

MEASURING SUSTAINABILITY IN TOURISM DESTINATIONS: A STAKEHOLDER SUSTAINABLE TOURISM MEASUREMENT FRAMEWORK

¹SHANA FATINA, ²TRI EDHI BUDHI SOESILO, ³RUDY PARLUHUTAN TAMBUNAN

¹University of Indonesia, School of Environmental Science, Indonesia, e-mail:

shana.fatina@gmail.com

²University of Indonesia, School of Environmental Science, Indonesia, e-mail: tri.edhi@ui.ac.id

³University of Indonesia, School of Environmental Science, Indonesia, e-mail:

rudypatamb@gmail.com

Abstract: *This research aims to develop an indicator framework to measure sustainable tourism in tourism destinations with environmental, social, and economic aspects. The indicators were designed using a literature review and expert review. The research produces indicators to measure a destination's environmental, economic, and social sustainability levels. The indicator framework was then used to measure the sustainability of Labuan Bajo, one of the UNESCO world heritage sites with its famous Komodo dragon. The results show that Labuan Bajo tourism is considered sustainable in social and economic aspects and average sustainable in environmental aspects. The framework indicators can be used as a reference for evaluating and improving tourism destinations' sustainability in a participatory approach with a better involvement of stakeholders.*

Keywords: *Sustainability, Tourism management, Indicator, Destination*

INTRODUCTION

Tourism is a cross-sectors activity. It correlates with many elements, offers opportunities to create jobs, and leverages the quality of life of the people. Tourism is still believed as the fastest sector to create an impact with less capital. However, tourism nowadays must practice more sustainability and be less oriented towards economic benefits only. Tourism with an economic-centric mindset will not be sustainable because it can cause a degradation in environmental quality or inequality in society that disrupts social resilience (Hall, 2019; S. Zhang & Chan, 2020).

With the rise of the post-pandemic tourism sector, people crave for leisure and holiday exponentially, making the abnormal tourism demand growth known as revenge tourism. The high demand is a potential for tourism rebound, but also challenging to manage a lesser impact on destinations (Bashir et al., 2020; Higgins-Desbiolles, 2020). Sustainable tourism is a new context in the tourism industry, but it needs to be deployed quickly due to the global trend toward sustainability. Managing tourism is critical to accelerating the Sustainable Development Goals, from urban, rural, and mountainous to coastal destinations (Okitasari & Katramiz, 2022; Rhama & Setiawan, 2022).

For this reason, it is necessary to develop tourism sustainability indicators that integrate social, economic, and environmental interests as the pillars of Sustainable Development. Thus, the management and development of tourism can be evaluated periodically by all responsible stakeholders, starting from tourism destinations.

LITERATURE REVIEW

Sustainable Tourism

Tourism is an industry that includes intangible things, namely the interaction between humans and the environment in multilevel complexity. The structure of the tourism industry is very different from the structure of the goods-producing industry (Framke, 2002). Sustainable tourism fully considers its current and future economic, social, and environmental impacts, meeting visitors' needs, industry, environment, and host communities (World Tourism Organization, 2013). Sustainable tourism has a lower concentration of tourist arrivals to minimize environmental impact. The stability is maintained yearly to ensure economic and employment benefits (Martínez et al., 2019). These human travel activities are not growth-oriented and are markedly constrained by environmental ecosystem boundaries (Hall, 2019), such as non-extractive tourism activities, supporting local farmers, micro-



transmission of renewable energy, and a circular economy that reduces waste (Daou et al., 2020; Obersteiner et al., 2021). Sustainable tourism can be derived into several environmental, economic, socio-cultural, science and technology dimensions, human capital, and government policy management (T. H. Lee et al., 2021). An indicator system that is measured periodically will help define trends in the variables' evolution of sustainability (Torres-Delgado & Palomeque, 2014).

Social Sustainability in Tourism

The social dimension of responsible tourism can be carried out by prioritizing social and environmental ethical behavior and providing insight into sustainable tourism activities (Gong et al., 2019; Kodir et al., 2020). Other indicators generally include the socio-political environment, destinations' socio-psychological capacity, and visitors' socio-psychological capacity (Mihalic, 2020). The social carrying capacity explains how the community, tourists, and government contribute to destinations. Stakeholders must be motivated and provide the resources residents need to retain the socio-cultural resources and uniqueness of the destination (Joshi & Dahal, 2019).

The social dimension is also measured by indicators of the number of visits, level of satisfaction, preferences, perceptions of tourist backgrounds, and specialization in observing certain animals (Bahja & Hancer, 2021; D'Lima et al., 2018; S. W. Lee & Xue, 2020; Quevedo et al., 2021). Apart from that, it can also present in the level of local community participation (Muntiferi et al., 2020), cultural identity (Dai et al., 2021), local cultural activities, public security, historic buildings, community social structure, local community welfare, or cultural exchanges between residents and tourists (Blancas et al., 2018; Eslami et al., 2019; Hosseini et al., 2021; Quevedo et al., 2021; Ziyadin et al., 2019). The satisfaction of society influences local support for sustainable tourism development. Both material and non-material life are two critical determinants.

Economic Sustainability in Tourism

Economic sustainability in tourism includes the availability of infrastructure, trade activities, destination attractions, and amenities (S. W. Lee & Xue, 2020), local services, local facilities, local products, and philanthropic activities (Gong et al., 2019). In addition, are the business opportunities, impacts on local products, revenue for local governments, and economic contribution to local communities (Eslami et al., 2019), economic benefits of tourism for host communities, the level of tourist satisfaction, development control, availability of tourist facilities and attractions, tourism activities, tourism job creation, tourism-related transportation activities, destination competitiveness (Blancas et al., 2018; Lozano-Oyola et al., 2019), job availability for gender equality, business continuity (Agyeiwaah et al., 2017), tourist spending, investment level, unemployment rate (Torres-Delgado & Palomeque, 2014), system carrying capacity of tourism (J. Wang et al., 2020), the economic impact of tourism development (Ziyadin et al., 2019), the number of accommodations, the number of the tourism industry, local trade transactions, occupancy rates, the number of local products (Navarro et al., 2020), the level of tourism dependency, government investment, job availability, goods and services prices, job rivalry between local residents and tourists, and the ease of opening a business (Sisneros-Kidd et al., 2019).

The arrival of tourists has driven local economic growth, creating local businesses, increasing income and living standards, paying taxes for local governments, as well as improving the quality of life of residents (Nugroho & Numata, 2020), creating jobs, increasing economic performance, and increasing the intensity of tourism (Nesticò & Maselli, 2020), as well as the commercial value of the related tourism industry (González-Mantilla et al., 2022). Economic sustainability in tourism also presents general economic indicators such as tourism revenue contribution, real GDP growth, inflation, investment, and others (Kyara et al., 2021; Scarlett, 2021).

Environmental Sustainability in Tourism

In the tourism context, the ecological footprint of a destination will increase due to the arrival of tourists who do not originate from that location (C. C. Lee & Chen, 2021). A tourist destination that previously had no burden with a not-too-large and non-consumptive local population must then face an increase in the number of tourists, which significantly increases the demand for ecosystem services and potentially becomes an ecological disaster. The increase in the ecological footprint caused by tourists must also be considered in determining tourism's carrying capacity.

Environmental sustainability in tourism can be measured by technical indicators that represent resource-carrying capacity systems and ecological carrying capacity systems (J. Wang et al., 2020) with the basic principles of not disturbing natural resources, not adding to pollution problems, and not harming site cleanliness (Gong et al., 2019). In general, environmental sustainability in tourism includes management of tourism density, transportation, changes in regional landscapes, management of biodiversity and natural resources, land use, energy management and climate change, waste management, water resources, and pollution (Navarro et al., 2020; Nesticò & Maselli, 2020; Phan et al., 2021; Rico et al., 2020; Saviolidis et al., 2021; Sudipa et al., 2020; Yoon et al., 2022; Y. Zhang & Tian, 2022). Resource management also includes the natural ecosystems protection, energy conservation, water quality management, wastewater management, urban solid waste segregation (Agyeiwaah et al., 2017), atmospheric pollution, impact management of the facilities and infrastructure, the intensity of tourism use, and environmental management (Blancas et al., 2018).

MATERIALS AND METHOD

This research was carried out in several stages: literature study, formulation of indicators, design of the questionnaire tool, data collection, data analysis, and interpretation. Primary data were collected using qualitative methods. The research was conducted in an observational study on October 2022 to March 2023.

Formulation of the indicator framework


The research examines more than 70 pieces of literature and previous studies and identifies indicators showing sustainable tourism management in various locations and destinations. These indicators are then compiled into a base matrix to be iterated and analysed into a compilation matrix of tourism sustainability indicators as a result of the research. Social sustainability indicators were reviewed from 20 studies with 49 variables. Economic sustainability indicators were reviewed from 20 studies with 38 variables. Environmental sustainability indicators were reviewed from 20 studies with 64 variables. Each presents three indicator matrixes: the social matrix, the economy matrix, and the environment matrix. The matrixes were then evaluated by a discussion with expert panels and results in Base Matrix with 34 variables of 10 for social sustainability, 13 for economic sustainability, and 11 for environmental sustainability, as listed in Table 1.

Table 1 Base Matrix of Tourism Sustainability Indicators

No	Variable	Source
SOCIAL		
1.	Availability of products and tourist attractions	S. W. Lee & Xue (2020), Quevedo et al. (2021), Torres-Delgado & Palomeque (2014)
2.	Tourist satisfaction	D'Lima et al. (2018), Joshi & Dahal (2019), Liang et al. (2021), Mihalic (2020), Torres-Delgado & Palomeque (2014), Agyeiwaah et al. (2017), Blancas et al. (2018), Lozano-Oyola et al. (2019)
3.	Community quality of life	Agyeiwaah et al. (2017), Blancas et al. (2018), Lozano-Oyola et al. (2019), Mihalic, (2020), Nugroho & Numata (2020); Zheng et al. (2020)
4.	Public safety	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Blancas et al. (2018), Joshi & Dahal (2019), Lozano-Oyola et al. (2019)
5.	Preservation of cultural heritage	Blancas et al. (2018); Eslami et al. (2019); Gong et al. (2019); Lozano-Oyola et al. (2019); Quevedo et al. (2021)
6.	Changes in the demographics of society	Alfaro Navarro et al. (2020), Blancas et al. (2018), Hsu et al. (2019), Joshi & Dahal, (2019), Lozano-Oyola et al. (2019), Nugroho & Numata (2020), Quevedo et al. (2021), Saveriades (2000), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014), Zheng et al. (2020)

No	Variable	Source
7.	Social carrying capacity	Alfaro Navarro et al. (2020), Blancas et al. (2018), Hayati et al. (2020), Hsu et al. (2019), Joshi & Dahal (2019), Lozano-Oyola et al. (2019), Saveriades (2000), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014)
8.	Changes in the welfare of residents	Blancas et al. (2018), Hsu et al. (2019), Joshi & Dahal (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Mihalic (2020), Nugroho & Numata (2020), Sisneros-Kidd et al. (2019), Ziyadin et al. (2019)
9.	Improved accessibility	Alfaro Navarro et al. (2020), S. W. Lee & Xue (2020)
10.	Public participation	Nugroho & Numata (2020)
ECONOMY		
1.	Tourist visits	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Blancas et al. (2018), Gonzáles-Mantilla et al. (2022), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nugroho & Numata (2020), Scarlett (2021), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014) Ziyadin et al. (2019)
2.	Length of stay of tourists	Alfaro Navarro et al. (2020), Blancas et al. (2018), Lozano-Oyola et al. (2019), Torres-Delgado & Palomeque (2014)
3.	Tourist spending	Gong et al. (2019), Gonzáles-Mantilla et al. (2022), Hsu et al. (2019), T. H. Lee et al. (2021), Nugroho & Numata (2020), Scarlett (2021), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014)
4.	Foreign exchange	Agyeiwaah et al. (2017), Blancas et al. (2018), Gonzáles-Mantilla et al. (2022), Kyara et al. (2021), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Scarlett (2021), Sisneros-Kidd et al. (2019), Wang et al. (2020)
5.	Regional income	Agyeiwaah et al. (2017), Blancas et al. (2018), Eslami et al. (2019), Gonzáles-Mantilla et al. (2022), Kyara et al. (2021), S. W. Lee & Xue (2020), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Nugroho & Numata (2020), Scarlett (2021), Sisneros-Kidd et al. (2019), Wang et al. (2020), Ziyadin et al. (2019)
6.	Investment	Eslami et al. (2019), S. W. Lee & Xue (2020), T. H. Lee et al. (2021), Mihalic (2020), Nesticò & Maselli (2020), Quevedo et al. (2021), Scarlett (2021), Wang et al. (2020)
7.	Number of attractions	Gong et al. (2019), S. W. Lee & Xue (2020), T. H. Lee et al. (2021)
8.	Number of local businesses	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Eslami et al. (2019), Gong et al. (2019), Gonzáles-Mantilla et al. (2022), Hsu et al. (2019), S. W. Lee & Xue (2020), T. H. Lee et al. (2021), Mihalic (2020), Nesticò & Maselli (2020), Nugroho & Numata (2020), Quevedo et al. (2021), Scarlett (2021), Sisneros-Kidd et al. (2019), Ziyadin et al. (2019)
9.	Employment	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Blancas et al. (2018), Hsu et al. (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021), Scarlett (2021), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014), Wang et al. (2020)

No	Variable	Source
10.	Unemployment rate	Hsu et al. (2019), T. H. Lee et al. (2021), Quevedo et al. (2021), Scarlett (2021), Torres-Delgado & Palomeque (2014)
11.	The occupancy rate	Blancas et al. (2018), Gong et al. (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Scarlett (2021), Sisneros-Kidd et al. (2019) Torres-Delgado & Palomeque (2014), Ziyadin et al. (2019)
12.	Infrastructure availability	Blancas et al. (2018), Gong et al. (2019), S. W. Lee & Xue (2020), T. H. Lee et al. (2021) Lozano-Oyola et al. (2019), Quevedo et al. (2021), Torres-Delgado & Palomeque (2014), Wang et al. (2020)
13.	Destination competitiveness	Blancas et al. (2018), Hsu et al. (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021)
ENVIRONMENT		
1.	Management of natural resources and biodiversity	Basak et al. (2021), Blancas et al. (2018), Eslami et al. (2019), Gong et al. (2019), Hsu et al. (2019), S. W. Lee & Xue (2020), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021), Saviolidis et al. (2021), Sisneros-Kidd et al. (2019), Wang et al. (2020), X. Zhang et al. (2022), Ziyadin et al. (2019)
2.	Energy management	Agyeiwaah et al. (2017), Blancas et al. (2018), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Saviolidis et al. (2021), Torres-Delgado & Palomeque (2014)
3.	Water management	Agyeiwaah et al. (2017), Blancas et al. (2018), T. H. Lee et al. (2021), Leka et al. (2022), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Torres-Delgado & Palomeque (2014), Wang et al. (2020), X. Zhang et al. (2022)
4.	Waste water management	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Blancas et al. (2018), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021), Torres-Delgado & Palomeque (2014), Wang et al. (2020), X. Zhang et al. (2022)
5.	Solid waste management	Agyeiwaah et al. (2017), Alfaro Navarro et al. (2020), Blancas et al. (2018), Gong et al. (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021), Torres-Delgado & Palomeque (2014), Wang et al. (2020), X. Zhang et al. (2022)
6.	Atmospheric pollution	Blancas et al. (2018), Gong et al. (2019), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Saviolidis et al. (2021), Torres-Delgado & Palomeque (2014), Wang et al. (2020), X. Zhang et al. (2022)
7.	Space travel intensity	Alfaro Navarro et al. (2020), Blancas et al. (2018), T. H. Lee et al. (2021), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Torres-Delgado & Palomeque (2014), X. Zhang et al. (2022) Ziyadin et al. (2019)
8.	Environmental management	Blancas et al. (2018), Hsu et al. (2019), S. W. Lee & Xue (2020), Leka et al. (2022), Lozano-Oyola et al. (2019), Quevedo et al. (2021), Sisneros-Kidd et al. (2019), Torres-Delgado & Palomeque (2014), J. Wang et al. (2020), S. H. Wang et al. (2016), X. Zhang et al. (2022), Ziyadin et al. (2019)



No	Variable	Source
9.	Land use	Blancas et al. (2018), Leka et al. (2022), Lozano-Oyola et al. (2019), Nesticò & Maselli (2020), Quevedo et al. (2021), Saviolidis et al. (2021), Torres-Delgado & Palomeque (2014), J. Wang et al. (2020), S. H. Wang et al. (2016), X. Zhang et al. (2022), Ziyadin et al. (2019)
10.	Climate change	Alfaro Navarro et al. (2020), Basak et al. (2021), Eslami et al. (2019), T. H. Lee et al. (2021), Leka et al. (2022), Nesticò & Maselli (2020), Quevedo et al. (2021), X. Zhang et al. (2022)
11.	Environmental awareness	Basak et al. (2021), S. H. Wang et al. (2016), X. Zhang et al. (2022)

Design the questionnaire tools

The expert panel has reviewed and results in the final matrix of sustainable tourism indicators in 21 variables of 7 for social sustainability, 7 for economic sustainability, and 7 for environmental sustainability, as listed in Table 2. The 21 indicators were then transferred into the questionnaire. Respondents' assessment will be carried out using a Likert Scale. The lowest score is 1, and the highest is 5.

Table 2 Matrix of Tourism Sustainability Indicators

No	Variable	Variable Operational Definitions	Unit
A. SOCIAL			
1.	Community quality of life	Increased welfare, the standard of living, income, health services, and education services, in people's lives	Likert Scale (1 to 5)
2.	Tourist satisfaction	Conformity of tourist expectations with the reality of tourist services obtained at the destination	Likert Scale (1 to 5)
3.	Number of tourist products and attractions	The availability of a wide selection of products and tourist attractions	Likert Scale (1 to 5)
4.	Preservation of cultural heritage	Protection of cultural assets, including intangible cultural heritage, celebration traditions, language, art, music, gastronomy, and other aspects of local identity.	Likert Scale (1 to 5)
5.	Public safety	Monitor, prevent, and respond to crime safety health hazards as needed of tourists and residents, and report progress openly to the public	Likert Scale (1 to 5)
6.	Infrastructure availability	Available accessibility, connectivity, and amenities at the destination	Likert Scale (1 to 5)
7.	Society participation	The community participates in activities related to tourism	Likert Scale (1 to 5)
B. ECONOMY			
1.	Tourist visits	The number of tourists visiting the destination	Likert Scale (1 to 5)
2.	Tourists' length of stay	Length of tourist visit at the destination	Likert Scale (1 to 5)
3.	Tourist spending	Average tourist spending at the destination	Likert Scale (1 to 5)
4.	Regional income	Total Regional Revenue	Likert Scale (1 to 5)

No	Variable	Variable Operational Definitions	Unit
5.	Investment	Total investment in the destination	Likert Scale (1 to 5)
6.	Number of local businesses	The number of micro, small, and medium enterprises growth in the tourism value chain of destination	Likert Scale (1 to 5)
7.	Employment	Creating jobs, training opportunities, job security, and decent wages, reducing unemployment	Likert Scale (1 to 5)
C. ENVIRONMENT			
1.	Biodiversity preservation	Monitor, measure, and respond to protecting biodiversity and the managing impact of tourism on natural ecosystem conservation	Likert Scale (1 to 5)
2.	Energy management	Reduce energy consumption by using efficiency and increasing the use of renewable energy	Likert Scale (1 to 5)
3.	Water management	Measure, monitor, openly report and manage water use including water quality for drinking, recreation, and ecological purposes using standard standards	Likert Scale (1 to 5)
4.	Waste management	Measure, manage and report on the solid waste and wastewater generated and set targets for their reduction	Likert Scale (1 to 5)
5.	Climate change	The existence of systems, regulations, or policies related to emission reduction programs, climate change adaptation, including risk reduction and awareness raising for the community and tourism actors.	Likert Scale (1 to 5)
6.	Environmental awareness	Activities to increase environmental awareness by the public and tourists	Likert Scale (1 to 5)
7.	Environmental management	The existence of systems, regulations, or policies related to cross-sectoral environmental management programs	Likert Scale (1 to 5)

Data collection

The quantitative method is to collect data through direct observation in the field with a questionnaire instrument to determine the condition of Labuan Bajo tourism in terms of environment, social, economic, cultural, and management aspects. Qualitative data from interview results will be processed by making transcripts and research notes, then reviewed to answer the research focus.

Data analysis and interpretation

The collected data from the questionnaire was then calculated and measured using sustainability criteria by range. The information is then evaluated by previous studies' findings and secondary data.

Case Study: Tourism in Labuan Bajo

The research was conducted in the Labuan Bajo, a marine tourism destination in the Northwest part of West Manggarai Regency, East Nusa Tenggara Province, Indonesia. Labuan Bajo is part of the Komodo Biosphere Reserve Area with two primary Key Tourism Areas (KTA): the KTA of Komodo National Park and the KTA of Labuan Bajo, as in Figure 1.

Labuan Bajo has become the next world-class biodiversity destination due to its proximity to the Komodo National Park and its breathtaking sunsets, pristine beaches, clear turquoise waters, and vibrant marine life. The destination offers excellent opportunities for scuba diving, snorkelling, and boat tours to explore the surrounding islands. However, its sensitive biodiversity as the main attraction has to be managed wisely so that the world-class tourism potential can sustainably preserve the environment. The multi-stakeholder collaboration model is applied to balance environmental sustainability, economic equity, and sustainable tourism.

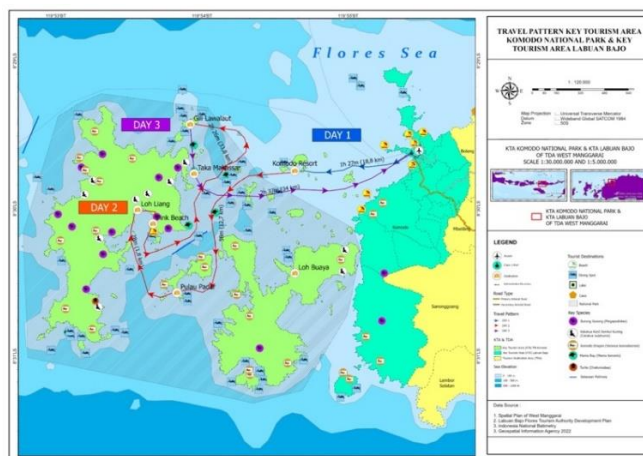


Figure 1. Travel Patterns of Key Tourism Area Komodo National Park and Key Tourism Area Labuan Bajo

The population in this research are tourism stakeholders in Labuan Bajo. Tourism stakeholders include penta helix elements, namely the central government, local governments, academics, business actors, communities, and the media. The research sample used a purposive sampling method with inclusion criteria set by the researcher. The target respondents are at least 18 years old and represent the Penta helix element of Labuan Bajo tourism. Labuan Bajo tourism stakeholders consist of the central government represented by the Coordinating Ministry for Maritime Affairs and Investment, Ministry of National Development Planning, Ministry of Public Works and Public Housing, Ministry of Tourism and Creative Economy/Tourism and Creative Economy Agency, and Ministry of Environment and Forestry, the local government represented by the Tourism Office and the Regional Development Planning Agency for both East Nusa Tenggara Province and West Manggarai Regency; academics represented by El Bajo Commodus Polytechnic and Nusa Cendana University; communities represented by some non-governmental organizations, tourism villages, and local community leaders; tourism and creative economy business circles represented by several accommodation businesses, travel agencies, creative economy businesses; as well as national and local media representatives.

RESULTS

Questionnaires were distributed to 34 target respondents consisting of 9 government officials, 5 academics, 6 community members, 9 business actors, and 5 media members. Questionnaire questions include respondents' perceptions of the achievement of 21 sustainable tourism indicators in the Labuan Bajo Super Priority Destinations in the 2016-2022 period by identifying the condition of each environmental, economic, and social aspect. The tourism sustainability predicate is determined using the scoring category system in Table 3 and produces research findings in Table 4 and Table 5.

Table 3 Categories of Sustainable Tourism Predicate for 34 Respondents

Category	Predicate	Lower limit	Upper limit
1.	Not Sustainable	231	539
2.	Average Sustainable	540	848
3.	Sustainable	849	1157

The research found that the Labuan Bajo tourism penta helix assesses that the implementation of Labuan Bajo tourism has been 'average sustainable' environmentally, 'sustainable' socially, and 'sustainable' economically.

Table 4 Results of the Labuan Bajo Sustainable Tourism Analysis Questionnaire

No.	Pentahelix element	Environment	Social	Economy
1.	Government	221	245	254
2.	Academics	84	141	137

3.	Community	157	170	188
4.	Business	208	239	254
5.	Media	121	135	134
	Total	791	930	967
	Predicate	Average	Sustainable	Sustainable
		Sustainable		

By each Penta helix group, the research results showed that government groups, academics, business actors, and the media all have the same results, namely 'average sustainable' environmentally and 'sustainable' socially and economically. Meanwhile, community groups state 'sustainable' results in all three aspects.

Table 5 Results of the Labuan Bajo Sustainable Tourism Analysis Questionnaire by Group

No.	Pentahelix element	Environment	Social	Economy
1.	Government	Average Sustainable	Sustainable	Sustainable
2.	Academics	Average Sustainable	Sustainable	Sustainable
3.	Community	Sustainable	Sustainable	Sustainable
4.	Business	Average Sustainable	Sustainable	Sustainable
5.	Media	Average Sustainable	Sustainable	Sustainable

These results indicate that Labuan Bajo tourism's social and economic aspects have been running sustainably and well-handled. In contrast, the handling of environmental aspects still needs improvement. Environmental aspects can be improved by focusing on stakeholder awareness to prioritize biodiversity conservation and measurable waste management.

DISCUSSION

This research examines the concept of sustainability in the tourism sector based on existing theories, including sustainability, environmental science, and sustainable development. These theories related to tourism sustainability are developed by integrating tourism theory with sustainability principles and environmental science. Tourism as a multidimensional sector turns out to be able to answer all the Sustainable Development Goals because its activities can accomplish all 17 goals. Measuring tourism sustainability can be done by examining a three-pillar approach: social, economic, and environmental as in the theoretical framework Figure 2.

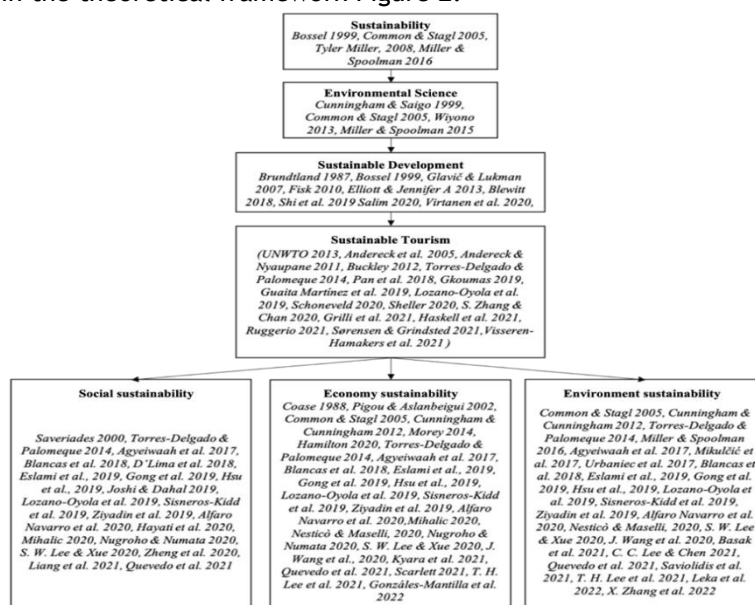


Figure 2 Theoretical Framework of sustainable tourism

After analyzing the results of elaborating sustainability indicator variables from existing research, the researchers developed a Conceptual Framework based on data availability and operational variables, as in Figure 3. The conceptual framework describes indicators for each of sustainable tourism's environmental, social, and economic aspects.

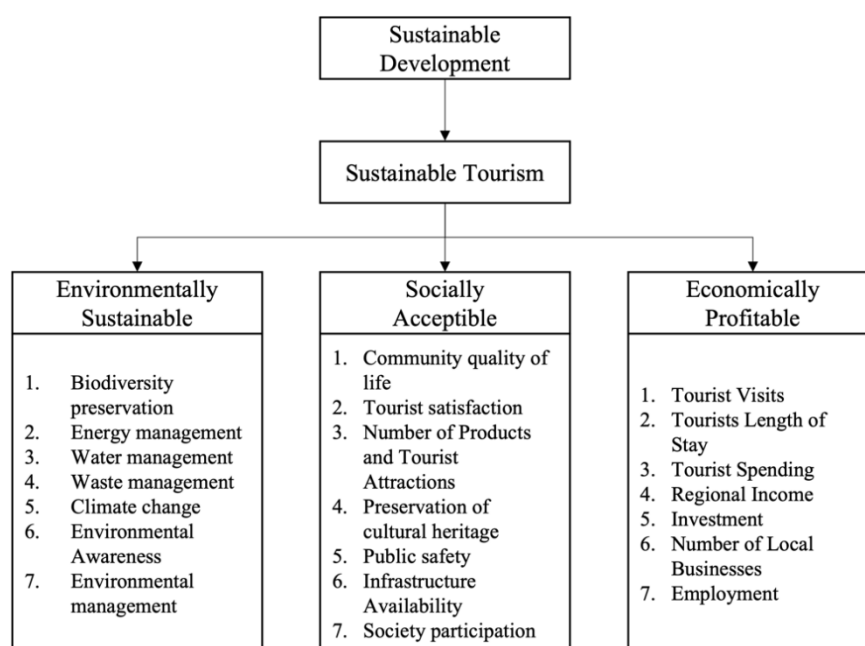


Figure 3 Conceptual Framework of sustainable tourism

The field observations and secondary data triangulation consistently supported the research results by reflecting on the Labuan Bajo case. The current socio-political and socio-psychological conditions in Labuan Bajo show extraordinary enthusiasm from the community, actors, and government in welcoming Super Priority Destination development programs (Mihalic, 2020). The assignment as the host of the 2023 ASEAN Summit and the 2022 G20 side events has aroused a sense of ownership and positive emotion from the people of Labuan Bajo towards tourism and the creative economy. The interest in the participation of local tourism and creative SMEs is very high, coupled with the attention of stakeholders specifically to the local context in various activities in Labuan Bajo (Dai et al., 2021; Joshi & Dahal, 2019; Muntiferi et al., 2020; Zheng et al., 2020). The presence of tourism has aroused interest in preserving local culture and pride in this cultural identity because it is appreciated by tourists and outsiders who see it as unique and attractive (Hsu et al., 2019). It is reflected in the growing number of dance studios, creative communities, and performing arts in the community following the training and empowerment programs held to fill the Labuan Bajo performance spaces. On the economic side, central government investment of more than IDR 4.4 trillion since 2020 has accelerated the availability of destination infrastructure and amenities (Gong et al., 2019; S. W. Lee & Xue, 2020). This development has maintained the continuity of the economic cycle during the pandemic, as seen from the GRDP figures, which are less severely affected than other tourism destinations. Growth in accommodation, retail, culinary choices, and tourism activities occurred by up to 35% in the 2017-2021 period, thereby increasing the length of tourist visits to Labuan Bajo to 4 to 5 days, with tourist spending reaching 9.6 to 10.6 million per person (Eslami et al., 2019; Navarro et al., 2020; Nugroho & Numata, 2020; Quevedo et al., 2021). An increase in tourist spending, in general, occurs with more options for tour package activities and products to buy, thus having an impact on increasing people's (Agyeiwaah et al., 2017; Blancas et al., 2018; Lozano-Oyola et al., 2019; Navarro et al., 2020; Sisneros-Kidd et al., 2019; Torres-Delgado & Palomeque, 2014). West Manggarai's GRDP has increased with the growth rate of local taxes and fees for the tourism sector (González-Mantilla et al., 2022; Kyara et al., 2021; Nesticò & Maselli, 2020; Nugroho & Numata, 2020; Scarlett, 2021).



On the environmental side, research shows that sustainability only reaches the 'Average Sustainable' category. Environmental sustainability indicators that tend to be technical still need optimal monitoring methods in the field, causing different perceptions of achievement for stakeholders. Efforts to implement carrying capacity have been carried out for several tourist attractions. However, they are not yet optimal because they tend to be controlled by the tourist market, which seasonally burdens destinations more at certain times, for example, during the extended holiday season or joint leave (J. Wang et al., 2020). Changes in the landscape have always been a concern of environmentalists but have not been expressly regulated in investment management or regional spatial arrangements. The lack of technical human resources for preparing environmental impact assessments and other technical documents causes the management of environmental impacts to be inconsistent between planning, implementation, and supervision. (Navarro et al., 2020; Nesticò & Maselli, 2020; Phan et al., 2021; Rico et al., 2020; Saviolidis et al., 2021; Sudipa et al., 2020; Torres-Delgado & Palomeque, 2014; Yoon et al., 2022; Y. Zhang & Tian, 2022) Even though water availability is limited, there has been no specific call for tourism activities to save water (Cole, 2017; Folgado-Fernández et al., 2019; Y. Zhang & Tian, 2022). Environmental activist groups are most active in the waste and greening sector (Agyeiwaah et al., 2017). There is no handling of ship waste yet, and the environmental impact on marine pollution is limited to discussion and reactive handling (Blancas et al., 2018; Lozano-Oyola et al., 2019; Obersteiner et al., 2021). Stakeholder participation in conservation is limited regarding rules and authority, so intensive coordination is needed to ensure that program benefits can be sustained despite cross-organizational leadership changes (Hsu et al., 2019).

The results of this research have included the perspective of Labuan Bajo tourism stakeholders to identify the current position of tourism sustainability. Labuan Bajo stakeholders should focus on strategies for managing environmental aspects to improve the destination's sustainability status. Periodic outreach, programs, and stakeholder coordination will help accelerate achieving better indicators. Labuan Bajo tourism must also be able to take advantage of the Komodo dragon icon to attract tourist arrivals as well as distribute tourism benefits not only stacked in the Komodo National Park area but also distributed to other destinations in Flores, Lembata, Alor, and Bima. Diversification of alternative tourism products within conservation areas and buffer zones is encouraged to avoid over-tourism that reduces the quality of the tourist experience.

Sustainable tourism management requires cross-sectoral collaboration to improve the quality of tourism services effectively. It is necessary to harmonize and integrate the management of tourist visits with the availability of accommodation, food availability, increasing GRDP, poverty alleviation, and improving the quality of life of the local community. In the Integrated Tourism Masterplan (ITMP) of Labuan Bajo, guidelines have been set for accelerating the development of the tourism sector, including concepts and themes, infrastructure, investment, as well as human resource participation and capacity to achieve the target of growth in visits, foreign exchange earnings, and environmental sustainability for 25 next year. The ITMP maps Penta helix stakeholders' division of tasks and operational policies for Key Tourism Area Komodo National Park and Key Tourism Area Labuan Bajo. The Ministry of Tourism and Creative Economy encourages the tourism ecosystem in Labuan Bajo through collaboration across Ministries/Agencies and stakeholders, the East Nusa Tenggara Provincial Government, West Manggarai Regency Government, the private sector, academics, the community, and the media in realizing sustainable tourism targets. However, understanding perspectives in the ITMP is crucial, given the many actors involved in collaborating to maintain the sustainability of Labuan Bajo tourism. The Central and Regional Governments must work harmoniously and encourage cross-Penta helix collaboration, from vision to implementation, as the key to accelerating inclusive and sustainable regional development.

CONCLUSION

The research produces indicators to measure a destination's environmental, economic, and social sustainability levels. Each aspect is measured using indicators that reflect how sustainable the tourism destination is. For example, the indicators tested in Labuan Bajo Tourism show that the


destination is sustainable in social and economic aspects but considered average sustainable in environmental aspects. Therefore, the destination must focus on improving its environmental sustainability. However, the most influential variables in the tourism system are 'the number of tourist products and attractions', 'tourist satisfaction', 'tourists' length of stay', 'tourist spending', 'tourist visits', 'waste management', 'water management', and 'environmental awareness'. In carrying out sustainable tourism development, measurement using appropriate indicators will help achieve goals and facilitate evaluation for future improvements. The sustainability indicator matrix can be adopted as a research tool with adjustments to the local context.


Tourism is a unique sector because its development and management can answer all 17 challenges of the Sustainable Development Goals. Tourism is the fastest, cheapest, and easiest way to create jobs, so it becomes an opportunity to solve the problem of poverty. Tourism can also be used to increase ecological protection because tourism activities can increase the public's and tourists' awareness to protect biodiversity to obtain sustainable benefits. Tourism also increases wisdom in managing natural resources and anticipating climate change. In addition, tourism development that prioritizes social sustainability will also build tolerance between nations, conserve cultural heritage, and improve people's quality of life if appropriately managed.

The limitation of this research is that the indicators are compiled based on the character of conservation-based tourism destinations, which do not pursue the number of visits. The indicator framework can be adapted to data availability in other destinations. The more data that exists and is recorded periodically, the more accurate the results will be. Attention must be paid to environmental sustainability, where the lack of technical knowledge of tourism stakeholders regarding existing indicators often overrides environmental and ecological interests in tourism implementation. The availability of data and access to information for environmental sustainability indicators and their current situation is an evaluation for improving education by stakeholders.

REFERENCES

- [1] Agyeiwaah, E., McKercher, B., & Suntikul, W. (2017). *Identifying core indicators of sustainable tourism: A path forward? Tourism Management Perspectives*, 24, 26-33. <https://doi.org/10.1016/j.tmp.2017.07.005>
- [2] Bahja, F., & Hancer, M. (2021). *Eco-guilt in tourism: Do tourists intend to behave environmentally friendly and still revisit? Journal of Destination Marketing and Management*, 20. <https://doi.org/10.1016/j.jdmm.2021.100602>
- [3] Basak, D., Bose, A., Roy, S., Chowdhury, I. R., & Sarkar, B. C. (2021). *Understanding sustainable homestay tourism as a driving factor of tourist's satisfaction through structural equation modeling: A case of Darjeeling Himalayan region, India. Current Research in Environmental Sustainability*, 3. <https://doi.org/10.1016/j.crsust.2021.100098>
- [4] Bashir, M. F., Ma, B., & Shahzad, L. (2020). *A brief review of the socio-economic and environmental impact of Covid-19. https://doi.org/10.1007/s11869-020-00894-8/Published*
- [5] Blancas, F. J., Lozano-Oyola, M., González, M., & Caballero, R. (2018). *A dynamic sustainable tourism evaluation using multiple benchmarks. Journal of Cleaner Production*, 174, 1190-1203. <https://doi.org/10.1016/J.JCLEPRO.2017.10.295>
- [6] Cole, S. (2017). *Water worries: An intersectional feminist political ecology of tourism and water in Labuan Bajo, Indonesia. Annals of Tourism Research*, 67, 14-24. <https://doi.org/10.1016/J.ANNALS.2017.07.018>
- [7] Dai, T., Zheng, X., & Yan, J. (2021). *Contradictory or aligned? The nexus between authenticity in heritage conservation and heritage tourism, and its impact on satisfaction. Habitat International*, 107. <https://doi.org/10.1016/j.habitatint.2020.102307>
- [8] Daou, A., Mallat, C., Chammas, G., Cerantola, N., Kaye, S., & Saliba, N. A. (2020). *The Ecocanvas as a business model canvas for a circular economy. Journal of Cleaner Production*, 258. <https://doi.org/10.1016/j.jclepro.2020.120938>
- [9] D'Lima, C., Everingham, Y., Diedrich, A., Mustika, P. L., Hamann, M., & Marsh, H. (2018). *Using multiple indicators to evaluate the sustainability of dolphin-based wildlife tourism in rural India. Journal of Sustainable Tourism*, 26(10), 1687-1707. <https://doi.org/10.1080/09669582.2018.1503671>
- [10] Eslami, S., Khalifah, Z., Mardani, A., Streimikiene, D., & Han, H. (2019). *Community attachment, tourism impacts, quality of life, and residents' support for sustainable tourism development. Journal of Travel and Tourism Marketing*, 36(9), 1061-1079. <https://doi.org/10.1080/10548408.2019.1689224>

- 
- [11] Folgado-Fernández, J. A., Di-Clemente, E., Hernández-Mogollón, J. M., & Campón-Cerro, A. M. (2019). Water tourism: A new strategy for the sustainable management of water-based ecosystems and landscapes in Extremadura (Spain). *Land*, 8(1). <https://doi.org/10.3390/land8010002>
 - [12] Framke, W. (2002). The destination as a concept: A discussion of the business-related perspective versus the socio-cultural approach in tourism theory. *Scandinavian Journal of Hospitality and Tourism*, 2(2), 92-108. <https://doi.org/10.1080/15022250216287>
 - [13] Gong, J., Detchkhajornjaroensri, P., & Knight, D. W. (2019). Responsible tourism in Bangkok, Thailand: Resident perceptions of Chinese tourist behavior. *International Journal of Tourism Research*, 21(2), 221-233. <https://doi.org/10.1002/jtr.2256>
 - [14] González-Mantilla, P. G., Gallagher, A. J., León, C. J., & Vianna, G. M. S. (2022). Economic impact and conservation potential of shark-diving tourism in the Azores Islands. *Marine Policy*, 135. <https://doi.org/10.1016/j.marpol.2021.104869>
 - [15] Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. *Journal of Sustainable Tourism*, 27(7), 1044-1060. <https://doi.org/10.1080/09669582.2018.1560456>
 - [16] Hayati, Y., Adrianto, L., Krisanti, M., Pranowo, W. S., & Kurniawan, F. (2020). Magnitudes and tourist perception of marine debris on small tourism island: Assessment of Tidung Island, Jakarta, Indonesia. *Marine Pollution Bulletin*, 158. <https://doi.org/10.1016/j.marpolbul.2020.111393>
 - [17] Higgins-Desbiolles, F. (2020). The “war over tourism”: challenges to sustainable tourism in the tourism academy after COVID-19. *Journal of Sustainable Tourism*, 29(4), 551-569. <https://doi.org/10.1080/09669582.2020.1803334>
 - [18] Hosseini, K., Stefaniec, A., & Hosseini, S. P. (2021). World Heritage Sites in developing countries: Assessing Impacts and handling complexities toward sustainable tourism. *Journal of Destination Marketing and Management*, 20. <https://doi.org/10.1016/j.jdmm.2021.100616>
 - [19] Hsu, C. Y., Chen, M. Y., & Yang, S. C. (2019). Residents’ attitudes toward support for island sustainable tourism. *Sustainability (Switzerland)*, 11(18). <https://doi.org/10.3390/su11185051>
 - [20] Joshi, S., & Dahal, R. (2019). Relationship between Social Carrying Capacity and Tourism Carrying Capacity: A Case of Annapurna Conservation Area, Nepal. *Journal of Tourism & Hospitality Educa On*, 9, 9-29. <https://doi.org/https://doi.org/10.3126/jthe.v9i0.23677>
 - [21] Kodir, A., Tanjung, A., Astina, I. K., Nurwan, M. A., Nusantara, A. G., & Ahmad, R. (2020). The Dynamics of Access to Tourism Development in Labuan Bajo, Indonesia. *Geojournal of Tourism and Geosites*, 29(2), 662-671. <https://doi.org/10.30892/gtg.29222-497>
 - [22] Kyara, V. C., Rahman, M. M., & Khanam, R. (2021). Tourism expansion and economic growth in Tanzania: A causality analysis. *Heliyon*, 7(5). <https://doi.org/10.1016/j.heliyon.2021.e06966>
 - [23] Lee, C. C., & Chen, M. P. (2021). Ecological footprint, tourism development, and country risk: International evidence. *Journal of Cleaner Production*, 279. <https://doi.org/10.1016/j.jclepro.2020.123671>
 - [24] Lee, S. W., & Xue, K. (2020). A model of destination loyalty: integrating destination image and sustainable tourism. *Asia Pacific Journal of Tourism Research*, 25(4), 393-408. <https://doi.org/10.1080/10941665.2020.1713185>
 - [25] Lee, T. H., Jan, F. H., & Liu, J. T. (2021). Developing an indicator framework for assessing sustainable tourism: Evidence from a Taiwan ecological resort. *Ecological Indicators*, 125. <https://doi.org/10.1016/j.ecolind.2021.107596>
 - [26] Leka, A., Lagarias, A., Panagiotopoulou, M., & Stratigea, A. (2022). Development of a Tourism Carrying Capacity Index (TCCI) for sustainable management of coastal areas in Mediterranean islands - Case study Naxos, Greece. *Ocean and Coastal Management*, 216. <https://doi.org/10.1016/j.ocecoaman.2021.105978>
 - [27] Liang, S., Li, C., Li, H., & Cheng, H. (2021). How do you feel about crowding at destinations? An exploration based on user-generated content. *Journal of Destination Marketing and Management*, 20. <https://doi.org/10.1016/j.jdmm.2021.100606>
 - [28] Lozano-Oyola, M., Blancas, F. J., González, M., & Caballero, R. (2019). Sustainable tourism tags to reward destination management. *Journal of Environmental Management*, 250, 109458. <https://doi.org/10.1016/J.JENVMAN.2019.109458>
 - [29] Martínez, J. M. G., Martín Martín, J. M., Salinas Fernández, J. A., & Mogorrón-Guerrero, H. (2019). An analysis of the stability of rural tourism as a desired condition for sustainable tourism. *Journal of Business Research*, 100, 165-174. <https://doi.org/10.1016/j.jbusres.2019.03.033>
 - [30] Mihalic, T. (2020). Conceptualizing over-tourism: A sustainability approach. *Annals of Tourism Research*, 84. <https://doi.org/10.1016/j.annals.2020.103025>

- 
- [31] Muntifering, J. R., Clark, S., Linklater, W. L., Hebach, E., Cloete, J., !Uri-#Khob, S., Jacobs, S., & Knight, A. T. (2020). Lessons from a conservation and tourism cooperative: the Namibian black rhinoceros case. *Annals of Tourism Research*, 82. <https://doi.org/10.1016/j.annals.2020.102918>
- [32] Navarro, J. L. A., Martínez, M. E. A., & Jiménez, J. A. M. (2020). An approach to measuring sustainable tourism at the local level in Europe. *Current Issues in Tourism*, 23(4), 423-437. <https://doi.org/10.1080/13683500.2019.1579174>
- [33] Nesticò, A., & Maselli, G. (2020). Sustainability indicators for the economic evaluation of tourism investments on islands. *Journal of Cleaner Production*, 248, 119217. <https://doi.org/10.1016/J.JCLEPRO.2019.119217>
- [34] Nugroho, P., & Numata, S. (2020). Resident support of community-based tourism development: Evidence from Gunung Ciremai National Park, Indonesia. *Journal of Sustainable Tourism*, 1-16. <https://doi.org/10.1080/09669582.2020.1755675>
- [35] Obersteiner, G., Gollnow, S., & Eriksson, M. (2021). Carbon footprint reduction potential of waste management strategies in tourism. *Environmental Development*, 39. <https://doi.org/10.1016/j.envdev.2021.100617>
- [36] Okitasari, M., & Katramiz, T. (2022). The national development plans after the SDGs: Steering implications of the global goals towards national development planning. *Earth System Governance*, 12, 100136. <https://doi.org/10.1016/J.ESG.2022.100136>
- [37] Phan, T. D., Bertone, E., Pham, T. D., & Pham, T. V. (2021). Perceptions and willingness to pay for water management on a highly developed tourism island under climate change: A Bayesian network approach. *Environmental Challenges*, 5. <https://doi.org/10.1016/j.envc.2021.100333>
- [38] Quevedo, J. M. D., Uchiyama, Y., & Kohsaka, R. (2021). Linking blue carbon ecosystems with sustainable tourism: Dichotomy of urban-rural local perspectives from the Philippines. *Regional Studies in Marine Science*, 45. <https://doi.org/10.1016/j.rsma.2021.101820>
- [39] Rhama, B., & Setiawan, F. (2022). Sustainable Development Goals in the Tourism Industry (Case Study of the Hospitality in Central Kalimantan, Indonesia). *Journal of Environmental Science and Sustainable Development*, 5(1). <https://doi.org/10.7454/jessd.v5i1.1148>
- [40] Rico, A., Olcina, J., Baños, C., Garcia, X., & Sauri, D. (2020). Declining water consumption in the hotel industry of mass tourism resorts: contrasting evidence for Benidorm, Spain. *Current Issues in Tourism*, 23(6), 770-783. <https://doi.org/10.1080/13683500.2019.1589431>
- [41] Saveriades, A. (2000). Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the Republic of Cyprus. *Tourism Management*, 21, 147-156.
- [42] Saviolidis, N. M., Cook, D., Davíðsdóttir, B., Jóhannsdóttir, L., & Ólafsson, S. (2021). Challenges of national measurement of environmental sustainability in tourism. *Current Research in Environmental Sustainability*, 3. <https://doi.org/10.1016/j.crsust.2021.100079>
- [43] Scarlett, H. G. (2021). Tourism recovery and the economic impact: A panel assessment. *Research in Globalization*, 3. <https://doi.org/10.1016/j.resglo.2021.100044>
- [44] Sisneros-Kidd, A. M., Monz, C., Hausner, V., Schmidt, J., & Clark, D. (2019). Nature-based tourism, resource dependence, and resilience of Arctic communities: framing complex issues in a changing environment. *Journal of Sustainable Tourism*, 27(8), 1259-1276. <https://doi.org/10.1080/09669582.2019.1612905>
- [45] Sudipa, N., Mahendra, M. S., Adnyana, W. S., & Pujaastawa, I. B. (2020). Tourism Impact on the Environment in Nusa Penida Tourism Area. *Journal of Environmental Management and Tourism*, 113(41), 113-124. [https://doi.org/10.14505/jemt.v11.1\(41\).13](https://doi.org/10.14505/jemt.v11.1(41).13)
- [46] Torres-Delgado, A., & Palomeque, F. L. (2014). Measuring sustainable tourism at the municipal level. *Annals of Tourism Research*, 49, 122-137. <https://doi.org/10.1016/j.annals.2014.09.003>
- [47] Wang, J., Huang, X., Gong, Z., & Cao, K. (2020). Dynamic assessment of tourism carrying capacity and its impacts on tourism economic growth in urban tourism destinations in China. *Journal of Destination Marketing and Management*, 15. <https://doi.org/10.1016/j.jdmm.2019.100383>
- [48] Wang, S. H., Lee, M. T., Château, P. A., & Chang, Y. C. (2016). Performance indicator framework for evaluation of sustainable tourism in the Taiwan coastal zone. *Sustainability (Switzerland)*, 8(7). <https://doi.org/10.3390/su8070652>
- [49] World Tourism Organization. (2013). Sustainable Tourism for Development Guidebook - Enhancing capacities for Sustainable Tourism for development in developing countries. In *Sustainable Tourism for Development Guidebook - Enhancing capacities for Sustainable Tourism for development in developing countries*. World Tourism Organization (UNWTO). <https://doi.org/10.18111/9789284415496>



- [50] Yoon, H., Sauri, D., & Rico, A. (2022). The water-energy nexus in hotels and recreational activities of a mass tourism resort: the case of Benidorm. *Current Issues in Tourism*, 25(4), 592-610. <https://doi.org/10.1080/13683500.2021.1893283>
- [51] Zhang, S., & Chan, E. S. W. (2020). A modernism-based interpretation of sustainable tourism. *International Journal of Tourism Research*, 22(2), 223-237. <https://doi.org/10.1002/jtr.2330>
- [52] Zhang, X., Zhong, L., & Yu, H. (2022). Sustainability assessment of tourism in protected areas: A relational perspective. *Global Ecology and Conservation*, 35. <https://doi.org/10.1016/j.gecco.2022.e02074>
- [53] Zhang, Y., & Tian, Q. (2022). Water-tourism nexus: impact of the water footprint of inbound tourists to China. *Water Supply*, 22(3), 2546-2559. <https://doi.org/10.2166/WS.2021.455>
- [54] Zheng, D., Liang, Z., & Ritchie, B. W. (2020). Residents' social dilemma in sustainable heritage tourism: the role of social emotion, efficacy beliefs, and temporal concerns. *Journal of Sustainable Tourism*, 28(11), 1782-1804. <https://doi.org/10.1080/09669582.2020.1760288>
- [55] Ziyadin, S., Borodin, A., Streltsova, E., Suieubayeva, S., & Pshembayeva, D. (2019). The fuzzy logic approach in the modeling of sustainable tourism development management. *Polish Journal of Management Studies*, 19(1), 492-504. <https://doi.org/10.17512/pjms.2019.19.1.37>