *Nusa Penida*.

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