

Digital Innovation In Disaster Management And Sustainable Tourism

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Abstract

Natural disasters are a common occurrence in Indonesia. Disaster management in tourism areas requires planning and government synergy from the national to regional levels. Regulation of the Minister of Tourism and Creative Economy Number 9 of 2021 concerning guidelines for sustainable tourism destinations states that sustainable management standards in destinations must have plans for risk management, crisis management, and emergency response. This study aims to analyze digital innovation steps in the implementation of disaster management in tourism areas. This study uses a qualitative descriptive research method with documentation data collection techniques. The documentation collected is sourced from articles that have been published in reputable international journals Scopus. All the data that has been collected is then analyzed using the help of an analysis tool, namely vosviewer. The study highlights the importance of data-driven decision-making, innovation, and environmental management principles in developing products and services that contribute to economic growth and environmental sustainability. It also emphasizes the need for competitive business models, effective digital leadership, comprehensive digital transformation strategies, and efficient workforce management.

Keywords: *Digital Innovation; Disaster Management; Tourism; Sustainable.*

Abstrak

Bencana alam merupakan hal yang banyak terjadi di Indonesia. Pengelolaan bencana di kawasan pariwisata diperlukan perencanaan dan sinergi pemerintah dari tingkat nasional hingga daerah. Peraturan Menteri Pariwisata dan Ekonomi kreatif Nomor 9 tahun 2021 tentang pedoman destinasi wisata berkelanjutan menyebutkan bahwa standar pengelolaan berkelanjutan pada destinasi harus memiliki rencana-rencana penanggulangan resiko, pengelolaan krisis, dan tanggap darurat. Penelitian ini bertujuan untuk menganalisis langkah-langkah inovasi digital dalam pelaksanaan manajemen bencana di kawasan pariwisata. Penelitian ini menggunakan metode penelitian deskriptif kualitatif dengan Teknik pengumpulan data dokumentasi. Dokumentasi yang dikumpulkan bersumber dari artikel yang sudah terpublikasi di jurnal internasional bereputasi scopus. Semua data yang telah terkumpul kemudian dianalisis data dengan menggunakan bantuan alat analisis yaitu vosviewer. Studi ini menyoroti pentingnya pengambilan keputusan berbasis data, inovasi, dan prinsip-prinsip pengelolaan lingkungan dalam mengembangkan produk dan layanan yang berkontribusi terhadap pertumbuhan ekonomi dan kelestarian lingkungan. Ini juga menekankan perlunya model bisnis yang kompetitif, kepemimpinan digital yang efektif, strategi transformasi digital yang komprehensif, dan manajemen tenaga kerja yang efisien.

Kata Kunci: Inovasi Digital; Manajemen Bencana; Pariwisata; Berkelanjutan.

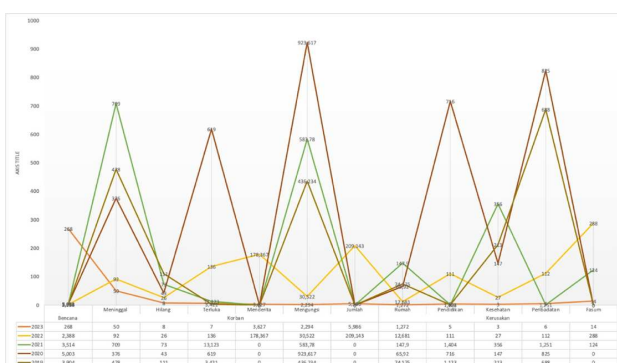
Introduction

Tourism is included in one of the industries that has an important role in a country's economy (Alputra Sudirman, Ode Dina Sarma, & Tri Susilawaty, 2020; Sudirman & Saidin, 2022). Reporting from the website of the House of Representatives of the Republic of Indonesia, the largest sector in terms of state foreign exchange receipts in 2020 is the tourism sector. According to Mathiesson & Waill, tourism is a temporary movement of people to tourist destinations outside of work and daily residence which is only carried out for a certain period of time and is relatively short, as well as the availability of facilities to meet needs during these activities (Dayu Venata, Juhari, Aji, & Kunci, 2023). Seeing a considerable opportunity, the government has begun to make the tourism sector one of the flagship programs in national development.

The purpose of this study is to analyze digital innovation steps in the implementation of disaster management in tourism areas (Gretzel U, Reino S, Kopera S, & Koo C, 2015; Rumbach & Németh, 2018). Tourism is a sector with quite rapid growth with the number of foreign tourist arrivals of 228.30% in 2022. However, tourism is a volatile industry and is easily affected by natural conditions, disasters and safety (Azzali, Kamble, Thirumaran, Wong, & Wood, 2020). The government must maintain the safety of tourists and continue to innovate in the implementation of disaster management and be responsible for tourists affected by disasters at tourist sites (Tang et al., 2020).

The data in figure 1 shows that the number of natural disasters that occurred in the last 5 years in Indonesia was 15,077 with 215,129 victims and 17,054,773 losses. The losses and victims that befell Indonesia were enormous. The disaster management that has been carried out by the government has not succeeded in reducing the number of victims and losses due to natural disasters (Azzali et al., 2020; Huan, Beaman, & Shelby, 2004). The government must be responsible for disaster management planning and management (Collins, 2008). The Government of Indonesia through the National Disaster Management Agency (BNPB) carries out a disaster safe program. The safety factor is the main factor in the disaster-safe tourism program being realized in the form of preparedness of tourism managers and disaster mitigation (Diekmann, McCabe, & Ferreira, 2018). In this preparedness effort, both managers and visitors have known the steps that must be taken immediately when a disaster occurs because there are evacuation procedures, maps and early warning instruments installed at tourism locations (Rahman, Ardhiyansah, Pasaribu, & Saputra, n.d.; Ridwan et al., 2022). Meanwhile, mitigation efforts are carried out through disaster risk reduction activities guided by the principles of sustainable management of tourist attractions (Rahman et al., n.d.; Wahyuningtyas, Tanjung, Kodir, & Wijanarko, 2020).

Figure 1. Data on victims and losses of natural disasters in the last 5 years



RESEARCH METHODS

This study uses a qualitative descriptive research method with documentation data collection techniques. The documentation collected is sourced from articles published in the reputable international journal Scopus, by including the keywords digital, disaster management and sustainable tourism. All the

data that has been collected is then analyzed using the help of vosviewer analysis tools. The approach used in this study is the theory of sustainable tourism development which includes social, technological, environmental, management or institutional indicators as indicators of sustainable tourism. Furthermore, this study will determine the relevance of digital innovation in the implementation of disaster management with the limits of disaster management activities, disaster prevention, preparedness, early warning, and mitigation.

Result and Discussion

This article reviews 137 articles that have been published in reputable international journals Scopus published in the last 5 years. The limitations of the research are included as keywords, namely digital transformation, disaster and tourism. From the results of the analysis carried out with the vos viewer application on 137 journals, figure 2 below can be noted

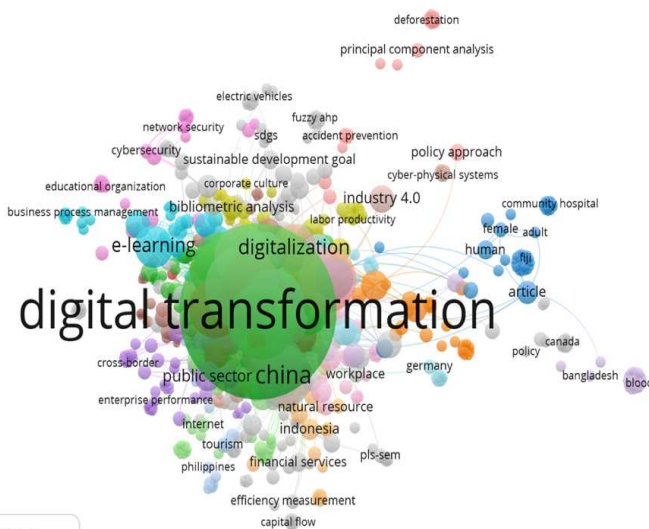


Figure 2. Analysis of digital transformation in disaster management and sustainable tourism (Source: Data analysis using vos viewer)

Item table on vosviewer analytics cluster

Cluster	Items	Presentage
Cluster 1	Digital technology, dynamics capabilities, efficiency, environmental sustainable, financial services, government, human, industrial development, information and communication, risk assessment, technological change	Blue 39 %
Cluster 2	China, corporate strategy, decision making, economic growth, empirical analysis, green innovation, sustainable development, text analysis.	Green 24 %
Cluster 3	Digital skill, digital strategy, digital technologies, competition advantage, education, finance performance, human resource.	Yellow 16 %
Cluster 4	Business, business model, competitiveness, digital leadership, digital digital transformation, governance approach	Purple 14 %
Cluster 5	Artificial intelligence, deloping countries, digital economy, digital	Grey 7%

	infrastructure, digital innovation	
		100 %

Each cluster has a different category and color. This describes the terms and keywords that are currently a research trend on digitalization used in the implementation of disaster management and sustainable tourism.

Cluster 1, identified that the trend of keywords that often appear shows that the use of digital technology encourages the development of technology and information to become smart destination management. Technology and digital are key to improving dynamics, operational efficiency, and environmental sustainability. In financial services, digital technologies offer opportunities for financial inclusion and increased security (Allen & Chan, 2017). The government can utilize digital technology to improve public services and transparency. Industrial development and information communication require investment in digital infrastructure and skills. Risk management and adaptation to technological changes must be an integral part of corporate and government strategies to achieve sustainable and inclusive growth (O'Malley, C. Harris, & Story, 2022).

Cluster 2, explains the company's strategy. Corporate strategies in tourism and disaster management should be based on data-driven decision-making, green innovation, and sustainable development principles. By leveraging digital technology and empirical analytics, companies can develop products and services that support economic growth and environmental sustainability (Heebkhoksung, Rattanawong, & Vongmanee, 2023). Empowerment of local communities and wise management of natural resources are key to ensuring that tourism contributes positively to

sustainable development. Text and empirical analysis provide valuable insights that can be used to refine strategies and ensure effective responses to existing challenges (Zenker & Kock, 2020).

Cluster 3, identifies tourism companies that want to remain competitive in the digital era should focus on developing digital skills, adopting digital strategies, and utilizing the latest technology. Competitive advantage can be achieved through data analytics and service personalization. Continuous tourism education and development is essential to ensure that employees have the necessary skills to adapt to technological changes. Financial performance can be improved through operational efficiency and better financial analysis, while effective human resource management can aid in attracting and retaining top talent. The company can achieve sustainable growth and create long-term value (Jardim & Albright, 2021).

Cluster 4 describes companies that must develop innovative business models, lead with strong digital leadership, implement a comprehensive digital transformation strategy, and implement an effective governance approach. By doing so, they can improve competitiveness, optimize performance, and achieve sustainable growth (Wang, Demerouti, & Le Blanc, 2017).

Cluster 5, identifies Artificial Intelligence and digital innovation providing a great opportunity for developing countries to improve their digital economies. Investments in digital infrastructure, supportive policies, and digital upskilling are key steps that need to be taken. With the right strategy, developing countries can overcome existing challenges and harness the potential of technology to achieve inclusive and sustainable economic growth (Holden, 2013).

1. Digital Innovation Towards Sustainable Tourism

Digitalization has brought radical changes to the tourism industry (Pencarelli, 2020). The main change in the 4.0 revolution to smart tourism is marked by a change in website services towards digital innovation with the concept of the Internet of Things (IoT) (Dewi, Harsono, Desriyanti, Yulianti, & Azhar, 2022). Smart tourism is built sustainably, able to intervene in changes to the tourism ecosystem such as the economy, quality of life and social order (Fu et al., 2020; Suluh et al., 2022). The concept of smart tourism with IoT also includes various devices that connect hardware with digital through appropriate technology. So that tourists are connected to location tracking data, transportation, culinary, transactions and so on (Pencarelli, 2020). Digitalization brings sustainable tourism that drives change gradually and systematically (Mineo & Pappalardo, 2020). Sustainable tourism guarantees opportunities for the younger generation, maximizes benefits for the community, minimizes costs, and ensures the preservation of the natural environment and cultural aspects to maintain the economy (Pochernina, 2020; Wided, 2022). The path to sustainable tourism requires the commitment of various parties, where progress can be made gradually (de Sausmarez, 2007; Rasoolimanesh, Ramakrishna, Hall, Esfandiar, & Seyfi, 2020). The process towards sustainable tourism is never-ending because technical and managerial innovations along with changes in tourist behavior will always create renewal opportunities (Happ & Ivancsó-Horváth, 2018).

2. Disaster management in sustainable tourism

Sustainable tourism ensures the preservation of the environment, nature and ensures the safety of tourists from natural disasters and other things that can threaten safety. However, often natural disasters have an impact on tourism areas

(AlHinai, 2020; Saman & Wickramasinghe, 2008). Indonesian people are often unprepared to face disasters such as floods, landslides, earthquakes to volcanic eruptions (Dash & Punia, 2019; Machado, 2012). Natural resources are an attraction and the main element to motivate tourists to visit. There are at least 7 categories that motivate tourist visits, namely physiography and climate, culture and history, market attractions, special events and entertainment (Machado, 2012). However, it can turn tourist areas into dramatic in a short time (Kurniawan, Purnomo, Fathani, & Fadhlurrohman, 2023).

The adoption of technology as digital innovation in disaster management and sustainable tourism is an interlocking link. Technology can change quickly and soon be replaced by new ones. The covid 19 pandemic that has changed the world order is helped by technology (Bhuiyan, Crovella, Paiano, & Alves, 2021; Zenker & Kock, 2020). Furthermore, technology can specifically be used as disaster management which of course must be supported by aspects of institutional readiness (government) (AlHinai, 2020)(Practice et al., 2021). Governments can see technology as a challenge and seize opportunities by changing the disaster management system that has been done so far (Chau, P. Y. K., & Tam, 2000; de Sausmarez, 2007) Governments can make development planning, use technology, minimize the impact of disasters for economic independence (Gurtner, 2016).

Jing (2009) Disaster management framework in tourism sites, articulates a comprehensive set of principles for disaster management strategies for the benefit of tourism companies and travel agencies. The framework follows the disaster process: pre-event, prodromal, emergency, medium, long-term (recovery), and resolution (Rausser, Strielkowski, & Korneeva, 2021). It has been

recognized that long-term recovery and resolution processes elicit experience to mitigate the impact of similar potential disasters, thus showing a recurring pattern of replacing pre-event and prodromal processes (Stamboulis & Skayannis, 2003). In his model, Ritchie (2004) highlights the components for tourism disaster management, including (a) disaster prevention and planning, (b) strategic implementation and resolution, and (c) evaluation and feedback.

Conclusion

This study examines the role of digital innovation in disaster management and tourism in Indonesia, focusing on the impact of digital technology on disaster-prone areas. The research based on the design of this study reveals that digital innovation is essential for disaster management and tourism in disaster-prone areas. The study highlights the importance of data-driven decision-making, innovation, and environmental management principles in developing products and services that contribute to economic growth and environmental sustainability. It also emphasizes the need for competitive business models, effective digital leadership, comprehensive digital transformation strategies, and efficient workforce management. Digitalization has revolutionized the tourism industry, introducing smart tourism and IoT integration, transforming aspects such as the economy, quality of lifestyle, and social security. The study emphasizes the need for strategic planning and management, leveraging digital technologies, implementing comprehensive digital transformation strategies, and leveraging AI and digital innovation. The study also discusses the consequences of natural disasters on tourist destinations, the concept

of sustainable tourism, public-private partnerships, and sustainable tourism indicators. It also discusses the development of an analytical tourism disaster management framework for sustainable tourism after sudden disasters and innovation strategies for experience-based tourism.

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