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Exploring Sustainable Tourism Resources to Realise Ergo Green Tourism in Indonesia

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ABSTRACT

This research examines sustainable tourism in Indonesia, focusing on **Ergo Green Tourism**, a model that integrates ergonomic principles with green tourism. With the tourism sector significant economic contribution, there is a growing need for a model that balances environmental sustainability with tourist comfort. The research aims to evaluate the Ergo Green Tourism model by analyzing the relationships between Environmental Green Knowledge, Green Marketing, and Environmental Protection in promoting sustainability and improving tourism performance in Indonesia. **A quantitative approach using** Structural Equation Modeling (SEM) was employed. Data was gathered from MSMEs in key Indonesian tourist destinations through structured questionnaires and in-depth interviews, combining both quantitative and qualitative insights. The findings show that environmental protection and environmental knowledge positively influence green marketing, Ergo Green Tourism, and sustainability. Furthermore, green marketing significantly enhances the development of Ergo Green Tourism. This research highlights the importance of integrating green and ergonomic practices into tourism. It provides actionable insights for stakeholders, including MSMEs and policymakers, and suggests further research to refine the model and assess its long-term impact across different regions in Indonesia.

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1. INTRODUCTION

The tourism sector plays a significant role in regional development, contributing to economic growth and community welfare [1]. In 2022, the sector contributed 3.6 % to Indonesia GDP, generated US$4.26 billion in foreign exchange, and provided employment for 22.89 million people. In Central Java, the tourism sector accounted for 7.85% of GRDP in 2021, with 46.6 million tourists generating 344 billion rupiah in revenue in 2022 [2]. The sector components, including attractions, accommodations, and activities, create multiplier effects that stimulate job creation and improve local economies. However, these economic benefits must align with environmental sustainability to ensure long-term development [3, 4].

Despite its potential, sustainable tourism faces challenges such as climate change, social media influences, and the need for creativity and adaptability. Indonesia, rich in natural and cultural resources, stands out as a prime candidate for sustainable tourism development [5]. Proper planning can yield long-term benefits, including poverty reduction, cultural preservation, and environmental protection. The government, through Kemenparekraf, has initiated a policy framework focused on sustainable management, socio-economic development, cultural preservation, and environmental sustainability to address these challenges. However, issues such as environmental degradation and irresponsible tourist behavior remain significant barriers [6].

Nature-based tourism, such as the Dieng Plateau in Central Java, showcases Indonesia natural attractions and aligns with global trends toward eco-tourism [7]. However, a holistic approach integrating human well-being, environmental preservation, and sustainable business practices is crucial. Ergo Green Tourism addresses this gap by combining ergonomic principles with sustainable tourism. This model emphasizes optimizing visitor comfort, safety, and environmental harmony through ergonomic designs, such as accessible facilities and eco-friendly infrastructure, distinguishing it from traditional eco-tourism.

This research aims to evaluate the Ergo Green Tourism model, with a particular focus on variables such as Environmental Green Knowledge, Green Marketing, and Environmental Protection, to strengthen sustainability in green tourism [8]. The model examines how these elements can work together to enhance the overall sustainability of tourism, ensuring that both environmental and economic aspects are addressed.

In addition, the study tackles both financial and non-financial barriers, including high implementation costs and limited infrastructure, which often hinder the adoption of sustainable practices by MSMEs in the tourism sector. By addressing these challenges, the research offers practical, actionable solutions for stakeholders to overcome these obstacles.

The study findings will provide guidance for developing strategies aimed at improving Indonesia global competitiveness in the green tourism industry. These strategies will also focus on ensuring long-term sustainability and fostering collaboration among key actors in the sector, including government agencies, businesses, and local communities [9, 10].

2. RESEARCH METHOD

This research uses both qualitative and quantitative methods to explore the effectiveness of the Ergo Green Tourism model. The study uses Structural Equation Modeling (SEM) regression analysis with structured questionnaires targeted at visitors, businesses, and relevant stakeholders to gather data and test the relationships between key variables, such as Environmental Green Knowledge, Green Marketing, Environmental Protection, and Ergo Green Tourism [11].

For the Micro, Small, and Medium Enterprises (MSMEs) involved in the study, the research adopts a mixed-method approach that combines both quantitative and qualitative analyses. This allows for a more comprehensive understanding of the tourism industry and how sustainable practices can be integrated through the Ergo Green Tourism model [12, 13]. The research utilizes a sequential explanatory design, beginning with a quantitative survey to collect numerical data, followed by in-depth interviews to enrich the findings and provide qualitative insights into the effectiveness of the model.

The research was conducted in several key tourism locations in Indonesia. These include Ujung Kulon National Park in Banten Province, which is known for its strict regulations on waste management and animal protection, as well as a dolphin rescue center. Other research locations include the Maron Nature Tourism Destination in East Java, which has educational significance, and the Dieng Plateau located in Wonosobo and Banjarnegara, which are also important tourist areas with rich cultural and natural value [14]. Furthermore, the research includes tourist areas that are being developed by the Indonesian Government into potential ”New Bali” destinations, such as Lombok and Tanjungpadan-Belitung, which are known for their excellent Air Quality Index (AQI).

The sampling technique used in this study is stratified random sampling, ensuring the inclusion of a representative variety of MSMEs involved in tourism, including sectors like culinary, fashion, lodging, art, and transportation [15]. Structured questionnaires were distributed to measure the key model variables. In terms of quantitative analysis, SEM was employed to test the relationships between these variables and assess their influence on green tourism sustainability [16].

For the qualitative analysis, the research involved conducting in-depth interviews and Focus Group Discussions (FGDs) with all stakeholders to gather comprehensive insights into the challenges and opportu-

nities within the tourism industry. This combination of quantitative and qualitative methods provides a rich, multi-dimensional view of the effectiveness of the Ergo Green Tourism model in promoting sustainable tourism practices [17].

3. RESULT AND DISCUSSION

This research explores how Environmental Green Knowledge, Green Marketing, Environmental Protection, and Ergo Green Tourism collectively enhance sustainable tourism [18–20]. Environmental Green Knowledge raises awareness and encourages sustainable practices among stakeholders, while Green Marketing promotes eco-friendly initiatives to attract environmentally conscious tourists.

Additionally, Environmental Protection focuses on conservation efforts to preserve natural resources and reduce tourism negative impacts [21]. The concept of Ergo Green Tourism integrates ergonomic principles with sustainability, ensuring comfort, efficiency, and environmental harmony in tourism experiences.

By combining these elements, the model provides a comprehensive framework that supports sustainable tourism development, balancing environmental responsibility with visitor satisfaction [22, 23].

While the model offers valuable insights into a holistic approach to sustainable tourism, further studies are needed to explore how these factors influence each other and to evaluate the actual impact of the Ergo Green Tourism concept on the tourism industry long-term sustainability [24**?**]. The elements of environmental knowledge, green marketing, and conservation efforts have the potential to drive sustainable tourism, especially when supported by the Ergo Green Tourism brand [25].

This research uses a qualitative approach to uncover new insights, building on previous studies [26] that suggest achieving Sustainable Competitive Advantage often depends on other supporting factors. For example, research [27] highlights that elements like reputation and image play a key role in strengthening competitive advantage. Similarly, another study confirms that Sustainable Competitive Advantage [28] can also be enhanced through the inclusion of concepts like Ergo Green Tourism [29] (Show in Figure 1).

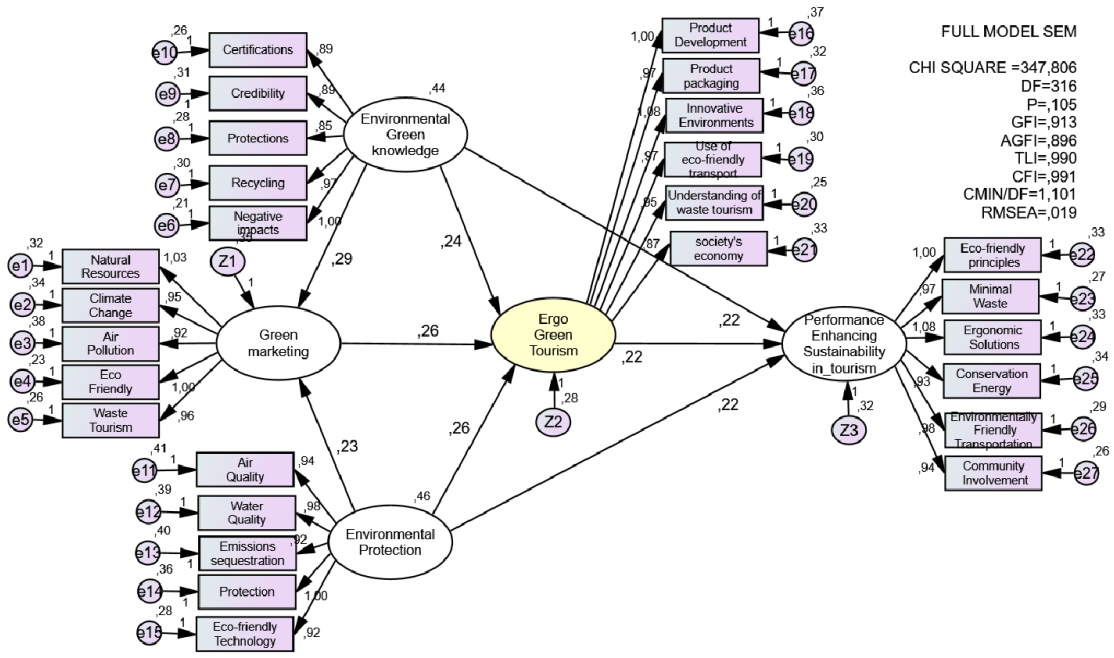

Figure 1. Modelling results

These results confirm that the proposed model is highly reliable and provides a solid foundation [30] for understanding and improving tourism strategies. With such strong statistical validation, the model can be used to guide real-world applications, particularly in developing sustainable tourism practices.

Table 1. Validity and reliability criteria for each construct

Variabels	Indicator	Loading Factor	Squared	Error	Reliablity	AVE
Green Marketing	X1	0,760	0,578	0,422	0.864	0.561
	X2	0.722	0.521	0.479		
	X3	0.690	0.476	0.524		
	X4	0.800	0.640	0.360		
	X5	0.768	0.590	0.410		
Enviromental Green Knowledge	X6	0.821	0.674	0.326	0.871	0.576
	X7	0.760	0.578	0.422		
	X8	0.728	0.530	0.470		
	X9	0.729	0.531	0.469		
	X10	0.752	0.566	0.434		
Enviromental Protection	X11	0.706	0.498	0.502	0.851	0.533
	X12	0.731	0.534	0.466		
	X13	0.701	0.491	0.509		
	X14	0.747	0.558	0.442		
	X15	0.762	0.581	0.419		
	X16	0.719	0.517	0.483		
Ergo Green Tourism	X17	0.737	0.543	0.457	0.857	0.545
	X18	0.749	0.561	0.439		
	X19	0.745	0.555	0.445		
	X20	0.766	0.587	0.413		
	X21	0.693	0.480	0.520		
	X22	0.557	0.443	0.746		
Performance Enchacing Sustainability In Tourism	X23	0.594	0.406	0.771	0.870	0.572
	X24	0.593	0.407	0.770		
	X25	0.518	0.482	0.720		
	X26	0.576	0.424	0.759		
	X27	0.581	0.419	0.762		

The Table 1 strong validity of the Environmental Green Knowledge construct highlights the importance of equipping MSME actors with a deep understanding of environmental issues [31, 32]. This knowledge can drive eco-friendly practices and align business strategies with sustainable goals [33, 34]. The Environmental Protection construct emphasizes that conservation should be central to tourism strategies [35]. MSMEs can incorporate practices such as waste reduction, energy efficiency, and biodiversity preservation to enhance sustainability [36].

While, the validity of the Ergo Green Tourism construct demonstrates its potential as a holistic and innovative approach [37]. By combining ergonomic design with green practices, MSMEs can create unique tourism experiences [38] that are both sustainable and appealing to eco-conscious travelers. The lower loading factors for some indicators in the Performance Enhancing Sustainability in Tourism construct suggest a need to refine these measures [39]. Future studies should reassess these indicators to ensure they fully capture the concept essence or consider expanding the sample size for better representation.

The validity and reliability findings underscore the importance of developing robust, reliable constructs to measure and implement sustainability in tourism [40]. For MSMEs, adopting the Ergo Green Tourism model provides a clear roadmap for achieving sustainable growth while enhancing their competitive advantage in a market increasingly focused on environmental responsibility [41]. In Table 2, while some indicators require further exploration, the overall model is a valuable tool for advancing sustainable tourism practices, benefiting both businesses and the environment [42–44].

Table 2. Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Green Marketing ← Environmental Protection	0.229	0.066	3.482	***	par_17
Green Marketing ← Environmental Green Knowledge	0.286	0.067	4.277	***	par_18
Ergo Green Tourism ← Environmental Protection	0.255	0.064	3.983	***	par_2
Ergo Green Tourism ← Environmental Green Knowledge	0.245	0.065	3.777	***	par_3
Ergo Green Tourism ← Green marketing	0.260	0.069	3.745	***	par_6
Performance Enhancing Sustainability in Tourism ← Ergo Green Tourism	0.222	0.077	2.876	0.004	par_1
Performance Enhancing Sustainability in Tourism ← Environmental Protection	0.219	0.069	3.192	0.001	par_4

Overall, the SEM analysis highlights the significant relationships between key constructs in the Ergo Green Tourism model [45]. Environmental Protection and Environmental Green Knowledge positively influence Green Marketing, Ergo Green Tourism, and Performance Enhancing Sustainability in Tourism, with all paths showing critical ratios above the 1.96 significance threshold [46]. Notably, Environmental Protection (CR = 3.482) and Environmental Green Knowledge (CR = 4.277) strongly impact Green Marketing, emphasizing the integration of sustainability and marketing strategies. Green Marketing itself also contributes significantly to the development of Ergo Green Tourism (CR = 3.745), demonstrating the role of effective marketing in advancing sustainable and ergonomic tourism practices [47].

These findings underscore the importance of enhancing environmental knowledge among MSME actors in the tourism sector, as it supports both marketing effectiveness and innovation in sustainable tourism [48]. Additionally, integrating environmental protection into tourism strategies is crucial for building competitive, sustainable businesses. Ergo Green Tourism, validated as a transformative [49] approach, should be prioritized for its potential to improve sustainability performance in tourism, aligning with the industry growing emphasis on environmentally responsible practices [50–52].

4. MANAGERIAL IMPLICATIONS

Implications of this research are vast and relevant to various stakeholders in the Indonesian tourism industry For tourism MSME players, the findings emphasise the importance of improving environmental knowledge and integrating green practices in their business operations. For policy makers, this research provides a scientific basis for the development of regulations and programmes that support sustainable tourism, with a particular focus on MSMEs. For academics, the Ergo Green Tourism model opens new opportunities for further research in the field of sustainable tourism, especially in the context of developing countries such as Indonesia. For local communities, the implementation of this model has the potential to improve quality of life through the development of more environmentally and socio-economically responsible tourism. For the tourism industry as a whole, this research offers a framework for transformation towards more sustainable and globally competitive practices.

The research also underscores the importance of a holistic approach in sustainable tourism development, where environmental, economic and social aspects are considered in a balanced manner. However, it should be noted that the implementation of this model may face challenges, especially in terms of resources and capacity of MSMEs.

5. CONCLUSION

This research develops the Ergo Green Tourism model as an innovative approach to achieving sustainable tourism in Indonesia. The model integrates several key constructs, including Environmental Green Knowledge, Green Marketing, Environmental Protection, Ergo Green Tourism, and Performance Enhancing Sustainability in Tourism. Analysis using Structural Equation Modeling (SEM) shows that all constructs in the

model have good validity and reliability. The main findings reveal that Environmental Protection and Environmental Green Knowledge have a positive and significant influence on Green Marketing, Ergo Green Tourism, and tourism sustainability performance. Additionally, Green Marketing is shown to have a significant impact on the development of the Ergo Green Tourism concept, which combines green tourism principles with ergonomic aspects to enhance comfort and efficiency for tourists and industry players.

However, the implementation of Ergo Green Tourism presents various challenges for MSMEs in Indonesia tourism sector. The primary challenges include high initial costs and resource demands required for sustainable practices, such as developing eco-friendly infrastructure and energy-efficient facilities. Operational costs, including maintaining certifications and implementing waste management systems, can strain the limited budgets of MSMEs. Limited access to green technologies, especially in remote areas, and financial barriers to training staff on sustainability practices further exacerbate the challenges. The niche market demand for Ergo Green Tourism and uncertain profitability discourage significant investment, while regulatory and certification processes add administrative burdens, particularly for MSMEs with constrained management capacity.

To implement green marketing and ergonomic principles effectively, MSMEs should start by conducting an environmental impact assessment to evaluate current operations, set sustainability goals, and align with green initiatives. Steps such as improving resource efficiency, switching to renewable energy, prioritizing sustainable sourcing, and reducing waste through recycling and composting should be adopted. Ergonomic design in workplaces and products can enhance employee comfort and operational efficiency. Additionally, MSMEs should develop eco-friendly products and services, promote sustainability practices through green marketing strategies, and engage environmentally conscious consumers by highlighting environmental benefits and certifications. Training employees on sustainability and ergonomics is essential, while collaboration with local communities, stakeholders, and NGOs can enhance green initiatives. Finally, implementing monitoring systems and continuous improvement strategies will ensure the long-term sustainability and competitiveness of MSMEs in the tourism sector.

6. DECLARATIONS

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6.2. Author Contributions

Conceptualization: AY; Methodology: SC; Software: KP; Validation: IG and AA; Formal Analysis: CM and IG; Investigation: SC; Resources: KP; Data Curation: AY; Writing Original Draft Preparation: AA and KP; Writing Review and Editing: SC and KP; Visualization: AY; All authors, AY, SC, KP, IG, AA, and CM, have read and agreed to the published version of the manuscript.

6.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6.4. Funding

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6.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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