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Integrating Sport Tourism into Indonesia's Geopark Development Strategy: Opportunities and Policy Challenges

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Abstract

Indonesia has increasingly positioned geoparks as instruments for sustainable tourism and regional development under the UNESCO Global Geoparks framework. However, many geoparks remain reliant on low-value, passive tourism, limiting their economic contribution and local development impact. Concurrently, the rapid growth of sport-based recreational activities, particularly running and cycling, presents new opportunities for experience-based tourism. This study examines the strategic integration of sport tourism into geopark development in Indonesia. Employing a qualitative, policy-oriented approach, it draws on secondary data and comparative case studies of Rinjani and Toba Caldera geoparks. The analysis identifies varying levels of readiness for sport tourism, categorized into high, medium, and emerging tiers, indicating the need for differentiated and context-specific policy interventions. The findings suggest that sport tourism can enhance visitor engagement, extend length of stay, and strengthen local economic multipliers, thereby improving destination competitiveness. However, its integration is constrained by fragmented governance, infrastructure gaps, environmental risks, and limited community participation. To address these challenges, the study proposes an integrated policy framework comprising five strategic directions: mainstreaming sport tourism into geopark planning, developing signature events, establishing sustainability standards, strengthening community involvement, and enhancing institutional coordination. The study contributes to tourism development literature by offering a structured framework for integrating sport tourism into geopark management, highlighting its potential to advance more dynamic, inclusive, and sustainable regional development in Indonesia.

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1. Introduction

In recent years, Indonesia has increasingly positioned geoparks as a strategic instrument for advancing sustainable tourism and regional development. Through its active participation in the UNESCO Global Geoparks (UGGp) framework, the country seeks to balance three interrelated objectives: geological conservation, environmental education, and local economic development. With 12 UGGps and numerous national and aspiring geoparks, Indonesia possesses one of the world's richest geodiversity profiles, encompassing volcanic landscapes, caldera systems, karst formations, and coastal–marine environments. These endowments provide a strong foundation for developing tourism models that are both environmentally sustainable and economically inclusive.

Despite this considerable potential, the economic contribution of many geoparks remains suboptimal. Tourism activities are still largely dominated by passive forms of visitation, such as sightseeing and short-duration trips. As a result, visitor engagement tends to be limited, the average length of stay remains relatively short, and the distribution of economic benefits to local communities is often constrained. This reflects a broader structural challenge in Indonesia's tourism sector, where abundant natural assets are not fully translated into high-value, experience-based tourism products. Recent studies in *Jurnal Kepariwisataan Indonesia* further highlight that tourism development often generates uneven economic impacts and requires stronger integration with local development strategies (Simorangkir et al., 2024). At the same time, geopark governance in Indonesia remains characterized by fragmented institutional arrangements and competing development priorities (Adisubroto, 2026; Ristiawan et al., 2023).

Concurrently, Indonesia has witnessed rapid growth in sport-based recreational activities, particularly running and cycling. The number of organized running events has increased significantly, with more than 70 events scheduled nationwide in 2025 alone. Flagship events such as the Borobudur Marathon and Pocari Sweat Run Indonesia attract tens of thousands of participants, indicating strong and expanding demand for active, experience-oriented tourism (Borobudur Marathon, 2025; Pocari Sweat Run Indonesia, 2025). However, most of these events remain concentrated in urban settings and are predominantly road-based, limiting their connection to Indonesia's diverse natural landscapes.

This imbalance highlights a critical gap. While global tourism trends increasingly emphasize experiential, nature-based, and sport-oriented travel, the integration of sport tourism into geopark development in Indonesia remains limited. Existing studies on geoparks tend to focus on conservation, education, and general tourism development, whereas sport tourism literature largely concentrates on urban events or mega-sport destinations. Consequently, there is insufficient conceptual and policy-oriented understanding of how sport tourism can be systematically embedded within geopark frameworks, particularly in developing country contexts.

In practice, some sporting events already take place in areas with significant natural and cultural value, yet they are not formally integrated into geopark strategies. This suggests an untapped opportunity to reposition such activities within a more coherent development framework. Within geopark contexts, sport tourism may include trail running, mountain biking, open-water swimming, diving, and trekking—activities well suited to Indonesia's landscapes, such as Mount Rinjani and Lake Toba. If properly developed, these activities can transform geoparks from passive destinations into dynamic, experience-based tourism spaces.

However, the integration of sport tourism also presents important challenges. Increased human activity may generate environmental pressures, including trail erosion, habitat disturbance, and waste management issues. In addition, sport tourism development often involves external stakeholders, raising concerns regarding governance, equitable benefit distribution, and meaningful community participation. Without appropriate policy frameworks, these risks may undermine the sustainability objectives that underpin geopark development.

Against this backdrop, this study examines how sport tourism can be strategically integrated into geopark development in Indonesia. Specifically, it aims to: (1) assess the readiness of geoparks for sport tourism development; (2) identify key opportunities and constraints; and (3) propose a policy framework to support its sustainable implementation. The study adopts a qualitative, policy-oriented approach, drawing on literature review, policy document analysis, and comparative case studies of the Rinjani Geopark and Toba Caldera Geopark.

The novelty of this study lies in its integrative perspective, which bridges geopark development and sport tourism within a single analytical framework. By introducing a tiered assessment of geopark readiness and proposing a structured policy approach, this research extends existing scholarship and contributes to tourism studies—particularly in the context of sustainable, nature-based destinations in developing economies. More importantly, it offers practical insights for policymakers seeking to enhance the economic and experiential value of geoparks through more dynamic and inclusive development strategies.

2. What Constitutes Sport Tourism? Scope, Global Relevance, and Analytical Dimensions

Sport tourism has emerged as one of the most dynamic and rapidly growing segments of the global tourism industry. At its core, sport tourism refers to travel that involves either active participation in, or engagement with, sporting activities outside one's usual place of residence (Gibson, 1998; Higham & Hinch, 2018). This broad definition encompasses a wide range of motivations and practices, from recreational outdoor activities to large-scale international sporting events. As such, sport tourism is best understood not as a single category, but as a multifaceted domain that intersects with leisure, health, and destination development.

In this study, sport tourism is approached not merely as a descriptive concept, but as a practical lens for understanding how natural assets—particularly those found in geoparks—can be transformed into more engaging and higher-value tourism experiences. The literature generally distinguishes three main forms of sport tourism, each with different implications for destination development.

The first is active sport tourism, which involves direct participation in physical activities. This includes a wide range of outdoor pursuits such as running (including road running, trail running, and ultramarathons), cycling, trekking, kayaking, open-water swimming, and diving. In the context of geoparks, this form of sport tourism is especially significant because it directly utilizes natural landscapes. Activities such as trail running across volcanic terrain or diving in marine ecosystems transform what would otherwise be passive sightseeing into immersive, experience-based tourism. In doing so, they increase visitor engagement while also enhancing the economic value of natural destinations.

The second form is event-based sport tourism, which centers on organized sporting events such as marathons, trail races, triathlons, and cycling tours. A well-known global example is the Ultra-Trail du Mont-Blanc, which has successfully positioned the Alpine region as a premier destination for endurance sports. Events of this kind demonstrate how carefully designed competitions can elevate a location onto the global tourism map, generating not only immediate economic benefits but also long-term branding advantages. Organizations such as the International Trail Running Association [ITRA] further support this ecosystem by standardizing events and connecting destinations to international sport tourism networks (ITRA, 2025).In this sense, event-based sport tourism plays an important role in amplifying and accelerating the impacts of active participation.

The third form, spectator sport tourism—such as travel to attend the Olympic Games or the FIFA World Cup—is less directly relevant in the context of geoparks. This type of tourism typically depends on large-scale urban infrastructure, including stadiums and arenas, and therefore does not align closely with the natural and landscape-based strengths of geopark destinations. For this reason, it is not a central focus of the present study.

To better understand how sport tourism operates in geopark contexts, this study considers three interrelated dimensions. The first is the intensity of activities, referring to the diversity and frequency of sport-based uses of natural landscapes. The second is the presence of events, including the number, scale, and level of recognition of organized sporting activities. The third is the depth of experience, which captures the extent to which visitors engage actively with the environment, including the duration and immersive quality of their activities. Together, these dimensions provide a practical way of assessing how sport tourism contributes to the transformation of geoparks into more dynamic tourism destinations.

Globally, the integration of sport tourism into natural landscapes has demonstrated significant economic and developmental potential. Events such as the Ultra-Trail du Mont-Blanc illustrate how natural environments can be repositioned as high-value tourism ecosystems. Beyond Europe, countries such as New Zealand, Japan, and Norway have successfully developed tourism strategies that combine outdoor sports with strong environmental branding. In these cases, natural landscapes are not merely scenic backdrops, but central to the tourism experience itself (Pine & Gilmore, 1999)

The economic contribution of sport tourism is substantial, with global estimates ranging between USD 800 and 900 billion annually (World Tourism Organization [UNWTO], 2016). Importantly, nature-based sport tourism tends to

attract higher-value visitors—those who stay longer, spend more, and engage more deeply with local environments. These characteristics are particularly relevant for geoparks, where increasing length of stay and strengthening local economic multipliers remain key policy objectives.

However, the transformation of geopark resources into these outcomes is not automatic and depends heavily on institutional quality and governance capacity (Rodríguez-Pose, 2013; Hall, 2019). It depends on a range of enabling conditions, including the availability of basic infrastructure, the effectiveness of governance and institutional coordination, and the extent of community participation in tourism activities. Without these supporting factors, the potential of sport tourism may remain underdeveloped.

In addition, not all geoparks are equally suited to the same forms of sport tourism. Differences in geological and ecological characteristics mean that each geopark has its own comparative advantages. For instance, volcanic landscapes such as Mount Rinjani are particularly well suited to endurance-based activities such as trail running and trekking, while marine environments such as Raja Ampat offer strong potential for diving and water-based sports. Recognizing these differences is essential for designing appropriate and effective development strategies.

Taken together, this perspective provides a structured way of understanding how sport tourism can contribute to geopark development. It highlights the importance of moving beyond passive tourism models and toward more active, experience-based approaches that generate both economic and sustainability benefits. In doing so, it establishes a clear foundation for analyzing sport tourism as a strategic driver of more dynamic, inclusive, and sustainable geopark development.

3. Method

This study adopts a qualitative, policy-oriented research design to examine the integration of sport tourism within geopark development in Indonesia. The primary objective is to generate a structured and policy-relevant understanding of how sport tourism can enhance both the economic value and experiential quality of geoparks, while remaining aligned with principles of sustainability.

The research is guided by a conceptual framework that links three interrelated components: geopark resource endowments, sport tourism development, and tourism as well as regional development outcomes. Geopark resource endowments encompass geodiversity, biodiversity, and cultural assets that form the foundational capital of each site. These resources are then transformed through sport tourism development, which includes a range of activities, organized events, and visitor experiences. In turn, this transformation generates measurable outcomes such as increased visitor engagement, extended length of stay, and broader local economic impacts. Within this framework, sport tourism is conceptualized as a mediating mechanism that converts natural and cultural assets into higher-value tourism products.

To operationalize this framework, the study employs three analytical dimensions. First, it examines the types of sport tourism activities that are either currently present or potentially feasible, including trail running, cycling, and water-based sports. Second, it assesses the presence and scale of organized sport-related events, which serve as indicators of institutional capacity and market development. Third, it evaluates the depth of visitor experience, reflecting the extent to which tourism offerings move beyond passive sightseeing toward more immersive and participatory engagement.

The empirical scope of the study focuses on geoparks in Indonesia, particularly those recognized within the UNESCO Global Geoparks framework. The unit of analysis is defined as geopark-based tourism systems, which integrate natural resources, governance structures, and tourism activities. A purposive sampling strategy is applied to select two case studies: Rinjani Geopark and Toba Caldera Geopark. These cases are deliberately chosen to capture variation in geographical characteristics and development trajectories. Rinjani represents a mountainous volcanic environment with strong potential for adventure and endurance-based sports, whereas Toba Caldera reflects a lake-based system with relatively more established tourism infrastructure and opportunities for multi-sport events. The intention is not to achieve statistical generalization, but rather to enable analytical comparison across contrasting contexts.

The study relies exclusively on secondary data sources, supported by limited field-based understanding of the 12 UNESCO Global Geoparks (UGGps) in Indonesia (Newsome et al., 2013; Weaver, 2011). These sources include academic literature on geoparks, sport tourism, and sustainable tourism development; policy documents and planning reports produced by national and regional governments; publicly available reports and statistical data from international organizations such as UNESCO and the UNWTO; as well as event-related information and tourism promotion materials. Collectively, these sources provide both a strong conceptual foundation and empirical insights into current practices and emerging trends.

Data collection is conducted through a systematic literature review and document analysis. Materials are selected based on their relevance to geopark management, sport tourism development, and policy frameworks. Particular attention is given to case-specific information that captures the characteristics, ongoing initiatives, and development challenges within each geopark.

Analytically, the study employs qualitative content analysis combined with a comparative case study approach. Document analysis is first used to identify recurring themes, policy directions, and patterns related to the integration of sport tourism in geopark contexts. This is followed by a cross-case comparison to examine similarities and differences between Rinjani and Toba Caldera in terms of development readiness, opportunities, and constraints. The analysis is structured around three key research questions: (1) what types of sport tourism activities are emerging or feasible within geopark areas; (2) what enabling conditions—such as infrastructure, governance, and community participation—shape their development; and (3) what economic and sustainability outcomes can be observed or reasonably anticipated.

The findings are synthesized into a tiered assessment of geopark readiness, which subsequently informs the formulation of policy recommendations. Although the study does not employ statistical techniques, it applies a systematic and transparent analytical framework to ensure consistency in interpretation.

This methodological approach contributes by bridging conceptual analysis with practical policy insights. While the findings are not intended to be statistically generalizable, they offer analytically grounded and context-sensitive recommendations for geopark development in Indonesia. The reliance on secondary data may limit empirical depth; however, it enables a broad and integrative assessment of policies and practices across different institutional and geographical contexts.

4. Result: Sport Tourism and the Development of Geoparks in Indonesia, A Policy Perspective and Challenges

Indonesia has strong potential to develop innovative and sustainable tourism destinations. Indonesia's growing interest in integrating sport tourism into geopark development reflects broader efforts to enhance the economic and experiential value of sustainable tourism destinations. Despite substantial geodiversity and tourism potential, many geoparks continue to face challenges related to visitor engagement, infrastructure, and governance.

However, despite this considerable potential, the contribution of geoparks to local economies remains uneven and, in many cases, limited. Tourism activities in many geopark areas continue to be dominated by passive forms of visitation, such as sightseeing and short-duration trips. While effective in attracting visitors, these activities tend to generate relatively low economic value, characterized by limited engagement, short lengths of stay, and weak linkages to local economies (UNESCO, 2021). As a result, many geoparks have yet to evolve into dynamic tourism ecosystems capable of delivering sustained and inclusive economic benefits.

At the same time, Indonesia has experienced a significant rise in sport-based recreational activities, particularly running. Over the past decade, running has evolved into a widespread lifestyle trend, supported by a growing number of organized events. Major events such as the Borobudur Marathon, the Pocari Sweat Run Indonesia, and the Jakarta Marathon have attracted large numbers of participants and demonstrated strong demand for sport-related travel. These events have contributed to local economies through increased spending on accommodation, transportation, and related services, highlighting the broader economic potential of sport tourism (Gibson, 1998; Higham & Hinch, 2018).

Figure 1. *Indonesia's 12 UNESCO Global Geoparks*

Source: Ministry of National Development Planning/Bappenas, 2025

Nevertheless, most of these activities remain concentrated in urban settings and are predominantly organized as road-running events. As such, they do not fully utilize Indonesia's vast and diverse natural landscapes. In contrast, nature-based sport tourism—such as trail running, mountain biking, open-water swimming, and trekking—remains relatively underdeveloped, particularly within geopark areas (Newsome et al., 2013). This disconnect represents a significant missed opportunity to align the growing demand for active, experience-based tourism with the country's unique geological assets.

International experience demonstrates that nature-based sport tourism can generate substantial economic, social, and branding benefits. Events such as the Ultra-Trail du Mont-Blanc illustrate how natural landscapes can be transformed into globally recognized tourism ecosystems, attracting participants from around the world and generating strong local economic impacts. Supported by networks such as the International Trail Running Association, these models highlight how sport tourism can be systematically integrated into destination development strategies.

4.1 Sport tourism potential in Indonesia's UGGps

In the Indonesian context, many geoparks are inherently well-suited to host nature-based sport tourism activities. As summarized in Table 1, volcanic landscapes such as Mount Rinjani and caldera systems such as Lake Toba offer strong potential for endurance sports, including trail running, cycling, and triathlon. Coastal and marine geoparks such as Raja Ampat provide ideal settings for diving, kayaking, and open-water activities, while karst landscapes and rainforest environments—such as those found in Meratus Mountains—support trekking, caving, and expedition-style tourism.

The matrix further reveals significant variation in readiness levels across geoparks. Many destinations, including Batur, Rinjani, and Toba Caldera, can be categorized as high readiness, with relatively mature tourism ecosystems and strong potential to host large-scale or international events. Others, such as Ciletuh–Palabuhanratu, Gunung Sewu, and Maros–Pangkep, fall into a medium readiness category, where key constraints include infrastructure gaps, limited accessibility, and the need for improved safety and route development. Meanwhile, geoparks such as Merangin Jambi and Meratus remain in the low to medium readiness category, requiring more fundamental investments in infrastructure, promotion, and institutional capacity.

Table 1. *Sport Tourism Potential in Indonesia's UNESCO Global Geoparks*

No.	Name of UGGp	Geological/ Landscape Characteristic	Main Sport Tourism Potential	Readiness Level	Policy Notes
1	Batur	Caldera & Volcano	Trail running, cycling, hiking	High	Already a mature tourism destination, ready to become an international event hub
2	Rinjani	High-altitude, extreme volcano, marine	Ultra-trail, mountain trekking, and swimming	High	Potential flagship trail run destination in Indonesia (UTMB-style)
3	Ciletuh-Palabuhan Ratu	Cliff, waterfalls, beaches	Trail running, surfing, coastal running	Medium	Accessibility needs improvement, suitable for multi-sport events
4	Gunung Sewu	Extensive karst landscape	Trail running, caving, cycling	Medium	Requires development of routes and safety standards
5	Toba Caldera	Large lake caldera	Cycling, trail running, marathon, triathlon	High	Existing event, strong potential as a sport tourism hub
6	Belitong	Granite formation and beaches	Open water swimming, triathlon, and cycling	Medium	Needs stronger branding as an ocean sport destination
7	Raja Ampat	Marine karst & high biodiversity	Diving, kayaking, and swimming	High (Premium)	For high-end tourism, over-tourism control is needed
8	Maros-Pangkep	Kart towers	Trail running, climbing, caving	Medium	Strong potential for adventure sports
9	Merangin-Jambi	Rivers & fossils	Rafting, jungle trekking	Low-medium	Requires infrastructure development and promotion
10	Banyuwangi	Volcanic landscape & crater	Trail running, hiking, endurance trekking	High	Unique (blue fire phenomenon suitable for international events)
11	Kebumen	Karst & coastal landscape	Trail running, coastal running, caving	Medium	Emerging destination requires clearer positioning
12	Meratus	Ophiolite complex, rainforest mountains, high biodiversity	Jungle trekking, trail running, MTB, rafting, expedition racing	Low–Medium	Focus on the eco-adventure niche; prioritize conservation and community-based tourism; avoid the mass tourism model

Source: Our elaboration & analysis

This variation underscores a critical policy insight: while Indonesia's geoparks collectively possess strong potential for sport tourism, their development pathways must be differentiated according to local characteristics and capacity. A uniform approach is unlikely to be effective. Instead, geopark development strategies should be tailored to specific landscape typologies, readiness levels, and market positioning—ranging from mass participation events in more developed sites to niche, eco-adventure tourism in less developed areas.

Despite this potential, the development of sport tourism within geoparks remains fragmented and lacks a coherent policy framework. Several interrelated challenges contribute to this situation. First, there is limited integration between geopark management, tourism development, and sport event planning, resulting in fragmented governance structures and missed opportunities for coordination. Second, infrastructure and capacity constraints—particularly in emerging geoparks—limit the ability to host and sustain sport tourism activities (Bramwell & Lane, 2011). Third, environmental risks, including trail degradation, habitat disturbance, and waste management challenges, pose significant concerns if activities are not properly managed (Pickering & Hill, 2007). Finally, the involvement of local communities remains limited, raising concerns about the equitable distribution of economic benefits and long-term sustainability.

These challenges highlight the need for stronger policy integration and institutional coordination. Despite clear complementarities between the two domains, current policies and practices remain largely disconnected, reducing the effectiveness of both.

Addressing this gap requires a more strategic and coordinated policy approach. Sport tourism should be systematically incorporated into geopark development plans at both national and regional levels, with clear alignment to conservation and sustainability objectives. Policymakers should promote the development of signature sport events tailored to the unique characteristics of each geopark, while also establishing environmental standards to safeguard ecological integrity. Equally important is strengthening community participation, ensuring that local actors are not only beneficiaries but active participants in sport tourism development.

In conclusion, sport tourism represents a promising pathway to enhance the role of geoparks in Indonesia's sustainable development agenda. By transforming geoparks from passive sightseeing destinations into active, experience-based landscapes, sport tourism can increase visitor engagement, extend length of stay, and generate higher economic value. However, realizing this potential requires coherent policy design, effective institutional coordination, and a strong commitment to sustainability. With the right approach, Indonesia's geoparks can evolve into globally competitive destinations that integrate conservation, tourism, and local development in a mutually reinforcing manner.

4.2 Case Illustrations: Sport Tourism Development in Rinjani and Toba Caldera Geoparks

To further substantiate the policy arguments outlined in this study, this section examines two representative cases of Indonesian geoparks with relatively high potential for sport tourism development: Rinjani Geopark and Toba Caldera Geopark. These cases illustrate both the opportunities and the structural challenges associated with integrating sport tourism into geopark development, while also highlighting different development pathways.

Rinjani Geopark: Toward a Global Trail Running Destination

Rinjani Geopark is defined by its dramatic volcanic landscape, steep elevation gradients, and diverse ecosystems, making it one of the most suitable locations in Indonesia for endurance-based sport tourism, particularly trail running and high-altitude trekking. The presence of Mount Rinjani—one of Indonesia's highest volcanoes—provides a natural setting comparable to leading global trail running destinations.

From a sport tourism perspective, Rinjani offers several strategic advantages. First, its rugged terrain and high-altitude environment provide the level of difficulty and scenic value required for international endurance events. Second, Lombok benefits from relatively well-developed tourism infrastructure compared to many other geopark regions, including accommodation, transport connectivity, and guiding services. Third, the global rise of trail running—supported by organizations such as the International Trail Running Association (ITRA, 2025)—creates a strong and growing market for destinations with these characteristics.

Despite these advantages, the development of sport tourism in Rinjani remains limited and fragmented. While trekking activities are well established, there is no consistent, internationally recognized trail running event that firmly positions Rinjani within the global sport tourism circuit. This contrasts with benchmark events such as the Ultra-Trail du Mont-Blanc, which have successfully transformed mountainous landscapes into globally competitive tourism products.

Several constraints help explain this gap. Environmental sensitivity is a primary concern, as increased foot traffic in fragile volcanic ecosystems may lead to erosion and ecological degradation if not properly managed. In addition, coordination between geopark authorities, tourism agencies, and sports event organizers remains limited. As a result, existing activities are not systematically aligned with broader geopark development objectives.

From a policy perspective, Rinjani represents a strong candidate for the development of a flagship international trail running event, provided that environmental safeguards, carrying capacity management, and governance coordination are strengthened. Such an initiative could significantly enhance Indonesia's visibility in the global sport tourism market while generating substantial local economic benefits.

Toba Caldera Geopark: An Emerging Hub for Cycling and Mass Sport Events

Toba Caldera Geopark presents a different but equally compelling model for sport tourism development. Centered around Lake Toba, the world's largest volcanic lake, the geopark offers vast scenic landscapes, relatively gentle topography, and an extensive road network that is highly suitable for cycling activities and large-scale public events.

In contrast to Rinjani, Toba has already begun to integrate sport tourism into its development trajectory. The region has hosted various cycling events and mass participation activities, demonstrating its capacity to attract both domestic and international visitors. The scenic routes surrounding Lake Toba provide an ideal setting for long-distance cycling, marathons, and triathlons, combining natural beauty with relatively accessible terrain.

Importantly, Toba has also entered the global trail running circuit through the organization of the Trail of the Kings Lake Toba by UTMB (UTMB World Series, 2025). The event attracted approximately 2,000 participants from dozens of countries, marking a significant milestone in positioning Toba within the international endurance sports calendar. This development demonstrates the feasibility of integrating Indonesian geoparks into global sport tourism networks when supported by appropriate branding and partnerships.

From a policy standpoint, Toba illustrates how sport tourism can function as a tool for regional revitalization. As a priority tourism destination, the area has benefited from substantial public investment in infrastructure, including improvements in transport connectivity and hospitality services. These developments create favourable conditions for scaling up sport tourism activities and attracting larger events.

Nevertheless, several challenges remain. First, many events are still sporadic and lack continuity, limiting their long-term branding and economic impact. Second, coordination among stakeholders remains uneven, particularly in aligning sport tourism initiatives with geopark conservation objectives. Third, community participation in higher-value segments of the tourism economy is still limited, with local actors often confined to supporting roles.

Despite these challenges, Toba's accessible landscape, existing infrastructure, and growing event portfolio position it as a strong candidate to become a regional hub for cycling and multisport events in Southeast Asia.

Comparative Insights and Synthesis

A comparative analysis of Rinjani and Toba Caldera underscores the necessity of adopting differentiated policy approaches in the development of geopark-based sport tourism. The two cases illustrate contrasting development models shaped by their distinct geographical characteristics, resource endowments, and levels of tourism maturity. Rinjani reflects a high-intensity, niche model centered on endurance and adventure sports, where development priorities emphasize strict environmental management, limited participant volumes, and the cultivation of high-value, globally competitive events. In contrast, Toba Caldera represents a mass participation model characterized by broader accessibility, greater event capacity, and the potential to host diverse sport tourism activities at scale.

These contrasting cases demonstrate the importance of tailoring sport tourism strategies to the ecological and infrastructural characteristics of each geopark. Rather, strategies must be carefully tailored to the specific conditions of each site, ensuring a balance between economic objectives, environmental sustainability, and social inclusion. Such differentiation is essential for optimizing the value of geopark resources while minimizing ecological and social risks.

Taken together, these case studies reinforce the central argument of this paper: although Indonesia possesses world-class natural assets for sport tourism, their effective utilization remains constrained by the absence of integrated planning and coordinated governance. Rinjani exemplifies the challenge of unlocking high-end, niche potential within environmentally sensitive contexts, while Toba Caldera demonstrates both the opportunities and complexities associated with scaling up sport tourism in more accessible and infrastructure-ready settings.

Accordingly, aligning sport tourism initiatives with broader geopark development strategies—supported by coherent policy frameworks, robust environmental safeguards, and strengthened community engagement—emerges as a critical pathway. Such alignment would enable Indonesia to harness its comparative advantages and advance a model of tourism development that is not only economically productive but also sustainable, inclusive, and globally competitive.

5. Policy Recommendations: Toward an Integrated Framework for Sport Tourism in Indonesian Geoparks

Existing studies on Indonesian geoparks have largely focused on governance, conservation, and pathways toward UNESCO recognition (Supriono et al., 2025; Hutabarat, 2023), with limited attention to the role of sport tourism as a driver of experiential and economic value creation.

The preceding analysis demonstrates that Indonesia's geoparks possess substantial—yet uneven—potential for sport tourism development. While some geoparks are well-positioned to enter the global market for nature-based sport tourism, others remain in earlier stages of development and require more foundational support. These differentiated conditions call for a coherent, tiered policy approach that aligns national priorities with local capacities. In response, this paper proposes an integrated policy framework consisting of five interrelated strategic directions.

5.1 Mainstreaming Sport Tourism into Geopark Governance and Planning

A critical first step is the formal integration of sport tourism into existing geopark governance and planning frameworks. Sport tourism remains insufficiently integrated into geopark planning. This limits policy coherence and reduces the long-term impact of individual initiatives.

To address this gap, sport tourism should be explicitly incorporated into national and subnational planning instruments, including geopark master plans and regional development strategies. Aligning sport tourism with the principles of the UNESCO Global Geoparks framework would ensure consistency with broader objectives of conservation, education, and local economic development. Moreover, such integration would facilitate stronger coordination among tourism authorities, geopark management bodies, and sport-related institutions.

5.2 Developing Signature Sport Events Based on Geopark Differentiation

Given the diversity of Indonesia's geoparks, a key policy priority is the development of signature sport events tailored to the unique characteristics of each site. Rather than adopting a uniform approach, policymakers should promote a differentiated portfolio of events that reflects the geological, ecological, and cultural distinctiveness of each geopark.

For high-readiness geoparks—such as Rinjani Geopark and Toba Caldera Geopark—this may involve establishing internationally competitive endurance events, including ultra-trail races and long-distance cycling tours. Aligning such events with global standards and networks, such as those recognized by the International Trail Running Association, would enhance international visibility and credibility.

For medium and emerging geoparks, smaller-scale national or regional events can serve as stepping stones, gradually building capacity, reputation, and market access. Over time, these events can evolve into larger platforms as infrastructure and institutional readiness improve

5.3 Establishing Sustainability Standards and Environmental Safeguards

While sport tourism presents significant economic opportunities, its expansion must be carefully managed to avoid environmental degradation. Increased human activity in sensitive landscapes—such as volcanic terrains, karst systems, and marine ecosystems—can lead to erosion, habitat disturbance, and waste management challenges if not properly regulated.

Policy interventions should therefore prioritize the establishment of clear sustainability standards for nature-based sport tourism. These may include national guidelines on carrying capacity, trail design and maintenance, waste management systems, and biodiversity protection. Standards should reflect the ecological characteristics of each geopark.

In addition, the promotion of "green sport events" is essential. Event organizers should be encouraged—or required—to adopt environmentally responsible practices, such as reducing single-use plastics, minimizing carbon footprints, and incorporating conservation activities into event design. Embedding sustainability into sport tourism development will ensure that economic gains do not come at the expense of ecological integrity.

5.4 Strengthening Local Economic Participation and Community Involvement

For sport tourism to contribute meaningfully to sustainable development, it must generate tangible and equitable benefits for local communities. However, current practices often show limited local participation, with many events organized by external actors and communities confined to peripheral roles.

To address this imbalance, policies should promote community-based approaches to sport tourism development. This includes capacity-building programs for local guides, small and medium enterprises (SMEs), and community organizations, enabling them to actively participate in and benefit from tourism activities. In addition, mechanisms should be established to enhance local value capture, such as local sourcing requirements, partnerships with local enterprises, and revenue-sharing arrangements.

Strengthening community involvement is critical not only for improving economic outcomes but also for fostering social acceptance and long-term sustainability of geopark initiatives.

5.5 Building Institutional Coordination and Multi-Stakeholder Partnerships

Effective sport tourism development requires strong institutional coordination and collaboration among multiple stakeholders. As highlighted in earlier sections, fragmented governance remains a key barrier to progress.

To overcome this challenge, integrated coordination mechanisms should be established to bring together government agencies, geopark authorities, sport organizations, event organizers, and local communities. These may take the form of inter-agency task forces, public–private partnerships, or dedicated sport tourism units within geopark management bodies.

In addition, inter-geopark collaboration should be encouraged. For example, a national trail-running circuit could be developed, with events hosted sequentially across multiple geoparks throughout the year—linking destinations such as Belitung, Kebumen, Meratus, and Maros-Pangkep, culminating in Rinjani. Such a model would not only enhance national branding but also distribute economic benefits more evenly across regions.

Furthermore, partnerships with international organizations and networks can facilitate knowledge transfer, standardization, and access to global markets. By fostering a collaborative ecosystem, Indonesia can accelerate the development of sport tourism while aligning with international best practices.

6. Conclusion

This study set out to examine how sport tourism can be strategically integrated into geopark development in Indonesia. The findings confirm that, despite Indonesia's exceptional geodiversity and the rapid growth of sport-based recreational activities, the linkage between geoparks and sport tourism remains underdeveloped. Consequently, many geoparks still struggle to maximize economic and experiential tourism value.

The analysis demonstrates that sport tourism provides a viable and scalable pathway to transform geoparks into more dynamic, experience-based destinations. By fostering active engagement with natural landscapes, sport tourism can enhance visitor experience, extend the length of stay, and strengthen local economic multipliers. At the same time, the study shows that the readiness of geoparks to adopt sport tourism varies significantly, shaped by differences in infrastructure, governance capacity, and institutional coordination.

High-readiness geoparks can be developed as international sport tourism and event destinations, while medium- and emerging geoparks should prioritize niche activities and incremental development strategies. This tiered approach represents a key contribution of the study, offering a more context-sensitive alternative to uniform policy models.

However, the successful integration of sport tourism depends on addressing several structural constraints, including fragmented governance, infrastructure gaps, environmental risks, and limited community participation. These challenges highlight the need for a coherent and integrated policy framework.

Accordingly, several policy recommendations are proposed. First, sport tourism should be mainstreamed into geopark planning and national tourism strategies. Second, the development of signature sport events linked to geopark identity should be prioritized to strengthen destination branding. Third, clear environmental and sustainability standards must be established to mitigate ecological risks. Fourth, local community participation should be enhanced through capacity-building and inclusive business models. Finally, stronger institutional coordination across tourism, environment, and regional development agencies is essential.

From a broader tourism policy perspective, this study underscores the importance of shifting from resource-based to experience-based tourism development. It highlights sport tourism as a strategic instrument not only for destination diversification but also for achieving more sustainable, inclusive, and place-based development outcomes. As such, integrating sport tourism into geopark management offers a practical pathway for aligning conservation objectives with economic development goals in Indonesia and other emerging tourism economies.

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