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ASSESSING THE RESILIENCE OF RURAL TOURISM IN INDONESIA DURING AND AFTER THE COVID-19 PANDEMIC USING THE MULTIMOORA METHOD

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Abstract

Tourism villages play a vital role in developing rural areas in Indonesia. However, they are vulnerable to external shocks, including economic fluctuations and recent public health events like the COVID-19 pandemic. This study analyses the resilience of 24 tourism village destinations in Indonesia from 2019 to 2022. The MULTIMOORA method (multi-objective optimisation by ratio analysis plus the full multiplicative form) was employed to assess resilience. The findings indicate that most tourism villages in Indonesia experienced significant impacts during the initial year of the pandemic. However, they demonstrated the ability to recover, as evidenced by changes in their rankings before and after the pandemic. This result suggests that tourism villages in Indonesia show strong capacity and performance to rebound from pandemic-related shocks. The novelty of this research lies in its ability to provide a comprehensive and timely assessment of the resilience of tourism villages in Indonesia during the COVID-19 pandemic, utilising a robust methodological approach and offering valuable insights into their capacity to recover from external shocks. The research significantly contributes to the broader literature on tourism village resilience. It provides empirical evidence, methodological innovation, and valuable insights into the economic resilience of the sector in the face of external shocks. The findings have implications for policymakers, researchers, and practitioners working in tourism development.

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Keywords: rural tourism resilience; pandemic shock; Multimoora; rural development

JEL Classification: R580, Z320, Z380

Introduction

Rural tourism has become a global trend due to its perceived benefits in economic, social, and environmental aspects. As stated by Shin et al. (2017), Jamini and Dehghani (2022), and Stepanova et al. (2023), rural tourism has gained momentum and become a new kinetic energy in revitalising rural development, stimulating economic growth, and providing various direct benefits to its residents. Rodrigues et al. (2021) argue that rural tourism is a sustainable development strategy capable of creating jobs, generating income, combating rural depopulation, fostering socio-economic networks, preserving cultural and natural heritage, and improving the quality of life for rural populations.

What exactly is rural tourism? The concept of rural tourism remains challenging to define precisely. This is related to the lack of consensus on what constitutes rural areas (Bosworth and Turner, 2018). According to OECD (1994), the definition of rural depends on the specific analytical goals or policy issues. Consequently, It is challenging to create a universally applicable definition of rural tourism across all regions and countries (Ayazlar and Ayazlar, 2015). Bernard Lane was the first to define rural tourism, namely tourism that occurs in rural areas (Lane, 1994). However, this simple definition is inadequate for various purposes (Bran et al., 2010). Rosalina et al. (2021) state that the universal definition of rural tourism lacks consensus, and a precise definition is still difficult to grasp because rural tourism is complex, encompassing multifaceted activities that vary across regions and countries. Instead, researchers have developed their definitions based on their unique experiences and contexts in each country (Nair et al., 2015). The UNWTO defines rural tourism as "a type of tourism activity in which the visitor's experience is related to a wide range of products generally related to nature-based activities, agriculture, rural lifestyle/culture, angling and sightseeing (Peira et al., 2021).

To address the lack of a definition for rural tourism, Bernard Lane proposed that rural tourism should encompass several key characteristics: (1) it must be located in rural areas, (2) it must reflect the distinctive features of rural tourism, (3) it involves small-scale buildings and settlements, (4) it connects with local communities and their families, (5) it centres around villages and small towns, and (6) it includes complex economic, environmental, and historical patterns (Lane, 2009; Lane and Kastenholz, 2015). Adding to the conception of rural tourism, the World Tourism Organization (WTO) defines rural tourism as a type of tourism that offers visitors personal interactions, experiences with the physical environment and rural life, and participation in local activities, traditions, and lifestyles (Aref and Gill, 2015).

Despite its recognised role in various countries, the COVID-19 pandemic, with its unprecedented impacts, has raised significant concerns about the sustainability of rural tourism. The tourism sector, including rural tourism, was one of the first severely affected by the COVID-19 pandemic (Harchandani and Shome, 2021). According to (Gössling et al., 2020), the COVID-19 pandemic has posed a significant threat to global tourism. The sector has been forced to face various risk situations and push to develop strategies to quickly adapt

to various economic, political, or social disruptions it has caused (Lamhour et al., 2023). This situation underscores the importance of resilience strategies in this sector (Kürüm Varolgüneş et al., 2022). Hu et al. (2021) indicate that given the impact of the COVID-19 outbreak, special attention is needed to enhance the resilience of rural tourism systems. Yu et al. (2023) emphasise that resilience is a crucial variable in helping rural tourism recover from the pandemic's impacts. Resilience essentially involves developing creative ways to plan, prepare and adapt to risks (Basurto-Cedeño and Pennington-Gray, 2018).

As a developing country, rural tourism plays a crucial role in Indonesia. It is set as direction for developing tourism in rural areas, which is expected to enhance economic growth and the welfare of rural communities while preserving nature and the environment and promoting the development and preservation of rural culture (Ariyani et al., 2022). In Indonesia, rural tourism is defined as tourism that presents rural activities and local wisdom as attractions (Wirdayanti et al., 2021). Rural tourism in Indonesia is institutionalised as tourist villages (Ariyani and Fauzi, 2024). Nuryanti (1993) defines a tourist village as a combination of accommodation, attractions, and supporting facilities with traditional village life. Over time, the number of tourist villages in Indonesia has continued to increase. In 2019, before the COVID-19 pandemic, the number of tourist villages reached 1,831 (Ariyani and Fauzi, 2023). These villages are categorised into four groups based on their development: pilot, developing, advanced, and independent villages. Following the implementation of Large-Scale Social Restrictions (PSBB) in response to the widespread COVID-19 pandemic, many tourist villages in Indonesia ceased operations (Damanik et al., 2022). PSBB significantly reduced mobility in workplaces, recreational areas, and transit zones. The decrease in visitor numbers led to the collapse of many tourist villages, resulting in workers losing their income and livelihoods (Pramana et al., 2022).

The impact of COVID-19 on tourist villages in Indonesia varies. Some villages that performed well before the pandemic were severely affected, with many even closing operations. Meanwhile, other villages survived. This fact is due to the varying levels of resilience among tourist villages. Resilience in tourist villages is also highly dynamic, a village may have good resilience in one year but experience a sharp decline the following year, while other villages may improve. This phenomenon is intriguing as it can help researchers and practitioners in tourism development identify factors determining the resilience of tourist villages, including policymakers in developing policies to strengthen the resilience of tourist villages.

This study aims to (1) analyse the resilience of tourist villages in Indonesia during and after the COVID-19 pandemic, (2) determine the ranking of tourist village resilience, and (3) trace changes in the ranking of tourist village resilience during this period. This task is particularly challenging due to tourism systems' complex and dynamic nature, involving many interrelated and nonlinear variables and activities (Baggio, 2020). The results of this study will provide breakthroughs in explaining how the performance of tourist villages in Indonesia before and after the COVID-19 pandemic and identifying which villages are the most resilient and the variables determining this. This study uses the MULTIMOORA method (Multi-Objective Optimization by Ratio Analysis plus Full Multiplication Form) to address these issues. The output of the MULTIMOORA method is a ranking derived from combining the results of three ternary ranking techniques: the Ratio System, Benchmark Approach, and Full Multiplication Form.

This study provides two significant theoretical contributions to the field of rural tourism. First, it enhances our understanding of resilience in the context of tourism and rural development. This paper also offers an in-depth analysis of the challenges faced by rural tourist villages in Indonesia, including infrastructure deficiencies, limited accessibility, and environmental issues, thus adding valuable insights to the existing literature on rural development and tourism. Additionally, this study introduces the MULTIMOORA method as a new analytical framework for assessing and ranking the resilience of rural tourist villages, thereby enriching the methodological tools available for tourism research.

The findings of this research will be valuable for policymakers in enhancing the resilience of rural tourism based on appropriate parameters in strengthening resilience. The paper is structured into five sections. After the introduction, section two provides a literature review. The third section outlines the location and the method used for the study. Section four presents the findings and discussion, and section five concludes with the key conclusions drawn from the research.

Literature review

Since the 21st century, resilience has increasingly been accepted as a framework for understanding global systems. The concept of resilience was first introduced by Holling (1973) to model fluctuations in ecological systems due to human-environment interactions. So far, academics and other stakeholders have not reached a consensus on a definition that can generally explain resilience. Resilience is defined in various ways by different experts, depending on their specific field of study. However, resilience fundamentally represents a dynamic measure of a system's ability to adapt and recover from challenges that threaten its future function and development (Folke et al., 2010; Southwick et al., 2014; Hosseini et al., 2016; Heslinga et al., 2020).

Proag (2014) states that resilience has two primary forms: (1) hard resilience, which describes the direct strength of a system or institutional structure under pressure, and (2) soft resilience, which indicates the system's ability to absorb and recover from disruptions without fundamental changes to its functions or structure. Wibowo and Hariadi (2024) suggest that resilience represents a process or outcome in specific phenomena influenced by many factors. Fiksel (2003) argues that the resilience of a system depends on at least three factors: (1) absorptive capacity, which is the ability to absorb disruptive events; (2) adaptive capacity, which is the ability to adjust to these events; and (3) restorative capacity, which is the ability to recover. Lew et al. (2016) assert that resilience can be an alternative indicator of integrated sustainable development.

In the tourism sector, resilience typically refers to how tourism destinations respond to disruptive natural disasters that affect the area and its surroundings, limiting their capacity to host tourists (Filimonau and De Coteau, 2020). Sharma et al. (2021) describe tourism resilience as the ability of a destination and its management to adapt to various risks during natural disasters or emergencies. (Dewi, 2020) expands on this definition, viewing tourism resilience as the capacity to handle natural disasters, social conflicts, policy changes, climate change, and impacts on surrounding ecosystems. Kaushal and Srivastava (2021) and Buultjens et al. (2017) emphasise that tourism resilience encompasses the industry's ability to endure both self-induced and external crises threatening stability and sustainable development. Additionally, resilience in tourism considers the effects of socio-economic

shocks, community resilience, and the overall impact of the tourism industry on regional resilience (Ibanescu et al., 2020).

The concept of resilience in tourism extends beyond just socio-economic shocks (McCartney et al., 2021). It encompasses the environmental and ecological sustainability of both formal and informal tourism enterprises (Biggs et al., 2012), the vulnerability of tourism businesses and organisations (Annarelli and Nonino, 2016), and the role of community involvement in enhancing destination resilience (Kwok et al., 2016). Additionally, it addresses disruptions to hotel operations (Brown et al., 2018), risk analysis and management, disaster resilience and sustainability (Basurto-Cedeño and Pennington-Gray, 2018), as well as climate change resilience (Dogru et al., 2019), recovery from the impacts of COVID-19 (McCartney et al., 2021), and the well-being of households dependent on tourism (Munanura et al., 2021). Furthermore, research on resilience in tourism also applies to rural areas, highlighting community resilience in rural tourism (Lew et al., 2016), tourism initiatives aimed at enhancing rural land resilience (Shi et al., 2022), the dynamics of rural tourism in Japan during the new normal (Ohe, 2022), and the vulnerability and adaptive capacity of rural tourism systems in response to COVID-19 (Yu et al., 2023).

The COVID-19 pandemic has underscored the critical relationship between tourism and resilience (Ibanescu et al., 2022). While the pandemic's long-term effects on regional growth are still being debated, tourism-dependent areas have faced significant challenges, especially during the initial outbreak (Hidalgo et al., 2022). Sharma et al. (2021) emphasise the need for tourism destinations to demonstrate resilience in order to survive, adapt, and thrive in the post-pandemic era. To evaluate the resilience of a tourism area, a suitable measurement tool is essential. Sharma et al. (2021) propose a framework that assesses resilience through four key dimensions: government response, technological innovation, local community engagement, and trust in consumer and tourism management. By measuring tourism destination resilience, stakeholders can gain valuable insights to strengthen resilience and develop effective recovery strategies (Ibanescu et al., 2022).

The concept of resilience has fundamentally shifted our understanding of decision-making in the face of unexpected events and tourism development. Scholars and policymakers increasingly advocate for a resilience-based approach to tourism, especially in marginalised or underserved regions (Cellini and Cuccia, 2015; Hall et al., 2020; Ritchie and Jiang, 2019). Resilience offers a holistic framework encompassing emergency preparedness, contingency planning, competitiveness, and sustainable development. As such, it has become a central focus in many policy strategies designed to mitigate disaster risks and enhance financial stability (Béné et al., 2014). Liu-Lastres et al. (2020) highlight the vital role of resilience in the tourism sector in recovering destinations in Aceh, Indonesia. Wibowo and Hariadi (2024) argue that Indonesian tourism lacked the necessary resilience to navigate the economic instability and evolving trends during and after the COVID-19 pandemic. Similarly, research in Papua, Indonesia by Dewi (2020) revealed that the pandemic adversely affected the economic, social, and cultural dimensions, ultimately impacting the resilience of ecotourism destinations. Conversely, Ariyani et al. (2023) found that tourist villages in Indonesia demonstrated a strong capacity to recover from the shocks of the pandemic, particularly in areas with a high Development Village Index and a stable visitor count, thanks to the enforcement of strict health protocols and the introduction of innovative tourism offerings.

Methodology

This research was conducted in four provinces: Central Java, East Java, West Java, and West Nusa Tenggara. The number of villages studied was 24. The criteria used to select the villages were as follows: the village represents a favourite tourist spot in the region, data is available, the village has economic and social implications for the rural economy in the area, and the COVID-19 pandemic has impacted the village. Detailed data of the 24 villages and their attractions are presented in Table 1.

Table no.1. Profile of research object tourism villages

No	Tourist Village	Regency	Province	Main Tourist Attraction
1	Pentingsari	Sleman	Special Region of Yogyakarta	Watch welcoming dance, traditional dance learning, traditional music learning
2	Karangrejo	Magelang	Central Java	Mountain panorama tour
3	Wanurejo	Magelang	Central Java	Traditional farming tour, village visit, practice making Javanese sugar
4	Bleberan	Gunung Kidul	Special Region of Yogyakarta	Horse-drawn carriage tour, Javanese fashion show, Javanese music ensemble learning
5	Tinalah	Kulon Progo	Special Region of Yogyakarta	Cave tour, cultural tour
6	Gunung Gajah	Pemalang	Central Java	Exploring nature, river tubing, camping
7	Pulau Cemara	Brebes	Central Java	Mountain panorama tour
8	Mandiraja	Pemalang	Central Java	Beach panorama tour
9	Wana Wisata	Boyolali	Central Java	Waterfall panorama tour
10	Tlogoweru	Demak	Central Java	Reservoir panorama tour, floating stalls
11	Wonosari	Grobogan	Central Java	Owl breeding, fishing
12	Tlogowero	Temanggung	Central Java	Rever panorama tour, culinary delights
13	Bilebante	Central Lombok	West Nusa Tenggara	Camping ground, swimming pool, fishing market, bicycle path
14	Tambaksari	Pasuruan	East Java	Countryside panorama tour, camping ground
15	Pampang	Gunung Kidul	Special Region of Yogyakarta	Nature and culture tour
16	Bendolawang	Malang	East Java	Nature and river tubing tour
17	Malangjiwan	Klaten	East Java	Agrotourism, nature panorama tour
18	Beji	Gunung Kidul	Special Region of Yogyakarta	Traditional natural baths tour
19	Tetebatu	East Lombok	West Nusa Tenggara	Natural panorama and customary forest tour
20	Sade	Central Lombok	West Nusa Tenggara	Rural natural panorama tour, cycling tour, camping ground
21	Bonjeruk	Central Lombok	West Nusa Tenggara	Traditional tribe tour
22	Hanjeli	Sukabumi	West Java	Waterfalls panorama tour, traditional culinary
23	Tepus	Gunung Kidul	Special Region of Yogyakarta	Harvesting and pounding Hanjeli (coix lachrymal-jobi l)
24	Cibuntu	Kuningan	West Java	Traditional dances, village tour, and beach panorama tour

Source: Ministry of Tourism and Creative Economy Republic of Indonesia (2022)

This research uses secondary data in the form of notes from tourist village managers relevant to the indicators of the research variables. Considering the absence of a single definition of rural tourism or a uniform theoretical framework and measures, the research introduces a measure of rural tourism resilience in Indonesia, structured on two dimensions: capacity and performance. The capacity relates to the resources that are part of the rural tourism system, and the performance refers to the work results of the tourism village during and after a shock occurs. Indicators of the capacity and resilience performance of tourist villages in Indonesia are presented in Table 2.

Table no. 2. Resilience indicators of rural tourism

Capacity Dimension	Performance Dimension
Capacity Building (X_1): number of trainings conducted in a year	Tourist (X_4): number of tourists during the year
Employee (X_2): number of employees in a year	Income (X_5): total income for a year
Village Development Index (X_3): a composite index that measures village development in Indonesia from various aspects: social, economic, environmental, accessibility, village Governance, and basic services.	Cost (X_6): total cost for a year

The data collection process used document observation. To ensure the validity of the data, the researcher cross-checked the head of the tourist village manager via telephone. Data collection was carried out between March and September 2023. The analysis covers the period from 2019, when the pandemic began in Indonesia, to 2022 when it had significantly subsided.

Data analysis

The resilience of rural tourism was analysed using the multi-objective optimisation by ratio analysis and full multiplicative form method (MULTIMOORA) developed by Brauers and Ginevičiu (2010). The MULTIMOORA method is a multi-criteria decision analysis (MCDA) method. The method considers various factors, such as the economic impact of the pandemic, the social impact of the pandemic, the environmental impact of the pandemic, and the ability of rural tourism destinations to adapt to change. The MULTIMOORA method was used to identify the most resilient rural tourism destinations during and after the pandemic.

Table no. 3. Performance of MOORA relative to other MCDA methods

MCDM Method	Computational Time	Simplicity	Mathematical Calculation	Stability	Information Type
MOORA	Very less	Very simple	Minimum	Good	Quantitative
AHP	Very less	Very critical	Maximum	Poor	Mixed
TOPSIS	Moderate	Moderately critical	Moderate	Medium	Quantitative
PROMETHEE	High	Moderately critical	Moderate	Medium	Mixed

Source: Brauers and Zavadskas (2012)

Table 3 compares the MOORA method (part of MULTIMOORA) and other MCDM methods regarding computational time, simplicity, calculation, stability, and information type. Hafezalkotob et al. (2019) highlighted the advantages of using MULTIMOORA, including its simple mathematics, low computational time, ease of use for decision-makers,

utilisation of three different methods for subordinate rankings, and integration of rankings through aggregation tools. Unlike many MCDA methods that rely on a single utility method for ranking selection, the MULTIMOORA method combines rankings from three subordinate ranking methods to produce an integrated ranking. Given the criticality of ranking stability in assessing resilience, the choice of MULTIMOORA for this study is deemed appropriate.

While MULTIMOORA offers several advantages, it also presents certain challenges, as highlighted by Hafezalkotob et al. (2019). One of the challenges lies in determining the relative importance of criteria through a weighting method. The subjective and objective approaches to assigning weights may yield different results compared to the conventional MULTIMOORA method, which does not involve weighting. Additionally, various methods are available for aggregating rankings, ranging from the straightforward rank position method to the more complex dominance theory method, particularly when dealing with multiple criteria and units of analysis. Similarly, using MULTIMOORA in situations involving target-based criteria like the Sustainable Development Goals (SDGs) for tourism development can pose challenges. The MULTIMOORA consists of three calculation methods, i.e., the ratio system, the reference point, and the multiplicative form. The final of these three systems results in a MULTIMOORA ranking, as seen in Figure 1.

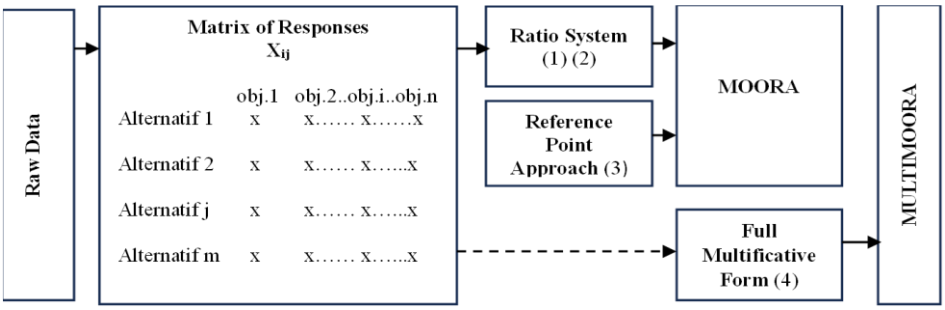

Figure no. 1. Diagram of MULTIMOORA
Source: Brauers and Zavadskas (2012)

The ratio system of MOORA is calculated as follows: Given the decision matrix x_{ij} , also known as a matrix of the response of alternative j on objective *i, i=1,2…n* as the objectives, and *j=1,2,…m* as alternatives, the normalised of this decision matrix is given as the following :

$$x_{ij}^{*} = \frac{x_{ij}}{\sqrt{\sum_{j=1}^{m} x_{ij}^{2}}} \qquad \text{(eq 1)}$$

The ratio system of MOORA is calculated according to the following formula

$$y^{*} = \sum_{j=1}^{g} x_{ij}^{*} - \sum_{j=g+1}^{n} x_{ij}^{*} \qquad \text{(eq 2)}$$

where g and $(n-g)$ are the number of criteria to be maximised and minimised, respectively.

The reference point approach employs the normalised performance of the ith alternative on the jth criterion, calculated using Eq.(3). A maximum criterion reference point is determined among these normalised performances. This reference point, denoted by the coordinates (rj), is considered to be more realistic and non-subjective (Brauers, 2008). Brauers and Zavadskas (2006) and Brauers and Ginevičius (2009) have emphasised that the Tchebycheff Min-Max metric is the most suitable for the reference point approach and is formulated as follows:

$$\min_i(\max_j|r_j - x_{ij}^*|) \quad \text{(eq 3)}$$

The following equation gives the complete multiplicative method of MOORA:

$$U^* = \frac{A_i}{B_i} \quad \text{(eq 4)}$$

Where $A_i = \prod_{j=1}^{g} x_{ij}$ denotes the product of objective of the -ith alternative to be maximised with g=1...m is the number of objectives to be maximised and $B = \prod_{j=g+1}^{m} x_{ij}$ denotes the product of objectives of the -ith alternative to be minimised with $m - g$ being the number of objectives to be minimised.

The final ranking of MULTMOORA was calculated based on the rank position or reciprocal rank method (Altuntas et al., 2015), which considers the position of each alternative according to each subordinate ranking technique. The Rank Position Method takes the following form:

$$RPM(A_i) = \frac{1}{\frac{1}{r(y_i)} + \frac{1}{r(z_i)} + \frac{1}{r(U_i)}} \quad \text{(eq 5)}$$

Where $r(y_i), r(z_i)$ and $r(U_i)$ are ranks obtained from ratio method, reference method, and multiplicative method, respectively.

Results and Discussions

The results of the MULTIMOORA analysis for the 24 tourist villages from 2019 to 2022 are presented in Table 4. The scores based on the ratio system are indicated by the label y*, while z* represents the reference system, and U* represents the multiplicative system. R denotes the final rankings based on the rank position method, and R indicates the change in rank position from the previous year.

Upon examining Table 4, it is evident that most tourism villages experienced a decline in performance during the COVID-19 pandemic, as indicated by a negative change in their rank. This negative trend persisted until 2021, as depicted in Figure 2. However, there was a gradual decrease in this trend, with an increasing number of tourist villages showing signs of recovery. By 2022, most tourist villages had recovered successfully, as evidenced by a positive trend in their rank compared to the previous year. Nonetheless, certain villages, such as Pulau Cemara and Mandireja, were still facing negative changes in their rank. It is important to note that these changes in rank are relative to other tourist villages. Therefore, as the performance of other villages improved, the relative performance of these two villages was significantly impacted, resulting in lower rank positions.

Table 4 reveals that there are variations in the recovery of tourist villages before and after the COVID-19 pandemic. For instance, Pentingsari held the top rank before the pandemic, but one year after the outbreak, it dropped to the twenty-third position in 2020. The pandemic severely affected this village, resulting in a declining income and employment while its operating costs remained high. Similarly, Bilebante (ranked second in 2019) was also impacted, although to a lesser extent. It experienced a drop in rank from second to seventh place in 2020. On the other hand, Bilebente (ranked third in 2019) and Tetebatu (ranked fourth in 2019) demonstrated relative resilience, with positive changes in their ranks from 2019 to 2022. Notably, Tetebatu managed to recover and regain the top rank in 2021. However, it dropped to the third position in 2022 due to the recovery of other villages two years after the COVID-19 pandemic. Table 4 also highlights that certain tourist villages, despite their ability to recover and show a positive change in rank, still maintained relatively low positions compared to other villages. This finding implies that these villages struggled to compete as favoured tourist destinations. For instance, Hanjeli held a relatively low rank before and after the COVID-19 pandemic, consistently ranking in the twenties compared to other tourist villages. Similarly, Tlogowero experienced a declining trend in its rank, dropping from eighteenth place before the pandemic to its final position in 2022.

As mentioned previously, the overall analysis indicates that most Indonesian tourist villages have shown a positive change in their position, indicating their ability to recover and their resilience to external shocks such as the COVID-19 pandemic. This recovery can be attributed to solid community participation, economic diversification, robust social networks, and adaptive management strategies. On Java Island, most villages exhibit a strong sense of community engagement, demonstrated by the local wisdom of "gotong royong" (cooperation without reservation), which acts as a social safety net during times of uncertainty. Furthermore, since the tourist villages in Indonesia are primarily located in agriculture-based areas, they were able to diversify their economy back to the agriculture sector when tourist activities came to a halt due to the pandemic.

It is important to highlight that the communities in tourist villages, due to their location in rural areas, were able to harness the power of social networks supported by information and communication technology (ICT). Before the smartphone era, village residents were known for their solid social networks built upon a social culture prioritising communal interests over individual ones. Similarly, the adaptive management strategies implemented by tourist village management played a crucial role in mitigating the negative impact of the COVID-19 pandemic. For instance, they temporarily reduced staff and adjusted their tourist attractions. Instead of visiting high-cost spots, they redirected visitors to relatively less expensive areas.

Figure 2 presents the resilience volatility of the 24 tourist villages that were the object of this research study during and after the COVID-19 pandemic in Indonesia. Figure 2 shows that many tourist villages experienced a drop in performance in the first year of the COVID-19 pandemic, as indicated by the downward bars in the graph. The upper part of the graph shows the villages that recovered in the first year, indicated by the light grey bars. Figure 2 also shows that some villages, such as Pampang, made a remarkable recovery in the first year, as noted in the black bar in the upper part of the graph.

Table no. 4. Comparison of tourist village resilience's rankings

Tourist Villages	2019				2020				Δ R 19-20
	y*	z*	U score	R	y*	z*	U score	R	
Pentingsari	0,145	0,147	53947	1	0,011	0,139	10	23	-22
Karangrejo	0,036	0,158	1143	8	0,004	0,133	75	18	-10
Wanurejo	0,014	0,161	147	16	0,031	0,132	296	17	-1
Bleberan	0,042	0,153	11495	6	0,153	0,101	26461	1	-5
Tinalah	0,034	0,164	5694	15	0,141	0,136	30596	8	-7
Gunung Gajah	0,015	0,165	1941	23	0,049	0,118	3056	10	-13
Pulau Cemara	0,034	0,164	14869	9	0,069	0,103	6270	5	-4
Mandiraja	0,018	0,165	3570	21	0,042	0,123	6250	11	-10
Wana Wisata	-0,011	0,158	686	13	0,045	0,120	1937	12	-1
Tlogoweru	0,080	0,165	2667	10	0,015	0,139	267	22	-12
Wonosari	0,031	0,163	27135	7	0,091	0,112	25743	9	-2
Tlogowero	0,012	0,163	1606	18	0,024	0,127	588	16	2
Bilebante	0,106	0,153	28826946225	3	0,105	0,138	15685313	2	1
Tambaksari	0,039	0,165	5984	14	0,040	0,132	3612	13	1
Pampang	0,026	0,165	6233	20	0,068	0,137	6357602	6	14
Bendolawang	0,031	0,165	7417	17	0,024	0,139	1122	20	-3
Malangjiwan	0,145	0,152	36338	2	0,152	0,112	2763	7	-5
Beji	0,050	0,164	8420	11	0,044	0,135	3123	15	-4
Tetebatu	0,123	0,159	11508	4	0,205	0,136	16692	3	1
Sade	0,073	0,162	34759	5	0,102	0,109	67184	4	1
Bonjeruk	0,067	0,164	8284	12	0,066	0,138	3233	14	-2
Hanjeli	0,026	0,164	1163	22	0,024	0,138	399	19	3
Tepus	0,016	0,165	99	24	0,023	0,139	99	21	3
Cibuntu	0,013	0,163	1750	19	0,011	0,139	10	23	-4

Tourist Villages	2021				2022				Δ R 21-22
	y*	z*	U score	R	y*	z*	U score	R	
Pentingsari	0,060	0,114	4267	11	0,072	0,104	6639	10	1
Karangrejo	0,071	0,122	996	13	0,102	0,129	1940	13	0
Wanurejo	0,021	0,122	340	20	0,035	0,112	1064	17	3
Bleberan	0,092	0,097	14189	3	0,079	0,103	12315	7	-4
Tinalah	0,128	0,111	44720	6	0,123	0,105	15414	8	6
Gunung Gajah	0,029	0,127	1614	19	0,021	0,115	1606	20	-1
Pulau Cemara	0,069	0,108	11908	8	0,056	0,109	29609	11	-3
Mandiraja	0,023	0,124	2469	17	0,018	0,116	2000	18	-1
Wana Wisata	0,077	0,125	3732	12	0,084	0,112	7463	12	0

Tourist Villages	2021				2022				Δ R 21-22
	y*	z*	U score	R	y*	z*	U score	R	
Tlogoweru	0,018	0,126	133	24	0,041	0,117	1600	18	6
Wonosari	0,101	0,119	57548	9	0,091	0,107	71323	6	3
Tlogowero	0,024	0,128	956	22	0,015	0,116	478	24	-2
Bilebante	0,106	0,112	267907500	2	0,127	0,102	7013500000	1	1
Tambaksari	0,019	0,120	894	18	0,038	0,114	6748	14	4
Pampang	0,050	0,115	357781	7	0,052	0,117	6251653	5	2
Bendolawang	0,019	0,119	1992	14	0,018	0,117	1965	21	-7
Malangjiwan	0,125	0,116	4104	10	0,127	0,105	3400	9	1
Beji	0,016	0,122	620	23	0,015	0,116	784	23	0
Tetebatu	0,188	0,110	16575	1	0,148	0,107	10535	3	-2
Sade	0,134	0,117	154966	4	0,129	0,105	57844	4	0
Bonjeruk	0,109	0,103	41869	5	0,137	0,087	41473	1	4
Hanjeli	0,017	0,120	275	21	0,019	0,115	424	22	-1
Tepus	0,047	0,120	501	16	0,040	0,111	649	15	-10
Cibuntu	0,031	0,124	1994	15	0,025	0,112	1142	16	-8

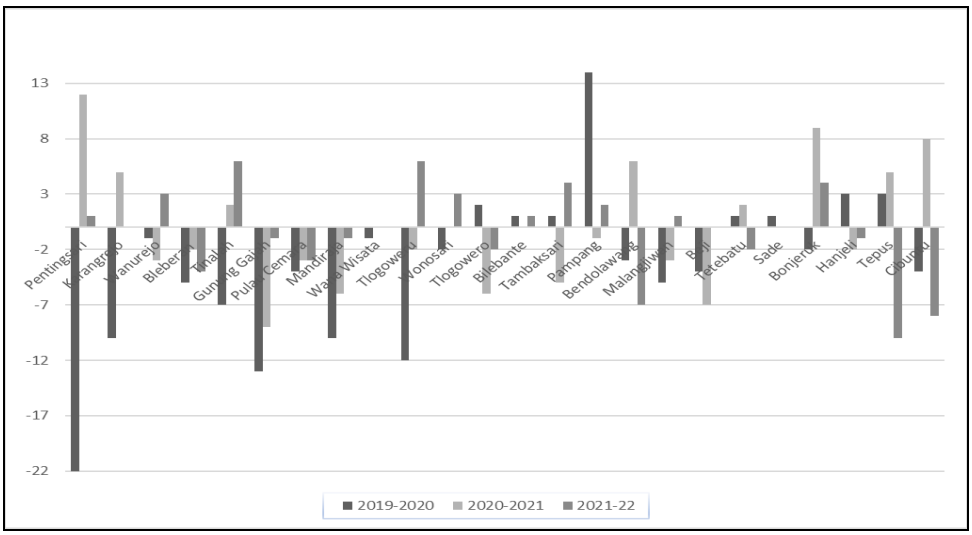

Figure no. 2. Volatility of tourist village resilience's rankings

It is important to note that using a ranking method may not fully encapsulate the complexity of resilience. However, employing multi-criteria analysis techniques like MULTIMOORA can offer a more comprehensive assessment of resilience, particularly in intricate systems like rural tourism, where resilience relies on multiple factors. The ranking process is transparent, with clearly defined criteria and their respective weights, enabling stakeholders to grasp the reasoning behind the rankings and fostering trust in the findings. These rankings can be employed to compare the resilience of different entities, such as various rural tourism villages or regions, helping to pinpoint strengths and weaknesses and guiding targeted interventions. Ultimately, the rankings assist in prioritising resources and actions based on the relative resilience of different areas, ensuring that efforts are directed toward those with the greatest need.

This paper aims to analyse the resilience of tourist villages in Indonesia during and after the COVID-19 pandemic. The ranking method can also track progress over time and evaluate the effectiveness of interventions. In rural tourism, resilience is often linked to adapting and recovering from setbacks, which occur over time. Therefore, measuring resilience progress by comparing states over time is particularly relevant. Monitoring these trends can reveal shifts in resilience levels, providing early indicators of potential vulnerabilities or successes. A comparative approach to measuring rural tourism resilience is indeed influenced by the specific contexts of the entities being compared. Cultural, economic, and social conditions can significantly impact resilience and vary widely across settings. The criteria selected for the MULTIMOORA ranking are equally important, as they can significantly affect the outcomes. The rankings may be misleading if the selected criteria do not accurately reflect the factors contributing to resilience. However, this comparative method allows for direct assessments of the resilience of various entities, such as tourist villages, providing valuable insights into their relative strengths and weaknesses.

In Indonesia, as in many other countries, measures to contain the spread of COVID-19, such as lockdowns and restricted social mobility, affected the data availability for this study. While comparative analysis is advantageous for tracking progress across different units, it requires solid quantitative data to support ranking calculations. This study relies on the best available quantitative data during and after the COVID-19 pandemic, including capacity building, workforce numbers, tourist counts, and a composite rural development index. Capacity building, for instance, plays a vital role in enhancing the resilience of rural tourism for several reasons. First, it empowers local communities by providing the knowledge, skills, and resources needed to manage and develop their tourism initiatives effectively. This empowerment fosters a sense of ownership over the tourism industry, increasing resilience to external shocks. Additionally, capacity building can help rural communities diversify their income sources by training them in various tourism-related fields, such as hospitality, guiding, and craft production, reducing dependence on a single tourism product and enhancing resilience to economic downturns. Furthermore, capacity building can lead to better management practices within rural tourism enterprises; by offering training in marketing, finance, and sustainability, local businesses can become more efficient, competitive, and better equipped to handle challenges.

As noted in the methodology, the village development index is a proxy for assessing village development during and after COVID-19. Its purpose is to gauge the ability of villages to recover from the pandemic's impact based on the delivery of essential services, infrastructure, and public amenities. Villages that demonstrated greater resilience managed

to sustain these services throughout the crisis and after it. It is acknowledged that qualitative factors, such as community participation, social networking, and entrepreneurship, were not fully captured in the data. However, these qualitative elements are believed to be significant contributors to village resilience, as supported by the study conducted by Ariyani and Fauzi (2023), even though they were not quantified in the ranking measurements.

Conclusions

This study makes two significant theoretical contributions to village tourism. First, it contests the common belief that rural tourism villages are inherently vulnerable by demonstrating that these communities can bounce back from external shocks like the COVID-19 pandemic. This finding enriches the broader theoretical discourse on resilience in both tourism and rural development. The paper thoroughly outlines the challenges rural tourism villages face in Indonesia, including infrastructure deficiencies, limited accessibility, and environmental issues, thereby adding to the existing literature on rural development and tourism. Second, the study introduces the MULTIMOORA method as a novel analytical framework for assessing and ranking the resilience of rural tourism villages. This methodological innovation enhances the tools available for tourism research.

From a managerial perspective, the findings carry important implications for policymakers. They advocate for government interventions supporting rural tourism's resilience factors, including community engagement, diversification, social networks, and adaptive management. By focusing on these areas, governments can help ensure that rural tourism continues to contribute positively to rural development. Moreover, recommendations for financial assistance, training programs, and infrastructure enhancements are tailored to strengthen the resilience of rural tourism and can guide governmental strategies. Policymakers, tourism practitioners, and community leaders can leverage these insights to formulate and implement strategies that promote sustainable and resilient rural tourism. The study addresses a knowledge gap by providing empirical evidence on the resilience of rural tourism villages in Indonesia, which can inform future research and policy initiatives.

This study evaluates the resilience of rural tourist villages using a multi-criteria analysis to rank their resilience levels. However, this approach may have limitations in capturing the dynamic nature of resilience. This study did not fully capture nonmetric indicators that contribute to resilience, such as social capital, norm, and culture. Additionally, like other multi-criteria approaches, criteria selection can influence the results.

For future research, alternative methodologies such as dynamic resilience analysis or time-based indexing could provide a more nuanced understanding of resilience changes over time. Evaluating the long-term effectiveness of resilience strategies adopted by villages during the pandemic would also be valuable. In-depth case studies could further explore the role of community participation in enhancing resilience and sustainability. Additionally, further investigation into the adoption of digital technologies in rural tourism villages, along with the associated benefits and challenges, is warranted.

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