Green Logistics Practices in Hospitality for Sustainable Industry in Egypt

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Abstract

This study explores the impact of green logistics practices on the sustainability and performance of Egypt's hospitality and tourism industry. The research aims to identify the key factors influencing the adoption of green logistics, assess the perceived benefits, and evaluate the challenges and barriers faced by hotels and resorts in implementing these practices.

Using a descriptive quantitative research design, the study collected data through structured surveys distributed to 100 hospitality professionals across various hotels and resorts in Egypt. The data were analyzed using statistical techniques, including regression analysis, and cross-tabulation, to measure the adoption levels, challenges, and impact of green logistics on sustainability and performance.

The findings reveal that while awareness of green logistics is relatively high, actual implementation remains limited, with only 14% of hotels practicing green logistics for more than six years. High-end hotels and larger establishments are more likely to adopt these practices due to greater resources and corporate commitments. Key benefits include improved operational efficiency, enhanced brand image, and increased customer satisfaction. However, the financial benefits are less clear, with 38% of respondents neutral on cost savings. Challenges include a lack of employee training, limited access to eco-friendly suppliers, and insufficient government support. The study also found a strong positive correlation between green logistics practices and sustainable development, but a weak and statistically insignificant relationship with hospitality industry performance.

This research contributes to the literature by extending Green Logistics Theory to the hospitality sector, particularly in a developing country context. It provides actionable insights for policymakers, industry stakeholders, and hotel managers to enhance sustainability through green logistics practices. The study's originality lies in its quantitative approach to measuring green logistics adoption and its impact on sustainability in Egypt's hospitality industry, filling a significant gap in the existing literature.

1. Introduction

The tourism industry is a multifaceted and dynamic economic sector encompassing a wide range of activities and services aimed at meeting the needs of tourists. It provides diverse products and services to individuals engaged in leisure, business, or other forms of travel (Sifolo and Henama, 2021). Key actors in the tourism industry include hospitality providers, transportation providers, and intermediaries such as travel agencies and tour operators. Hospitality providers, including hotels, resorts, and inns, offer lodging, dining, and amenities, while transportation providers, such as airlines and ground transportation companies, facilitate the movement of tourists. Intermediaries play a crucial role in planning and organizing travel experiences, linking various components of the tourism supply chain (Sifolo & Henama, 2021; Deng, 2021)

Tourism is a cornerstone of the Egyptian economy, significantly contributing to GDP, employment, and foreign exchange earnings. It attracts millions of tourists annually, drawn to Egypt's rich historical heritage, scenic landscapes, and vibrant culture. According to CAPMAS, the number of tourists visiting Egypt increased by 85.4% in the first half of 2022, reaching 4.9 million compared to 2.6 million in the same period in 2021 (www.sis.gov.eg, September 2022). The industry provides employment opportunities in various roles, including tour guides, hoteliers, and travel agents. Additionally, tourism supports the preservation of cultural heritage by funding the maintenance of historical sites and promoting cultural exchange. It also drives local development in rural and underdeveloped areas, creating opportunities for local businesses and community empowerment.

However, the tourism industry has faced challenges due to poor management practices, leading to negative environmental impacts. Hospitality management, a critical component of the industry, involves managing products, services, and events to ensure a seamless guest experience. This includes activities such as purchasing, inventory management, transportation, and distribution. Effective logistics management in hospitality is essential for cost savings, operational efficiency, sustainability, and competitive advantage. It optimizes inventory levels, reduces waste, and streamlines transportation, contributing to sustainability efforts and risk management. Green logistics, or sustainable logistics, focuses on reducing the environmental impact of logistics activities, including transportation, warehousing, and distribution. It aims to lower carbon emissions, energy consumption, and waste, aligning with global sustainability goals (Mutua Mutie *et al*., 2022). With global CO_2 emissions tripling over the past two decades

(Chen *et al*., 2022), green logistics is vital for environmental protection, cost savings, and compliance with sustainability standards. Practices such as using alternative fuels, optimizing transportation routes, and adopting energy-efficient technologies help reduce the carbon footprint of hospitality businesses.

Green logistics also enhances a company's brand image and reputation, as consumers increasingly prefer environmentally conscious businesses. By adopting sustainable practices, companies can attract eco-conscious customers and gain a competitive edge. Furthermore, green logistics supports global sustainability initiatives, such as the United Nations Sustainable Development Goals (SDGs), by addressing climate change and promoting sustainable development. In summary, the tourism industry, particularly in Egypt, plays a vital role in economic growth and cultural preservation, while green logistics offers a pathway to sustainability, cost efficiency, and competitive advantage in the hospitality sector.

1.1 Research Aim

The study aims to identify and analyze how green logistics practices affect the sustainability and performance in Egypt's hospitality and tourism sector. The study also quantifies the benefits, challenges and barriers of implementing green logistics in hotels, resorts operations.

1.2 Research Problem Statement

Egypt's hospitality industry, a vital economic sector contributing 11.5% to GDP (Central Agency for Public Mobilization and Statistics [CAPMAS], 2022), faces significant sustainability challenges that threaten its long-term competitiveness. Despite growing global emphasis on sustainable tourism, Egyptian hotels demonstrate poor environmental performance, consuming 30% more energy than international benchmarks (Hanna & Farouh, 2012) while generating 1.5 kg of waste per guest daily (El-Berishy *et al*., 2019). These unsustainable practices persist even as the industry experiences growth, with tourist arrivals increasing by 85.4% in 2022 (State Information Service, 2022). A critical disconnect exists between awareness and implementation - while 67% of hotel managers recognize the importance of green logistics (current study), only 14% have consistently practiced it for over six years. This implementation gap raises important questions about the relationship between green logistics adoption and measurable outcomes in the Egyptian context. Preliminary data suggests financial benefits remain unclear (38% of respondents neutral on cost savings), while operational efficiency (84% agreement) and brand image (82% agreement) show stronger correlations. The problem is compounded by structural barriers including inconsistent employee training (only 21% of hotels provide regular sustainability training), limited access to eco-friendly suppliers, and insufficient government incentives. This study investigates how these factors collectively contribute to Egypt's hospitality sustainability crisis, using quantitative metrics to assess whether weak adoption of green logistics practices explains the industry's suboptimal environmental and financial performance. The research is particularly timely given Egypt's hosting of COP27 and its alignment with the UN Sustainable Development Goals (World Tourism Organization & United Nations Development Programme, 2018).

1.3 Research Objectives

The objective of the research is to:

1. **To identify** the key challenges and barriers that prevent the adoption of green logistics practices in the hospitality sector.
2. **To analyze** the influence of factors such as hotel classification and size, on green logistics adoption.
3. **To measure** the level of awareness, adoption, and employee training on green logistics practices among hospitality and tourism businesses in Egypt.
4. **To assess** the perceived benefits of green logistics implementation, including cost savings, operational efficiency, and environmental sustainability.
5. **To evaluate** the impact of green logistics practices on sustainable development and the improved performance of the hospitality industry in Egypt.
6. **To provide** data-driven recommendations for improving green logistics integration in Egypt's hospitality industry, based on survey findings and statistical analysis.

1.4 Research Questions

1. What are the key factors influencing the adoption and implementation of green logistics practices in hotels in Egypt?
2. What are the perceived benefits of green logistics practices adoption in Egypt's hospitality industry?
3. What are the key challenges and barriers preventing the adoption of green logistics in Egyptian hotels?

2.Literature Review

This section provides a comprehensive review of existing literature on the implementation of green logistics practices to enhance sustainability, with a focus on the hospitality and tourism sector.

2.1 Sustainable Development

Sustainable development, as defined by the World Commission on Environment and Development (1987), refers to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In tourism, sustainable development involves addressing economic, social, and environmental impacts while meeting the needs of visitors, the industry, and host communities (World Tourism Organization, 2005). The hospitality and tourism industry is a significant contributor to pollution, resource consumption, and waste, making sustainability a critical focus. The United Nations Development Programme (UNDP) emphasizes the role of tourism in achieving the 17 Sustainable Development Goals (SDGs) by 2030. Egypt has also aligned with these goals, hosting COP27 in 2022 to promote sustainability.

2.1.1 Environmental Sustainability

Environmental sustainability focuses on preserving natural resources and addressing challenges like climate change, pollution, and waste management (Arora *et al*., 2018). The hospitality industry plays a key role in shaping the environmental landscape, with increasing pressure to adopt eco-friendly practices (O'Neill and Alonso, 2009). Research highlights the growing attention to green practices in hospitality, but there is a need for more conceptual frameworks and theoretical support to drive eco-innovation (Sharma, Chen, and Liu, 2020). Small hospitality businesses often recognize the importance of sustainability but face challenges in implementation due to limited resources and stakeholder support (Shen and Chen, 2020).

2.1.2 Economic Sustainability

Economic sustainability ensures long-term growth and profitability in the hospitality industry. It involves efficient resource management, innovation, and sustainable business models (Presenza, Petruzzelli, and Natalicchio, 2019). The industry faces pressure to adopt sustainable practices due to globalization, technological advancements, and environmental concerns
(Roberts, Reynolds, and Dolasinski, 2022). Investing in workforce development and integrating sustainability into hospitality programs are key to achieving economic sustainability
(Kobyak *et al.,* 2020).

2.1.3 Social Sustainability

Social sustainability ensures equitable access to resources and opportunities for all community members (An and Alarcón, 2020). While economic and environmental aspects of sustainability have been widely studied, social sustainability remains under-researched due to its complexity (Ly and Cope, 2023). Recent efforts have focused on developing frameworks to better understand and implement social sustainability initiatives (Barron et al., 2023).

2.2 Green Logistics Practices

Green logistics involves environmentally friendly strategies in logistics and transportation operations, aiming to reduce carbon emissions, energy consumption, and waste
(Sabbaghi and Vaidyanathan, 2015). In hospitality, green logistics practices include renewable energy use, waste reduction, and sustainable supply chain management
(Sharma et al., 2020). These practices are driven by environmental regulations, customer demands, and cost savings, offering benefits such as reduced environmental impact and improved corporate image (Salhieh and Abushaikha, 2016).

2.2.1 Energy Efficiency

Energy efficiency is critical in the hospitality industry, which is a major energy consumer. Hotels in Egypt are adopting measures such as renewable energy programs, energy-efficient appliances, and motion sensors to reduce energy consumption (Bohdanowicz, 2005). These practices not only lower costs but also contribute to environmental sustainability (Subbiah and Kannan, 2011).

2.2.2 Waste Management

Waste management is a global challenge, with poor practices leading to pollution. The hospitality industry is adopting strategies such as waste separation, recycling, and donation programs to reduce waste (Han et al., 2018). Effective waste management can lead to cost savings and environmental benefits (Mohan, Bansal, and Mona, 2017).

2.2.3 Air Pollution and Carbon Emission Reduction

Transportation is a major source of air pollution in the hospitality industry. Green logistics practices such as using electric vehicles, optimizing routes, and implementing reverse logistics can reduce emissions (Islam et al., 2020). These practices also enhance the industry's reputation and appeal to eco-conscious consumers (Duan, 2019).

2.2.4 Water Management

Water conservation is essential in the hospitality industry, which consumes large amounts of water. Hotels are adopting measures such as low-flow fixtures, sensor-activated taps, and recycled water for landscaping to reduce water usage (Sykimte, 2023). These practices not only benefit the environment but also lead to cost savings (Subbiah and Kannan, 2011).

2.2.5 Efficient Transportation

Efficient transportation, including the use of electric or hybrid vehicles and optimized delivery routes, is key to reducing the hospitality industry's carbon footprint (Sadiku, Kotteti, and Musa, 2018). Hotels can also encourage guests to use eco-friendly transportation methods, further reducing emissions (Subbiah and Kannan, 2011).

2.2.6 Sustainable Procurement

Sustainable procurement involves sourcing eco-friendly products and services, reducing the environmental impact of hospitality operations (Al-Romeedy, 2019). Hotels in Egypt are increasingly sourcing locally and using environmentally certified products, enhancing their sustainability efforts and public image (Sadiku, Kotteti, and Musa, 2018).

2.3 Green Logistics Practices in Egypt's Hospitality and Tourism Industry

Research on green logistics practices in Egypt's hospitality and tourism industry is limited but growing. Studies highlight the potential of green logistics to reduce carbon emissions and enhance competitiveness (El-Berishy et al., 2019). Cost savings, improved operational efficiency, and alignment with Egypt's sustainable development goals are key motivations for adopting green logistics practices (Madhat and Bourrekadi, 2023).

2.4 Green Hospitality Practices and Sustainability

The hospitality industry is a major contributor to environmental degradation due to high water and energy consumption and waste production. Green logistics practices, such as renewable energy

use and waste reduction, are essential for minimizing this impact (Subbiah and Kannan, 2011). Small hotels, however, face challenges in implementing these practices due to limited resources and support (O'Neill and Alonso, 2009).

2.5 Improved Performance of the Hospitality Industry

Green logistics practices have been shown to enhance the sustainability and performance of the hospitality industry. Studies indicate that these practices can improve operational efficiency, reduce costs, and enhance brand image (Asadi *et al.*, 2020). In Egypt, adopting green logistics can help hotels attract eco-conscious tourists and achieve long-term financial and environmental benefits (Nguyen *et al.*, 2020).

3. Research Methodology

The research adopts a descriptive quantitative research design, focusing on statistical analysis to determine the current state of green logistics practices in the Egyptian hospitality sector. This approach will allow for a structured evaluation of adoption levels, challenges, and the impact on sustainability and performance. By using survey-based data, the study will provide a more general and objective assessment of green logistics implementation within the industry.

3.1 Data Collection Methods

The research adopts a descriptive quantitative approach, using structured survey data to systematically assess the impact of green logistics practices on the sustainability of the hospitality and tourism industry in Egypt.

The quantitative part of this study aims to statistically describe the impact of green logistics practices on sustainability of the hospitality and tourism industry in Egypt.

A survey will be conducted to a large sample of professionals within the hospitality and tourism industry. It is a structured survey with closed-ended questions, Likert scales, multiple-choice questions, and ranking scales to quantify responses. The survey stress on the research objectives.

The survey distributed both online and physically, targeting large sample scale, and responses will be collected and analyzed using statistical software such as SPSS.

Regression Analysis will examine the relationships between dependent and independent variables, to be able to predict the impact of green logistics practices on sustainability of the industry.

Reliability Analysis, will Ensure that survey scales measuring green logistics practices are valid and reliable.

These analyses will help to understand the relationships between variables and validate the conceptual model.

The sampling strategy applied in this research ensure that the data collected will be reliable from Industry stakeholders in Egypt. We used purposive sampling from different hotels and resorts in Egypt.

The sample size is 100 participants to get accurate and satisfying statically results. A sample size of 100 is statistically valid for this study, as it meets the threshold for reliable regression analysis

and aligns with sample sizes used in similar hospitality research (Field, 2018; El-Berishy et al., 2019). This sample provides sufficient power to detect effect sizes while maintaining practical feasibility for a targeted industry survey (Saunders et al., 2019).

By applying this sampling strategy, the research obtain data that are rich and detailed, which ensured a comprehensive understanding of the importance of green logistics practices in enhancing sustainability in Egypt's hospitality and tourism industry.

3.2 Data Analysis

The data analysis in this study follows a descriptive quantitative approach, utilizing statistical techniques to evaluate the adoption, challenges, and impact of green logistics practices in the Egyptian hospitality and tourism industry. The responses collected through the structured survey were systematically analyzed using SPSS to ensure accuracy and reliability in examining green logistics adoption and its relationship with sustainability and performance outcomes.

3.3 Research Hypotheses

The following hypotheses were formulated to guide the study and were tested using the data collected:

H1: Green logistics practices have an impact on sustainable development.

H2: Green logistics practices have an impact on improved performance of the hospitality industry.

3.4 Research Variables

Independent Variable: Green Logistics Practices in Hospitality

- Energy Efficiency
- Minimizing Carbon Emission
- Water Management
- Efficient Transportation
- Sustainable Procurement

     Dependent Variable: 1. Sustainable Development

- Environmental Sustainability
- Economic Sustainability
- Social Sustainability

        2. Improved Performance of the industry.

- Operational Efficiency
- Financial Performance
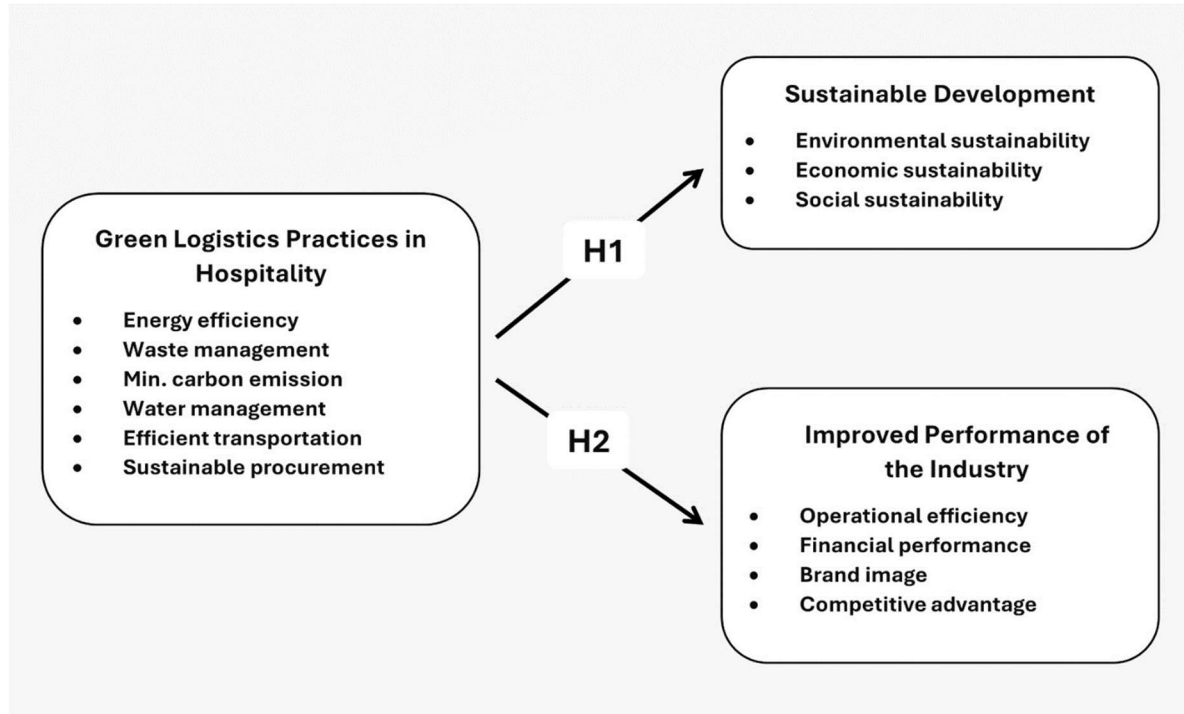- Brand Image
- Competitive Advantage

Figure 1: The Research Variables and Hypotheses

4. Research Results

a. Descriptive Analysis

Provides a detailed overview of the current state of green logistics practices in Egypt's hospitality industry, based on survey responses from 100 industry professionals. The analysis covers various aspects of green logistics, including awareness, adoption levels, challenges, and perceived benefits.

Here are the key findings:

4.1.1 Demographics and Hotel Information

The majority of respondents were male (73%), Egyptian (99%), and held university degrees (59%). Most were between 30-50 years old, with over 15 years of experience in the hospitality industry. Most respondents worked in hotels (88%), with 66% of hotels having 50-150 rooms. High-end hotels (4 and 5-star) were more likely to adopt green logistics practices, with 41% of respondents from 5-star hotels.

4.1.2. Awareness and Adoption of Green Logistics

While 67% of respondents were aware of the importance of green logistics, only 14% had been implementing these practices for more than 6 years, indicating that green logistics is still relatively new in Egypt's hospitality sector.

Waste separation was practiced by 52% of hotels, but recycling was less consistent, with only 12% always recycling. Composting organic waste was rare, with 38% never doing it.

4.1.3 Energy and Water Management

Energy-efficient practices like LED lighting were widely adopted (53% always used them), but renewable energy usage such as wind and solar energy was low, with 45% never using it.

Water-saving measures, such as low-flow toilets and smart irrigation systems, were moderately adopted, but advanced techniques like graywater recycling were underutilized (36% never used it).

4.1.4 Transportation and Procurement

Eco-friendly transportation methods were not widely adopted, with only 12% always using them. Local sourcing of products was more common, with 41% always prioritizing local products. Recycled products were less frequently purchased, with only 12% always buying them, indicating a gap in sustainable procurement practices.

4.1.5 Employee Awareness and Training

Employee training on green logistics was inconsistent, with only 21% of hotels always providing training. Most employees had received fewer than three sustainability training sessions, highlighting a need for more frequent and comprehensive training programs.

4.1.6 Perceived Benefits and Challenges

The implementation of green logistics was seen to improve operational efficiency (84% agreed) and enhance brand image (82% agreed), but the financial benefits were less clear, with 38% neutral on whether green logistics saved costs.

High costs and customer resistance were not seen as major barriers, but a lack of information and suppliers for green logistics were noted as challenges by some respondents.

4.1.7 Future Outlook and Support Needed

Most hotels (84%) planned to increase green logistics practices in the next five years, with training (74%) and government support (41%) identified as key requirements for successful implementation.

Energy management (78%) and waste management (63%) were seen as the most important areas for future development in green logistics.

The descriptive analysis shows that while there is growing awareness and adoption of green logistics practices in Egypt's hospitality industry, there are still significant gaps in implementation, particularly in areas like renewable energy, waste recycling, and employee training. High-end hotels are leading the way, but smaller establishments and those with fewer resources face challenges in adopting sustainable practices. The findings suggest that increased training, government support, and collaboration with suppliers and other organizations are essential for further progress in green logistics and sustainability in the industry.

4.2 Quantitative Analysis of Results

4.2.1 Testing Hypothesis 1

H1: Green logistics practices have an impact on sustainable development

Table 1: Regression Analysis of Green Logistics Practices on Sustainable Development

RegressionModel Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.498[a]	.248	.240	2.16290

a. Predictors: (Constant), Green Logistics Practices

b. Dependent Variable: Sustainable Development

The table summarizes the results of a regression analysis examining the impact of green logistics practices on sustainable development. The model has an R value of 0.498, indicating a moderate relationship between the two variables. The R-squared value of 0.248 suggests that approximately 24.8% of the variation in sustainable development can be explained by green logistics practices. The adjusted R-squared value of 0.240 further refines this explanation, accounting for the number of predictors in the model. The standard error of the estimate (2.16290) provides an idea of the average distance between the observed values and the regression line, indicating the model's precision.

The results show that green logistics practices have a meaningful and statistically significant influence on sustainable development.

Table 2: ANOVA Table for Regression Analysis of Green Logistics Practices on Sustainable Development

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	150.851	1	150.851	32.246	.000[a]
	Residual	458.459	98	4.678		
	Total	609.310	99			

a. Predictors: (Constant), Green Logistics Practices

b. Dependent Variable: Sustainable Development

The ANOVA table provides insights into the significance of the regression model examining the impact of green logistics practices on sustainable development. The F-statistic of 32.246 is highly significant (p = 0.000), indicating that the model is statistically significant and that green logistics practices are a meaningful predictor of sustainable development.

The regression sum of squares (150.851) represents the variation in sustainable development explained by green logistics practices, while the residual sum of squares (458.459) reflects the

unexplained variation. The large F-value and low p-value confirm that the relationship between green logistics practices and sustainable development is not due to random chance.

The results strongly support the idea that green logistics practices have a significant influence on sustainable development, reinforcing the importance of adopting green logistics practices to achieve sustainability goals.

Table 3: Regression Coefficients for the Impact of Green Logistics Practices on Sustainable Development

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	7.591	.828		9.166	.000	5.947	9.234					
Green Logistics Practices	2.281	.402	.498	5.679	.000	1.484	3.078	.498	.498	.498	1.000	1.000

a. Dependent Variable:
Sustainable Development

The table presents the regression coefficients for the relationship between green logistics practices and sustainable development. The unstandardized coefficient for green logistics practices (B = 2.281) indicates that for every one-unit increase in green logistics practices, sustainable development increases by 2.281 units, holding other factors constant. This relationship is statistically significant (p = 0.000), confirming that green logistics practices have a strong and positive impact on sustainable development which support Hypotheses 1(H1).

The standardized coefficient (Beta = 0.498) further emphasizes the strength of this relationship, suggesting that green logistics practices are a substantial predictor of sustainable development. The 95% confidence interval for B (1.484 to 3.078) does not include zero, reinforcing the reliability of this finding.

Additionally, the zero-order, partial, and part correlations (all 0.498) highlight the consistent and robust influence of green logistics practices on sustainable development. The collinearity statistics (Tolerance = 1.000, VIF = 1.000) indicate no multi collinearity issues, meaning the predictor variable is independent and reliable.

The results strongly support the idea that adopting green logistics practices significantly enhances sustainable development, making it a critical strategy for organizations aiming to achieve sustainability goals, which support H1(Green logistics practices have a significant impact on sustainable development).

4.2.2 Testing Hypothesis 2

H2: Green logistics practices have an impact on improved performance of the hospitality industry.

Table 4: Regression Model Summary: Impact of Green Logistics Practices on Hospitality Industry Performance

Regression

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.133[a]	.018	.008	5.97735

a. Predictors: (Constant), Green Logistics Practices

b. Dependent Variable: Hospitality Industry Performance

The table summarizes the regression model examining the impact of green logistics practices on hospitality industry performance. The R value of 0.133 indicates a weak relationship between the two variables. The R-squared value of 0.018 suggests that only 1.8% of the variation in hospitality industry performance is explained by green logistics practices. After adjusting for the number of predictors, the adjusted R-squared value drops to 0.008, further emphasizing the minimal explanatory power of the model.

The standard error of the estimate (5.97735) is relatively high. These results show that green logistics practices have a very limited influence on hospitality industry performance.

While green logistics practices may contribute to sustainable development, their direct impact on hospitality industry performance appears to be negligible, this could be due to the lack of awareness, insufficient training programs, and limited financial resources were cited as significant barriers to the adoption of green logistics practices. This is further supported by the open-ended responses in the survey, where participants emphasized the need for more training and awareness programs to fully realize the benefits of green logistics.

Table 5: ANOVA Results for the Impact of Green Logistics Practices on Hospitality Industry Performance

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.336	1	63.336	1.773	.186[a]
	Residual	3501.414	98	35.729		
	Total	3564.750	99			

a. Predictors: (Constant), Green Logistics Practices

b. Dependent Variable: Hospitality Industry Performance

The ANOVA table above examines the relationship between green logistics practices and hospitality industry performance. The regression model shows that green logistics practices explain some variation in hospitality industry performance, with a sum of squares of 63.336. However, the F-value of 1.773 and a significance level (Sig.) of .186 indicate that the relationship is not statistically significant at the conventional 0.05 level. This suggests that, based on this analysis, green logistics practices have a relation with hospitality industry performance but not that significant. Additional variables may be needed to better understand the factors influencing hospitality industry performance such as the training courses and increasing the awareness.

Table (6): Regression Coefficients for the Impact of Green Logistics Practices on Hospitality Industry Performance

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	27.909	2.289		12.194	.000	23.367	32.450					
Green Logistics Practices	1.478	1.110	.133	1.331	.186	-.725	3.681	.133	.133	.133	1.000	1.000

a. Dependent Variable: Hospitality Industry Performance

The coefficients table provides further insight into the relationship between green logistics practices and hospitality industry performance. The standardized coefficient (Beta) for green logistics practices is 0.133, indicating a small positive relationship with hospitality industry performance. However, the t-value of 1.331 and a significance level (Sig.) of 0.186 confirm that this relationship is not statistically significant. This aligns with the ANOVA results, reinforcing that green logistics practices do not significantly predict hospitality industry performance.
While the model suggests a slight positive trend, the results are not strong enough to conclude that green logistics practices significantly impact hospitality industry performance. This could show that other factors can be included may play a more critical role in determining performance such as training courses to hospitality employees and increasing the awareness among hospitality stakeholders.

Research Discussion
This study's findings reveal critical insights about green logistics adoption in Egypt's hospitality sector, with implications for theory and practice. The discussion interprets these results through three angles: theoretical contributions, practical implications, and challenges.

5.1 Theoretical Implications

The strong positive relationship between green logistics practices and sustainable development (β = 0.498, p < 0.001) supports the extension of Green Logistics Theory to hospitality contexts, particularly in developing economies. This aligns with Asadi et al.'s (2020) findings that environmental practices drive sustainability, but contrasts with their work by revealing weaker economic returns in Egypt's nascent adoption phase. The Resource-Based View (Barney, 1991) explains why high-end hotels (41% of 5-star respondents) lead adoption—their financial and organizational resources enable investments in energy efficiency (e.g., LED lighting at 53% adoption) and staff training. However, the insignificant impact on overall industry performance (R^2 = 0.018, p = 0.186) suggests that green logistics alone cannot overcome structural barriers like disjointed supply chains or inconsistent policy support, support Shen and Chen's (2020) observations in small hospitality businesses.

5.2 Practical Implications

While 84% of hotels reported efficiency gains from green logistics, only 56% acknowledged cost savings. This discrepancy may reflect short-term implementation costs overshadowing long-term benefits, as noted by Nguyen et al. (2020). Hotels should track metrics like energy savings post-LED adoption to quantify ROI.

The relation between employee training and successful implementation (only 21% of hotels provide regular training) underscores the need for standardized sustainability curricula, similar to Bohdanowicz's (2005) European models.

Government incentives could address adoption barriers, as 74% of respondents identified training support and 41% cited subsidies as critical needs. Egypt's COP27 commitments provide a framework for such interventions.

5.3 Challenges

The study highlights Egypt-specific barriers, as suppliers limitations represents

Only 12% of hotels consistently source recycled products, reflecting Elzarka's (2020) findings about weak eco-supply chains in developing markets.

Self-reported data (a study limitation) may overstate adoption rates. Future research should integrate utility bills or waste audits for validation.

The male-dominated sample (73%) and low composting rates (38% never compost) suggest socio-cultural influences on sustainability behaviors, a gap requiring qualitative exploration.

These results help understanding of green logistics in emerging economies, demonstrating that while environmental benefits are achievable, systemic changes are needed to translate sustainability into financial performance. The findings align with Egypt's 2030 Vision but reveal urgent needs for policy alignment, supply chain development, and workforce training.

5. Recommendations

Based on the findings, there are several recommendations for hotel managers, policymakers, and industry stakeholders to improve the adoption of green logistics practices and enhance sustainability and overall performance of Egypt's hospitality industry, these recommendations are summarized in the following table.

Table 7: Recommendations for Green Logistics Practices in Egypt's Hospitality Industry

Recommendation	Implementation Mechanisms	Responsible Entity
Invest in energy efficiency	Adopt LED lighting, energy-efficient appliances, and smart energy management systems.	Hotel managers
Explore renewable energy options	Install solar panels and other renewable energy sources to reduce reliance on fossil fuels.	Hotel managers, Government
Implement waste management programs	Introduce waste separation, recycling, and composting initiatives with staff training.	Hotel managers
Prioritize sustainable procurement	Source local and eco-friendly products; collaborate with certified suppliers.	Hotel managers, Suppliers
Enhance employee training	Conduct regular sustainability training sessions and awareness campaigns.	Hotel managers, Industry associations
Promote eco-friendly transportation	Use electric/hybrid vehicles for guest shuttles; optimize delivery routes.	Hotel managers
Provide financial incentives	Offer tax breaks, subsidies, or grants for adopting green logistics practices.	Government
Develop regulations and standards	Set targets for energy efficiency, waste reduction, and water conservation.	Government, Industry associations
Encourage public awareness	Launch campaigns to promote eco-friendly tourism and consumer behavior.	Government, Industry associations
Collaborate with suppliers	Create a database of eco-friendly suppliers and incentivize green practices.	Industry associations, Suppliers
Share best practices	Establish platforms for knowledge exchange and joint procurement of sustainable products.	Industry associations, Hotel managers
Engage guests in sustainability efforts	Educate guests on green initiatives (e.g., towel reuse, eco-friendly transportation).	Hotel managers

7. Limitations of the Research

While this study provides valuable insights into green logistics practices in Egypt's hospitality industry, but still it has its limitations. First, the research focused on a sample of 100 hospitality professionals, which may not fully represent the diversity of the industry. Future research could expand the sample size to include a broader range of hotels and resorts across different regions in Egypt.

Second, data collected relied on self-reported responses from hotel managers and employees, which may be subject to bias or inaccuracies. Future studies could incorporate objective measurements, such as energy consumption data or waste management records, to validate the findings.

Third, the research used a cross-sectional design, which provides a snapshot of green logistics practices at a single point in time. Longitudinal studies could offer deeper insights into the long-term impact of green logistics on sustainability and performance.

Finally, the findings are specific to Egypt's hospitality industry and may not be applicable to other regions. Future research could compare the adoption of green logistics practices in different countries to identify global trends and best practices.

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