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THE PATH TO GREEN COMPETITIVENESS: EXPLORING THE ROLES OF STRATEGY, INNOVATION, CULTURE, AND TECHNOLOGY

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ABSTRACT

Green tourism is gaining popularity in Bangladesh, but several concerns remain regarding the sustainability of its competitiveness. The objective of this study examines how proactive environmental strategies, green innovation, green organizational culture, and green technology dynamism jointly influence green competitiveness in the tourism sector of Bangladesh. Following a quantitative design, a survey questionnaire was employed to collect data from a cluster-based sample of 437 respondents. The results of structural equation modeling indicate that proactive environmental strategies have varying effects on green competitiveness based on the indirect influence of green organizational culture and green innovation. This relationship is further strengthened by green technology dynamism, which represents a systematic approach to addressing environmental challenges. These findings carry both theoretical and practical applications. Apart from expanding the green tourism literature, the study provides recommendations to policymakers and industry stakeholders on the importance of investing in green technology, innovation, and culture. The proposed framework should be tested in other emerging countries to enhance generalizability.

KEYWORDS: Proactive Environmental Strategies, Green Innovation, Green Organizational Culture, Green Technology Dynamism, Green Competitiveness

1. INTRODUCTION

Bangladesh boasts over 700 tourism attractions, including beaches, forests, historical monuments, and cultural sites (Milon, 2024). With its numerous destinations and rich natural heritage, Bangladesh's tourism industry has vast potential for development. According to the World Travel and Tourism Council (2019) and The Financial Express (2023), Bangladesh attracts numerous foreign tourists from India (49%), China (19%), Myanmar (14%), Pakistan (6%), the United States (5%), and various other countries annually. In addition, 13.7 million domestic tourists visit these sites each year (BIDA, 2021). The Bangladesh Bureau of Statistics (2021) estimated that tourism contributed 3.02% to Bangladesh's GDP that year, compared with the global tourism industry's 10.4% contribution to global GDP.

However, the Bangladesh tourism industry faces significant challenges, ranging from inadequate infrastructure and facilities to insufficient information for tourists, which threaten its competitiveness and growth (Rahman, 2021). Adding to these issues, the global tourism sector is facing increased pressure to adopt sustainable practices in response to growing global concerns about climate change and environmental degradation. Specifically, tourism stakeholders are now prioritizing green competitiveness, which refers to the implementation of sustainable practices that mitigate environmental consequences by reducing carbon emissions, conserving natural resources, or promoting eco-friendly services (Chygryn et al., 2021). Without green competitiveness, Bangladesh's tourism sector cannot attract eco-conscious travelers, thereby harming national revenue, foreign exchange income, and job prospects. Consequently, it is crucial to implement ecologically sustainable policies to establish the long-term viability and competitiveness of the country's tourism industry.

Thus, sustainable tourism growth in Bangladesh requires accounting for ecological costs and adopting responsible practices, especially because tourist attractions and accessibility have a profound influence on tourist happiness (Biswas et al., 2020). Geospatial research indicates that over 44% of Bangladesh's territory possesses significant ecotourism value, with Cox's Bazar, Chittagong, and Rangamati identified as especially advantageous sites (Abtahee et al., 2023). Community-based tourism offers another sustainable model for tourism development, with three mountainous regions in the country identified as suitable for implementation (Mia et al., 2024). Recognizing this potential, the government has implemented the "National Tourism Policy-2010" and the "Seventh Five Year Plan FY2016–FY2020" to address challenges in the sector.

Towards achieving green competitiveness, proactive environmental strategies (PES) entail intentional actions by enterprises to mitigate their ecological footprint and enhance overall environmental performance (Sebaka & Zhao, 2023). Green innovation is essential for implementing these strategies, as it involves the development and utilization of innovative products, processes, and practices to achieve environmental benefits (Polas et al., 2023). According to Padilla-Lozano and Collazzo (2022), green innovation can significantly enhance a company's ecological competitiveness by improving efficiency, reducing expenses, and differentiating the firm in the market. Similarly, a green organizational culture (GOC) is crucial in the tourism sector for promoting employee engagement, firm reputation, customer loyalty, environmental sustainability, ecological policy implementation, and ultimately, green competitiveness (Danirmala, 2022). In addition, harnessing green technology dynamism, i.e., the rapid and continuous advancement of environmentally sustainable technologies (Gazali & Zainurrafiqi, 2023), can strengthen PES and improve the green competitiveness of tourism enterprises.

Notwithstanding these findings, research on environmental strategies and green competitiveness has largely been conducted in developed countries (Wang et al., 2022), while neglecting developing countries such as Bangladesh. Given the latter's different environmental and economic conditions, understanding how PES can be effectively implemented within the unique context of Bangladesh is crucial for advancing both theoretical and practical knowledge. Moreover, few studies have examined the mediating roles of green innovation and GOC in explaining the established relationship between PES and green competitiveness. This calls for research to explore the mechanisms linking innovation, organizational culture, environmental strategies, and competitiveness in the green tourism context. The literature has also largely overlooked the dynamic nature of green technology (Schot, 2020), which can help organizations enhance their green competitiveness by adapting to and leveraging technological advancements.

To address these gaps, this study's objective is to investigate how PES, green innovation, and GOC interact to promote green competitiveness in Bangladesh's tourism sector, with a focus on the moderating role of green technology dynamism. This comprehensive framework advances theoretical

understanding by integrating these factors and explaining how they jointly support tourism enterprises' sustainable practices and competitive advantage. Practically, the study offers valuable insights for tourism stakeholders (e.g., travel agencies, legislators) to promote the adoption of eco-friendly practices and green technologies. Ultimately, this research supports the tourism industry's efforts to achieve the United Nations' Sustainable Development Goals (SDGs) surrounding economic growth, climate action, and responsible consumption.

2. LITERATURE REVIEW

2.1. Resource-Based View (RBV)

In strategic management, the Resource-Based View (RBV) holds that a company's competitive edge originates from its unique, heterogenous, and immobile resources and capabilities rather than external factors like industry structure or competitive position. Specifically, the theory suggests that businesses with valuable, rare, inimitable, and non-substitutable (VRIN) resources are better poised to achieve a long-lasting competitive edge (Wernerfelt, 1984). From this perspective, the focus goes inward towards a company's internal resources and capabilities as a means of raising its competitive advantage (Barney, 1991). Building on the RBV, Madhani (2010) introduced the concept of core competencies, which are the unique abilities and technologies that enhance a firm's competitiveness.

Accordingly, empirical studies have linked RBV with sustainability and competitiveness. One analysis uncovered that proactive environmental policies enhance eco-innovation, which in turn, improves green core competency and competitive advantage (Kuo et al., 2022). Another study discovered a non-linear relationship between green technology and environmental performance, influenced by proactive environmental management and corporate strategies (Forés, 2019). Sharma and Vredenburg (1998) also showed that proactive environmental responsiveness is correlated with the cultivation of distinctive organizational capacities, thereby impacting firm competitiveness. Based on the RBV, these studies suggest that sustainable practices can augment competitiveness in the tourism sector.

2.2. Hypotheses Development

PES in the tourism industry have demonstrated beneficial effects on organizational sustainability and competitiveness. For example, these strategies foster green innovation, which directly enhances green core competency and indirectly strengthens green competitive advantage (Kuo et al., 2021). Green management practices, encompassing green manufacturing, commerce, logistics, environmental initiatives, and regulatory compliance, have also been shown to substantially improve the sustainability of tourism organizations in Bangladesh (Amir & Salehin, 2022). PES, combined with competitive differentiation and cost leadership advantages, has further been found to favorably influence the sustainable development of product strategy, manufacturing, and financial performance (Ahmed et al., 2021).

The triple-bottom-line approach has become central to evaluating sustainable development, extending beyond conventional economic metrics (Nogueira et al., 2023). Within the tourism sector, PES are increasingly recognized as essential capabilities that can enhance both competitiveness and sustainability (Elkhwesky, 2022). These strategies support environmental objectives and regulations, thereby promoting sustainable practices in hospitality and tourism. However, despite the growing significance of sustainability in tourism, there remains a lack of understanding regarding the efficacy of different methods in simultaneously fostering sustainable development and competitiveness (Camisón, 2020). PES have also been found to yield competitive benefits and boost business performance in the tourism sector (Do & Nguyen, 2020).

By adopting and promoting sustainable practices, Bangladesh's tourism sector has the potential to achieve continuous growth, attract the distinct demographic of environmentally conscious visitors, and safeguard its natural and cultural assets. Based on this discussion, the study proposes the following hypothesis:

H1: PES significantly increase green competitiveness in Bangladesh's tourism sector.

Previous research indicates that mitigating climate change and achieving sustainable development targets critically depends on PES, among which green innovation is crucial (Javeed et al., 2023). According to Madanaguli et al. (2023), multiple stakeholders (e.g., businesses, communities, and policymakers) play a significant role in shaping the environmental sustainability of rural tourism. Other research has revealed that the travel sector is becoming increasingly competitive due to the emergence of new destinations and products that demand adaptation to shifting trends (Azmi et al.,

2023).

In Bangladesh, efforts to transform into 'Smart Bangladesh' focus mainly on technological improvements, environmental sustainability, and resource utilization (Bhuiyan et al., 2024). This underscores the importance of government policy, environmental practices, and innovation in driving national tourism growth. Notably, implementing PES can help Bangladesh's tourism industry thrive sustainably by minimizing carbon emissions, protecting natural resources, and promoting environmentally responsible living. Through such strategies, green innovation ideas can be generated to help Bangladeshi tourism enterprises stand out from the competition. Based on this discussion, the study proposes the following hypothesis:

H2: PES significantly increase green innovation in Bangladesh's tourism sector.

A recent analysis of four decades of sustainable tourism research indicates evolving themes at the macro, meso, and micro levels, offering insights into the field's development and future directions (Agarwal et al., 2024). Comparative assessments of hotels and resorts further reveal emerging trends in energy efficiency, waste management, and community engagement, highlighting the need for local and governmental participation in developing sustainable tourist destinations (Papallou et al., 2024). Similarly, Campos et al. (2024) showed that environmental indicators in the hospitality sector, particularly those related to water, energy, waste, and emissions, are crucial for the effective and sustainable management of tourism destinations. Another study found that green human resource management can enhance employee attitudes, behaviors, and performance, leading to improved environmental outcomes in the organization (AlKetbi & Rice, 2024).

Collectively, these studies emphasize the complex nature of sustainability in tourism, encompassing environmental, social, and economic dimensions, which stresses the need for ongoing sustainability research and practice. Within this context, environmentally conscious behaviors and green strategies play an essential role in advancing Bangladesh's tourism industry. As the nation pursues sustainable development and works to mitigate its environmental impact, the green tourism industry is increasingly recognizing the importance of PES in fostering a green culture. Based on these findings, we propose the following hypothesis:

H3: PES significantly increase GOC in Bangladesh's tourism sector.

Green innovation and green competitiveness are becoming increasingly critical for the sustainable development of Bangladesh's tourism industry. Tourism fosters economic growth, generates employment, and alleviates poverty while facilitating the attainment of the SDGs (Rahman et al., 2024). Innovation in green tourism can promote rural development, safeguard natural and cultural heritage, advocate for gender equality, and diversify service exports (Honeck & Akhtar, 2014). Innovative green management practices (i.e., green manufacturing, commerce, logistics, environmental initiatives, and regulatory management) are also known to enhance organizational sustainability within the travel sector (Amir & Salehin, 2022). Nonetheless, obstacles such as inadequate infrastructure, limited investment, and political instability continue to impede progress in this area. To address these challenges and develop sustainable tourism in Bangladesh, firms should integrate corporate social responsibility with green financing while increasing stakeholder engagement in green innovation. Notably, by implementing innovative green practices, companies can attract environmentally conscious consumers and command premium prices for their products and services, leading to higher sales and profitability. Thus, it posits that green innovation can enhance the competitiveness of green tourism enterprises in Bangladesh. The study proposes the following hypothesis:

H4: Green innovation significantly increases green competitiveness in Bangladesh's tourism sector.

Green competitiveness is essential for tourism growth (Soh et al., 2023), with green competitive advantage emerging as a pivotal strategy (Bintara et al., 2023). This type of competitive advantage is anchored in firms' ecological innovation and environmental consciousness, which result in better performance and sustainability outcomes. To promote sustainable recovery in the post-pandemic era, companies and policymakers must prioritize financial stability, digital culture, and health concerns (Noor et al., 2023). Knowledge management is another crucial factor in strengthening the competitiveness of tourism enterprises, with theories such as the Knowledge-Based View, RBV, and Dynamic Capabilities Theory elucidating the connection between a firm's knowledge assets and competitive advantage (Ogutu et al., 2023).

Manigandan & Raghuram (2024) established the relationship between corporate culture and environmental competitiveness in the tourism industry. Widiyati and Murwaningsari (2021) also found that GOC affects competitive advantage in the hotel sector. Their study revealed that enterprises with a strong ecologically sustainable culture typically achieve higher levels of customer satisfaction, loyalty, and positive word-of-mouth, thereby gaining a competitive advantage over their rivals. Based on these findings, we propose that a strong green culture can significantly enhance firms' green competitiveness within Bangladesh's tourism sector. The study proposes the following hypothesis:

H5: GOC significantly increases green competitiveness in Bangladesh's tourism industry.

Sustainable innovation and green technology are becoming increasingly vital in most industries, including travel and hospitality. Research has highlighted how new technologies such as artificial intelligence (AI), blockchain, and Internet of Things (IoT) can improve efficiency and optimize resource management, thereby promoting sustainability (Chauhan & Sahoo, 2024). Campos et al. (2024) also demonstrated that environmental indicators (i.e., water, energy, waste, and emissions) are essential for sustainable destination management in the tourism industry. Likewise, Saxena et al. (2024) expressed that leadership, dynamic capabilities, and stakeholder involvement are critical elements influencing sustainable innovation in businesses.

Notably, Ahmed et al. (2020) noted a positive correlation between green competitiveness and green technology dynamism in Bangladesh's tourism industry. Similarly, Khan et al. (2020) found a positive association between green innovation and green technology dynamism in Bangladeshi tourism enterprises. Zhu et al. (2023) further showed that the use of green technologies and their dynamic capabilities has a significant impact on competitive advantage in manufacturing and green product development. Additionally, Karmaker et al. (2023) observed that the impact of these technologies is reinforced by green supply chain management and sustainable economic strategies, which improve both socioeconomic and environmental outcomes. The present study builds on these findings by testing how the dynamism of green technology in Bangladesh's tourism industry supports the adoption of sustainable practices by balancing the interaction between green innovation and PES.

Overall, the aggregate findings suggest that green technology dynamism, in conjunction with PES, can enhance green competitiveness in Bangladeshi tourism companies.

Based on this review, the following hypotheses are proposed:

H6: Green technology dynamism moderates the relationship between PES and green innovation in Bangladesh's tourism sector.

H7: Green technology dynamism moderates the relationship between PES and green competitiveness in Bangladesh's tourism sector.

In addition, green innovation and environmental initiatives play crucial roles in enhancing competitiveness and sustainability in the tourism industry. By facilitating the exchange of green information and promoting organizational green learning, environmental innovation strategies improve green competitiveness (Wang et al., 2022). Similarly, green innovation enhances firm performance and competitive advantage in small and medium-sized enterprises (SMEs) (Sudirman et al., 2024). Purwanto (2024) further noted that implementing green innovation strategies requires organizations to learn and adapt to green technological turbulence to achieve sustained competitive advantage.

In Bangladesh, the adoption of green energy and technology is hindered by obstacles; yet, it still presents opportunities for sustainable development and environmental preservation (Askary et al., 2022). Ibrahim and Mahmood (2022) found that PES indirectly enhance environmental performance through environmentally conscious manufacturing practices in SMEs. In addition, Pranee et al. (2024) identified strategic planning, green supply chain management, and innovation capabilities as critical determinants of performance among community-based firms in the tourism industry.

Collectively, these findings focus on the essential nature of green innovation and environmental policies in cultivating sustainable competitive advantage across diverse industries, including tourism. The application of these practices can drive environmental performance, strengthen organizational legitimacy, and enhance overall competitiveness. Based on the evidence, the following hypothesis is proposed:

H8: Green innovation mediates the relationship between PES and green competitiveness in Bangladesh's tourism industry.

This study further postulates the importance of

GOC in building environmental sustainability and green competitiveness in Bangladesh's tourism industry. Abbas and Tufail (2024) showed that GOC reinforces employees' pro-environmental behaviour and environmental self-identity. Salazar et al. (2012) found that environmental training and organizational learning, driven by innovation, foster PES in tourism enterprises. Another study by Qu et al. (2021) found that GOC impacts the link between green absorptive capacity and green innovation. Similarly, Assoratgoon and Kantabutra (2023) explained that it is necessary to concentrate on deeper cultural layers, such as conscious and unconscious assumptions and beliefs, in building a sustainable and productive organizational culture. Apart from that, Ali et al. (2023) proved GOC to be an essential mechanism between PES and green competitiveness in the tourism sector.

Based on these considerations, the following hypothesis is proposed:

H9: GOC mediates the relationship between PES and green competitiveness in Bangladesh's tourism sector.

The hypotheses are exhibited in the research model in Figure 1.

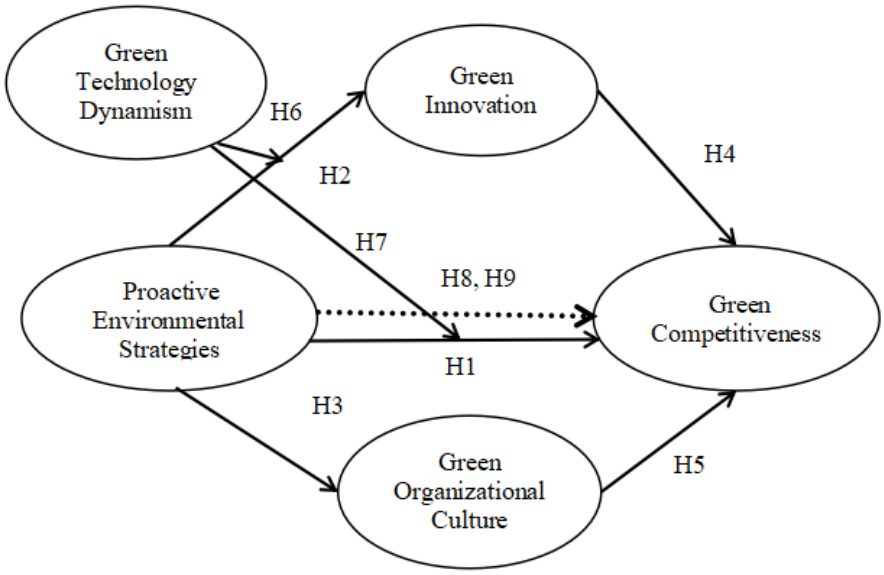

Figure 1: Conceptual Model.

3. MATERIALS AND METHODS

3.1. Sampling and Data Collection

This study adopted a quantitative methodology, using a structured questionnaire survey to collect consistent and reliable data for analysis. Target respondents of the study were middle line mangers who are working in Bangladesh. A minimum sample size of 384 was determined using the approach described by Krejcie and Morgan (1970). Using cluster sampling, a total of 600 questionnaires were distributed to respondents at two chosen sites in Bangladesh: Dhaka and Cox's Bazar. Of these, 514 responses were retrieved. After screening for validity, 437 questionnaires were retained for data analysis, while 77 were discarded due to incomplete responses. The final sample size yielded a satisfactory response rate of 72.83%.

3.2. Measurement Instruments

Six items measuring PES were adapted from Gonzalez-Benito et al. (2005) and Singjai et al. (2018). Five items for green innovation were adapted from Chen et al. (2006). The green technology dynamism scale, consisting of four items, was taken from Jiang et al. (2018). Wang (2019) provided five items for GOC, and seven items measuring green competitiveness were drawn from Chen (2008) and Zameer et al. (2020). Information from credible sources, such as the 2023 annual report of the Tourism Industry Board and the World Economic Forum (WEF), further served as supplementary sources for evaluating tourism competitiveness (Bustamante et al., 2021). All items were measured using a 5-point Likert scale, where 1 denoted "strongly disagree" and 5 denoted "strongly agree."

4. DATA ANALYSIS AND RESULTS

The demographic data in Table 1 reveals a relatively balanced gender distribution among middle line managers, with males making up 67.9% (297) and females 32.1% (140). In terms of age

distribution, most respondents were in the 31–35 age group (30.3%), followed closely by the 26–30 group (29.5%) and the 20–25 group (21.2%). The smallest proportion of respondents was over 35 years old (19.2%). Regarding work experience, most participants (35.8%) reported having 1–4 years of work experience, followed by 33.6% with 4–7 years. Respondents with 8–11 years of work experience accounted for 18.6%, while only 12.2% reported more than 11 years of experience. Overall, the data present a broad mix of ages and levels of working experience, offering a well-rounded understanding of the demographic and experiential traits of the surveyed group.

Table 1: Demographic Profile

Variables	Category	Frequency	Percent
Gender	Male	297	67.9
	Female	140	32.1
Age	20-25	92	21.2
	26-30	129	29.5
	31-35	132	30.3
	More than 35	84	19.2
Working Experience	01-04 Years	156	35.8
	04- 07 Years	147	33.6
	08-11 Years	81	18.6
	More than 11 Years	53	12.2

The proposed hypotheses were tested using the two-stage partial least squares structural equation modeling technique (PLS-SEM) (Hair et al., 2022). Table 2 presents the results of the initial measurement model assessment, consisting of factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE) values. Burns and Burns (2008) and Ghozali (2006) recommend a minimum factor loading of 0.6, while Hair et al. (2022) offer empirical support that items with a loading above 0.50 may be maintained if they are statistically significant and sufficiently build the construct. Following this guidance, items with loadings below 0.6 were deleted in this study to achieve the required AVE and CR levels. Specifically, three PES items, four green competitiveness items, two green innovation items, two GOC items, and one green technology dynamism item were removed.

According to recommended standards, AVE and CR should exceed 0.50 and 0.70, respectively (Nunnally, 1978; Hair et al., 2022). Table 2 shows that all constructs demonstrated factor loadings, CR, and AVE values surpassing the recommended thresholds. These results support the internal consistency reliability and convergent validity of the measurement model (see Figure 2).

Before proceeding to the structural model assessment, Variance Inflation Factor (VIF) values were assessed to rule out collinearity (see Table 2). Generally, VIF values below 5 indicate low multicollinearity, i.e., limited correlation among predictors in the model (Hair Jr. et al., 2021).

All VIF values in this study were less than 5, suggesting that multicollinearity was not a major issue in the model. Most VIF values were below 2, indicating very low correlation among predictors. Although slightly higher, VIF values like 3.356 and 2.401 were still within acceptable limits and showed only a modest degree of multicollinearity, which was not a significant issue in this analysis.

Table 2: Measurement Model Assessment

Constructs	Items	Loadings	CR	AVE	VIF
Green Competitiveness	GC1	0.749	0.784	0.549	1.152
	GC5	0.784			1.250
	GC7	0.686			1.201
Proactive Environmental Strategies	PES 3	0.794	0.873	0.696	1.213
	PES1	0.837			1.395
	PES5	0.871			1.869
Green Innovation	GI2	0.901	0.909	0.769	3.356
	GI3	0.895			1.956
	GI4	0.833			2.401
Green Organizational Culture	GOC2	0.850	0.861	0.674	1.647
	GOC3	0.764			1.393
	GOC4	0.845			1.636
Green Technology	GTD2	0.784	0.822	0.606	1.291

Dynamism	GTD3	0.795	1.398
	GTD4	0.756	1.282

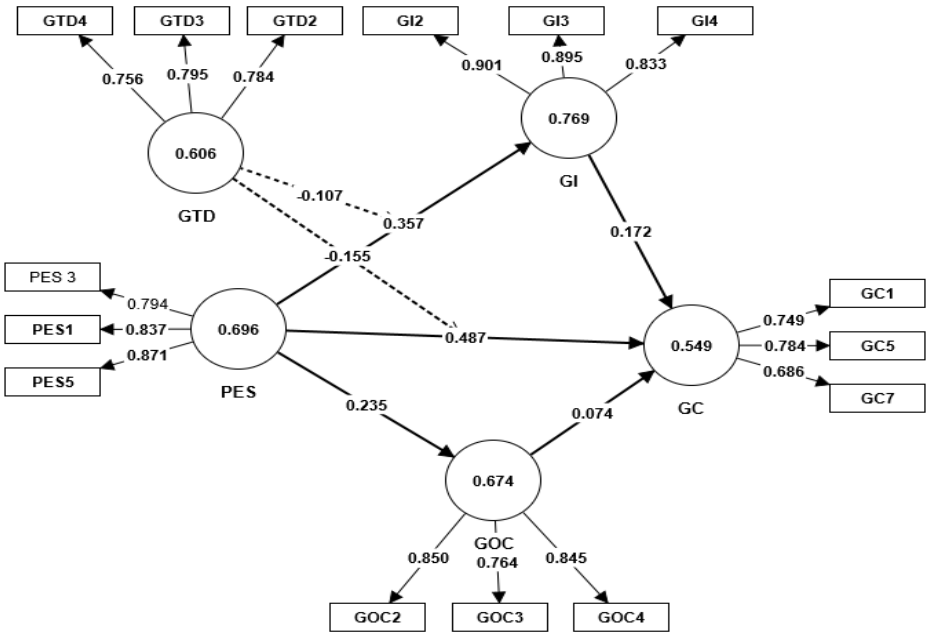

Figure 2: Measurement Model.

Moreover, Heterotrait-Monotrait (HTMT) ratios presented in Table 3 confirm the constructs' discriminant validity. All values fell within the acceptable maximum limit of 0.85 or 0.90 (Hair et al., 2017; Henseler et al., 2015), demonstrating that the construct measurements were sufficiently varied.

Table 3: Discriminant Validity Assessment (HTMT)

Constructs	GC	GI	GOC	GTD	PES
Green Competitiveness					
Green Innovation	**0.722**				
GOC	0.401	**0.169**			
Green Technology Dynamism	0.248	0.212	**0.089**		
PES	0.422	0.483	0.251	**0.170**	
Green Technology Dynamism x PES	0.825	0.473	0.195	0.211	**0.569**

Table 4 presents the structural model results for coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). As an indication of how well a model explains the phenomenon under study, Hair et al. (2022) categorized R^2 values as weak, modest, moderate, or strong, ranging from 0–0.10, 0.11–0.30, 0.30–0.50, and above 0.50, respectively. With an R^2 value of 0.707, the model explained 70.7% of the variance in green competitiveness, representing strong explanatory ability. An R^2 value of 0.278 indicates that the model explained 27.8% of the variance in green innovation, while an R^2 value of 0.255 shows that the model explained 25.5% of the variance in GOC, reflecting a modest level of explanatory power for these two variables.

Table 4: R^2, F^2 And Q^2 Results

Constructs	R^2	f^2	Q^2
Green Competitiveness	0.707	0.522	0.281
Green Innovation	0.278	0.132	0.186
GOC	0.255	0.159	0.034

Cohen et al. (1988) suggests that effect size, denoted by f^2, can be classified as small (≥0.02), medium (≥0.15), and large (≥0.35). In this study, the large f^2 value of 0.522 implies that the independent variables have a substantial influence on green competitiveness. Next, the f^2 value of 0.132 indicates a small-to-medium effect size for green innovation, while the f^2 value of 0.159 reflects a medium effect

size for GOC, suggesting that the independent variables have a moderate influence on this construct.

Predictive relevance was assessed using the Stone-Geisser Q^2 value, where a model that accurately predicts a particular endogenous construct is indicated by a Q^2 greater than zero. The Q^2 values of 0.281 for green innovation and 0.186 for green competitiveness in Table 4 suggest good predictive relevance. Although relatively low, the Q^2 value of 0.034 for GOC still exceeds zero, indicating limited predictive power.

Table 5 presents the results of the hypothesis testing within the structural model assessment. With p-values under 0.05, the findings show significant correlations among the constructs, thereby providing strong support for the hypotheses. PES indicated positive effects on green competitiveness, green innovation, and GOC, with beta values of 0.487, 0.357, and 0.235, respectively. The large t-statistics, along with p-values below 0.05, confirm the statistical significance of these relationships, supporting H1, H2, and H3. Green innovation also positively influenced green competitiveness, with a beta of 0.172, a t-statistic of 2.895, and a p-value of 0.002 ($p < 0.05$), stressing the role of creative environmental ideas in enhancing organizational competitiveness. Thus, H4 was supported. In the same manner, H5 was accepted, as GOC had a significantly positive, albeit smaller, effect on green competitiveness, with a beta of 0.074, a t-statistic of 2.279, and a p-value of 0.011 ($p < 0.05$). This indicates that focusing on a sustainability-oriented culture aids in securing competitive benefits.

For the moderation analysis, the interaction between green technology dynamism and PES showed a significant negative effect on green competitiveness ($\beta = -0.155$, $t = 2.704$, $p < 0.05$), but an insignificant negative effect on green innovation ($\beta = -0.107$, $t = 1.828$, $p > 0.05$). Therefore, H6 was supported, while H7 was rejected.

Table 5: Direct And Moderating Hypotheses Results

Hypotheses	Constructs	Beta (β)	Standard Deviation	T Statistics	P Values	Decision
H1	PES -> GC	0.487	0.061	7.951	0.000	Supported
H2	PES -> GI	0.357	0.119	3.002	0.001	Supported
H3	PES -> GOC	0.235	0.049	4.811	0.000	Supported
H4	GI -> GC	0.172	0.059	2.895	0.002	Supported
H5	GOC -> GC	0.074	0.033	2.279	0.011	Supported
H6	GTD x PES -> GC	-0.155	0.057	2.704	0.003	Supported
H7	GTD x PES -> GI	-0.107	0.059	1.828	0.064	Not Supported

Note: Statistical significance at T>1.96 (two-tails), p<0.05.

As shown in Table 6, the mediating role of green innovation in the PES-competitiveness relationship was not statistically significant, with a beta of 0.061, a t-statistic of 1.531, and a p-value of 0.063 ($p > 0.05$); as such, H8 was not supported. This suggests that while PES may directly encourage green innovation, such innovation does not explain the indirect effect between PES and green competitiveness. Conversely, the mediating effect of GOC between PES and green competitiveness was statistically significant, with a beta of 0.018, a t-statistic of 2.019, and a p-value of 0.022 ($p < 0.05$). This result, which supports H9, implies that tourism businesses prioritizing PES are able to strengthen their competitive advantage by fostering a green culture.

Table 6: Mediating Hypotheses Results

Hypotheses	Constructs	Beta (β)	Std. Deviation	T Statistics	P Values	Decision
H8	PES -> GI -> GC	0.061	0.04	1.531	0.063	Not Supported
H9	PES -> GOC -> GC	0.018	0.009	2.019	0.022	Supported

Note: Statistical significance at T>1.96 (two-tails), p<0.05

5. FINDINGS AND DISCUSSION

Based on the RBV, this study verifies the importance of leveraging internal resources and capabilities, namely PES, green innovation, GOC, and green technology, to boost the green competitiveness of Bangladesh's tourism sector. First, the study discovered that environmental strategies significantly and positively influence green competitiveness (H1), in line with prior research by Lee and Ball (2003) and Rehman and Prokop (2023). This suggests that green tourism businesses that adopt PES are more likely to gain a competitive advantage. Thus, proactive actions like reducing carbon footprint, conserving resources, and promoting sustainability are important for firms to stand out in the market and attract eco-conscious customers.

Likewise, PES were shown to greatly cultivate green innovation (H2), supporting prior research (Bhatia, 2021; Özgül & Zehir, 2023). This finding denotes that tourism companies focusing on environmental sustainability are more inclined to innovate their products and processes towards being environmentally friendly. The results also indicate that proactive environmental initiatives significantly and positively influence GOC (H3), consistent with the study of Lin et al. (2024). In other words, organizations that implement PES are more likely to foster a culture that values and acts in favor of the environment.

Green competitiveness is also significantly influenced by green innovation (H4), confirming the role of innovation in driving organizational competitiveness in the tourism sector. This finding backs previous studies (Borsatto & Amui, 2019; Nuryakin & Maryati, 2020). Innovative, environmentally friendly products and processes serve as a key channel for strengthening competitiveness in green tourism, particularly by ensuring adherence to regulations, cutting costs, and meeting the mounting demand for sustainable tourism options. In addition, the empirical results validate a positive influence of GOC on green competitiveness (H5), corroborating existing literature (Muisyo et al., 2022; Ahmad et al., 2023). A robust green culture incorporates sustainability into the firm's core operations and beliefs, which boosts the firm's competitive advantage via employee involvement and support for environmental projects.

This study further found that the relationship between PES and green competitiveness is negatively moderated by green technology dynamism (H6), supporting the works of Li et al. (2019) and Asad et al. (2023). The negative moderating effect ($\beta = -0.155$, $p = 0.003$) indicates that while proactive environmental strategy (PES) enhances green competitiveness (GC), this effect becomes weaker when green technology dynamism (GTD) is high. In highly dynamic technological environments, rapid changes and uncertainty make it more difficult for firms to keep pace and fully leverage their environmental initiatives. As a result, the ability of PES to translate into competitive advantage is reduced. When GTD is lower and technologies are more stable, PES can be implemented more effectively, leading to stronger gains in green competitiveness. Conversely, green technology dynamism does not act as a moderator between PES and green innovation (H7). A possible explanation is that PES may drive green innovation to such an extent that the technology's dynamism becomes negligible.

Interestingly, contrary to the study's expectations, the findings show that green innovation does not mediate the relationship between PES and green competitiveness (H8). This suggests that while firms pursue PES, it does not automatically lead to innovation-driven competitive advantages. Green innovation may require more resources, time, or capabilities than firms currently possess. Consequently, PES might enhance competitiveness through more direct channels, such as reputation, regulatory compliance, or operational efficiency. Instead, the study found that GOC plays a significant mediating role in the PES-competitiveness relationship (H9). That is, cultivating a sustainable corporate culture is a main pathway by which PES translate into green competitiveness.

5.1. Theoretical Implications

The RBV provides a useful foundation for understanding the theoretical implications of this study's findings regarding PES, green innovation, GOC, and green competitiveness in the green tourism industry. The supported hypotheses offer profound contributions to the literature on Bangladesh's tourism sector, namely in the domain of organizational sustainability and competitiveness.

The findings suggest that the application of PES (e.g., resource efficiency, waste management) not only reduces the systemic environmental impact of tourism enterprises but also boosts their competitiveness and innovation potential. Furthermore, GOC emerges as a critical mediator in the relationship between PES and green competitiveness. Companies that place high importance on sustainability in their organizational culture are more likely to see consistent employee behaviors aligned with environmental goals, which in turn, improves overall performance and market position.

Moreover, the moderating impact of green technology dynamism highlights the imperative for organizations to adapt to advancements in green technology solutions. Tourism companies that can incorporate novel green technologies into their strategies are capable of attaining a competitive edge, as technological developments influence both customer preferences and operational efficiency. Taken together, these findings extend theoretical perspectives by offering empirical evidence on the importance of sustainability initiatives, GOC, and technological adaptability in the sustainable development and long-term competitiveness of Bangladesh's tourism industry.

5.2. Practical Implications

The results of this research carry substantial practical implications for Bangladesh's green tourism sector. Specifically, it calls for tourism practitioners to adopt a comprehensive approach that integrates environmental footprint reduction with proactive actions (e.g., investments in energy efficiency, effective waste management) to substantially improve the environmental sustainability and attractiveness of tourism destinations. This approach also aligns with the preferences of modern environmentally conscious travelers seeking sustainable holiday options.

Moreover, it is vital for travel agencies to promote a culture of environmentally friendly innovation. Investing in sustainable technologies and adopting green practices across the tourism value chain can ensure widespread benefits, making Bangladesh's unique attractions stand out further to international visitors. Another core contribution of this study to tourism firms is regarding the importance of integrating technological developments (e.g., digital infrastructure and renewable energy sources) into sustainable tourism solutions, while also acknowledging the adverse influence of green technology dynamism.

Implementing these strategies can help Bangladesh's tourism sector enhance its competitiveness, efficiency, and adaptability, leading to a stronger competitive advantage in an increasingly sustainability-oriented global marketplace. By positioning itself as an ecotourism destination through pro-environmental initiatives, Bangladesh can attain tourism growth while simultaneously protecting its natural and cultural assets and attracting eco-conscious visitors. Lastly, tourism authorities and travel management bodies should prioritize investments in these areas, as doing so can streamline operational processes, cut costs, and increase competitiveness in the international travel market.

5.3. Limitations And Directions for Future Research

Although this study contributes significant insights into the factors influencing green competitiveness in Bangladesh's tourism industry, its limitations should be accounted for in future studies. First, the findings are confined to Bangladesh's green tourism industry and may not be generalizable to other industries or nations. Future research could explore how different contextual factors (e.g., government policies, market conditions, and cultural norms) moderate the links among PES, green innovation, GOC, and green competitiveness in diverse settings. Second, the cross-sectional design of this research limits the ability to establish causal links between variables. Longitudinal or experimental study designs can be used by researchers in the future to provide stronger evidence of the causal relationships in our framework. Third, the study's self-reported data and certain single-item measures may have generated bias. Future research might circumvent these constraints by using multi-item scales for each construct and, if practical, triangulating survey data with objective data sources.

6. CONCLUSION

This study has proven that green competitiveness in the tourism industry is primarily driven by the interplay among PES, green innovation, and GOC. Proactive strategies establish a strong foundation for sustainability by surpassing regulatory requirements and fostering innovation, while green innovation enables businesses to develop eco-friendly products and processes that elevate their market differentiation. A supportive GOC further amplifies these efforts by building employee commitment and aligning organizational values with environmental goals. These findings underscore the importance of integrating strategic, cultural, and innovative approaches to achieve green competitiveness, while remaining adaptive to technological advancements that aid operational efficiency. Future research should explore sector-specific dynamics, time-lag effects, and broader geographic contexts to expand generalizability and deepen understanding of these insights.

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APPENDIX

Survey Questionnaire

Kindly place a tick mark (✓) on the number from 1 to 5 that most accurately reflects the degree to indicate your level of satisfaction (Strongly Agree = 5, Agree = 4, Neutral= 3, dissatisfaction (Disagree = 2, Strongly disagree = 1) with each of the following statements

Variables	Items
Proactive Environmental Strategies (PES)	1. My company actively monitors the environmental impact of its operations.
	2. I implement preventive measures to reduce environmental risks within my area of responsibility.
	3. I encourage the use of cleaner processes.
	4. My company invests in eco-friendly technologies to improve environmental performance.
	5. I help apply environmental standards which is legal requirements.
	6. I proactively engage in waste reduction.
Green Innovation (GI)	1. My company improves existing services to make them more environmentally friendly.
	2. My company redesigns operational processes to reduce environmental harm.
	3. I encourage my team to use innovative green technologies to save environment.
	4. My company encourage to use innovative technologies to save resources.
	5. Environmental considerations are a key driver in our innovation activities.
Green Organizational Culture (GOC)	1. Our company values environmental protection as part of its core culture.
	2. Employees are encouraged to behave in an environmentally responsible way.
	3. Environmental responsibility is integrated into our organizational values.
	4. Management strongly supports environmental initiatives.
	5. A green mindset is promoted throughout the organization.
Green Technological Dynamism (GTD)	1. The demand for new green technologies is constantly increasing.
	2. I observe rapid technological changes in tourism operations.
	3. I observe smart waste systems evolving in our industry.
	4. New green technologies are introduced in our organization.
Green Competitiveness (GC)	1. Our green practices enhance the competitiveness of company.
	2. Offering environmentally friendly products strengthens our market position.
	3. Green initiatives improve customer satisfaction and loyalty.
	4. Our green strategies differentiate us from competitors.
	5. Green efforts contribute to long-term business sustainability.
	6. We gain financial benefits from implementing green practices.
	7. Our green initiatives enhance company's reputation.