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Analysis of factors influencing green environmental performance of hotels in West Sumatra

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Abstract

The hospitality industry in West Sumatra faces challenges in improving environmental performance due to the increasing number of tourists and the waste generated. This study aims to analyze the influence of green intellectual capital, green transformational leadership, and green human resource management on environmental performance through employees' pro-environmental behavior. A quantitative approach was employed using the Structural Equation Modeling (SEM)-PLS method, involving 536 respondents from 268 hotels in West Sumatra. The analysis results indicate that green intellectual capital directly affects environmental performance ($p < 0.000$) and pro-environmental behavior ($p < 0.033$). Green human resource management influences both environmental performance ($p < 0.016$) and pro-environmental behavior ($p < 0.000$). Green transformational leadership only affects pro-environmental behavior ($p < 0.048$) but does not significantly impact environmental performance ($p < 0.766$). An indirect effect was found in green intellectual capital on environmental performance through pro-environmental behavior ($p < 0.009$) and green human resource management ($p < 0.029$). Employees' pro-environmental behavior has been proven to be a mediating variable that strengthens the relationship between organizational factors and hotel environmental performance. This study emphasizes that investing in green intellectual capital and green human resource management strategies is essential to enhance the sustainability of the hospitality industry. The recommendations include strengthening green policies, providing continuous employee training, and offering incentives for hotels committed to sustainability.

Keywords: Green human resource management, green intellectual capital, green transformational leadership, pro-environmental behavior, environmental performance.

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1. Introduction

The tourism industry is a vital economic sector in Indonesia, contributing 3.8% to the Gross Domestic Product (GDP) in 2023 [1]. West Sumatra possesses significant tourism potential, characterized by its unique natural attractions, cultural heritage, and culinary experiences that attract both domestic and international visitors. According to the West Sumatra Tourism Office, the number of tourists visiting the region reached 13,397,670 in the same year, reflecting a substantial increase in the regional tourism sector [2]. The rise in tourist numbers corresponds directly to an increase in hotel occupancy rates, which, in turn, leads to a higher volume of waste generated by the hospitality industry [3]. Hotel waste consists of various materials, including food waste, plastics, paper, and metals, which, if not properly managed, can contribute to environmental pollution [4]. The growing volume of hotel waste poses a significant challenge in maintaining ecological balance in tourist destinations.

Data shows that in 2022, hotel waste in West Sumatra reached 200,000 tons, an increase from the previous year [5]. Padang recorded the highest volume of hotel waste, followed by Bukittinggi and Pariaman, which are the province's main tourism hubs. With this rising trend, hotel waste management strategies have become an increasingly urgent issue for both environmental sustainability and the hospitality industry. Hotels that are not environmentally friendly can have negative impacts not only on the environment but also on public health and the long-term viability of the hospitality business itself [6]. Poorly managed hotel waste can contaminate water sources, increase greenhouse gas emissions, and degrade air quality in tourist areas [7]. Additionally, negative perceptions of hotels that fail to implement eco-friendly practices can reduce their attractiveness to environmentally conscious travelers [8].

The pressure to adopt environmentally friendly practices is increasing in the global hospitality industry, including in Indonesia [9]. The concept of the "Green Hotel" has emerged as a solution to reduce environmental impact through the implementation of sustainable practices, such as improved waste management, energy efficiency, and the use of eco-friendly materials [10]. Governments and stakeholders play an active role in promoting the adoption of this concept through regulations, certifications, and incentive programs for hotels that meet sustainable environmental standards. In this context, research on green intellectual capital, green transformational leadership, and green human resource management is becoming increasingly relevant [11]. These factors can contribute to enhancing employees' pro-environmental behavior and improving the environmental performance of hotels in West Sumatra. The findings of this study are expected to provide valuable insights for the sustainability of the hospitality industry and serve as a foundation for designing more effective policies to support environmentally friendly tourism.

2. Theoretical Review

2.1. Environmental Performance

Green hotel environmental performance is defined as the outcome of managing the environmental impact of hotel activities by complying with regulations and exceeding stakeholder expectations [12]. According to studies, environmental performance reflects an organization's initiatives in meeting and surpassing societal expectations regarding sustainability, rather than merely adhering to regulatory requirements [10, 13]. In the hospitality sector, effective environmental management significantly contributes to global sustainability by reducing carbon emissions, improving resource efficiency, and proactively managing waste [14]. The hotel industry holds a major responsibility in minimizing energy, water, and fuel consumption while handling large volumes of waste [15].

Green environmental performance is influenced by several key factors, including green intellectual capital, green transformational leadership, green human resource management (GHRM), and employees' pro-environmental behavior. Green intellectual capital, which encompasses human capital and structural green capital, has been proven to positively contribute to environmental performance [16-21]. Additionally, green transformational leadership plays a crucial role in driving green innovation and fostering organizational environmental citizenship behavior through employee empowerment [22, 23]. GHRM also contributes to environmental performance by encouraging employees to innovate and develop eco-friendly products and processes [24-29]. Furthermore, employees' pro-environmental behavior acts as a mediating variable that connects internal and external factors to environmental performance. Actions such as reducing energy consumption, managing waste, and using environmentally friendly products significantly contribute to corporate sustainability [30-33].

2.2. Green Human Resource Management (GHRM)

Green Human Resource Management (GHRM) is the integration of environmental awareness into all HR management processes, including recruitment, training, rewards, and the development of a workforce that understands and applies eco-friendly practices [34]. GHRM incorporates an organization's ecological management goals into various HR functions, such as recruitment and selection, training and development, performance management, and reward systems [35, 36]. As part of the sustainable HRM literature, GHRM serves as a platform linking HRM practices with corporate environmental management activities [37]. Studies emphasize that GHRM can reduce pollution by managing the organization's operational processes [38]. Furthermore, strategic-level HRM has been shown to contribute to improved environmental performance within organizations [33].

Green Human Resource Management is assessed based on four main dimensions: green recruitment, green training, environmentally friendly employee evaluation, and green compensation and reward systems [16]. Research also states that GHRM is not only oriented toward eco-friendly HRM practices but is also closely related to corporate environmental strategies and employees' green behavior [38]. Studies have found that implementing GHRM has a positive relationship with employees' pro-environmental behavior, meaning that the better the implementation of GHRM, the higher the employees'

contribution to environmental sustainability in the workplace [33]. Thus, GHRM plays a crucial role in helping organizations achieve sustainability goals through human resource management aligned with responsible environmental practices.

2.3. Green Transformational Leadership

Green transformational leadership is defined as leadership behavior that focuses on creating a clear vision, inspiring, and motivating employees to achieve organizational sustainability goals [13, 39, 40]. Green transformational leaders play a crucial role in fostering an innovative work environment that supports sustainability by encouraging employees to identify with the organization's vision [41]. This leadership style not only emphasizes inspiration but also enhances innovation and company performance by creating a motivating work climate that drives employee engagement [42-44]. In a competitive business context, green transformational leadership contributes to product and process innovation, enhancing the company's competitive advantage [45, 46]. Additionally, this leadership positively impacts performance management, talent management, and employee efficiency through the intellectual stimulation provided by leaders [47, 48].

Green transformational leadership also plays a role in activating green human resource management (GHRM) practices aimed at acquiring, developing, and retaining employee work behaviors aligned with sustainability principles [49-51]. Leaders with strong green beliefs and values significantly influence HR management strategies that support organizational environmental goals [38, 47]. Indicators of green transformational leadership include inspiration, vision, environmental planning, environmental goals, environmental beliefs, and the implementation of green ideas in daily organizational practices [13, 39, 40]. With effective green transformational leadership, companies can more easily adapt to global sustainability trends and enhance their environmental performance.

2.4. Green Intellectual Capital

Green intellectual capital is an organizational value-creation asset that encompasses knowledge, competencies, and relationships at both the individual and organizational levels, managed with the primary goal of environmental protection [18]. This capital consists of three main components: green human capital, green structural capital, and green relational capital [16, 19, 52]. Green human capital refers to employees' skills, knowledge, experience, and creativity in supporting environmental sustainability. Green structural capital includes organizational infrastructure, information technology systems, corporate governance, and management philosophy that support eco-friendly practices. Meanwhile, green relational capital encompasses collaborative relationships with customers, suppliers, strategic partners, as well as government and industry networks for environmental management and green innovation [53]. With green intellectual capital, companies can comply with international environmental regulations, enhance organizational image, and create added value in sustainability aspects.

Green intellectual capital also plays a crucial role in developing green human resource management (GHRM), where HRM practices influence the strengthening of various aspects of intellectual capital [54]. Studies indicate that "green human capital" and "green relational capital" contribute to the adoption of GHRM in the manufacturing sector [52]. Additionally, employees' prior work experience related to environmental issues can accelerate the development of environmental knowledge within the current company [55]. Other studies have found that companies implementing green human, structural, and relational capital practices can improve their sustainability performance [56]. Furthermore, green intellectual capital has been proven to positively impact a company's economic, environmental, and social performance [57] and significantly contribute to achieving corporate environmental performance [55].

2.5. Pro-Environmental Behavior

Employees' green pro-environmental behavior refers to voluntary individual actions that contribute to the effectiveness of an organization's environmental performance [58]. This behavior includes various activities such as resource conservation, energy consumption reduction, and participation in eco-friendly workplace practices [59]. Studies emphasize that employees' pro-environmental behavior plays a role in promoting corporate social responsibility for natural resource conservation [60]. This behavior is categorized into three main dimensions: eco-initiatives, eco-civic engagement, and eco-helping [58, 61]. Research has found that employees' pro-environmental behavior positively influences corporate environmental performance, particularly in the manufacturing sector [33].

Green human resource management (GHRM) contributes to increasing employees' awareness and engagement in environmental issues, ultimately improving corporate environmental performance [40]. Strategic HRM has been found to play a role in shaping employees' pro-environmental behavior and acts as a mediator in the relationship between GHRM and environmental performance [30-32]. Moreover, providing incentives for employees engaged in eco-friendly practices can strengthen their motivation to contribute to corporate environmental sustainability. Therefore, implementing effective green HRM practices is crucial for companies in fostering a workplace culture that supports sustainability and enhances environmental performance [62].

3. Methodology

This study employs a quantitative approach to analyze the influence of green intellectual capital, green transformational leadership, green human resource management, and employees' pro-environmental behavior on the environmental performance of hotels in West Sumatra. The analysis method used is Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach, which enables researchers to statistically examine the relationships between latent variables. This method was chosen due to its ability to model complex interactions among latent variables while maintaining accuracy and predictive reliability. The study population consists of 875 star-rated and non-star hotels in West Sumatra, based on data from BPS (Statistics Indonesia) in 2023. The research sample was determined using Slovin's formula with a 90% confidence

level, resulting in 268 hotels as the sample. Each hotel is represented by two respondents—one manager and one employee—leading to a total of 536 respondents. Respondents were selected based on a minimum of one year of work experience and involvement in the hotel's environmental activities. Managers and employees were chosen as respondents because they possess in-depth knowledge of green practices and environmental management in hotels, aligning with previous studies in green human resource management [41-43].

4. Results and Discussion

4.1. Result

Before hypothesis testing, an assessment of the reflective measurement model was conducted to validate the manifest variables (indicators) and constructs for further examination. The initial assessment includes an evaluation of factor loadings, which indicate the intensity of the relationship between manifest variables and their latent constructs. Hair et al. [63] state that reflective indicators should be removed from the measurement model when the loading value (λ) is less than 0.5, after which the model is recalibrated. If the loading value (λ) exceeds 0.5, the indicator is considered valid.

Indicators with high factor loadings significantly contribute to explaining their latent variables, whereas indicators with low factor loadings provide minimal contribution in explaining their respective constructs. The loading values (λ) are presented in Table 1.

Table 1.
Factor Loadings of Variables.

Item	Factor Loadings				
	Environmental Performance	Green Human Resource Management	Green Transformational Leadership	Green Intellectual Capital	Employees' Pro-Environmental Behavior
1	0.993	0.970	0.765	0.900	0.752
2	0.990	0.985	0.814	0.924	0.751
3	0.987	0.987	0.760	0.937	0.796
4	0.995	0.983	0.756	0.941	0.789
5	0.989	0.982	0.773	0.910	0.745
6	0.973	0.982	0.887	0.942	0.676
7	0.991	0.977	0.862	0.921	0.704
8	0.980	0.981	0.865	0.891	0.754
9	0.994	0.984	0.845	0.897	0.713
10	0.993	0.982		0.908	
11		0.661		0.923	
12		0.987		0.916	
13		0.984		0.902	
14		0.986		0.926	
15		0.987		0.943	
16		0.986		0.937	
17		0.975			
18		0.983			
19		0.980			

Based on the analysis results using Smart-PLS 3.0, all manifest variables in Green Human Resource Management, Green Intellectual Capital, Green Transformational Leadership, Pro-Environmental Behavior, and Environmental Performance have a loading factor value above 0.50, ranging from 0.661 to 0.987. This indicates that these indicators are valid in measuring the latent variables and significantly contribute to explaining them. Convergent validity is a crucial aspect of construct measurement, assessing the extent to which a construct can explain the variance of the items forming it Hair et al. [63]. One of the primary indicators used is the Average Variance Extracted (AVE), with a minimum threshold of 0.50. If the AVE value exceeds 0.50, the construct is considered to have good convergent validity. The results of the discriminant validity analysis are further presented in Table 2, which compares the AVE values for each latent variable.

Table 2.
Convergent Validity Test Results.

Variable	Average variance extracted (AVE)
Green Transformational Leadership	0.980
Environmental Performance	0.976
Green Transformational Leadership Green Human Resource Management	0.939
Green Intellectual Capital	0.846
Employees' Pro-Environmental Behavior	0.552

Based on Table 2, it can be concluded that all five latent variables have AVE values exceeding the minimum criterion of 0.5. This indicates that the variance of the indicators for Green Intellectual Capital, Human Resource Management, Transformational Leadership, Pro-Environmental Behavior, and Environmental Performance is considered valid.

To evaluate discriminant validity, three commonly used analytical methods are the Fornell and Larcker Criterion, Cross Loadings, and the Heterotrait-Monotrait Ratio (HTMT). Among these, HTMT analysis has been proven to be superior. All HTMT ratio values in this study are below 0.85, as recommended by Henseler et al. [64]. Therefore, HTMT analysis is used in this study to assess discriminant validity, with the results presented in Table 3.

Table 3.
Discriminant Validity Test Results.

Variabel	Green Transformational Leadership	Environmental Performance	Green Transformational Leadership Green Human Resource Management	Green Intellectual Capital	Employees' Pro-Environmental Behavior
Green Transformational Leadership					
Environmental Performance	0.289				
Green Transformational Leadership Green Human Resource Management	0.333	0.438			
Green Intellectual Capital	0.216	0.710	0.264		
Employees' Pro-Environmental Behavior	0.343	0.585	0.501	0.335	

The discriminant validity test results in Table 2 indicate that all heterotrait-monotrait ratio (HTMT) values are below 0.85, signifying a clear distinction between the constructs in the research model. Green transformational leadership has the lowest correlation with green intellectual capital (0.216) and the highest correlation with pro-environmental behavior (0.343). Environmental performance exhibits the strongest relationship with green intellectual capital (0.710) and a significant association with pro-environmental behavior (0.585). Meanwhile, green human resource management shows the highest correlation with environmental performance (0.438) and a moderate relationship with pro-environmental behavior (0.501). Overall, these findings indicate that each variable in the study demonstrates good discriminant validity, and there is no multicollinearity among the constructs. The composite reliability analysis confirms strong internal consistency for all constructs, with Cronbach's Alpha and Composite Reliability values exceeding the recommended threshold of 0.70. The detailed results of Cronbach's Alpha and Composite Reliability analysis are presented in Table 4.

Table 4.
Composite Reliability Test.

Variable	Cronbach's Alpha	Reliability Composite
Green Transformational Leadership	0.996	0.997
Environmental Performance	0.997	0.997
Green Transformational Leadership Green Human Resource Management	0.996	0.997
Green Intellectual Capital	0.988	0.989
Employees' Pro-Environmental Behavior	0.900	0.917

The reliability test results in Table 4 indicate that all variables in this study exhibit high reliability, with Cronbach's Alpha and Composite Reliability values exceeding 0.6. Green Transformational Leadership, Environmental Performance, and Green Human Resource Management have the highest reliability scores (0.996–0.997). Meanwhile, Green Intellectual Capital (0.988–0.989) and Pro-environmental Behavior (0.900–0.917) also demonstrate strong reliability. The higher Composite Reliability values compared to Cronbach's Alpha confirm that the constructs in this study are well-measured and consistent. Therefore, the measurement model used in this research can be considered valid and reliable for assessing the studied variables.

The inner model tests the structural model's fit with the data through latent variable analysis. The process begins with evaluating the measurement model before proceeding to the structural model using bootstrapping. The evaluation is based on t-statistics (≥ 1.96) and p-values (≤ 0.05) to determine hypothesis acceptance. The coefficient of determination (R^2) measures the contribution of exogenous variables to endogenous variables, categorized as strong (0.67), moderate (0.33), and weak (0.19) (Chin, 1998). The R^2 values for Green Human Resource Management, Pro-environmental Behavior, and Environmental Performance are presented in Table 5.

Table 5.
Inner Model Result.

Variable	R Square	Adjusted R Square
Environmental Performance	0.737	0.712
Green Transformational Leadership Green Human Resource Management	0.145	0.133
Employees' Pro-Environmental Behavior	0.249	0.231

The analysis of the coefficient of determination (R^2) shows that the environmental performance variable has an R^2 value of 0.737, meaning that 73.7% of its variability can be explained by green intellectual capital, green human resource management, and green transformational leadership. Green human resource management has an R^2 value of 0.145, indicating that 14.5% of its variability is explained by green intellectual capital and green transformational leadership. Meanwhile, pro-environmental behavior has an R^2 value of 0.249, meaning that 24.9% of its variation is influenced by green intellectual capital, green human resource management, and green transformational leadership.

Path analysis is used to measure the strength of the influence of one variable on another, both directly and indirectly, using the bootstrapping method to evaluate the significance of its effect. In this study, hypotheses are accepted at a 5% significance level with a critical value of 1.96, indicating that the relationships between variables in the research model are statistically significant. The analysis results are presented in Table 6.

Table 6.
Variable Relationship Constructs.

Variable Relationship Constructs	Coefficient	T Value	P Value
Green Intellectual Capital -> Employees' Pro-Environmental Behavior	0.201	2.135	0.033
Green Intellectual Capital -> Environmental Performance	0.561	7.036	0.000
Green Transformational Leadership Green Human Resource Management -> Employees' Pro-Environmental Behavior	0.379	3.832	0.000
Green Transformational Leadership Green Human Resource Management -> Environmental Performance	0.127	2.411	0.016
Green Transformational Leadership -> Employees' Pro-Environmental Behavior	0.175	1.981	0.048
Green Transformational Leadership -> Environmental Performance	0.016	0.298	0.766
Green Intellectual Capital -> Green Transformational Leadership Green Human Resource Management	0.200	2.137	0.033
Green Transformational Leadership Hijau -> Green Transformational Leadership Green Human Resource Management	0.289	3.801	0.000
Employees' Pro-Environmental Behavior -> Environmental Performance	0.320	3.346	0.001
Green Intellectual Capital -> Kinerja Lingkungan -> Employees' Pro-Environmental Behavior	0.114	2.610	0.009
Green Transformational Leadership Green Human Resource Management -> Environmental Performance -> Employees' Pro-Environmental Behavior	0.121	2.189	0.029

The path analysis results indicate that green intellectual capital has a positive effect on pro-environmental behavior (0.201; $p = 0.033$) and environmental performance (0.561; $p = 0.000$). Similarly, green human resource management also enhances pro-environmental behavior (0.379; $p = 0.000$) and environmental performance (0.127; $p = 0.016$). Green transformational leadership positively influences pro-environmental behavior (0.175; $p = 0.048$) but does not have a significant impact on environmental performance (0.016; $p = 0.766$). Additionally, green intellectual capital improves green human resource management (0.200; $p = 0.033$), as does green transformational leadership (0.289; $p = 0.000$). Finally, pro-environmental behavior positively affects environmental performance (0.320; $p = 0.001$). These findings indicate that green intellectual capital, green human resource management, and green transformational leadership play a crucial role in shaping pro-environmental behavior and enhancing the environmental performance of hotels in West Sumatra.

The analysis results indicate that green intellectual capital and green human resource management have an indirect effect on environmental performance through pro-environmental behavior. Green intellectual capital shows a positive influence with a coefficient of 0.114 ($T = 2.610$; $p = 0.009$), while green human resource management has a coefficient of 0.121 ($T = 2.189$; $p = 0.029$). Both relationships are significant, indicating that an increase in green intellectual capital and green human resource management will enhance pro-environmental behavior, ultimately having a positive impact on the environmental performance of hotels in West Sumatra Province.

4.2. Discussion

4.2.1. Green Intellectual Capital on the Green Environmental Performance of Hotels in West Sumatra

The research findings indicate that green intellectual capital plays a significant role in enhancing the environmental performance of hotels in West Sumatra. This capital consists of human capital, structural capital, and relational capital, which support the implementation of environmentally friendly policies and practices [44]. Employees with knowledge and skills in sustainability are more proactive in managing energy efficiency, reducing waste, and implementing green operational strategies [50]. Additionally, the growing demand from tourists for hotels that adopt sustainability principles encourages hotels to develop green intellectual capital to enhance competitiveness and customer loyalty [65]. Thus, green intellectual capital not only has a positive impact on the environment but also provides economic benefits for hotels.

The successful implementation of green intellectual capital in the hospitality industry is also influenced by innovation and green transformational leadership. Competent human capital enables the development of energy efficiency programs and the adoption of environmentally friendly technologies [44] while strong structural capital accelerates sustainability strategies through corporate policies. Additionally, well-established relational capital, such as collaboration with eco-friendly suppliers and local communities, strengthens a sustainability-oriented business ecosystem [65]. Green transformational leadership fosters an organizational culture that is more proactive toward sustainability, while employees' innovative work behavior plays a crucial role in driving efficient resource management solutions [50]. Therefore, the combination of green intellectual capital, green transformational leadership, and workplace innovation becomes a key factor in enhancing the sustainability and competitiveness of the hospitality sector, including in West Sumatra [44].

4.2.2. Green Intellectual Capital on Pro-Environmental Behavior of Hotels in West Sumatra

Research indicates that green intellectual capital plays a crucial role in driving pro-environmental behavior in the hospitality industry, particularly in West Sumatra. This capital encompasses competencies, innovation, and a commitment to sustainability, enabling hotels to implement eco-friendly practices more effectively. Employees with a strong understanding of sustainability are more proactive in managing energy consumption, reducing waste, and adopting more efficient operational strategies. This aligns with the study by Yusliza et al. [62], which emphasizes that employees' knowledge, skills, and attitudes contribute to shaping an environmentally conscious organizational culture. Additionally, research by Nisar et al. [66] found that the implementation of green intellectual capital and green human resource management enhances hotels' environmental performance through employees' pro-environmental behavior.

Global trends in the hospitality industry indicate that travelers increasingly consider sustainability when choosing accommodations, including in West Sumatra, which boasts rich natural and cultural attractions. Hotels that adopt green intellectual capital have a greater opportunity to attract environmentally conscious tourists and strengthen their reputation as responsible businesses. Furthermore, stricter government regulations supporting sustainability further encourage hotels to adopt green practices. Hotels that invest in employee training, eco-friendly technology, and collaboration with local communities will be better prepared to navigate regulatory challenges and market shifts. Nisar et al. [66] also emphasize that strategies based on green intellectual capital can enhance hotels' operational efficiency and long-term competitiveness.

4.2.3. Green Intellectual Capital Has a Significant Influence on Green Human Resource Management

The research findings indicate that green intellectual capital significantly influences the implementation of green human resource management (GHRM) in hotels across West Sumatra. Green intellectual capital consists of three key aspects: green human capital (employees' environmental knowledge and skills), green structural capital (hotel sustainability systems and policies), and green relational capital (relationships with customers and stakeholders). These aspects play a crucial role in shaping more environmentally friendly HR policies. Several star-rated hotels in Padang, Bukittinggi, and Pariaman have already implemented sustainability training programs for employees, such as energy efficiency and waste management. A study by Shazali et al. [49] revealed that employees with strong green skills are more likely to support corporate sustainability policies. However, smaller hotels still face challenges in developing systems that support GHRM due to limited capital, infrastructure, and access to environmental training.

The success of GHRM heavily depends on how green intellectual capital is integrated into hotel operational policies. Shahzad et al. [45] emphasize that environmentally conscious employee selection, continuous training, and incentive systems for employees exhibiting pro-environmental behavior are key factors in effective GHRM. Some hotels in West Sumatra have introduced reward systems for employees actively participating in energy efficiency programs and waste recycling, contributing to their motivation and environmental awareness. With strong green intellectual capital, hotels can establish a more robust sustainability culture, enhance operational efficiency, and create a competitive advantage in the hospitality industry. Therefore, government support and hotel associations are essential in assisting hotels, especially small-scale ones, in strengthening GHRM practices through training programs, sustainability policies, and collaborations with external stakeholders.

4.2.4. Green Human Resource Management and Pro-Environmental Behavior in Hotels in West Sumatra.

Research findings indicate that Green Human Resource Management (GHRM) has a significant influence on pro-environmental behavior in hotels in West Sumatra. With a path coefficient of 0.379 and a p-value of 0.000 (<0.05), the better the green human resource management, the higher the tendency for pro-environmental behavior in the hospitality sector. GHRM includes various policies, such as sustainability-based recruitment, environmental training, and reward systems for employees implementing green practices [67]. However, the implementation of these policies still faces several challenges, primarily the lack of employee awareness and skills in carrying out green practices. Wu et al. [67] found that many hotel

employees in West Sumatra still perceive environmental policies as an additional burden with no direct impact on their jobs. This issue is exacerbated by the lack of training on sustainability, causing green policies designed by management to often be suboptimally implemented at the operational level.

In addition to internal factors, the implementation of GHRM is also influenced by external factors such as government regulations and market demands. A study by Gomes et al. [68] showed that companies operating in environments with strict environmental regulations are more likely to adopt comprehensive GHRM policies. Star-rated hotels with international networks find it easier to implement green policies due to better access to resources and technology, whereas smaller hotels often face financial constraints in adopting sustainability policies. However, with the increasing demand from tourists for environmentally friendly hotel services, many small hotels have started adopting green practices, such as reducing single-use plastic usage and improving energy efficiency. Moreover, sustainability-based recruitment and reward systems for employees practicing green initiatives have also proven effective in increasing employee engagement in sustainability initiatives [69]. Thus, GHRM not only plays a role in enhancing pro-environmental behavior among employees but also serves as a sustainable business strategy for the hospitality industry.

4.2.5. Green Human Resource Management Has a Significant Influence on Green Environmental Performance

The research findings indicate that Green Human Resource Management (GHRM) has a significant influence on improving the environmental performance of hotels in West Sumatra. With a path coefficient of 0.127 and a significance value of 0.017 (<0.05), every enhancement in GHRM practices within hotel operations contributes to a 0.127-unit increase in environmental performance. The implementation of GHRM in the hospitality industry includes environmentally-based recruitment policies, sustainability training for employees, and reward systems that encourage eco-friendly behavior. A study by Tang et al. [70] revealed that hotels that effectively implement GHRM policies tend to have higher energy efficiency, better waste management, and more optimal water conservation practices. As tourists, particularly those from the middle-upper class and international markets, become more aware of eco-friendly practices, hotels that adhere to stricter sustainability standards are increasingly their preferred choice.

The growing demand for sustainable hotels has driven increased investment in GHRM across both star-rated and non-star-rated hotels, making it a crucial factor in improving the environmental performance of hotels in West Sumatra. Star-rated hotels are generally better equipped to implement comprehensive green practices, while non-star-rated hotels are gradually adapting with simpler yet impactful strategies, such as reducing single-use plastics and optimizing energy consumption. Although GHRM contributes to improved environmental performance, challenges in implementation remain, particularly in raising employee awareness and providing adequate training. Therefore, collaboration between the government, academics, and the hospitality industry is essential in creating an ecosystem that supports the sustainable implementation of green policies. As demand for environmentally friendly services continues to rise, hotels in West Sumatra must strengthen their GHRM practices to enhance competitiveness and generate positive environmental impacts.

4.2.6. Green Transformational Leadership Has a Significant Influence on Employees' Pro-Environmental Behavior

The research findings indicate that green transformational leadership has a significant influence on pro-environmental behavior in hotels in West Sumatra. With a path coefficient of 0.175 and a significance value of 0.048 (<0.05), each increase in green transformational leadership enhances pro-environmental behavior by 0.175 units. This leadership plays a crucial role in raising employees' environmental awareness through inspiration, vision, and motivation toward sustainability practices. Robertson and Barling [52] state that leaders with a clear sustainability vision can encourage employees to actively participate in waste management, energy efficiency, and plastic reduction. However, the implementation of green transformational leadership in West Sumatran hotels remains inconsistent. Some star-rated hotels in tourist cities like Bukittinggi and Padang have adopted more advanced environmental policies, while many others still rely on conventional policies that pay less attention to sustainability aspects [53].

One of the main challenges in implementing green transformational leadership is the lack of active employee involvement in environmental policies. Khan et al. [54] found that when leaders set a real example of green practices, employees are more likely to engage in pro-environmental behavior. However, in many hotels in West Sumatra, employee participation in green initiatives remains limited due to a lack of incentives and appreciation from management. To address this issue, the government and hospitality associations can play a role in providing training for hotel managers to better understand and implement effective green strategies. With the growing demand from tourists for sustainable services, hotels in West Sumatra need to be more proactive in adopting green transformational leadership to create an eco-friendlier work environment and enhance competitiveness in the hospitality industry.

4.2.7. Green Transformational Leadership Has a Significant Influence on Green Environmental Performance

The research findings indicate that green transformational leadership does not have a significant impact on environmental performance in hotels in West Sumatra. With a path coefficient of 0.016 and a P-value of 0.776 (>0.05), this suggests that while green transformational leadership can enhance employees' environmental awareness, it does not directly improve hotels' environmental performance. Dumay et al. [55] revealed that in the hospitality industry, company policies, government regulations, and resource readiness play a more significant role in shaping environmental performance. Some star-rated hotels in tourist cities like Padang and Bukittinggi have implemented green initiatives such as energy efficiency and waste management. However, many mid-range and small hotels face challenges in effectively implementing environmental policies. Yuliza [53] also found that green policies in hotels often serve as mere formalities without concrete implementation, indicating that leadership alone is insufficient to drive significant changes in environmental performance.

One of the main reasons for the limited impact of green transformational leadership on environmental performance is the lack of investment in green infrastructure and eco-friendly technology. Khan et al. [56] stated that without clear policy support and sufficient budget allocation, green transformational leadership only influences awareness rather than yielding tangible results. Cost constraints also serve as a major obstacle to environmental programs in many hotels in West Sumatra, particularly in small hotels with limited resources. Additionally, the lack of incentives for employees to engage in green practices further slows down the implementation of sustainability policies. Therefore, a more comprehensive approach is needed, including stricter environmental management policies, employee incentives, and investment in green technology. Regulatory support and financial assistance from local governments and hospitality associations are also essential to accelerating the transformation of the hospitality industry toward more sustainable practices.

4.2.8. Green Transformational Leadership Has a Significant Influence on Green Human Resource Management

The research findings indicate that green transformational leadership has a significant influence on green human resource management (GHRM) in hotels across West Sumatra. With a path coefficient of 0.289 and a P-value of 0.000 (< 0.05), these results confirm that stronger green transformational leadership in hotel management enhances the effectiveness of GHRM strategies. This leadership style plays a crucial role in inspiring and motivating employees to engage in environmentally friendly practices. Studies in several star-rated hotels in West Sumatra reveal that leaders with a green vision foster an organizational culture that supports green innovation, adopts sustainability policies, and increases employee involvement in environmental programs. Some hotels in Bukittinggi and Padang have implemented green policies initiated at the top leadership level, such as energy-saving technology, plastic waste reduction, and employee training in sustainability practices.

Beyond internal factors, green transformational leadership is also influenced by external pressures, including government regulations, industry trends, and customer expectations for eco-friendly services. Hotels in West Sumatra are increasingly driven to align their operational strategies with sustainability standards, such as efficient energy management systems, improved waste management, and participation in community-based environmental programs. Leadership that responds proactively to these trends plays a key role in accelerating the implementation of green policies. Overall, this study confirms that green transformational leadership is a critical factor in ensuring the consistent application of GHRM, thereby enhancing the competitiveness and sustainability of hotels in West Sumatra.

4.2.9. Employees' Green Pro-Environmental Behavior Has a Significant Influence on Green Environmental Performance.

The research findings indicate that pro-environmental behavior (PEB) significantly influences the effectiveness of Green Human Resource Management (GHRM) in hotels in West Sumatra. The higher employees' awareness and engagement in environmentally friendly practices, the more effective the implementation of GHRM policies in hotel operations. PEB reflects individual actions that support sustainability, such as reducing plastic usage, improving energy efficiency, and better waste management. Studies in several hotels show that a green work culture supported by internal policies and regulations can enhance employee compliance with eco-friendly practices. For instance, star-rated hotels in Padang and Bukittinggi have implemented incentive systems for employees participating in sustainability programs, ultimately strengthening GHRM strategies and long-term hotel sustainability.

Beyond internal factors, support from external stakeholders also plays a role in enhancing pro-environmental behavior in hotels. Collaborations with environmental organizations, eco-friendly suppliers, and local communities can encourage hotels to be more proactive in implementing sustainable practices. Several hotels in West Sumatra have partnered with environmental organizations to reduce their carbon footprint through conservation programs and resource efficiency. A study by Begum and Swamy [71] emphasizes that involvement in community-based sustainability programs can increase employee and guest awareness of the importance of eco-friendly practices. By fostering a sustainability culture, providing relevant training, and establishing strategic partnerships, hotels can more effectively implement GHRM policies that not only impact their internal environment but also strengthen the broader sustainability ecosystem.

2.4.10. Employee Pro-Environmental Behavior Mediates the Relationship Between Green Intellectual Capital and Environmental Performance.

The research findings indicate that green intellectual capital (GIC) has an indirect influence on hotel environmental performance through employees' pro-environmental behavior. With a coefficient value of 0.114, a T-Value of 2.610 (> 1.96), and a P-Value of 0.009 (< 0.05), this relationship is significant, demonstrating that an increase in GIC enhances pro-environmental behavior, which ultimately has a positive impact on hotel environmental performance. GIC consists of green human capital, green relational capital, and green structural capital, all of which contribute to raising awareness and fostering sustainability-driven innovation in the hospitality industry. Studies conducted in star-rated hotels in Padang, Bukittinggi, and Payakumbuh reveal that hotels with high GIC levels are more effective in managing resources sustainably and improving eco-friendly operational efficiency.

Beyond internal factors, external pressures such as government regulations and customer demands for sustainable practices also influence hotel environmental performance. Several hotels in West Sumatra have started implementing Green Employee Training programs to enhance employees' skills in energy conservation, waste reduction, and water efficiency. Additionally, adaptation to green tourism policies, such as Eco Hotel Certification and CHSE Certification, highlights how investment in GIC can accelerate the transformation of pro-environmental behavior within the hospitality industry. A study by Begum and Swamy [71] confirms that hotels with strong GIC can align their strategies with global sustainability standards, enhance operational efficiency, and build a positive reputation among tourists. Therefore, fostering environmental

competence and awareness across the organization is key for hotels to achieve sustainable environmental performance improvements.

4.2.11. Employees' Pro-Environmental Behavior Mediates the Relationship Between Green Human Resource Management (GHRM) And Green Environmental Performance

The research findings indicate that Green Human Resource Management (GHRM) has an indirect effect on environmental performance through employees' pro-environmental behavior. With a coefficient of 0.121, a T-Value of 2.189 > 1.96, and a P-Value of 0.029 < 0.05, this relationship is significant, indicating that the implementation of GHRM fosters environmentally friendly behavior, ultimately enhancing hotels' environmental performance. Several hotels in West Sumatra have adopted GHRM practices, such as employee training in waste management, energy conservation, and resource efficiency. A study by Pham et al. [72] affirms that GHRM not only improves operational efficiency but also cultivates an organizational culture that supports sustainability, thereby strengthening employees' commitment to corporate environmental goals.

In addition to internal factors, government regulations and market trends favoring sustainability contribute to the successful implementation of GHRM. The Green Hotel Certification program applied in several star-rated hotels in West Sumatra demonstrates that compliance with environmental standards enhances energy efficiency and waste management. Furthermore, incentive systems for employees actively participating in environmental initiatives, such as recycling programs and energy conservation, help boost their engagement in sustainability efforts. With sustainability-oriented leadership and effective GHRM strategies, hotels can not only improve environmental performance but also attract eco-conscious travelers. Therefore, hotel management must take a proactive approach in adopting GHRM strategies to ensure the optimal implementation of sustainability policies, yielding long-term benefits for the hospitality industry.

5. Conclusion

This study found that several factors significantly influence the environmental performance of hotels in West Sumatra. Tourist motivation plays a crucial role in sustainable tourism development by promoting ecotourism and environmentally friendly practices. Green intellectual capital also has a positive impact on environmental performance by enhancing pro-environmental behavior and improving resource management. Additionally, Green Human Resource Management (GHRM) significantly contributes to increasing employee awareness and engagement in sustainability policies, supported by green transformational leadership. Hotels that effectively implement GHRM experience improvements in energy efficiency, waste management, and industry competitiveness. These findings indicate that the combination of green intellectual capital, GHRM, and green transformational leadership can accelerate the adoption of sustainability strategies in the hospitality industry.

On the other hand, some factors do not have a significant impact on environmental performance, such as green transformational leadership, whose effectiveness still depends on environmental policies, regulations, and resource readiness. Although leaders with a sustainability vision can encourage pro-environmental behavior, many mid-sized and small hotels still face challenges in implementing green policies due to infrastructure limitations and a lack of incentives. Furthermore, while GHRM has been proven to significantly influence pro-environmental behavior, its implementation still faces challenges related to resources, management commitment, and organizational readiness.

6. Recommendations

Hotel management is advised to integrate Green Human Resource Management (GHRM) into their operations to enhance environmental performance. Steps that can be taken include continuous employee training on eco-friendly practices, implementing incentive systems to encourage pro-environmental behavior, and strengthening a workplace culture that supports sustainability. Additionally, investing in green intellectual capital, including human, relational, and structural resources, can accelerate the adoption of sustainability strategies in the hospitality industry. Hotel management should also ensure compliance with environmental regulations and standards such as Green Hotel Certification to enhance competitiveness and attract environmentally conscious tourists.

The government plays a crucial role in supporting the implementation of eco-friendly practices in the hospitality sector through regulations and incentives that promote sustainability policies. Actions that can be taken include expanding the Green Hotel certification program, providing incentives such as tax reductions or subsidies for hotels implementing green practices, and increasing public awareness through educational campaigns and training. Moreover, the government can facilitate collaboration between hotels, environmental organizations, and local communities to create a more sustainable tourism ecosystem. With strong regulations and support from various stakeholders, the hospitality sector in West Sumatra can enhance its competitiveness while contributing to environmental conservation.

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