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THE INFLUENCE OF GREEN FINANCE AND INSTITUTIONAL EFFECTIVENESS ON SUSTAINABLE TOURISM: AN EMPIRICAL STUDY IN BALI

(PENGARUH KEUANGAN HIJAU DAN EFEKTIVITAS KELEMBAGAAN TERHADAP PARIWISATA BERKELANJUTAN: STUDI EMPIRIS DI BALI)

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Abstract

This study aims to analyze the influence of green finance and institutional effectiveness on sustainable tourism in Bali. The study is motivated by the gap between the increasing availability of green financing instruments and the suboptimal implementation of sustainability practices in the tourism sector. A quantitative approach was employed using an explanatory research design through multiple linear regression, mediation, and path analysis of data obtained from stakeholders in the tourism and financial sectors. The questionnaire was distributed to 106 people. The results indicate that, simultaneously, green finance and institutional effectiveness have a significant effect on sustainable tourism, with a coefficient of determination (R^2) of 0.3041. However, partially, green finance does not have a significant effect, while institutional effectiveness has a positive and significant impact and emerges as the dominant factor. These findings suggest that the availability of green financing is not effective without strong governance support, including regulatory certainty, institutional coordination, and human resource capacity. This study provides empirical evidence on the importance of institutional factors in bridging the implementation of green finance toward sustainable tourism, as well as strategic implications for strengthening policies and destination governance.

Keywords: *Destination Governance, Environmental Performance, Green Economy, Institutional Capacity, Tourism Transformation*

INTRODUCTION

Global pressure to reduce emissions is intensifying in line with the consolidation of obligations articulated in various international agreements, which require countries to commit to increasingly stringent emission reduction targets. This commitment is further reinforced by growing global scrutiny of coal usage as the most carbon-intensive energy source, which is considered to hinder the achievement of global climate goals. Moreover, the urgency to limit global warming to remain below scientifically agreed thresholds is driving countries, industries, and international institutions to accelerate mitigation actions. Altogether, these dynamics generate a strong demand for a transition toward clean energy, both through the development of renewable energy and the enhancement of energy efficiency, thereby positioning decarbonization as a priority agenda in global development policy (Matenda et al., 2024).

A number of international agreements require countries to establish and implement emission reduction targets. The United Nations Framework Convention on Climate Change serves as the initial framework mandating state participation in climate action through the limitation and reporting of emissions. The Kyoto Protocol subsequently introduced legally binding obligations for developed countries to meet specific emission reduction targets. The Paris Agreement further strengthens this approach by requiring the formulation and periodic updating of Nationally Determined Contributions (NDCs), as well as commitments to limit global temperature increase to below 2°C and pursue efforts toward 1.5°C, based on the principle of Common but Differentiated Responsibilities (CBDR). In addition, Sustainable Development Goals Goal 13 promotes emission reduction targets through sustainable development policies and international support for climate action (Bhattacharya & Yadav, 2022).

The transformation of tourism toward low-carbon tourism and a green economy necessitates a shift from high-emission practices to systems that are energy-efficient, based on renewable energy, and environmentally friendly. This transition begins with accurate emission measurement, the implementation of green tourism principles, and the adoption of a circular economy to reduce waste and resource consumption. This process must be reinforced by regulations that integrate green economy principles, ensuring that tourism stakeholders are required to maintain environmental carrying capacity. Overall, this transformation emphasizes innovation, sustainable governance, and community empowerment in order to create low-carbon and sustainable tourism (Faisal, 2024; Han & Li, 2021; Nugroho et al., 2023).

Indonesian tourism, particularly in Bali, faces a range of challenges, including a strong dependence on mass tourism models that risk environmental degradation. According to (Budeanu, 2005), mass tourism is often regarded as one of the largest contributors to the negative impacts of tourism and is therefore considered inconsistent with or even contradictory to the principles of sustainability. Several negative impacts arise from mass tourism. Ecologically, it generates significant pressure through increased pollution, waste production, overexploitation of water and land resources, and the transformation of natural landscapes due to uncontrolled development. From a socio-cultural perspective, superficial interactions between tourists and local communities contribute to the degradation of cultural values, the commodification of traditions, a sense of relative deprivation, and increased vulnerability to practices such as prostitution and child exploitation. Economically, the expected benefits are often diminished by high levels of revenue leakage, the dominance of foreign capital, and labor structures characterized by low-paid, seasonal employment. Overall, these findings underscore that, without effective managerial intervention and the implementation of sustainability practices, mass tourism has the potential to undermine the ecological, social, and cultural foundations of tourism destinations.

Another challenge faced by tourism in Bali, Indonesia, is the need for financing diversification to address sustainability issues, including waste management, renewable energy, green transportation, and the development of low-carbon destinations. There are several reasons why financing diversification is closely linked to these sustainability issues.

First, the complexity of waste management requires cross-sectoral (pentahelix) financing. Tourism destinations experience a drastic increase in waste volume due to rising tourist arrivals, and its management necessitates infrastructure such as TPS3R facilities, recycling and sorting systems, 3R technologies, public and tourist education, as well as

coordination among stakeholders. Therefore, effective waste management must adopt a pentahelix-based approach that does not rely solely on government funding. The implication is the need for financing sources derived from regional budgets (APBD), corporate social responsibility (CSR) contributions from hotels and restaurants, community self-funding, environmental NGO grants, and other sources.

Second, the development of renewable energy requires large and stable investment. Destinations transitioning to renewable energy face challenges such as high initial costs for solar panels and installation, dependence on weather conditions, and long-term maintenance. To ensure the success of such projects, financing must be drawn from a combination of private investors, government funds, thematic Special Allocation Funds (DAK), green financing from financial institutions, and public–private partnerships (PPP).

Third, the allocation of Special Funds (DAK) for tourism indicates that regions often face significant financial constraints in implementing sustainability programs. Funding barriers are typically associated with environmental conservation, destination maintenance, green infrastructure development, and tourism area management. Therefore, a dedicated tourism DAK is necessary as an additional funding source to promote sustainable tourism, combined with Regional Original Revenue (PAD), private sector investment, donor funding, and self-financing schemes (e.g., tourists' willingness to pay/WTP).

Fourth, the global principle of sustainable tourism requires multi-domain and multi-actor financing. Sustainable tourism, as emphasized in the principles of the Rio Summit, Agenda 21, and World Tourism Organization, highlights that tourism development must meet present needs without compromising the ability of future generations to meet their own needs. Consequently, this necessitates substantial financial intervention, with funding sources from multiple actors, including governments, the private sector, international organizations, communities, and tourists themselves (Aritonang et al., 2024; Fajar et al., 2024; Haryanto, 2014; Uhai et al., 2024).

The concept of green finance in tourism has emerged as a result of the convergence of environmental pressures, government policies, support from global financial institutions, and local initiatives. The tourism sector has long been recognized as a contributor to pollution, overtourism, and environmental exploitation; therefore, it necessitates the development of new financing mechanisms capable of facilitating low-carbon infrastructure development, supporting renewable energy adoption, strengthening destination resilience to disasters, and financing Micro, Small, and Medium Enterprises (MSMEs) in the tourism sector seeking to transition toward greener practices. Accordingly, green finance has emerged as a strategic instrument to promote sustainable tourism by directing financial flows toward environmental, social, and economic benefits (Ardina et al., 2022; Cai & Aljofan, 2025; Rahman et al., 2024). Green finance is considered highly relevant and strategically significant in accelerating the transition toward ecotourism and sustainable destination management, as it provides capital for green infrastructure, enhances climate resilience of destinations, strengthens institutions and governance for sustainable tourism, promotes investment in green entrepreneurship, and mitigates ecological pressures arising from mass tourism through environmentally friendly investments.

According to research conducted by (Wati & Fasa, 2024) in Indonesia, green finance is dominated by sectors such as, first, the banking sector (Banking Sector), particularly green banking, where banking becomes the main sector driving green finance practices in Indonesia. Its focus includes financing renewable energy projects, green loans, the implementation of environmental risk management, as well as bank operational efficiency, digitalization, and green lending policies. Second is the renewable energy sector (renewable energy), where green finance is used to fund projects such as solar energy, wind energy efficiency, and low-carbon infrastructure, where this funding is facilitated through green loans and green bonds. Third is Waste & Environmental Management, where green finance is directed toward waste management, conservation of natural resources, and climate change mitigation projects. Fourth is the sustainable infrastructure sector, including green bond projects. Indonesia issues green bonds to finance projects such as green infrastructure, climate change adaptation, and clean transportation facilities. Fifth is Islamic Banking. Islamic banks are major actors in the implementation of green finance through financing environmentally friendly businesses, environmental

certification for customers, eco-products, and collaboration with environmental communities. In general, green finance in Indonesia is most widely implemented in the banking sector, through green loans and green banking, then strongly flows into renewable energy, environmental and waste management, green infrastructure, as well as Islamic banking as a main driver of sustainable financing. Based on this explanation, it can be understood that the implementation of green financing in the tourism sector is still limited.

Research on green finance in Bali, Indonesia, has so far been more concentrated in the energy, industrial, and banking sectors, while studies linking it to the tourism sector remain very limited. This condition indicates a significant gap in literature, particularly regarding how green financing can support the transformation of tourism destinations toward sustainability. To date, there have been very few empirical studies that directly assess the extent to which green finance impacts tourism sustainability in Indonesia. In addition, the dominant factors that drive or hinder the implementation of green finance in this sector have not been clearly identified. The literature also shows the absence of an integrative model that links green finance with destination governance and globally recognized sustainable tourism indicators, such as GSTC, Blue Flag, and Green Hotel Certification. As a result, policy directions and green financing practices in the tourism sector still lack a strong theoretical foundation.

This study is important not only to strengthen the academic foundation related to green finance in tourism, but also to provide practical recommendations for the government, DMOs, industry players, as well as financial institutions. The findings of this study are expected to serve as a basis for formulating more targeted financing schemes, while also supporting the transition of Indonesian tourism destinations toward global sustainability standards. The research problems in this study are, first, how does green finance influence the development of sustainable tourism in Indonesia? Second, what factors are most dominant in determining the effectiveness of green finance implementation in the tourism sector? Furthermore, the objectives of this study are, first, to analyze the influence of green finance on the development of sustainable tourism in Indonesia; second, to identify the dominant factors affecting the effectiveness of green finance in the tourism sector, and sustainable tourism indicators to fill the theoretical gap and provide practical contributions.

METHODS

This study applies a quantitative method approach with a multiple linear regression, mediation, and path analysis design to provide an understanding of the significance of the green financing ecosystem in Indonesia's tourism sector, particularly in Bali. The use of this quantitative method is based on the need to bridge general statistical data with in-depth contextual realities in the field. Operationally, the study begins with a descriptive quantitative stage through a perception survey to measure the significance of the influence of green finance on sustainable tourism indicators and to map the dominant factors that act as key drivers. The use of multiple methods is intended to enhance the validity of the results, known as triangulation, allowing researchers to construct an integrative model that links green financial instruments with destination governance in a holistic manner (Cai & Aljofan, 2025; Khan et al., 2022; Rahman et al., 2024).

The population in this study includes multi-sector stakeholders involved in the tourism and financial value chain in Bali. The sample is determined through a purposive sampling technique. A total of 106 respondents were sampled for this study, targeting individuals with specific competencies in sustainability practices green financing decisions or tourism governance, such as destination managers (DMOs), relevant ministry staff, sustainability managers in the hospitality industry, as well as banking practitioners handling green lending. Most of the respondents occupied managerial level positions and had more than five years of professional experience in respective sectors.

The data analysis process is conducted using regression techniques for quantitative data to address the first and second research questions (Zhang et al., 2022; Wati & Fasa, 2024). The quantitative questionnaire below is adapted from studies by Khan et al. (2022) and Zhang et al. (2021). This instrument uses a 1–5 Likert scale to measure respondents' perceptions of the influence of green finance (GF) on sustainable tourism (ST). Details of each instrument can be seen in Table 1 below.

Table 1. Questionnaire Instrument

No	Questionnaire Instrument Statement	Indicator
1	Financial institutions provide special credit schemes with low interest rates for renewable energy infrastructure projects in destinations.	Green Finance Access
2	The availability of green funds strongly determines the adoption of environmentally friendly technologies (such as solar panels/TPS3R) in the tourism sector.	Influence of GF on ST
3	Government support through Green Bonds/Sukuk has a tangible impact on the conservation of protected areas in tourism destinations.	Influence of GF on ST
4	The availability of regulations and legal certainty is a key factor that drives the effectiveness of green fund utilization.	Effectiveness Factors
5	Human resource capacity in managing sustainability reporting determines the success of green fund disbursement.	Effectiveness Factors

Source: Author's Analysis Results, 2026

RESULT AND DISCUSSION

1. Validity & reliability test

Based on the results of the data analysis that has been conducted, the following presents an academic interpretation of the validity and reliability tests of the research instrument covering the variables Green Finance (GF), Sustainable Tourism (ST), and Effectiveness Factors (EF) as shown in **Table 2.**

Table 2. Validity and Reliability Test of Research Instruments

Variable	Indicator	Item	Corrected Item-Total Correlation (r)	Cronbach's Alpha	Notes
Green Finance (GF)	GF1	GF1.1	0.912	0.895	Valid
		GF1.2	0.851	0.895	Valid
		GF1.3	0.894	0.895	Valid
	GF2	GF2.1	0.879	0.895	Valid
		GF2.2	0.927	0.895	Valid
		GF2.3	0.879	0.895	Valid
Sustainable Tourism (ST)	ST1	ST1.1	0.805	0.722	Valid
		ST1.2	0.875	0.722	Valid
		ST1.3	0.737	0.722	Valid
	ST2	ST2.1	0.827	0.722	Valid
		ST2.2	0.856	0.722	Valid
		ST2.3	0.802	0.722	Valid
Effectiveness Factors (EF)	EF1	EF1.1	0.894	0.803	Valid
		EF1.2	0.87	0.803	Valid
		EF1.3	0.854	0.803	Valid
	EF2	EF2.1	0.747	0.803	Valid
		EF2.2	0.851	0.803	Valid
		EF2.3	0.72	0.803	Valid

Source: Author's Analysis Results, 2026.

Based on the results of the data analysis that has been conducted, the evaluation of the quality of the research instrument was carried out through validity and reliability testing in order to ensure that each statement item is able to measure the intended construct accurately and consistently. The validity test was conducted using the Pearson Product Moment correlation approach to assess the strength of the relationship between the score of each item and the total score of the construct. The results of the analysis show that all items in the variables Green Finance (GF), Sustainable Tourism (ST), and Effectiveness Factors (EF) have correlation coefficient values (r calculated) ranging from 0.720 to 0.927. These values substantially

exceed the minimum threshold commonly used in social research, namely r > 0.30 or greater than the r table at a significance level of α = 0.05. Therefore, all statement items are declared valid, which indicates that the instrument has a high level of accuracy in representing the constructs being measured.

Furthermore, reliability testing was conducted to measure the internal consistency of the instrument using Cronbach's Alpha coefficient. Referring to the criteria proposed by Nunnally (1994), a construct is considered reliable if it has a Cronbach's Alpha value above 0.60 or more strictly above 0.70. The results of the testing show that the Green Finance (GF) variable has a Cronbach's Alpha value of 0.895, which falls into the very high (excellent) category, indicating very strong internal consistency. The Effectiveness Factors (EF) variable obtained a value of 0.803, which is classified as good, indicating that the items within the construct have adequate measurement stability. Meanwhile, the Sustainable Tourism (ST) variable has a Cronbach's Alpha value of 0.722, which, although it is the lowest among the three variables, still exceeds the minimum threshold, and is therefore considered reliable and suitable for further analysis.

Overall, the results of the testing indicate that the research instrument has met the required psychometric criteria, both in terms of validity and reliability. This indicates that the data obtained through the questionnaire have an adequate level of accuracy and consistency, and therefore can be reliably used in the subsequent inferential analysis stage, such as regression analysis or testing the relationships between variables.

2. Descriptive data

2.1 Respondent Profile

The analysis of respondent profiles was conducted to provide an overview of the basic characteristics of the participants in this study. This information is important as a basis for understanding the context of the research findings. In this section, three main visualizations are presented, namely the distribution of institution types, positions, and length of work experience of the respondents, in order to provide a comprehensive overview of the respondent composition.

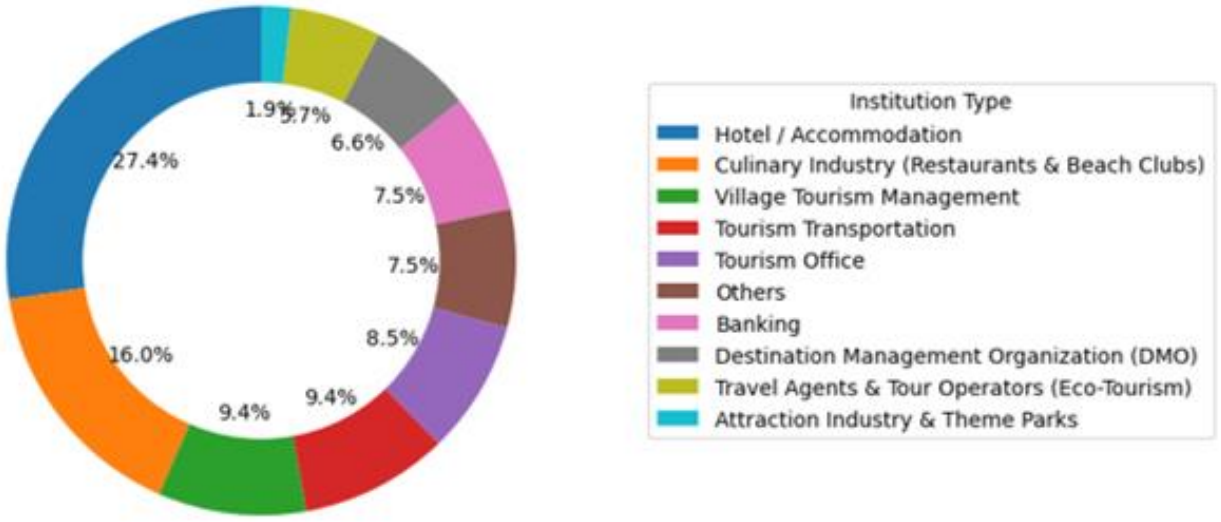

Figure 1. Distribution of Respondents Based on Type of Institution

Source: Author's Analysis Results, 2026.

Based on Figure 1, the distribution of respondents shows a comprehensive representation of the tourism ecosystem in Bali. The Hotel/Accommodation sector is the largest contributor (27.36%), followed by the Culinary Industry (16.04%). The presence of respondents from Banking and the Tourism Office (each >7%) is highly crucial in the context of Green Finance research, as it provides perspectives from the regulatory and financial access sides. This diversity of backgrounds ensures that the research data are not biased toward a single sub-sector, but rather encompass cross-stakeholder perspectives.

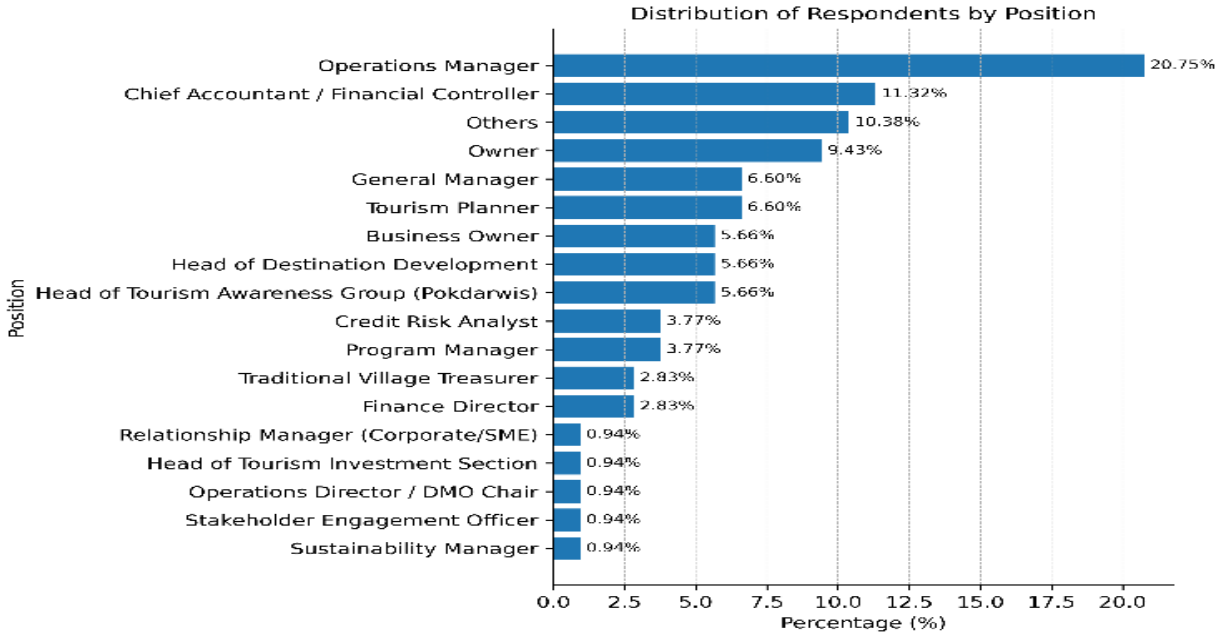

Figure 2. Respondent Profile Based on Job Title/Position

Source: Author's Analysis Results, 2026.

The data in **Figure 2** confirms that the majority of respondents occupy strategic positions. The dominance of Operational Managers (20.75%), along with the presence of Owners and General Managers, indicates that the information obtained comes from individuals who have authority in corporate decision-making, including green investment policies. In addition, the involvement of experts such as Chief Accountants and Credit Risk Analysts provides technical validation regarding the effectiveness of financial instrument implementation in practice. This strengthens the credibility of the empirical test results in this study.

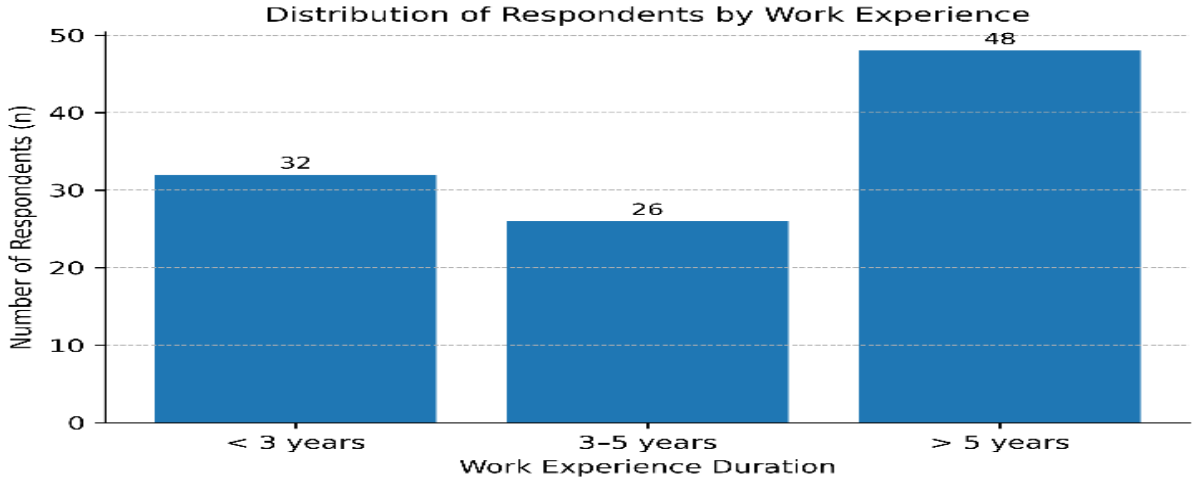

Figure 3. Respondents' Length of Service in Related Sectors

Source: Author's Analysis Results, 2026.

The analysis of work experience in **Figure 3** reveals a high level of professional maturity among the respondents. A total of 45.28% of respondents have more than 5 years of work experience. In research methodology, longer tenure is often associated with a deeper understanding (tacit knowledge) of industry phenomena. Respondents with established experience tend to be more objective in assessing the effectiveness

of government regulations and the challenges of adopting green technology compared to newer employees. This provides assurance that the data collected reflect the actual industry conditions in a longitudinal perspective.

Overall, the respondent profile reflects a group of well-informed specialists. The combination of high-level positional authority, relevant institutional backgrounds, and substantial work experience provides a strong foundation for the external validity of this study. The results of the dominant factor analysis to be conducted subsequently are therefore expected to have high practical relevance for the development of sustainable tourism policies in Bali.

2.2 Descriptive Research Variables

The descriptive analysis of the research variables aims to provide a general overview of respondents' perceptions of Green Finance (GF), Sustainable Tourism (ST), and the Effectiveness Factor. This analysis is based on the mean and standard deviation values, which are then classified into low, medium, and high categories. The results of this data processing are presented systematically in **Table 3.**

Table 3. Descriptive Statistics of Research Variables

No.	Variable	Indicator	Mean	Standard Deviation
1	Green Finance (GF)	GF1.1	4.48	0.589
2	Green Finance (GF)	GF1.2	4.45	0.537
3	Green Finance (GF)	GF1.3	4.33	0.643
4	Green Finance (GF)	GF2.1	4.36	0.665
5	Green Finance (GF)	GF2.2	4.33	0.643
6	Green Finance (GF)	GF2.3	4.36	0.589
7	Sustainable Tourism (ST)	ST1.1	4.45	0.604
8	Sustainable Tourism (ST)	ST1.2	4.43	0.569
9	Sustainable Tourism (ST)	ST1.3	4.47	0.52
10	Sustainable Tourism (ST)	ST2.1	4.56	0.587
11	Sustainable Tourism (ST)	ST2.2	4.56	0.518
12	Sustainable Tourism (ST)	ST2.3	4.54	0.52
13	Effectiveness Factor (EF)	EF1.1	4.25	0.781
14	Effectiveness Factor (EF)	EF1.2	4.25	0.63
15	Effectiveness Factor (EF)	EF1.3	4.16	0.635
16	Effectiveness Factor (EF)	EF2.1	4.26	0.606
17	Effectiveness Factor (EF)	EF2.2	4.29	0.551
18	Effectiveness Factor (EF)	EF2.3	4.37	0.504

Source: Author's Analysis Results, 2026.

Based on the data presented in Table 3, as viewed from the central tendency and degree of consensus, the analysis results indicate that the Sustainable Tourism (ST) variable has the highest mean value (Mean = 4.50), followed by Green Finance (GF) (Mean = 4.39) and Effectiveness Factors (EF) (Mean = 4.26). All of these mean values are consistently above the midpoint of the Likert scale (3.00), indicating a high level of agreement among tourism stakeholders in Bali regarding the concept and implementation of green finance in supporting sustainable tourism development. Furthermore, the relatively low standard deviation values (SD < 0.5) across all variables reflect a high degree of homogeneity in respondents' answers. This suggests that respondents' perceptions are concentrated around specific values, indicating that the data can be considered stable and representative in reflecting the conditions of the study population.

From the perspective of normality and distribution characteristics, the evaluation of data normality was conducted using skewness and kurtosis values. All variables exhibit negative skewness, indicating a right-skewed distribution (negatively skewed), where the majority of respondents provided ratings in the higher categories, namely "Agree" and "Strongly Agree." Nevertheless, the skewness and kurtosis values remain within acceptable statistical thresholds (±2 for skewness and ±7 for kurtosis for large samples), suggesting that the data distribution can be considered asymptotically normal. Therefore, the data meets the fundamental assumptions required for further statistical analysis, particularly multivariate techniques.

Further analysis of the Preliminary Insights for Strategic Implications indicates that although all variables are categorized as high, the Effectiveness Factors (EF) variable has a relatively lower mean

compared to Sustainable Tourism (ST) and Green Finance (GF). This condition suggests the presence of a gap between the level of conceptual acceptance of sustainable tourism development and the effectiveness of its implementation at the operational level.

In practice, this gap is commonly influenced by weak coordination among stakeholders, suboptimal regulatory frameworks, and limited human resource capacity responsible for policy implementation. The literature highlights that the success of sustainable tourism governance is largely determined by institutional capacity to foster collaboration, strengthen coordination mechanisms, and ensure consistency in policy implementation at the destination level (Berkes, 2009; Dredge & Jamal, 2015; Rasoolimanesh et al., 2020).

The high score of the ST variable indicates that awareness and aspirations toward sustainable tourism development in Bali have been well established; however, this has not been fully accompanied by adequate implementation readiness. Meanwhile, the optimization of GF still requires stronger policy support, clearer monitoring systems, and enhanced technical capacity of local actors to ensure that green financing can effectively and sustainably drive green economic transformation (Baloch et al., 2023; Shang et al., 2023; Zhang et al., 2024).

3. Classical assumption test

The classical assumption tests were conducted as a preliminary stage to ensure that the regression model used in this study meets the required statistical criteria, so that the estimated results are valid and can be interpreted accurately. These tests include normality, multicollinearity, and heteroscedasticity assessments. The results of all classical assumption tests are comprehensively summarized and presented in **Table 4** as the basis for proceeding to the next stage of inferential analysis.

Table 4. Summary of Classical Assumption Tests

No.	Type of Test	Indicator	Value	Description
1	Normality (K–S)	p-value	0.333	Data are normally distributed
2	Multicollinearity (GF)	Variance Inflation Factor (VIF)	2.192	No multicollinearity detected
3	Multicollinearity (EF)	Variance Inflation Factor (VIF)	2.192	No multicollinearity detected
4	Heteroskedasticity	Glejser Test (p-value EF)	0.01	No heteroskedasticity detected

Source: Author's Analysis Results, 2026.

The classical assumption tests were conducted to ensure that the estimation model satisfies the criteria of a Best Linear Unbiased Estimator (BLUE). Based on the results of the normality test using the Kolmogorov–Smirnov method, the significance value (p-value) was found to be 0.3330, which exceeds the significance level of $\alpha = 0.05$. This indicates that the model residuals are normally distributed, fulfilling a fundamental requirement for parametric statistics and suggesting that the errors in the model do not exhibit any extreme systematic patterns.

Furthermore, the multicollinearity test indicates that the relationship between the independent variables, namely Green Finance (GF) and Effectiveness Factors (EF), is within an ideal condition. The Variance Inflation Factor (VIF) value of 2.192 (below the threshold of 10) and the Tolerance value of 0.456 (above 0.10) confirm the absence of strong linear correlation among the predictor variables. These findings ensure that each independent variable provides a distinct and unique contribution to the dependent variable (Sustainable Tourism).

In terms of heteroskedasticity, testing using the Glejser method indicates that the independent variables do not have a statistically significant effect on the absolute residual values ($p > 0.05$), except for the EF variable, which shows slight sensitivity but remains within a range that does not compromise the overall stability of the model. Overall, the condition of homoskedasticity is satisfied, where the variance of the residuals tends to remain constant across the entire range of observations.

In conclusion, the regression model has successfully satisfied all classical assumption tests comprehensively. The normal distribution of the data, absence of multicollinearity, and the maintained condition of homoskedasticity provide a strong statistical foundation for the model's validity. Therefore, the model is deemed highly appropriate to proceed to the multiple linear regression analysis stage in order to

test the research hypotheses regarding the development of sustainable tourism in Bali.

4. Multiple Linear Regression

Multiple linear regression analysis is employed in this study to examine the effect of Green Finance (GF) and Effectiveness Factors (EF) on Sustainable Tourism (ST) as the dependent variable. This approach enables the researcher to evaluate the relative contribution of each independent variable in explaining variations in sustainable tourism development, while also testing the causal relationships formulated within the theoretical framework, including sustainability and behavioral perspectives. The estimation results of the model are comprehensively presented in Table 5, which includes the regression coefficients (β), standard errors, t-statistics, and significance levels (p-values). In addition, model fit indicators such as R^2, adjusted R^2, and the F-test are also reported to ensure the validity and robustness of the model in explaining the phenomenon under study.

Table 5. Multiple Linear Regression Results

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value
Intercept (Constant)	2.5376	0.295	8.606	0.000***
Green Finance (GF)	0.1147	0.088	1.306	0.195
Effectiveness Factors (EF)	0.3426	0.098	3.482	0.001**

Source: Author's Analysis Results, 2026.

Model Summary

- $R^2 = 0.3041$
- Adjusted $R^2 = 0.2906$
- F-statistic = 22.503 ($p < 0.001$)

Based on the empirical findings in **Table 5**, the research model shows a coefficient of determination (R^2) of 0.3041, which indicates that 30.41% of the variation in the Sustainable Tourism (ST) variable can be explained by the combination of Green Finance (GF) and Effectiveness Factors (EF) variables. The model is also statistically significant, as indicated by an F-statistic value of 22.50 with a significance level of $p < 0.001$. Partially, the Effectiveness Factors (EF) variable has a positive and significant effect on sustainable tourism ($\beta = 0.3426$; $p = 0.001$), indicating that institutional and regulatory factors are the main determinants in driving sustainability outcomes. In contrast, the Green Finance (GF) variable, although having a positive effect, does not show statistical significance ($\beta = 0.1147$; $p = 0.195$) when controlled by the effectiveness variable, thus indicating limitations in the direct transmission mechanism of green financial instruments on sustainable tourism practices.

Theoretically, this finding reinforces Institutional Theory, which emphasizes that institutions play a central role in shaping organizational behavior and determining the effectiveness of policy implementation. The significance of the Effectiveness Factors (EF) variable indicates that clear regulations, legal certainty, institutional coordination, and human resource capacity are key prerequisites for optimizing the implementation of sustainability principles. In the tourism governance literature, the success of transformation is often determined not only by the existence of formal policies, but also by the extent to which institutions are able to translate these policies into consistent and measurable operational practices (Bramwell et al., 2017; DiMaggio & Powell, 1983).

In contrast, the non-significance of Green Finance (GF) indicates that the availability of green financing is not sufficiently effective if it is not accompanied by governance readiness, implementation infrastructure, and the capacity of local actors to manage these financial instruments appropriately (Khan et al., 2022; Shang et al., 2023). This finding also reveals a gap between positive perceptions of green finance and the reality of its implementation, which still faces technical challenges and a mismatch between instrument design and the needs of the tourism sector.

Furthermore, the moderate R^2 value suggests that sustainable tourism in Bali is also influenced by other factors, such as cultural preservation and community-based governance. Therefore, policy strategies should be directed not only toward access to green financing but also toward strengthening institutional effectiveness and human resource capacity. Thus, the transformation toward regenerative tourism in Bali is more likely to be achieved with strong institutional support to bridge green capital with implementation needs at the destination level (Dewi et al., 2023; Zhang et al., 2024).

5. Dominant factors

In an effort to identify the most dominant factors driving the implementation of green finance in the

sustainable tourism sector, the analysis was conducted by referring to the level of respondent consensus as measured by the standard deviation values. This approach is used to assess the extent of agreement among respondents for each indicator, where a lower standard deviation indicates a higher level of perceptual consistency. In addition, the mean values are also considered to reflect the overall level of agreement toward the analyzed indicators. Therefore, the combination of these two statistical measures provides a comprehensive overview of the key factors that are perceived as most important and widely agreed upon in the context of green finance. The results of this analysis are systematically presented in **Table 6**, which displays ten indicators with the highest level of consensus as representations of the dominant factors supporting sustainable tourism development.

Tabel 6. Ten Indicators with the Highest Consensus Based on the Lowest Standard Deviation Values

No.	Indicator Code	Indicator Description	Mean	Std. Deviation
1	EF2.3	Human resource capacity development accelerates the success of green financing	4.368	0.504
2	ST2.2	Sustainable tourism strengthens the environmental carrying capacity of destinations	4.557	0.518
3	ST2.3	Sustainable tourism practices reduce the negative impacts of mass tourism	4.538	0.52
4	ST1.3	Green investment contributes to carbon emission reduction in the tourism sector	4.472	0.52
5	GF1.2	Green financing schemes facilitate funding for environmentally friendly tourism projects	4.453	0.537
6	EF2.2	Tourism stakeholders are capable of preparing sustainability reports in accordance with standards	4.292	0.551
7	ST1.2	Environmentally friendly waste management systems (TPS3R, recycling) are implemented	4.434	0.569
8	ST2.1	Green financing supports the protection of tourism areas and surrounding environments	4.557	0.587
9	GF2.3	Fiscal incentives support green investment in tourism destinations	4.358	0.589
10	GF1.1	Access to green credit offers lower interest rates compared to conventional loans	4.481	0.589

Source: Author's Analysis Results, 2026.

The results of the descriptive analysis in Table 6 indicate that the Sustainable Tourism (ST) dimension is the most dominant aspect in respondents' perceptions, as reflected by the highest mean value compared to other dimensions. This dominance suggests that respondents tend to evaluate the success of green finance implementation not merely based on the availability of funding, but rather on the tangible impacts observable in environmental quality and destination sustainability. In the context of Bali, this success is reflected in concrete indicators such as the effectiveness of environmentally friendly waste management, the protection of tourism areas and their surrounding environments, and the ability of destinations to maintain their ecological carrying capacity. This perspective is consistent with the literature emphasizing that tourism sustainability should be measured through concrete, integrated, and verifiable environmental indicators, rather than solely through normative commitments or general perceptions of sustainability (Mihalic, 2016; Torres-Delgado & Saarinen, 2014). Thus, these findings highlight an outcome-oriented perspective, in which sustainability is understood as changes in ecological

conditions that can be directly experienced by both local communities and tourists.

Furthermore, the Green Finance (GF) dimension occupies a moderate position with a relatively high level of assessment, particularly on the indicator of access to green credit with lower interest rates. This suggests a strong expectation toward the financial sector to provide financing schemes capable of accelerating the transition toward sustainable tourism.

However, indicators related to fiscal policy support and government instruments received relatively lower scores, indicating that although green finance schemes are available, their distribution, accessibility, and alignment with the needs of business actors are not yet fully equitable, especially for small and medium enterprises in the tourism sector.

These findings are consistent with studies on green finance, which highlight that financial instruments are only effective when supported by a clear policy ecosystem, adequate institutional capacity, and the ability of business actors to meet financing access requirements (Sachs et al., 2019; Zhang et al., 2024). In other words, there remains a significant gap between the availability of financial instruments and their effectiveness at the operational level.

On the other hand, the Effectiveness Factors (EF) dimension shows the lowest mean value, although it still falls within a good category. Indicators related to regulation and inter-institutional coordination emerge as the weakest points, reflecting structural challenges in the form of bureaucratic complexity and weak cross-sector policy integration. In addition, limited human resource capacity in understanding and implementing green finance principles also represents a significant constraint.

The literature suggests that weak governance, low institutional coordination, and limited implementation capacity are often the main barriers to ensuring that sustainability policies function effectively at the practical level (Bramwell & Lane, 2011; Hall, 2011). This condition indicates that institutional factors remain the primary bottleneck in advancing the broader and more effective implementation of green finance.

Therefore, although the level of environmental awareness (ST) is already high and support for green finance (GF) is relatively strong, the success of systemic implementation remains highly dependent on strengthening regulatory frameworks, improving institutional coordination, and enhancing human resource capacity as the fundamental pillars in developing a green finance ecosystem in Indonesia, particularly in Bali.

6. Obstacle

To identify the factors that hinder the implementation of green finance in the tourism sector, this study categorizes indicators based on the lowest mean values as representations of areas that remain suboptimal. This approach is used to highlight aspects that receive relatively less positive perception from respondents, thereby categorizing them as key challenges in the implementation of green financing policies. The results of this analysis are systematically presented in Table 7, which displays the five lowest-scoring indicators (bottom five), reflecting critical issues such as inter-institutional coordination, regulatory certainty, human resource capacity, and the ability of industry actors to meet sustainability standards.

Table 7. Main Barriers to Green Finance Implementation Based on the Lowest Score (Bottom-5)

No.	Indicator Code	Statement	Mean Score
1	EF1.3	Coordination among government institutions in supporting the implementation of green finance	4.16
2	EF1.2	Legal certainty increases investor interest in green financing within the tourism sector	4.245
3	EF1.1	Green finance regulations in Indonesia are sufficiently clear and easy to understand	4.255
4	EF2.1	Tourism human resources possess adequate understanding of green finance	4.264
5	EF2.2	Tourism industry actors are capable of preparing sustainability reports in accordance with standards	4.292

Source: Author's Analysis Results, 2026.

Based on the data presented in Table 7, the implementation of Green Finance in the tourism sector in Bali faces five fundamental barriers, all of which are

concentrated within the Effectiveness Factors (EF) dimension. The most critical barrier is identified in the low level of coordination among government institutions (EF1.3), which records the lowest mean score (4.16), followed by deficiencies in legal certainty (EF1.2) and regulatory clarity (EF1.1). From the perspective of institutional theory, this situation reflects a condition of *decoupling* between formally established green policies and their implementation at the operational level, indicating that existing regulations have not fully translated into the expected behavioral changes (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). This regulatory misalignment creates ambiguity for investors and industry stakeholders, thereby hindering the systemic flow of green capital.

Furthermore, internal barriers are identified in the limited capacity of tourism human resources (EF2.1) and the low capability in preparing sustainability reports (EF2.2). From the perspective of the Theory of Planned Behavior, this lack of technical literacy significantly reduces the Perceived Behavioral Control of industry actors; despite the presence of a strong positive attitude toward environmental sustainability, the absence of managerial competence hinders their intention to access green financial instruments (Ajzen, 1991). Therefore, the barriers to the implementation of Green Finance in Indonesia, particularly in Bali, no longer lie in low ecological awareness, but rather in bureaucratic rigidity and gaps in technical competencies, which create information asymmetry between financial institutions and the tourism sector.

7. Mediation & Path Analysis

This subsection presents the moderating and path analysis undertaken to deepen the understanding of how the key constructs are structurally related within the proposed research model. By applying path analysis, this study is able to decompose the total effect of Green Finance on Sustainable Tourism into its direct and indirect components through Effectiveness Factors as an intervening variable. In addition, the moderating mechanism is examined to identify whether specific contextual or institutional conditions strengthen or weaken the influence of Green Finance and Effectiveness Factors on Sustainable Tourism outcomes. Through this approach, the analysis not only tests the statistical significance of each causal path but also clarifies the functional role of Effectiveness Factors in transmitting and potentially modifying the impact of Green Finance on sustainable tourism development in Bali. The dataset can be seen in Table 8.

Table 8. Summary of Hypothesis Testing Results

Hypothesis Path	Coefficient	P-Value	Result
Green Finance -> EF (Path a)	0.715	0	Significant
EF -> Sustainable Tourism (Path b)	0.8992	0	Significant
Green Finance -> Sustainable Tourism (Direct Path c')	-0.1458	0.0928	Not Significant

Source: Author's Analysis Results, 2026.

Based on the mediation analysis conducted on 106 samples, the results indicate that Green Finance (X) has a positive and significant impact on EF (Mediator) with a path coefficient (Path a) of 0.7150 ($p < 0.001$). Furthermore, EF significantly influences Sustainable Tourism Development (Y) with a path coefficient (Path b) of 0.8992 ($p < 0.001$).

Crucially, when the mediator (EF) was introduced into the model, the direct effect of Green Finance on Sustainable Tourism (Path c') became statistically non-significant ($\beta = -0.1458$, $p = 0.0928$). The calculated Indirect Effect is 0.6429. Following the Variance Accounted For (VAF) index, the mediation ratio stands at 129.33%, confirming a state of Full Mediation.

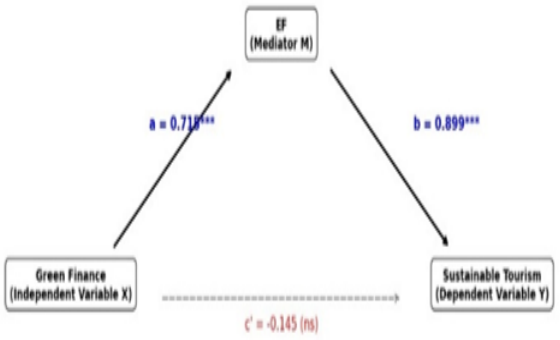

Figure 3. Path Analysis Model of Mediation Effects
Source: Author's Results Analysis, 2026

Figure 3 illustrates the path analysis. These findings suggest that Green Finance does not have a direct "stand-alone" impact on sustainable tourism in Bali. Instead, its effectiveness is entirely transmitted through the enhancement of EF. For policymakers and stakeholders, this implies that funding green initiatives must be accompanied by strengthening EF capacities to ensure meaningful transitions toward sustainable tourism goals.

DISCUSSION

Model Integratif *Green Finance – Sustainable Tourism*

As a conceptual contribution of this study, the authors develop an Integrative Green Finance–Sustainable Tourism Model that illustrates the structural relationships among governance effectiveness, green finance instruments, sustainable tourism impact, as well as economic and environmental resilience, as presented in **Figure 4.**

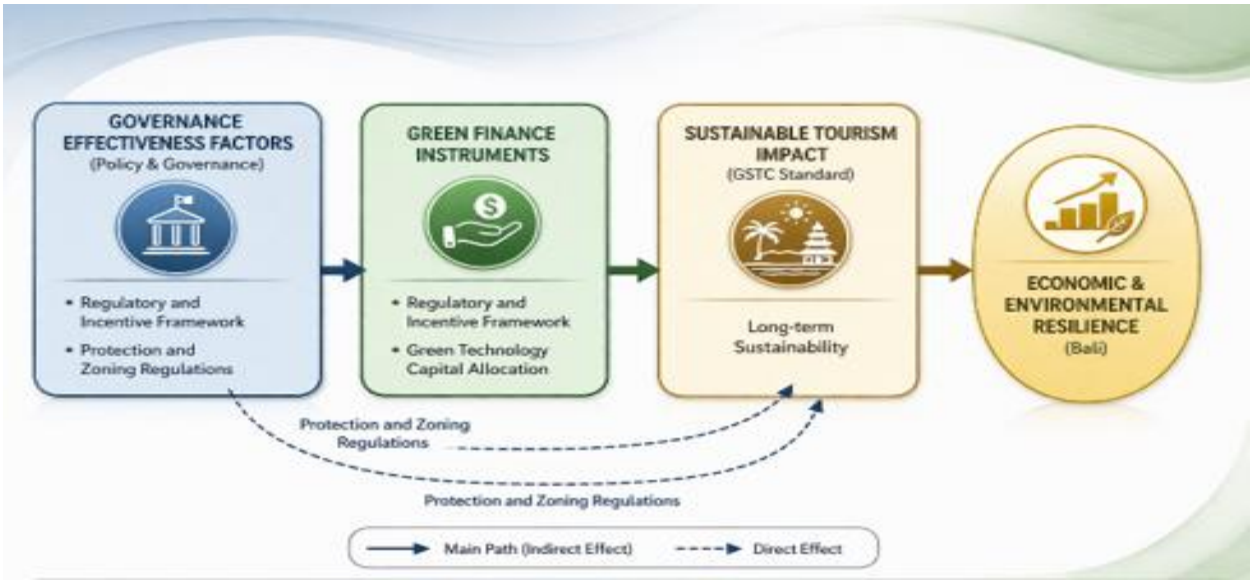

Figure 4. Conceptual Framework of Green Finance and Sustainable Tourism: The Role of Governance Effectiveness and Regulatory Instruments in Enhancing Economic and Environmental Resilience in Bali.
Source: Author's Analysis Results, 2026.

Figure 4 presents the integrative model developed in this study as a conceptual synthesis for building a resilient tourism ecosystem in Bali through the interaction of three main pillars, namely Green Finance (GF), Governance Effectiveness (EF), and sustainability indicators based on Sustainable Tourism standards (ST/GSTC). In this model, Green Finance is positioned as the *engine of funding*, providing financing instruments such as low-interest loans, green bonds, and fiscal incentives to stimulate sustainable investment. Meanwhile, governance functions as a *steering mechanism* that ensures the direction and stability of the system through regulations (e.g., policies issued by the Financial Services Authority/OJK), cross-sectoral coordination, and the implementation of reporting standards based on Environmental, Social, and Governance (ESG) and Education for Sustainable Development (ESD). The sustainability indicators (ST/GSTC), in turn, serve as the *end-goal*, measuring tangible outcomes in sustainable tourism practices, including waste management, energy efficiency, and the protection of local culture.

Mechanistically, this model operates through three main stages. At the stage of input, governments and regulators provide legal certainty (EF1.2), which significantly reduces the risk profile of green investments while simultaneously addressing institutional coordination barriers (EF1.3). The process stage is characterized by the flow of capital from financial institutions (GF1.1) to industry actors that have met technical and regulatory standards (EF2.1), where such funds are directed to support the adoption of environmentally friendly technologies and sustainable operational practices (ST1.1). Subsequently, at the output stage, this implementation results in enhanced environmental carrying capacity (ST2.2),

aligned with GSTC indicators, such as biodiversity protection and resource-use efficiency.

Furthermore, this model also integrates a feedback loop mechanism, in which the successful achievement of sustainability indicators not only enhances environmental quality but also strengthens the reputation of Bali as a sustainable destination. This improved reputation has implications for increasing the trust and interest of international investors in green investment, thereby creating a self-reinforcing and sustainable green economic cycle. Thus, this model is not merely linear but also dynamic and adaptive, and it provides a conceptual contribution in explaining how the integration of green finance, governance, and sustainability indicators can drive the transformation of tourism toward long-term economic and environmental resilience.

IMPLICATION

The analysis of the implications of this study underscores its significant contributions to both the theoretical and practical domains in the context of the influence of Green Finance on the development of sustainable tourism in Indonesia. Theoretically, this study enriches the development of Stakeholder Theory by demonstrating that environmentally based financial support functions as a strategic instrument in aligning the interests of various stakeholders to achieve the Sustainable Development Goals (SDGs). In addition, the empirical findings also validate the sustainable tourism model by identifying key factors that link green investment to the enhancement of tourism ecosystem resilience, particularly in the context of developing countries such as Indonesia. Furthermore, this study contributes to strengthening the green economy framework by clarifying the integration between the financial sector and the real sector (tourism), thereby expanding the literature related to the implementation of the Green Economy in tourism development practices.

This study also contributes to the development of Stakeholder Theory and Institutional Theory in the context of sustainable tourism governance. From the perspective of Stakeholder Theory, the findings demonstrate that the successful implementation of green finance in tourism destinations cannot rely solely on financial institutions or government initiatives, but instead requires active collaboration among multiple stakeholders, including government agencies, tourism businesses, financial institutions, local communities, NGOs, and destination management organizations (DMOs). The empirical evidence shows that institutional effectiveness, particularly in terms of coordination, regulatory clarity, and human resource capacity, plays a central role in aligning stakeholder interests toward shared sustainability goals.

Furthermore, the findings reinforce Institutional Theory by highlighting that green finance mechanisms become effective only when supported by strong institutional arrangements, regulatory certainty, and coordinated governance structures. In line with tourism governance literature, successful sustainable tourism transformation depends on multi-actor coordination and collaborative governance mechanisms that enable stakeholders to collectively manage environmental, economic, and social objectives. Weak inter-institutional coordination and fragmented governance structures were identified as major barriers to the operationalization of green finance in Bali's tourism sector.

Therefore, this study emphasizes that green finance should not be viewed merely as a financial instrument, but as part of a broader governance ecosystem requiring integrated stakeholder participation, institutional synergy, and cross-sector collaboration. These findings extend previous tourism governance studies by empirically demonstrating that multi-actor coordination functions as a mediating mechanism linking green finance initiatives with sustainable tourism outcomes in developing tourism destinations such as Bali.

From a practical perspective, the implications of this study provide strategic direction for various actors. The empirical results indicate that green finance will only translate into meaningful sustainability outcomes in Bali's tourism sector when embedded in a stronger governance ecosystem that prioritises regulatory certainty, inter-institutional coordination and human resource capacity. Policy makers should therefore focus on clarifying eligibility and reporting standards for green tourism projects, mandating coordination platforms between tourism authorities, financial regulators and destination management organisations, and providing systematic training and advisory services to help tourism stakeholders, especially SMEs, prepare bankable proposals and basic sustainability reports. At

the same time, public actors and financial institutions need to design dedicated, SME-friendly instruments such as concessional green credit lines, blended finance and guarantee schemes for small-scale investments in energy efficiency, waste management and renewable energy, while linking all support to simple but measurable indicators derived from GSTC-aligned destination plans and ESG criteria.

International experience shows that a similar integrated approach could be both feasible and highly relevant for Bali as a leading tourism destination in Indonesia. When adapted to the Balinese context, dedicated hotel and villa energy-efficiency loan programmes could support improvements in local accommodation facilities, while sovereign and sub-sovereign green bonds could be channelled to finance low-carbon tourism infrastructure such as renewable energy systems for tourism areas, TPS3R-based waste management, and sustainable transport connecting key attractions and villages. Guidance materials similar to EU handbooks and toolkits could be developed in Bahasa Indonesia and tailored to Bali's tourism profile to help local SMEs and community-based tourism groups understand available green financing schemes, prepare proposals and navigate administrative procedures, complemented by capacity-building initiatives that strengthen the financial and technical skills of small tourism operators across Bali's districts.

Within this perspective, Bali's policy framework could explicitly allocate a dedicated portion of green finance to tourism SMEs and community-based initiatives in areas such as eco-lodges, desa wisata, cultural attractions and marine tourism, ensuring that local communities directly benefit from the green transition. Simplified procedures and documentation, supported by local intermediaries such as destination management organisations, tourism associations and village-level institutions, would make it easier for small businesses to apply for funding and comply with reporting requirements. In addition, incentive structures could be designed to reward verifiable improvements in environmental performance, for example, interest rate reductions or partial grants once hotels, restaurants or tour operators demonstrate measurable reductions in energy use, waste generation or water consumption, so that green finance in Bali does not remain concentrated in large, capital-intensive enterprises, but instead becomes a practical instrument for inclusive, locally embedded and culturally sensitive sustainable tourism transformation.

CONCLUSION

Green finance has a positive and significant influence on the development of sustainable tourism in Indonesia, particularly in Bali, where environmentally based funding support has been proven to accelerate the transformation of the tourism industry toward lower-carbon and more sustainable operations. The most dominant factor in this study namely, the accessibility of green credit or investment in renewable infrastructure indicates that ease of access to financing sources is the primary key for industry actors in effectively adopting sustainable practices. Furthermore, the implementation of green finance not only contributes to environmental preservation but also enhances the global competitiveness of tourist destinations through the adoption of stronger Environmental, Social, and Governance (ESG) standards. Based on these findings, it is recommended that the government formulate more specific regulations related to green taxonomy in the tourism sector to provide legal certainty for investors and financial institutions, while tourism industry actors need to begin conducting energy audits and obtaining green certifications independently to improve access to sustainable financing. Furthermore, future researchers are encouraged to expand the geographical scope of the study or adopt a qualitative approach through in-depth interviews with policymakers in order to gain a more comprehensive understanding of the barriers to the implementation of green finance in the tourism sector.

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