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Bridging Insights for Sustainability: A Mixed-Methods Exploration of Best Practices in the Hotel Development Business

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Abstract *This study, mainly reinforced by Fayoum University and the Academy of Scientific Research and Technology (ASRT) in Egypt, purposes to establish a holistic guideline of the best practice for sustainable development (SD) in Fayoum-Egyptian hotels at EL-Fayoum, Egypt. The study proposes a conceptual model that focuses on the costumers' point of view, looking at the impact which accommodation establishments SD initiatives have on guests' choice to stay there and revisit intention (IR). The research utilizes a flexible mixed-methods approach, divided into two intervals: qualitative and quantitative. The qualitative interval consists of 14 semi-organized interviews with key hotel executives to discuss SD practices. During the quantitative interval, a survey circulated to hotel customers. This helps in generalizing results and testing hypotheses through a machine learning approach based on structural equation modeling (SEM). The findings designate SD measures significantly affect guests' IR. The environmental, economic, and social norms of SD, inclined by subjective norms, have a positive effect on IR. SEM breakdown demonstrates that subjective norms show a significant mediating position between SD measures and IR, screening noteworthy predictive weight. This research adds to the philosophy of planned behavior (TPB) by pertaining to it within the hotel sector, offering a dynamic SD framework that comprehends environmental, economic, and social SD facets. The study offers hotel managers a toolkit with an actionable acuity to implement dynamic SD performs, through responsible maneuvers.*

Keywords: *Best-Practice Model, Sustainable Development, Fayoum Hotels, SEM, Mixed-Methods, Machine Learning*

INTRODUCTION

Planet Earth is undergoing dramatic environmental changes due to human activities that disrupt its natural balance and lead to widespread pollution. Addressing these challenges requires substantial investment in preserving natural resources, and ecotourism has emerged as a promising strategy that merges economic recovery with environmental conservation by encouraging people to explore and appreciate nature sustainably (El-Khadrawy et al., 2020; Raslan et al., 2016, 2024). Sustainable development (SD) principles—encompassing economic, social, and environmental dimensions—are central to this approach. Recognizing tourism's crucial position in universal economies, sustainable tourism encourages responsible resource administration while safeguarding local cultures and natural territories (Go & Kang, 2023; Rasoolimanesh et al., 2023; Herzallah et al., 2025), that is also supported by the United Nations' 2030 protocol for SD main objectives (UNWTO, 2015; Carlisle et al., 2021).

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In the hotel industry, the pressure to adopt sustainable practices is intensifying as hotels endeavor to minimize their eco-friendly footprint while meeting the expectations of increasingly eco-conscious travelers. Hotels, particularly those in Fayoum's Tunis Village, have begun implementing green initiatives—take for example the power and water maintenance, surplus lessening, as well as recognition of green recycled supplies—to enhance their environmental performance and competitive edge (Reem et al., 2022; Elzek et al., 2021; Anshima et al., 2025; Shahbaz et al., 2025). Certifications like '*LEED and Green Key*' further underscore these efforts, attracting a clientele that values social responsibility and green perceptions (Zaki, 2025a).

SD in hotels is typically examined through key scopes: environmental scope, economic, and the societal one. Environmental indicators assess both local and global impacts, economic indicators consider monetary and human capital, and social indicators focus on corporate social responsibility and ethical welfare (Hoffman, 2018; Zaki, 2025; Balkrishan et al., 2024; Oriade et al., 2021; Raslan et al., 2024; Tinwala & Biswas, 2020). Despite growing interest, a comprehensive theoretical framework capturing the complex, multi-dimensional nature of SD in hospitality remains elusive (Khan et al., 2024). Noteworthy, our current argument addresses that drawback by developing a best practice conduct to effectively integrate SD within hotels in Fayoum, Egypt.

Focusing on the interplay between SD measures and customer behavior, the research employs '*the Theory of Planned Behavior (TPB)'* to examine how customer insights and subjective norms influence the intention to revisit hotels. Unlike previous studies that have predominantly emphasized managerial perspectives (ElBelehy & Crispim, 2024; Rutecka et al., 2023), This research combines customer learnings through qualitative interviews and quantitative surveys (e.g., Through empirical studies on the well-known hotels in sustainable aspects, this research deepens theoretical implications within the TPB framework and offers some management suggestions designed to enhance overall standard (Chiangphan & Vongsaroj, 2024; Velaoras et al., 2025).

LITERATURE INSPECTION

This section synthesizes the current body of literature on SD in the hotel business, directed to know how environmental, economic, and social sustainability measures shape customer revisiting intentions. By reviewing key studies and theoretical insights, we highlight the mechanisms through which SD initiatives influence consumer behavior, setting the stage for our investigation into the intermediating situation of subjective norms (SN) coincided by '*Theory of Planned Behavior (TPB)'* framework.

Sustainable Development Measures and Customer Revisiting Intention

Sustainable development (SD) takes a serious focus in the service industry, emphasizing eco-friendly conservation, economic benefits, and social responsibility. Customers increasingly seek eco-friendly hotels that integrate sustainability into their operations, influencing their behavioral intentions (Go & Kang, 2023). Studies highlight those environmental performances of green certifications, best energy usage, leftover lessening could achieve a merit (Raslan et al., 2024). Similarly, economic sustainability—ensuring affordability while maintaining service quality—affects customer perception and retention (Li et al., 2022). Social sustainability, including employee well-being and community engagement, fosters trust and long-term relationships with guests (Han et al., 2022).

Empirical findings suggest that hotels incorporating comprehensive SD measures experience higher revisit rates, as sustainability-driven experiences align with consumer values. Therefore, we hypothesize:

H1: Customers' perception of sustainable development measures positively influences their revisiting intention.

- H1.1: Environmental sustainability positively influences customer revisiting intention.
- H1.2: Economic sustainability positively influences customer revisiting intention.
- H1.3: Social sustainability positively influences customer revisiting intention.

Influence of Subjective Norms on Customer Revisiting Intention

Subjective norms mean social burden evaluations of specific behaviors, that shape customer decisions and preferences (Ajzen, 1985). In sustainable hotels, customers are influenced by peers, media, and social groups advocating for eco-conscious travel (Zhang et al., 2023). Research indicates that when sustainability norms are reinforced by social circles, individuals are more likely to favor green hotels (Zaki, 2025b). The TPB supports the premise that subjective norms directly impact behavioral intentions (Cheng & Cheng, 2024).

In the hospitality context, subjective norms have been shown to enhance sustainable consumer behavior, increasing the likelihood of revisits to eco-friendly hotels (Kim et al., 2015). So, our second argument:

H2: Subjective norms positively influence customer revisiting intention.

Mediating Role of Subjective Norms

Subjective norms do not operate in isolation; they mediate the relationship between SD measures and revisiting intention. Research suggests that customers exposed to sustainable hospitality practices are more likely to develop favorable social norms, reinforcing their commitment to green hotels (Gebbels et al., 2020). Studies indicate that environmental, economic, and social sustainability efforts can strengthen social norms, which in turn, shape customer behavior (Wu et al., 2021).

This aligns with findings that sustainability initiatives must be socially validated to become effective behavioral drivers. Therefore, we hypothesize:

H3: Subjective norms act as a mediator in the relationship between SD actions and customer revisiting intention.

- H3.1: Subjective norms act as a mediator in the relationship between environmental sustainability and revisiting intention.
- H3.2: Subjective norms act as a mediator in the relationship between economic sustainability and revisiting intention.
- H3.3: Subjective norms act as a mediator in the relationship between social sustainability and revisiting intention.

Theory and Related Hypotheses Rational

Ajzen's 1991 TPB builds on the earlier Theory of Reasoned Action by adding the perceived behavioral control as its third element. This addition acknowledges that not all behaviors are completely within our control (Lizcano-Prada et al., 2025). The TPB enhances the accuracy of predictions by combining attitudes and subjective norms particularly in situations where people feel varying degrees of control over their actions. Essentially, the TPB model serves as a framework for understanding the factors that shape our behavioral intentions, including social norms and our attitudes toward specific behaviors (Zhang et al., 2025).

While TPB has been a popular tool for examining behavioral intentions, it has notable limitations, especially when applied to sustainability research. One major assumption of TPB is that there's a straightforward path from intention to action, which might overlook the social and contextual factors unique to different regions. Elements like cultural norms, legal regulations, and environmental awareness levels can affect the link between intention and behavior, highlighting that this relationship is influenced by a variety of factors (Akhter et al., 2025).

Drawing on *TPB*, the reviewed literature highlights customer behavior is influenced not only by direct perceptions of sustainability initiatives but also by the social norms surrounding these practices. Integrating these insights, our conceptual framework posits that while customers' perceptions of environmental, economic, and social sustainability directly enhance their intention to revisit hotels (H1), subjective norms further reinforce this relationship (H2). Moreover, subjective norms serve as a critical mediator between the individual SD dimensions and customer revisiting intention (H3). These hypotheses form the theoretical backbone of our study, guiding our empirical investigation into how sustainable practices in the hospitality sector can drive customer loyalty and long-term success.

METHODOLOGY

Our methodology approach is based on explanatory consecutive mixed methods strategy seeking to know how SD measures influence customer revisit intentions at Fayoum hotels (Creswell & Clark, 2007). In the initial qualitative phase, semi-structured interviews with 14 hotel managers—supported by a literature review on key sustainable development indicators and their customer impacts—provide in-depth insights into the practices and perceptions shaping sustainability in the hospitality sector. Following this, an online survey targeting hotel guests is administered to validate and expand upon the qualitative findings using robust statistical analysis (Saunders et al., 2012). To make the research more thorough and robust, we use triangulation by combining various data sources and approaches. This includes working closely with local hotel managers, travel agencies, and market research firms to gain different perspectives. Additionally, we employ various methods to ensure a well-rounded understanding of the topic (Yin, 2009). This mixed methodology approach ensures a nuanced understanding of how cultural norms and sustainable practices jointly influence customer behavior and inform hotel management policies.

During the qualitative chapter, we spoke with 14 hotel managers from a wide range of establishments. These hotels varied in their sustainability certifications—from Level 2 to Level 3—and had different ratings on Booking.com, ranging from 5.0 to 9.3. The sizes of these hotels also differed, with some being cozy spots with just a few rooms, while others were large complexes boasting over 100 rooms. They cater to a diverse clientele, including Egyptians, Germans, French, Arabs, and Belgians. Many of these hotels have earned green awards, like *GreenStar*, highlighting their dedication to sustainable practices.

The interviews lasted between 9 and 31 minutes and took place from late March to mid-May 2024. They provided

rich insights into each hotel's operational strategies and sustainability initiatives. To further validate these insights, we conducted an online survey of hotel guests. By using triangulation, we combined various data sources and methods, which not only increases the reliability of our findings but also sheds light on how sustainable practices and cultural norms influence tourist behavior and guide tourism management policies.

This study employed an online, self-administered questionnaire to collect primary data efficiently and economically from hotel customers, aligning with established practices in social research (Saunders et al., 2012). Questionnaires are particularly effective in tourism studies for capturing human perceptions and behavioral intentions, offering valuable insights into how hotel customers perceive SD measures and their influence on visit intentions. The survey was designed using Google Forms, following best practices for structured data collection, and consisted of three sections: customer demographics, evaluation of SD constructs, and visit/revisit intention. Established measurement scales (Table 1) adapted from previous studies ensured validity.

Table 1: Survey Measures

Measure	Source
subjective norms	(Ajzen, 1985)
intention to revisit	(Khasawneh & Alfandi, 2019)
SD indicators (environmental)	(Alipour et al., 2019; Raslan et al., 2016; 2024)
SD indicators (economic)	(Alipour et al., 2019; Raslan et al., 2016; 2024)
SD indicators (social)	(Alipour et al., 2019; Raslan et al., 2016; 2024)

To mitigate common method bias, the dependent variable (IR) was assessed before independent variables. The 5-point Likert type scale was mainly adopted to measure responses, ensuring comparability and statistical robustness.

The hotel managers chosen for the interviews were selected using a purposeful sampling method. This approach helped ensure that we gathered valuable insights that truly reflect their experiences with sustainable travel.

Data analysis followed our implemented mixed methods methodology, mixing qualitative verdicts through thematic analysis using *QualCoder* software, an alternative to *NVivo*, to systematically code and interpret interview transcripts. While, the quantitative information were scrutinized using *Structural Equation Modeling (SEM)* via *JASP* software, following Hair's et al. (2020) dual process: first, validating the measurement model, and then testing structural relationships through bootstrapping (Sarstedt et al., 2022). This methodology strengthens the study's analytical rigor, enabling a robust examination of how SD perceptions influence travel intentions. Ethical considerations adhered to *Fayoum University* guidelines, ensuring participant anonymity and voluntary participation, with informed consent obtained prior to data collection.

RESULTS

Sample Outline

This study examines a sample of 14 hotels located in Fayoum, Egypt, recognized for their commitment to sustainability through the *Sustainable Travel Badge on Booking.com*. These hotels represent a diverse mix of privately owned properties and one affiliated with an international hotel chain. The selection was purposive, ensuring that all hotels in the study demonstrate sustainability efforts while operating in different market segments, ranging from boutique guesthouses to upscale resorts. This diversity shows inclusive breakdown of sustainability performs in various operational contexts. Next section provides an overview of the selected hotels, including their sustainability certification levels, ownership structure, and key facilities.

A Detailed Description of the Hotel Cases

The selected 14 hotels in Fayoum vary in size, ownership, and sustainability initiatives, reflecting a broad spectrum of sustainable hospitality practices. Most properties are privately owned, with the exception of Helnan Auberge (C12), which belongs to the Scandinavian International Hotels chain. The Sustainable Travel Badge levels assigned by Booking.com range between Level 2 and Level 3, indicating varied commitments to environmental and social sustainability. The facilities offered by these hotels are diverse, catering to different customer preferences, including eco-friendly accommodation, local dining experiences, outdoor activities such as birdwatching and hiking, and wellness services like spas and pools. Many hotels, particularly those in Tunis Village, emphasize cultural engagement through pottery workshops and traditional experiences, reinforcing the connection between sustainability and local heritage. This diverse representation provides valuable insights into how different hotel types integrate sustainability into their operations and guest experiences.

Qualitative Phase Findings

SD Concept Awareness

Hotel managers defined sustainable development through a multifaceted lens, emphasizing a balanced approach that

harmonizes environmental conservation, guest satisfaction, and community well-being. Many highlighted the importance of long-term impact, ensuring resources are preserved for future generations. Environmental conservation emerged as a priority, with hotels adopting eco-friendly practices like minimizing waste and using renewable resources. Support for local communities—through sourcing local products and funding small projects—was also central. Managers stressed the need for awareness and education among staff and guests, alongside optimizing resource use (e.g., reducing water and energy waste). Innovative strategies, such as involving guests in organic farming or pursuing eco-certifications, further underscored their commitment to holistic sustainability.

Hotels have rolled out diverse initiatives to reduce their environmental footprint. Energy and water efficiency measures—like LED lighting, solar panels, low-flow fixtures, and rainwater harvesting—were widely adopted. Waste reduction strategies, including recycling programs and biodegradable amenities, aimed to curb landfill contributions. Many hotels prioritized local sourcing, partnering farmers and artisans to boost regional economies while offering guests authentic experiences. Engaging guests through activities like tree-planting or QR-code-driven sustainability education also bridged the gap between awareness and action.

Environmental SD Measures

Environmental stewardship was a cornerstone of hotel practices. Investments in energy different sources and their applications reduce dependence on natural fuels. Water conservation efforts, such as "Towels for Tomorrow" programs and sewage treatment systems, addressed global scarcity concerns. Hotels also minimized pollution through eco-friendly cleaning products and maintained HVAC systems for efficiency. Innovations like carbon-offset options for guests and partnerships with waste management firms highlighted forward-thinking approaches to sustainability.

Economic Measures

Economic sustainability strategies balanced profitability with planetary health. Hotels prioritized local economy support by sourcing ingredients and crafts from nearby suppliers, directly aiding regional agriculture and job creation. Cost-saving measures lowered operational expenses over time. Investments in green technologies (e.g., solar panels) and waste management systems (e.g., composting) demonstrated how eco-conscious choices could drive financial resilience.

Social Measures

Social sustainability centered on employee well-being, community engagement, and cultural preservation. Hotels invested in staff training, fair wages, and safe working conditions, fostering loyalty and job satisfaction. Community outreach—via NGO partnerships, cultural events, and environmental clean-ups—strengthened local ties. Cultural sensitivity was prioritized, with hotels showcasing regional heritage through cuisine, crafts, and guided tours. Hiring locally not only reduced costs but also built community trust.

SD Impact on Guests

Sustainability practices significantly enhanced guest experiences. Eco-conscious travelers appreciated hotels aligning with their values, such as fresh local cuisine or energy-efficient amenities. Transparency about sustainability efforts—via brochures, QR codes, or staff interactions—built trust. Many guests reported psychological comfort knowing their stay supported ethical practices, enriching their overall experience.

RI & SD Nexus

Guests' likelihood to return was closely tied to sustainability. Unique offerings—like farm-to-table dining or cultural immersion activities—created memorable stays. Environmental efforts (e.g., plastic reduction) resonated with eco-aware travelers, while trust in a hotel's ethical practices fostered loyalty. Managers noted that guests who participated in sustainability initiatives often became repeat visitors and brand advocates.

Current and Future Key SD Measures

Present priorities include a holistic approach integrating environmental, economic, and social goals. Immediate actions regarded sustainability activities and community partnerships. Continuous improvement—via staff training and tech upgrades—ensures practices remain cutting-edge.

Looking ahead, hotels aim to expand climate action (e.g., scaling solar energy), adopt circular economy models (e.g., zero-waste partnerships), and enhance guest education. Strengthening community collaborations and investing in adaptive strategies (e.g., drought-resistant landscaping) will address future challenges. Balancing profitability with planetary health remains a guiding principle.

In summary, Fayoum's hotels exemplify how sustainability transcends trendiness—it's a necessity. By intertwining environmental care, economic resilience, and social equity, they create meaningful impacts for guests, communities, and the planet. Their practices prove that ethical tourism isn't just viable but vital for long-term success.

Quantitative Phase Findings

Measurement Model and Structural Model Results

The results from the SEM model, displayed in Fig. 1, show the factor loadings and fit indices. For the latent variable E, the significant loadings include: E1 (1.00), E2 (0.92), E3

(1.00), E4 (0.97), E5 (0.97), E6 (0.93), and E8 (0.75). The loadings for the C variable are close to the ideal threshold, exceeding 0.60. For the S variable, the loadings range from 0.82 (S8) to 1.00 (S1).

The fit indices indicate an excellent model fit (Table 2). All these indices either meet or exceed their respective thresholds, demonstrating a highly satisfactory model fit (Hair et al., 2021).

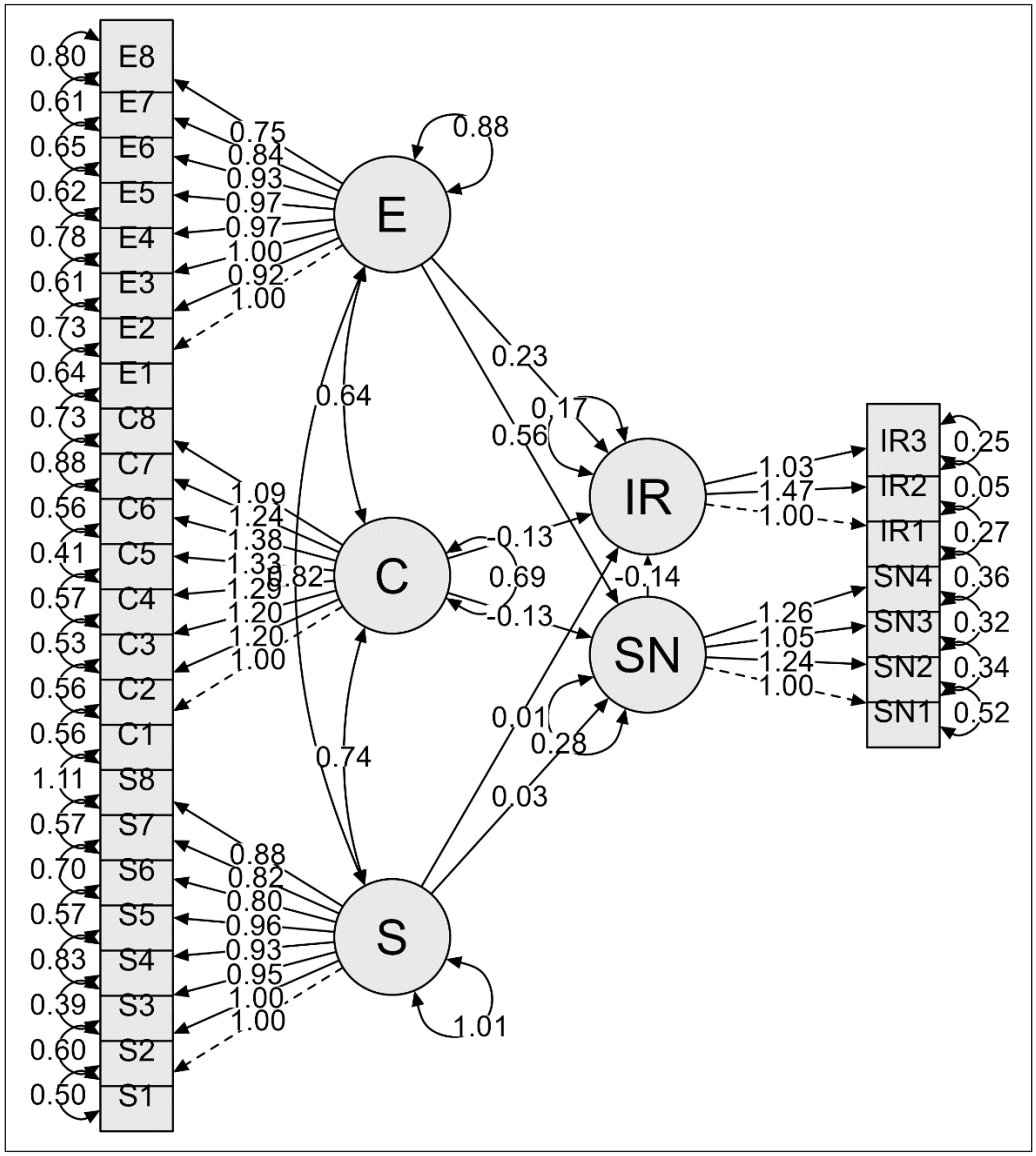

Fig. 1: SEM Model

The R^2 values for SN and IR show how the (E, C, and S) independent variables account for the variance in the dependent variables (Environmental dimension, economic, and social). The R^2 for SN is 0.48, meaning the model explains 48% of SN variance. The R^2 for IR is 0.42, indicating that 42% of the variance in IR is explained. These results confirm the model's effectiveness, although other factors may also influence SN and IR outcomes. Table 2 shows the model indices coincided with Hair et al. (2021).

Table 2: Fit Indices

Fitting Index	Value	Edge
X^2/ df	674.39/424, p < .001	≤ 3
CFI	0.998	≥ 0.9
TLI	0.998	≥ 0.9
NNFI	0.998	≥ 0.9
NFI	0.990	≥ 0.9

Fitting Index	Value	Edge
PNFI	0.903	> 0.5
RFI	0.989	≥ 0.9
IFI	0.998	≥ 0.9
RNI	0.998	≥ 0.9
RMSEA	0.035	≥ 0.08
SRMR	0.061	< 0.09
GFI	0.991	≥ 0.9

The path coefficient analysis, statistical significance, R^2, and predictive relevance (Q^2) values were examined for the hypotheses. The adjusted R^2 values for SD, SN, and IR were 0.192, 0.334, and 0.317, respectively, all exceeding the recommended threshold of 0.2 (Hair et al., 2020). The Q^2 values greater than zero suggest reliable predictive relevance. Additionally, the SRMR value of 0.076 confirms the SEM model's adequacy.

The model includes a second-order structure that complicates the analysis, though the SRMR remains within acceptable limits. The results, as presented in Table 3, show that the Environmental (E), Economic (C), and Social (S) factors (H1.1 - H1.3) have a significant positive effect on IR ($\beta E = 0.462, \beta C = 0.196, \beta S = 0.042, p < 0.001$) and SN ($\beta E = 0.063, \beta C = 0.256, \beta S = 0.798, p < 0.001$), confirming Hypotheses 1.1, 1.2, and 1.3. A reciprocal influence between SN and IR was also observed ($\beta = 0.257, p < 0.001$), consistent with earlier research (Campos et al., 2024; Ebohon & Momoh, 2023; Elshaer et al., 2023; Hafeez et al., 2024).

Table 3: Structural Model Results

Path	β	Std. Error	z-Score	Sig.	Decision
SN>IR	-0.257	0.102	2.513	0.002	Agree
S>IR	0.042	0.208	0.202	0.004	Agree
C>IR	-0.196	0.204	-0.96	0.017	Agree
E>IR	0.462	0.219	2.115	0.014	Agree
S>SN	0.063	0.142	0.445	0.01	Agree
C>SN	-0.256	0.132	1.936	0.003	Agree
E>SN	0.798	0.119	6.703	< .001	Agree

To assess the mediating role of SN between the SD factors (E, C, and S), we performed bootstrap resampling with 5,000 samples. As shown in Fig. 2, the indirect effects of E, C, and S through SN were significant, with effects of 0.250, 0.01, and 0.1, similarly ($p < 0.001$). The confidence intervals for these effects were above zero, providing strong evidence for Hypotheses 3.1, 3.2, and 3.3, as confirmed by Sabiote-Ortiz et al. (2024).

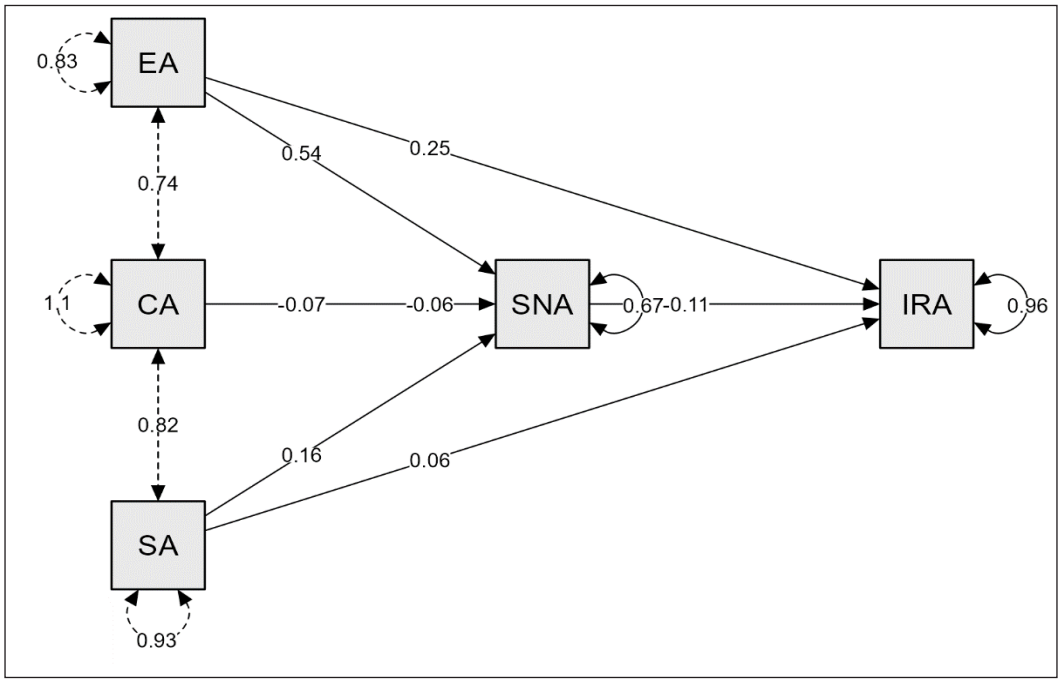

Fig. 2: Mediation Breakdown

CONCLUSIONS

The research addressed its primary question- identifying best performs for achieving SD in Fayoum hotels—through a two-phases ; interviews with hotel directors and distributing surveys of hotel customers. The findings underscored the importance of integrating environmental, economic, and social measures into hotel operations to achieve sustainability. The study also highlighted the need for greater awareness and implementation of SD practices among hotel managers, as well as the customer perceptions act in driving sustainable tourism. The development of a comprehensive SD toolkit offers actionable recommendations for hotels to enhance their sustainability efforts, balancing ecological responsibility, economic viability, and social well-being.

STUDY IMPLICATIONS AND FUTURE RESEARCH CONSIDERATIONS

This study contributes to the TPB by applying it to the hospitality industry, offering a nuanced understanding of how behavioral intentions are shaped by sustainability practices. The integration of environmental, economic, and social dimensions into a unified SD framework provides a robust theoretical model for future research in sustainable tourism.

For hotel managers, the study offers a practical toolkit for implementing SD practices, including energy and water conservation, waste reduction, and community engagement. Emphasizing staff training and guest engagement can enhance the effectiveness of these initiatives, leading to improved customer satisfaction and loyalty. The findings also highlight the importance of cultural sensitivity and local partnerships in building a sustainable brand reputation.

The study acknowledges some limitations, such as a small sample size and difficulties in gathering data. Future research should take a closer look at how subjective norms influence sustainability efforts, conduct long-term studies to evaluate the ongoing effects of sustainability initiatives, and compare practices across various regions and types of hotels. Exploring the economic effects of sustainability on hotel profits and community development could also shed light on the advantages of adopting sustainable hospitality practices.

Additionally, the study offers a comprehensive checklist of sustainable development (SD) best practices organized into environmental, economic, and social categories. These recommendations aim to help hotel management implement effective sustainable practices that benefit the environment, local communities, and the hospitality sector. Important steps include shifting to renewable energy, minimizing plastic use, supporting local economies, and involving guests in sustainability initiatives. By embracing these practices, hotels can meet their sustainability goals, contribute to environmental protection, and improve their competitiveness.

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