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Analysis of Trail Running Tourism Potential in Mount Tampomas, Sumedang: An MSP+DM Framework Approach

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Analysis of Trail Running Tourism Potential in Mount Tampomas, Sumedang: An MSP+DM Framework Approach

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Abstract

Sumedang Regency, particularly the Mount Tampomas area, has strong potential to be developed as a trail running tourism destination. This study aims to analyze the development potential of trail running tourism in Sumedang using the MSP+DM framework (Marketability, Sustainability, Participatory, and Disaster Mitigation). A qualitative phenomenological approach was employed through field observations, in-depth interviews, and document analysis involving tourism managers, government representatives, and local community members. Data were analyzed using NVivo 12 software. The findings show that Mount Tampomas offers significant tourism potential supported by distinctive trail characteristics, accessible transportation, and active digital promotion through social media platforms. Community participation was identified as a major supporting factor, particularly in tourism operations, environmental conservation, and emergency response activities. Sustainability practices have been implemented through standard operating procedures, environmental maintenance programs, and local economic empowerment initiatives. In the disaster mitigation aspect, the main risks identified were lightning strikes and falling trees rather than landslides, indicating a discrepancy between governmental risk assumptions and empirical field conditions. The novelty of this study lies in the integrated application of the MSP+DM framework for analyzing trail running tourism development and in highlighting differences between policy-based risk perceptions and local experiential knowledge. The study recommends strengthening integrated tourism management, visitor carrying-capacity regulations, and collaborative stakeholder involvement to support sustainable trail running tourism development in Sumedang.

Keywords: trail running, Sumedang, MSPDM, sports tourism, Mount Tampomas

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A. Introduction

Sports tourism has become one of the fastest-growing sectors in the global tourism industry, particularly through the increasing popularity of nature-based activities such as trail running. Trail running combines physical activity with outdoor tourism experiences by utilizing natural trails across forests, hills, and mountainous areas. Globally, participation in trail running has continued to rise significantly, reflecting increasing public interest in health-oriented and adventure-based tourism activities (Grofelnik et al., 2024). This trend indicates that trail running is no longer viewed as a niche sport, but rather as a strategic tourism product with considerable economic and recreational value.

Beyond its tourism appeal, trail running also provides various physical and psychological benefits. Running on natural terrain contributes to improved cardiovascular endurance, physical fitness, and mental well-being (Sudrazat, 2020). Outdoor sports activities are also associated with stress reduction, emotional balance, and enhanced quality of life (Oswald et al., 2020). In addition, trail running tourism can generate positive economic impacts through increased local business activities, hospitality services, and community-based tourism initiatives. These combined benefits make trail running increasingly relevant as a sustainable sports tourism attraction. Indonesia possesses strong natural potential for the development of trail running tourism due to its mountainous landscapes, biodiversity, and tropical environment. One of the regions with promising potential is Sumedang Regency, West Java, particularly the Mount Tampomas area. Mount Tampomas offers varied topography ranging from moderate to challenging trails, making it suitable for different categories of trail running activities. In addition, the area contains rich biodiversity and scenic natural landscapes

that enhance its attractiveness as a nature-based sports tourism destination. These characteristics position Sumedang as a potentially competitive trail running destination in West Java.

Despite these advantages, the development of trail running tourism in Sumedang has not yet been managed optimally. Several challenges remain, including limited infrastructure, insufficient tourism promotion, lack of integrated management, and minimal stakeholder collaboration. Furthermore, environmental sustainability and disaster mitigation aspects have not been comprehensively integrated into tourism development planning. Although the regional government has established tourism-related regulations and strategic plans, no specific policy framework currently addresses the development of trail running tourism as a nature-based sports tourism product.

Previous studies have explored trail running tourism in several regions, including Bali and other international destinations. However, limited studies have comprehensively examined trail running tourism potential in Sumedang Regency using an integrated framework that combines marketability, sustainability, stakeholder participation, and disaster mitigation aspects. Therefore, this study seeks to fill this gap by applying the MSP+DM framework to analyze the development potential of trail running tourism in Mount Tampomas, Sumedang.

This study aims to analyze the potential for trail running tourism development in Sumedang Regency using the MSP+DM framework (Marketability, Sustainability, Participatory, and Disaster Mitigation). The novelty of this research lies in the integrated application of the MSP+DM framework within the context of trail running tourism analysis in Sumedang, as well as in the identification of discrepancies between

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governmental assumptions regarding disaster risks and empirical field conditions experienced by local stakeholders. The findings are expected to provide practical recommendations for sustainable and collaborative trail running tourism development in Sumedang Regency.

B. Methods

This study employed a qualitative approach with a phenomenological design to analyze the potential development of trail running tourism in Sumedang Regency using the MSP+DM framework (Marketability, Sustainability, Participatory, and Disaster Mitigation). The phenomenological approach was chosen to explore the experiences, perceptions, and meanings constructed by stakeholders regarding trail running tourism development in the Mount Tampomas area (Rahmania et al., 2023). The MSP+DM framework developed by Priatmoko (2019) in Fauzi et al. (2025) was used as the analytical framework to examine tourism potential from the aspects of marketability, sustainability, stakeholder participation, and disaster mitigation.

The study was conducted in the Mount Tampomas area, located in the northern region of Sumedang Regency, West Java. Administratively, the area covers five subdistricts: Buahdua, Conggeang, Paseh, Cimalaka, and Tanjungkerta. These locations were selected because they possess natural characteristics suitable for trail running tourism development, including mountainous terrain, biodiversity, and existing outdoor tourism activities.

Data were collected through field observations, in-depth interviews, and document analysis. Field observations were carried out to identify trail conditions, tourism facilities, environmental characteristics, and community activities related to trail running tourism. In-depth interviews were conducted to obtain detailed information regarding stakeholder

experiences, perceptions, and development strategies. Document analysis included regional tourism regulations, development plans, and institutional reports related to tourism and sports development in Sumedang Regency.

Informants were selected using purposive sampling based on their direct involvement in trail running tourism management and policy implementation. This study involved three main informants consisting of: (1) the manager of the Mount Tampomas tourism area (N1), (2) a representative from the Sumedang Regency Department of Tourism, Culture, Youth, and Sports (N2), and (3) a representative from the local trail running community (N3). These informants were considered capable of providing comprehensive information regarding tourism management, policy perspectives, community participation, environmental sustainability, and disaster mitigation practices.

Data validity was ensured through source triangulation, prolonged observation, and member checking. Triangulation was conducted by comparing findings from interviews, observations, and documents to ensure data consistency. Prolonged engagement in the field allowed the researcher to gain a deeper understanding of the research context, while member checking was carried out by reconfirming interview results with participants to validate the accuracy of the interpretations. All participants provided informed consent prior to the interviews.

Data analysis was conducted using NVivo 12 software through several stages, namely data reduction, coding, categorization, thematic analysis, and interpretation. The analysis began with open coding to identify important concepts and statements from interview transcripts, observation notes, and documents. Subsequently, axial coding was conducted to connect related categories and identify relationships among themes within the

MSP+DM dimensions. The final stage involved thematic categorization and interpretation to generate comprehensive findings regarding the development potential of trail running tourism in Sumedang Regency. The use of NVivo 12 facilitated systematic data organization, coding management, and theme visualization, enabling a more structured and reliable qualitative analysis.

Based on observations, interviews, and document analysis, the development of trail running tourism in Mount Tampomas, Sumedang Regency, demonstrates considerable potential across the four MSP+DM dimensions: marketability, sustainability, participatory, and disaster mitigation. Most indicators have been implemented adequately, although several areas still require improvement, particularly regarding integrated marketing systems, visitor carrying-capacity regulations, and stakeholder collaboration. The findings are summarized in Table 1.

C. Result and Discussion

Table 1. Result Of The Obsrvations

MSP+DM Dimensions	Indicators	Deskription	Theoretical Basis
<i>Marketability</i>	Trail Running Trails	Trails vary (rocky, root-covered, steep inclines), equipped with webbing and artificial steps; alternative trails are available.	Priatmoko 2019
<i>Marketability</i>	Digital promotion and information systems	Social media utilization (Instagram: 12,000 followers, TikTok, WhatsApp), digital content production (short films, live reports), but not yet integrated into a single website	KOTLER
<i>Sustainability</i>	Environmental management and carrying capacity	Implementation of SOPs, Clean Friday program, routine tree trimming, coordination with BKSDA and Perhutani, but no quantitative visitor cap	UNWTO
<i>Sustainability</i>	Economic and social sustainability	Local SMEs (up to 5 units), profit-sharing for underprivileged residents and orphans, volunteer system, community members involved as rangers and staff	KORTEN
<i>Participatory</i>	Community engagement	Active community participation (rangers, registration staff, evacuation teams), the Sumedang Runner community (event logistics), local youth as volunteers, growing tourism awareness	KORTEN
<i>Disaster Mitigation</i>	Safety standards and disaster preparedness	Natural disaster preparedness (lightning: education on turning off cell phones, time-based system; fallen trees: daily checks). Non-natural disaster preparedness (strict SOPs, briefings, mandatory communication, free evacuation team)	UU No. 24 of 2007

The findings indicate that Mount Tampomas possesses strong marketability potential as a trail running tourism destination. The uniqueness of the trails emerged as the primary attraction, characterized by varied terrain including rocky paths, root-covered sections, steep inclines, and alternative routes leading to different destinations. Supporting facilities such as webbing and artificial footholds have also been installed to improve safety and accessibility for runners.

Accessibility was identified as another supporting factor. Informants explained that Mount Tampomas is easily accessible from the toll road and can be reached within approximately 10–15 minutes from the Cimalaka exit. Shuttle

services are also available for visitors without private transportation.

Regarding facilities, the management has gradually developed supporting infrastructure, including plans for a basecamp for visitors and improvements to trail safety facilities. However, specialized facilities dedicated exclusively to trail running activities are still limited.

Promotion activities are actively conducted through social media platforms such as Instagram, TikTok, and WhatsApp. Nevertheless, the tourism information system remains fragmented because information is distributed across different platforms and has not yet been integrated into a comprehensive digital system.

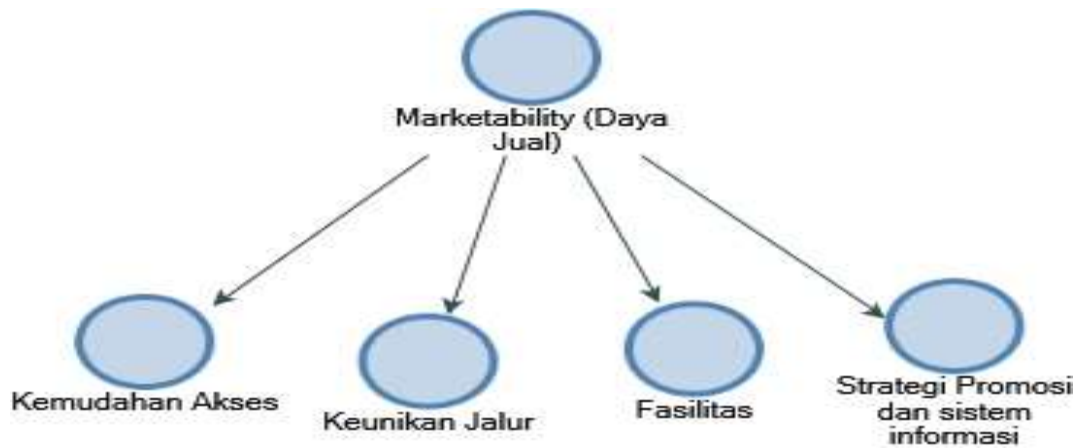


Figure 1. The Potential of Trail Running as a Sport from the Perspective of *Marketability*
 Source: NVivo 12 Data Analysis (2026)

The findings demonstrate that trail uniqueness, accessibility, and digital promotion are important factors supporting the marketability of Mount Tampomas as a trail running tourism destination. These findings support Grissemann (2025), who states that sports tourism attractiveness is

influenced by unique tourism products, accessibility, supporting facilities, and effective promotion strategies. However, the absence of integrated information systems and specialized facilities indicates that destination management still requires improvement to strengthen tourism competitiveness.

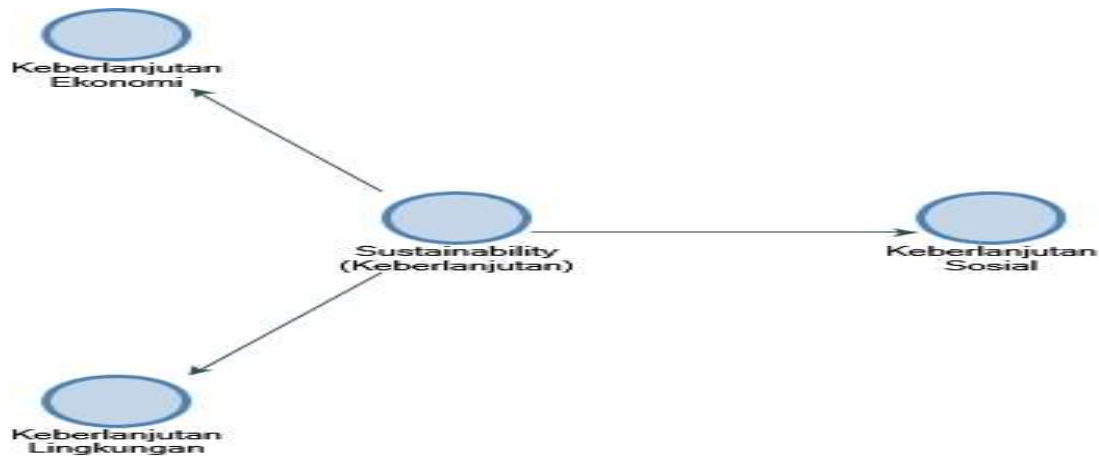


Figure 2. Strategies for Managing Trail Running Tourism from the Perspective of Sustainability

Source: NVivo 12 Data Analysis (2026)

Researchers explored strategies for managing trail running tourism in Sumedang from the perspective of sustainability to determine the extent to which sustainability principles are applied—from environmental, economic, and social perspectives. After conducting an interview with the manager of Mount Tampomas, he revealed that environmental sustainability is the top priority through the implementation of strict Standard Operating Procedures (SOPs), stating, “We implement SOPs. We have SOPs. We apply those SOPs in the field. We ensure they are followed. And there may be consequences for violating the SOPs. Those SOPs must be followed. Because they safeguard the ecosystem’s sustainability.” (Manager). Additionally, the management runs a weekly routine program: “Every Friday we always hold ‘Clean Friday,’ so we address issues like fallen trees on the trail or overgrown vegetation blocking the path we trim them.” (Manager). These efforts align with the findings Ziakas (2022). that ecological sustainability in sports tourism is not determined solely by formal regulations,

but rather by the capacity of local managers to translate conservation principles into concrete actions.

Researchers also found that the managers have coordinated with various parties responsible for conservation areas. The manager explained, “We also collaborate and coordinate with the BKSDA.” (Manager). This inter-institutional coordination is crucial, given that most of the trail running routes are located within conservation areas that have strict regulations regarding habitat and ecosystem protection. However, researchers believe that the local government, through the Department of Tourism, Culture, Youth, and Sports (Disparbudpora), has so far limited its efforts to public awareness campaigns and appeals; no specific physical facilities have been built, and no quantitative maximum visitor limit has been established. This is reinforced by a statement from a source at Disparbudpora: “So far, we’ve only been conducting public awareness campaigns or issuing appeals. We haven’t yet taken concrete, physical action regarding the construction of facilities or trails for trail

running.” (Disparbudpora). Additionally, regarding the maximum visitor limit, Disparbudpora acknowledged, “*We ourselves cannot specify a number how many people per meter is the maximum but we do recommend a certain number.*” (Disparbudpora). This gap between policy and implementation is a critical consideration for long-term sustainability.

On the other hand, researchers are examining the economic impact of trail running tourism on the local community. The manager stated that the increase in visitor numbers has a direct impact on residents’ income: “*Economically speaking, it’s truly a blessing. Since so many people are interested, the area naturally gets busier. Naturally, this also boosts the local economy.*” (Manager). Furthermore, the manager explained that revenue from registration fees is used to fund operations and social activities: “*If we have a budget surplus—say, due to high visitor numbers—we distribute that budget to the village and to communities that truly need it. For example, poor families, orphans—we share it with them.*” (Manager). However, the manager also limits the number of MSMEs to avoid creating a cluttered impression: “*If there are too many, first it will look cluttered, and second, there’ll be trash. If there are just 5 MSMEs, that’s enough. If we add more, it’ll get too crowded. It creates unhealthy competition.*” (Manager). This aligns with research findings stating that sports tourism can boost local economic growth if managed with principles of fairness and sustainability (Aristiyanto et al, 2025).

From a social sustainability perspective, the researchers found that the local community’s response to the presence of trail running tends to be positive because they experience economic benefits and are involved in various management activities. The researchers also noted that the potential for social

conflict remains if the community feels excluded or, conversely, disadvantaged. The managers and DISPARBUDPORA anticipate this by engaging in “intensive communication” (Manager) and “Communication with the community must be resolved first. This includes public order and security as well—with the community public order and security officers—it must be done; it’s already good.” (Disparbudpora).

Overall, the three sustainability indicators above indicate that the management of trail running in Sumedang has yielded encouraging results at the field implementation level, particularly regarding community economic empowerment, social capital development, and environmental conservation. As emphasized by the manager, “*We implement SOPs. We have SOPs. We implement those SOPs in the field. We ensure they are followed in practice.*” (Manager). This aligns with the findings of the research study that the success of nature-based sports tourism management is largely determined by the balance between environmental, economic, and social aspects (Rangkuti, et al, 2025). There are several areas that need improvement moving forward; specifically, closer collaboration between local governments, site managers, communities, and all segments of society is key to achieving sustainable and equitable destination management that provides long-term benefits for all stakeholders.

The sustainability findings reveal that environmental conservation has become an important management priority. The manager emphasized that strict SOP implementation is applied to maintain ecosystem sustainability. In addition, routine environmental maintenance programs such as the weekly “Clean Friday” activity and regular trail inspections are conducted consistently.

Coordination with conservation agencies, including BKSDA and Perhutani, is also carried out because many trail routes are located within protected forest areas. However, the local government's role remains limited mainly to awareness campaigns and general recommendations. Quantitative visitor carrying-capacity limits have not yet been established.

Economically, trail running tourism has generated positive impacts for local communities. Increased tourist visits contribute to local income generation through SMEs, transportation services, and tourism-related activities. Revenue-sharing practices are also implemented to support disadvantaged residents and social programs.

From a social perspective, local communities generally respond positively

to tourism development because they are directly involved in management activities and experience economic benefits. Communication between managers, local government, and residents is continuously maintained to prevent potential social conflicts.

The findings indicate that environmental, economic, and social sustainability principles have been implemented relatively well in Mount Tampomas. This supports Ziakas (2022), who argues that sustainability in sports tourism depends not only on regulations but also on the practical implementation of conservation actions by local stakeholders. Nevertheless, the absence of visitor carrying-capacity regulations may create environmental risks if tourism activities continue to increase without proper control.



Figure 3. Strategies for Managing Trail Running Tourism from the Perspective of Participatory

Source: NVivo 12 Data Analysis (2026)

The participatory findings show that local communities play a significant role in the development of trail running tourism in Sumedang. Community members are actively involved as rangers, volunteers, registration staff, and evacuation teams. The volunteer system also provides opportunities for local youth to develop

organizational and tourism management skills.

The local government mainly acts as a facilitator through human resource preparation, tourism promotion, and event coordination. However, budget limitations and limited technical expertise remain challenges in supporting tourism

development more comprehensively. Community organizations such as the Sumedang Runner community contribute to route planning, technical event management, and tourism promotion. Meanwhile, private-sector involvement supports accommodation facilities and destination branding development.

Researchers also found growing tourism awareness among local communities. Residents increasingly recognize the importance of hospitality, visitor safety, and maintaining a positive tourism image as part of sustainable destination management.

These findings demonstrate that trail running tourism development in Sumedang applies a community-based and multi-stakeholder participation model. This finding aligns with Widianingsih et al. (2023), who emphasize that the success of nature-based tourism development depends heavily on community initiative and stakeholder collaboration. Stronger synergy among government institutions, local communities, and private stakeholders remains essential for achieving sustainable tourism development.



Figure 4. Destination Readiness Examined from the Perspective of *Disaster Mitigation*
Source: NVivo 12 Data Analysis (2026)

The disaster mitigation findings indicate that the primary risks in Mount Tampomas are lightning strikes and falling trees rather than landslides. Informants explained that lightning incidents have occurred more frequently based on long-term field experience, while major landslides have rarely been reported.

To reduce disaster risks, the management has implemented preventive measures including visitor education, weather-based scheduling systems, trail inspections, and emergency briefings. Visitors are advised to follow safety

protocols during adverse weather conditions.

The study also found that non-natural disasters frequently result from human error, such as violations of SOPs and excessive self-confidence among visitors. Therefore, strict SOP implementation and routine safety briefings are emphasized during tourism activities.

In addition, evacuation and emergency response teams have been established to handle accidents and emergency situations. Sweep teams routinely monitor trail conditions and conduct final inspections after operational

hours to ensure visitor safety. The findings suggest that disaster mitigation preparedness in Mount Tampomas is relatively well developed through education, SOP implementation, and emergency response systems. These findings support Zakia et al. (2025), who state that disaster mitigation in sports tourism requires continuous education and preparedness rather than relying solely on infrastructure development. However, stronger institutional support and safety certification programs are still needed to improve long-term disaster management capacity.

Discussion

The findings of this study indicate that the Mount Tampomas area in Sumedang Regency possesses strong potential to be developed as a sustainable trail running tourism destination. This potential is reflected through the four dimensions of the MSP+DM framework: marketability, sustainability, participatory, and disaster mitigation. However, beyond describing tourism potential, this study also reveals several structural and managerial issues that provide important theoretical and practical implications for the development of nature-based sports tourism.

From the marketability perspective, the uniqueness of the Mount Tampomas trails emerged as the primary factor influencing destination attractiveness. The combination of varied elevations, rocky terrain, steep inclines, and alternative routes creates a distinctive trail running experience that differs from conventional outdoor tourism destinations. These findings are consistent with Geiger et al. (2023), who found that terrain diversity and challenge levels significantly influence the attractiveness of trail running destinations. However, this study extends previous findings by showing that marketability in trail running tourism is not solely determined by natural characteristics, but also by the ability of local communities and managers to create

adaptive and community-driven promotional strategies. Unlike destinations that rely heavily on institutional marketing, promotion in Mount Tampomas is largely conducted independently through social media platforms managed by local actors. This finding suggests that digital community-based promotion can become an alternative tourism marketing model in regions with limited governmental support and financial resources.

Nevertheless, despite strong destination attractiveness, the absence of an integrated tourism information system remains a major limitation. Information regarding routes, safety procedures, accommodation, and tourism activities is still scattered across different social media platforms. This finding supports Atmaja (2023), who argues that fragmented information systems reduce destination competitiveness in the digital tourism era. More importantly, this condition indicates that tourism development in Mount Tampomas remains operationally community-based rather than institutionally integrated. Theoretically, this finding highlights that marketability within the MSP+DM framework should not only emphasize tourism attractiveness and promotion, but also include integrated digital governance as a core indicator of destination readiness.

From the sustainability dimension, this study found that environmental sustainability has been implemented through strict SOPs, routine environmental maintenance programs, and coordination with conservation authorities. These findings support Ziakas (2022), who states that sustainability in sports tourism depends heavily on practical conservation actions implemented by local stakeholders rather than relying solely on formal policies. However, unlike previous studies that generally emphasize infrastructure-based sustainability, this study demonstrates that sustainability in Mount Tampomas is maintained primarily through social

discipline, volunteerism, and collective environmental awareness.

Economically, the limitation of MSMEs to a maximum of five units reflects a unique management strategy balancing economic benefits and environmental preservation. In many tourism destinations, increasing tourism activities is commonly associated with unlimited commercial expansion. However, the managers of Mount Tampomas intentionally restricted commercial activity to prevent waste accumulation, overcrowding, and unhealthy business competition. This finding differs from mainstream tourism development approaches that prioritize economic maximization. Instead, it reflects a sustainability-oriented tourism management model that prioritizes ecological balance over short-term economic growth. Theoretically, this finding strengthens the argument that sustainable sports tourism development requires selective economic control mechanisms to maintain long-term destination quality.

In terms of participation, this study confirms that community involvement plays a central role in trail running tourism development. Local residents are actively involved as rangers, volunteers, evacuation teams, and tourism service providers. These findings are consistent with Lapeyre (2024), who emphasizes that community-based tourism depends on collective ownership and local participation. However, this study further reveals that community participation in Mount Tampomas does not merely function as supporting labor, but rather as the operational backbone of the tourism system itself. This differs from many tourism development models in which local communities occupy only complementary roles while decision-making remains centralized within government institutions or private investors.

At the same time, this study identified structural weaknesses in governmental

involvement. The local government mainly acts as a facilitator because of budget constraints and limited technical expertise regarding trail running tourism management. This finding suggests that the sustainability of nature-based sports tourism in developing regions may depend more heavily on local social capital than on formal institutional capacity. Consequently, the MSP+DM framework should also consider institutional capability gaps as an important variable affecting tourism governance effectiveness.

The most significant and novel finding of this study lies in the disaster mitigation dimension, particularly regarding the discrepancy between governmental risk perceptions and empirical field realities. Government institutions tend to prioritize landslide risks because mountainous tourism destinations are generally associated with geological hazards. However, based on the sixteen-year experience of local managers, the dominant threats in Mount Tampomas are actually lightning strikes and falling trees, both of which have caused fatalities. This finding is highly important because it demonstrates that policy assumptions regarding disaster risks may differ substantially from local empirical experiences.

This discrepancy has major theoretical implications for the MSP+DM framework, particularly in the disaster mitigation dimension. Previous applications of disaster mitigation in tourism planning often rely heavily on macro-level hazard assumptions and generalized geographical risk classifications. In contrast, this study demonstrates that local experiential knowledge can provide more accurate and operationally relevant disaster mitigation priorities than top-down policy assumptions. These findings extend the MSP+DM framework by demonstrating that disaster mitigation priorities in trail running tourism may differ significantly between policy-level assumptions and local empirical realities.

Furthermore, the findings indicate that disaster preparedness in Mount Tampomas is not centered primarily on physical infrastructure development, but rather on preventive education, daily trail inspections, communication systems, and rapid-response evacuation teams. This differs from conventional disaster mitigation approaches that often prioritize infrastructure investment. The study therefore proposes an empirically driven disaster mitigation model emphasizing adaptive local knowledge, continuous visitor education, and human resource preparedness as the primary foundations of safety management in nature-based sports tourism.

Overall, this study contributes theoretically by strengthening and extending the MSP+DM framework within the context of trail running tourism. The findings demonstrate that successful nature-based sports tourism development depends not only on tourism attractiveness, sustainability policies, and stakeholder participation, but also on the alignment between institutional policies and empirical local realities. Practically, the study provides important recommendations for tourism managers and policymakers to strengthen integrated digital information systems, establish visitor carrying-capacity regulations, and develop disaster mitigation strategies grounded in local field experience rather than solely relying on generalized policy assumptions.

D. Conclusion

This study concludes that the Mount Tampomas area in Sumedang Regency possesses strong potential to be developed as a sustainable trail running tourism destination based on the four dimensions of the MSP+DM framework: marketability, sustainability, participatory, and disaster mitigation. The destination's main strengths include the uniqueness of its trails, active community participation, environmental management initiatives, and

disaster preparedness systems grounded in local empirical experience.

The study contributes to the development of nature-based sports tourism research by demonstrating that community-based management and local experiential knowledge play a crucial role in sustaining trail running tourism destinations. A key finding of this study is the discrepancy between governmental disaster-risk assumptions and actual field conditions, where lightning strikes and falling trees were identified as more dominant threats than landslides. This finding extends the application of the MSP+DM framework, particularly in the disaster mitigation dimension, by emphasizing the importance of locally grounded risk assessment.

Practically, the findings imply that stronger collaboration among government institutions, local communities, tourism managers, and private stakeholders is necessary to support sustainable destination development. Integrated tourism information systems, wider digital promotion strategies, and scientifically based visitor carrying-capacity regulations are required to strengthen long-term destination competitiveness and environmental sustainability.

Future studies are recommended to employ quantitative or mixed-method approaches involving broader stakeholder groups and comparative analyses across different trail running destinations in Indonesia to further strengthen the development model of sustainable nature-based sports tourism.

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F. Conflict of Interest

No conflict of interest

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