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The Impact of Green Innovation on Competitive Advantage at Five-Star Hotels in Jordan

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Abstract: This study aimed to identify the impact of green innovation (in products, operations, and administrative methods) on competitive advantage (flexibility, cost, delivery, and quality) at five-star hotels in Jordan. Using a descriptive and analytical approach, along with proportional stratified sampling, the study surveyed 475 senior and middle management workers across 21 five-star hotels. Out of 214 distributed questionnaires, 200 valid responses were analyzed using SPSS (V26.0). The study found high levels of green innovation and competitive advantage, with a statistically significant effect of green innovation on competitive advantage. Recommendations included designing recyclable services, ensuring safe and sustainable use, improving service quality with advanced methods, and continuously evaluating market suitability.

Keywords: green innovation; competitive advantage; five-star hotels; Jordan

1. Introduction

With the fast pace of economic development, the industrial activities and usage of resources have created serious environmental issues, which need sustainable industrial practices from organisations (Begum eAwant al., 2022; Adriana et al., 2020). Green innovation is crucial to cut environmental impact and create economic value, as environmental quality is emerging as a key concern of organizational leaders (Turki et al., 2022). Green innovation refers to using environmental-friendly processes, technologies and management to reduce negative impacts and promote sustainability (Awan et al., 2021; Bani Ismail & Ismaeel, 2025). It also enhances the organizational image, minimize expenses, and facilitate long-term sustainable development (Rehman et al., 2021).

Concurrently, the globalization and advancement of technology have increased competition and organizations need to deliver superior and differentiated value (Ismaeel et al., 2024a). Now competitive advantage has become a priority goal for firms and an opportunity to achieve superior performance from competitors by having strategies that are unique and hard for others to copy. This is even more difficult in the hospitality industry, especially for five-star hotels, where customer expectations and the dynamics of the market are ever-evolving.

Green innovation can be used as a strategic tool to build more competitive advantage by increasing efficiency, service quality and responsiveness. Previous studies emphasize that it plays a vital part in enhancing organization performance and competitiveness (Khazal and Diab, 2019; Tu and Wu, 2021). This study thus investigates the relationship between green innovation (product, process and administrative) and competitive advantage (flexibility, cost, delivery and quality) dimensions in 5-star hotels in Jordan.

2. Literature Review

2.1. Previous Empirical Studies

One of the major issues in organizational research is achieving competitive advantage, and several research papers have focused on internal and external aspects that affect competitive advantage. Abdulaziz (2024) and Jaruwit (2023) emphasized the importance of marketing culture and the quality of e-service in boosting the competitive advantage in IT and tourism industries. Their results highlight the significance of customer service and internal communication, as well as the reliability of digital service.

Leadership and organizational practices have been investigated: The studies by Belhaj (2023) and Attallah (2024) showed that Total Quality Management (TQM) and green leadership and innovation play a crucial role in gaining competitive advantage in the healthcare sector, respectively. Khazal & Diab (2019) also showed that green leadership and innovation is important for gaining sustainable advantage. In the same vein, Anggraeni & Ismail (2023) found that the drivers in the hotel industry are strategic leadership and intellectual capital. Technological and operational: also important. Al-Yousfi et al. (2024) pointed out the importance of marketing information systems, and Shebeshe & Sharma (2025) and Jahanbakhsh & Amini (2023) validated the positive impacts of sustainable supply chain practices.

Furthermore, Al-Khalifa & Al-Mahasneh (2024) and Otache & Uaman (2024) highlighted the importance of entrepreneurial orientation and management on competitive advantage in banking and SMEs respectively. Table 1 summarizes these studies.

Table 1. Summary of previous empirical studies.

Authors	Context	Key Focus	Main Findings
Abdulaziz (2024)	IT sector (Egypt)	Marketing culture & e-service quality	Both variables significantly enhance competitive advantage
Belhaj (2023)	Healthcare (Libya)	Total Quality Management	TQM dimensions positively affect competitive advantage
Attallah (2024)	Textile industry	Green leadership & innovation	Green innovation mediates the effect on competitive advantage
Al-Yousfi et al. (2024)	Manufacturing (Iraq)	Marketing information systems	Improves performance and supports competitive advantage
Al-Khalifa & Al-Mahasneh (2024)	Banking (Bahrain)	Entrepreneurial orientation	Strong positive impact on competitive advantage
Khazal & Diab (2019)	Industrial firms	Green innovation	Significant effect on sustainable competitive advantage
Otache & Uaman (2024)	SMEs (Nigeria)	Entrepreneurial management	Competitive advantage mediates performance improvement
Shebeshe & Sharma (2025)	Manufacturing	Sustainable supply chain	Enhances competitive advantage and organizational performance
Jaruwit (2023)	Tourism & hotels	E-service quality	Improves efficiency and competitiveness
Anggraeni & Ismail (2023)	Hotels (Indonesia)	Strategic leadership & intellectual capital	Both positively influence competitive advantage
Sun et al. (2023)	Multi-country	Green innovation & sustainability	Enhances economic growth and resource efficiency
Jahanbakhsh & Amini (2023)	SMEs	Supply chain practices	Improves competitive advantage and performance
Singh et al. (2022)	SMEs	Green innovation & capabilities	Innovation mediates performance outcomes
Begum et al. (2022)	Organizations	Green leadership	Drives green innovation through cognitive processes

Source: Adopted by authors according to the previous studies.

The reviewed studies provide evidence that innovation-oriented and sustainability-based practices contribute to competitive advantage. Although not all were conducted in the hotel industry, their findings on flexibility, cost efficiency, delivery performance, and quality are relevant for hospitality firms. These insights informed the current study's hypotheses on the impact of green innovation dimensions on competitive advantage in five-star hotels.

The present study is unique in a number of respects. Firstly, it examines the hospitality industry and, in particular, five-star hotels, which are highly service-driven and customer-centric industries. This is in contrast to many previous studies that focused primarily on industries or manufacturing settings such as IT firms (Abdulaziz, 2024), textile factories (Attallah, 2024), or small and medium enterprises (SMEs) (Otache & Uaman, 2024). This study focuses on upscale hotels, which have not been thoroughly studied in relation to green innovation and competitive advantage. Secondly, the research offers a regional focus by focusing on Jordan, which has not been extensively examined in the context of green innovation and competitiveness. Although studies have been conducted in other countries such as Egypt, Iraq, and Ethiopia, this study provides insights that are specific to the Jordanian hospitality sector, given its unique environmental, economic, and regulatory factors. This contributes to a better understanding of the region's sustainability and competitiveness. Lastly, this study places green innovation at the forefront as the main independent variable and tests its relation with competitive advantage. Other studies have considered green innovation as a moderator (e.g., Attallah, 2024), or have connected it to other variables, such as stakeholder pressure or dynamic capabilities (e.g., Singh et al., 2022). This direct link provides a clearer picture of how green innovation activities (such as providing eco-friendly services, implementing sustainable operations, and using green technologies) can improve competitive advantage in the context of luxury services (Joudi & Joudi, 2021). So, the current study provides important theoretical and practical insights into the emerging field of sustainable business strategy.

2.2. Theoretical Framework and Conceptual Model

In light of the significant developments in the global economy, organizations must use modern techniques and tools to achieve excellence and meet customer needs and desires. Globalization, the free market, and technological advancements have intensified competition among organizations striving to distinguish themselves to survive and continue. Organizations aim to excel in their performance and provide unique, high-quality outputs that competitors cannot imitate. This focus on achieving competitive advantage has become a central theme in the world of business and economics. Competitive advantage involves implementing strategies that cannot be directly replicated by other organizations (Zarafeli & Al-Bashabsheh, 2023). This study investigates the impact of green innovation on competitive advantage in five-star hotels in Jordan.

Green Innovation

The focus on environmental preservation and protection has become a key feature of the current global system due to increasing environmental risks and diverse sources of pollution. Organizations must seek new and innovative ways to offer green products using environmentally friendly processes. Adopting green innovation can improve environmental performance, enhance competitive advantage, and maximize profitability (Ismaeel et al., 2024b; Alafi et al. 2023). Green innovation is one of the most important environmental strategies, involving the transformation of production processes to reduce resource consumption, minimize pollution, and incorporate environmental management systems into organizational operations (Alafi & Ismaeel, 2024). Song and Yu (2018) emphasized that green innovation focuses on waste reduction, pollution prevention, and the application of environmental management systems in operations.

Green Product Innovation

Green innovation encompasses strategic efforts by organizations to reduce environmental impact while enhancing value creation. One key dimension is green product innovation, which involves designing and developing products that are environmentally friendly throughout their

lifecycle (Asadi et al., 2020). This includes using less polluting materials, minimizing energy and resource consumption, and ensuring products are recyclable or reusable. The process is collaborative and systematic, involving stakeholders to generate ideas, allocate resources, and manage risks effectively. It also requires a cultural and managerial commitment to sustainability and continuous improvement.

Green Process Innovation

The second dimension, **green process innovation**, focuses on modifying production and supply chain activities to enhance efficiency and reduce environmental harm. This can involve overhauling systems or making targeted improvements, such as adopting cleaner technologies or recycling waste. Organizations benefit from reduced costs, improved resource utilization, and enhanced competitiveness. It also supports the development of green products and helps address environmental challenges during manufacturing. Key indicators include reduced emissions, lower raw material usage, and effective waste recycling.

Green Administrative Innovation

Lastly, **green administrative innovation** refers to the adoption of new managerial and organizational practices that foster an environmentally responsible culture. This includes restructuring organizational processes, updating strategies, and implementing policies that prioritize sustainability. It enables organizations to proactively manage environmental impacts and adapt to market and technological changes. By leveraging new knowledge and aligning with environmental standards, organizations can improve their market position and long-term resilience.

Green administrative innovation in five-star hotels specifically, delivers competitive advantage by institutionalizing sustainability through policies, procedures and performance appraisal. Sustainability-focused management practices drive service standardization, employee engagement, and adherence to international hospitality standards, and lead to higher service quality, reliability and flexibility in service delivery and support cost effectiveness through resource management.

Competitive Advantage

Competitive advantage refers to an organization's ability to outperform competitors by creating superior value and achieving better returns on invested capital (Yuleva, 2019). It is realized when firms develop unique resources or capabilities that are difficult for competitors to imitate (Al-Bashabsheh & Al-Assasfeh, 2022). Achieving such advantage requires effective strategic formulation and the optimal use of physical, technological, and organizational resources (Zarafeli & Al-Bashabsheh, 2023; Bouchareb & Hajaji, 2023).

Sustaining competitive advantage depends on several internal capabilities. Organizational learning enables firms to adapt to environmental changes and transform challenges into opportunities (Girish et al., 2022; Zhang et al., 2023). Technological adoption enhances productivity and service quality, while strong customer relationships support tailored offerings and long-term loyalty (Stroumpoulis et al., 2022; Mahadevan & Joshi, 2022). In addition, collaboration through business networks strengthens knowledge exchange and competitive positioning (Ismaeel & Alzubi, 2020a).

In practice, competitive advantage is reflected in key performance outcomes such as market share, profitability, customer satisfaction, and innovation (Bouhalassa & Courtel, 2024). It is also shaped by strategic flexibility, efficient resource utilization, and responsiveness to market changes (Al-Khaldiya, 2023; Al-Jahdali, 2020).

This study focuses on four core dimensions of competitive advantage. Flexibility enables organizations to adapt services and operations to changing demands, while cost efficiency reflects optimal resource utilization (Abdulaziz, 2024; Ismaeel & Alzubi, 2020b). Delivery emphasizes speed and reliability in service provision, which enhances responsiveness and market positioning (Dahmani & Dahmani, 2023; Shaarawi, 2021). Quality remains a critical factor, as it improves

customer satisfaction, reduces costs, and strengthens brand reputation (Al-Bashabsheh & Al-Assasfeh, 2022; Abdulaziz, 2024; Bouaziz, 2023).

Within this framework, green innovation plays a key role in strengthening competitive advantage. Green product innovation enhances service quality and differentiation, process innovation improves cost efficiency and delivery performance, and administrative innovation supports flexibility and long-term sustainability. Together, these dimensions create a comprehensive and sustainable basis for competitive advantage in the hospitality sector.

2.3. Hypotheses Development

Based on the theoretical foundations of resource-based view and green innovation theory, as well as consistent empirical evidence indicating that environmentally oriented innovations enhance organizational competitiveness, this study formulates its hypotheses. Prior studies suggest that green product, process, and administrative innovations can strengthen flexibility, reduce costs, improve delivery efficiency, and enhance service quality in hospitality organizations. Accordingly, the following hypotheses are proposed:

Main Hypothesis (Ho1): There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation in its combined dimensions (green innovation in products, green innovation in processes, and green innovation in management methods) on competitive advantage in its dimensions (flexibility, cost, delivery, and quality) in five-star hotels in Jordan.

Several sub-hypotheses branch from this main hypothesis:

- **Ho1.1:** There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation in its combined dimensions (green innovation in products, green innovation in processes, and green innovation in management methods) on flexibility in five-star hotels in Jordan.
- **Ho1.2:** There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation in its combined dimensions (green innovation in products, green innovation in processes, and green innovation in management methods) on cost in five-star hotels in Jordan.
- **Ho1.3:** There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation in its combined dimensions (green innovation in products, green innovation in processes, and green innovation in management methods) on delivery in five-star hotels in Jordan.
- **Ho1.4:** There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation in its combined dimensions (green innovation in products, green innovation in processes, and green innovation in management methods) on quality in five-star hotels in Jordan.

Figure 1 illustrates the study model that links the impact of green innovation to competitive advantage.

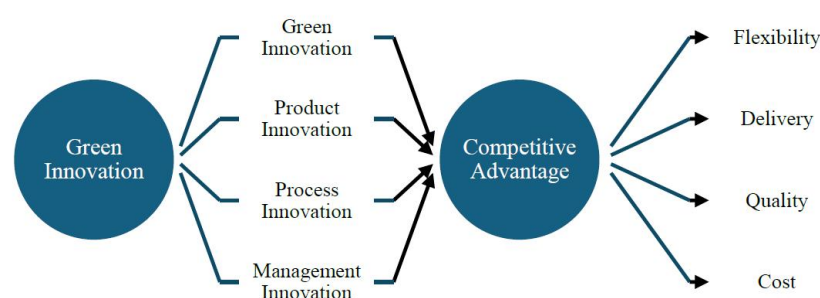


Figure 1. Study Model.

Sources: Adopted by authors based on previous studies (e.g. Zarafeli & Al-Bashabsheh, 2023; Bouchareb & Hajaji, 2023; Al-Bashabsheh & Al-Assasfeh, 2022; Siahaan & Nazaruddin, 2020).

3. Methodology and Procedures

This section outlines the methodological framework used to achieve the objectives of the study. It presents research design, population and sampling strategy, data collection tools, and the statistical techniques employed for analysis. Additionally, it describes the development and validation of the research instrument to ensure its reliability and accuracy in measuring the study variables.

3.1. Research Design and Methodology

The research is applied and causal in nature, seeking to explore the causal link between green innovation and competitive advantage in Jordanian five-star hotels. It is a non-experimental field study, naturalistic, and cross-sectional in regard to its temporal dimension, since the data were collected only once. It adopts a quantitative approach with a descriptive-analytical design to investigate the dimensions of green innovation (product, process and administrative innovation) and how they influence the dimensions of competitive advantage (flexibility, cost, delivery and quality). The data collection method was a survey that collected information from a stratified random sample of 214 managerial and supervisory staff across 21 five-star hotels in Jordan, with a response rate of 93.5% (200 responses). The sample includes the managerial and supervisory employees in Amman hotels.

The population of the study were 475 managerial employees in 21 five-star hotels. A stratified random sample of 214 respondents was taken, with 200 valid responses.

3.2. Data Collection Instrument and Validation

The main data collection instrument was a questionnaire that sought to answer the research questions and objectives. The questionnaire was divided into three parts: (1) demographic and job-related characteristics (gender, age, education, job position, and experience); (2) the independent variable (green innovation) which was measured in three dimensions, with 16 items (see Appendix A); and (3) the dependent variable (competitive advantage) which was measured in four dimensions, with 18 items (see Appendix A). The responses used a five-point Likert scale and were analyzed in SPSS. The instrument was validated by eight experts and amendments were made. The reliability of the scale was checked by Cronbach's Alpha, with a minimum value of 0.70 acceptable. The study used both secondary data sources (books, journals, reports and databases) and primary data obtained from the self-developed questionnaire.

Reliability analysis showed strong internal consistency, with Cronbach's α values ranging from 0.81 to 0.89 for green innovation dimensions and from 0.83 to 0.91 for competitive advantage dimensions, exceeding the acceptable threshold of 0.70.

4. Results

4.1 Descriptive Analysis of Study Variables

To provide an initial insight into the perceptions of the respondents, and to help interpret the results of the regression analyses, descriptive statistics were obtained for the main constructs of the study. We used means and standard deviations to measure the importance of the dimensions of green innovation and competitive advantage in Jordanian five-star hotels. Furthermore, the ranking of the dimensions according to their mean values allows hotels' prioritisation of green innovation practices and sources of competitive advantage to be compared. The descriptive statistics and rankings of the dimensions of green innovation and competitive advantage are shown in tables 2 and 3, respectively.

As shown in table 2, green process innovation achieved the highest mean score among green innovation dimensions, indicating that five-star hotels place greater emphasis on environmentally friendly operational processes.

Table 2. Mean scores, standard deviations, and ranking of green innovation dimensions.

Green Innovation Dimension	Mean	Standard Deviation	Rank
Green Process Innovation	4.21	0.62	1
Green Product Innovation	4.08	0.67	2
Green Administrative Innovation	3.96	0.71	3
Overall Green Innovation	4.08	0.64	—

Means are based on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Table 3 shows that delivery ranked first among the dimensions of competitive advantage, reflecting hotels' emphasis on timely service provision and responsiveness to customer needs.

Table 3. Mean scores, standard deviations, and ranking of competitive advantage dimensions

Competitive Advantage Dimension	Mean	Standard Deviation	Rank
Delivery	4.25	0.58	1
Flexibility	4.14	0.63	2
Quality	4.02	0.66	3
Cost	3.89	0.72	4
Overall Competitive Advantage	4.08	0.65	—

4.2. Hypothesis Testing

Main Hypothesis (H01): There is no statistically significant effect at the level of significance ($\alpha \leq 0.05$) of green innovation in its dimensions (green product innovation, green process innovation and green administrative innovation) on competitive advantage in its dimensions (flexibility, cost, delivery and quality) in five-star hotels in Jordan. Simple Linear Regression was conducted to test the main hypothesis and the effect of green innovation on competitive advantage in five-star hotels in Jordan.

H01: From table 4, the model summary shows that the coefficient of correlation (R) between the independent variable (green innovation) and the dependent variable (competitive advantage) is .822. The coefficient of determination (R^2) is .676, indicating that 67.6% of the variance is explained by the model. The adjusted R^2 is .675 and the standard error of the estimate is .31317. The ANOVA (F) value is 413.553 and the level of significance is .000. In terms of the coefficients, the constant in competitive advantage has a B value of .956, S.E of .148, and a t-value of 6.473 at a significance level of .000, which shows that it is significant. The green innovation variable has a B value of .759, S.E of .037, Beta of .822, and a t-value of 20.336 at a significance level of .000, also statistically significant.

Table 4. The effect of green innovation on competitive advantage.

IV	D. V	B	S.E	Beta	t	Sig.
Constant	Competitive Advantage	.956	.148	...	6.473	.000
Green Innovation	Competitive Advantage	.759	.037	.822	20.336	.000

In table 5, the correlation coefficient (R) for hypothesis H01-1, which relates to green innovation and flexibility, is 0.771. The coefficient of determination (R^2) is 0.594, meaning that 59.4% of the variance is explained by the model. The adjusted R^2 value is 0.592 and the standard error of the estimate is 0.37889. The ANOVA analysis gives an F-value of 289.693, and a significance of 0.000, indicating the model is significant.

The coefficients show that the constant for flexibility is 0.949, with a standard error (S.E.) of 0.179, a t-value of 5.313 at the 0.000 significance level, which is significant. The green innovation variable has a B value of 0.768, S.E. of 0.045, Beta of 0.771, and a t-value of 17.020, also significant at the 0.000 level.

Table 5. Results related to the sub-hypotheses.

I.V	D.V	B	S.E	Beta	t	Sig.	
Constant	Flexibility	.949	.179	...	5.313	.000	H01-1: There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation on flexibility in five-star hotels in Jordan.
Green Innovation		.768	.045	.771	17.020	.000	
Constant	Cost	0.876	0.235	—	3.720	0.000	H01-2: There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation on cost in five-star hotels in Jordan.
Green Innovation		0.733	0.059	0.659	12.323	0.000	
Constant	Delivery	1.309	0.242	—	5.412	0.000	H01-3: There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation on delivery in five-star hotels in Jordan.
Green Innovation		0.706	0.061	0.635	11.555	0.000	
Constant	Quality	0.745	0.158	—	4.714	0.000	H01-4: There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of green innovation on quality in five-star hotels in Jordan.
Green Innovation		0.812	0.040	0.822	20.346	0.000	

In H01-2, the correlation coefficient (R) value is 0.659, suggesting a strong positive correlation between green innovation and cost. The coefficient of determination (R^2) is 0.434, which means that 43.4% of the variance in cost can be explained by green innovation. The ANOVA table shows that the F-value is statistically significant ($F = 151.867$, $\text{Sig.} = 0.000$), validating the model. The table of coefficients reveals that green innovation has a statistically significant positive effect on cost ($B = 0.733$, $t = 12.323$, $\text{Sig.} = 0.000$). So, the null hypothesis is rejected and the alternative hypothesis is accepted, implying a statistically significant influence of green innovation in its overall dimensions on cost in Jordanian five-star hotels.

In H01-3 test, the correlation coefficient (R) is 0.635, showing a strong positive association between green innovation and delivery. The coefficient of determination (R^2) is 0.403, implying that 40.3% of delivery is explained by green innovation. The ANOVA table indicates a statistically significant F-value (133.528, $\text{Sig.} = 0.000$), supporting the model. The coefficients table reveals that green innovation has a positive influence on delivery ($B = 0.706$, $t = 11.555$, $\text{Sig.} = 0.000$). Thus, the null hypothesis is rejected and the alternative hypothesis is accepted, suggesting that the effect of green innovation (in its combined dimensions) on delivery is statistically significant in Jordan's five-star hotels.

Last, the test of H01-4 reveals a strong correlation coefficient ($R = 0.822$), which indicates a positive correlation between green innovation and quality. The coefficient of determination ($R^2 = 0.676$) shows that 67.6% of the variance in quality is explained by green innovation. The F-test in ANOVA shows the significance of the model ($F = 413.951$, $\text{Sig.} = 0.000$). The table of coefficients reveals that the effect of green innovation on quality is strong and statistically significant ($B = 0.812$, $t = 20.346$, $\text{Sig.} = 0.000$). Thus, the null hypothesis is rejected, and the alternative hypothesis is accepted, which means that the combined dimensions of green innovation have a statistically significant effect on quality in five-star hotels in Jordan.

5. Discussion and Recommendations

The results show that green innovation is highly adopted in the 5-star hotels in Jordan with green process innovation as the highest, followed by product innovation and administrative innovation. This demonstrates the commitment of hotels to sustainable service delivery, ongoing service development and embedding sustainability in the daily activities of their business. On the administrative side, the relatively weak focus on administrative innovation indicates that managerial systems have yet to be fully aligned with the principles of green.

Likewise, competitive advantage was identified to be high on all dimensions. Deliveries were most cited, indicating the need for a quick and responsive service, which is crucial in the hospitality industry, followed by flexibility, quality, and cost. These findings reflect the importance of responsiveness and adaptability that hotel staff attend while maintaining service quality and operational efficiency.

The results also validate that green innovation has a statistically significant relationship with competitive advantage in all aspects of the innovation (flexibility, cost, delivery and quality). The connection can be accounted for by the establishment of green practices in the organizational culture through training programs, employee involvement and continuous improvement efforts. This improves efficiency, fosters innovation and boosts competitiveness. The results are in line with previous research (Khazal & Diab, 2019; Sun et al., 2023; Tu & Wu, 2021), which highlighted the importance of green innovation on organizational performance.

On the dimensional level, green innovation considerably contributes to providing flexibility by establishing a culture that promotes adaptation and service customization to meet shifting customer requirements (Abou & Naamouni, 2023; Ismaeel, 2023). It also helps in cost efficiency by implementing advanced technologies, optimizing resources, and reducing waste, which enables hotels to provide competitive rates while maintaining quality standards (Ibrahim & Taha, 2023; Khazal & Diab, 2019). Moreover, green innovation also contributes to the delivery performance by creating internal coordination and responsiveness, providing service on time (Zameer et al., 2022; Tu & Wu, 2021). Regarding quality, green innovation facilitates the process of implementing evaluation systems, complying with international standards and continuous improvement of services (Al-Haraizah et al., 2026; Sun et al., 2023).

From these results, some practical implications can be drawn. Hotels can increase the design of an environmentally friendly and recyclable service and strengthen the operational procedures to increase the environmental efficiency (Li et al., 2020). In addition, the integration of green administrative practices into the evaluation and decision-making systems and processes must be greater to ensure consistency and sustainability. Furthermore, increased flexibility in services will help hotels better adapt to change and customer needs.

In terms of cost, the reinforcement of cost control systems and the use of resources can help in the development of cost competitiveness. It will further boost responsiveness and customer satisfaction by building advanced customer databases. Furthermore, international competitiveness will be ensured by making hotel services comply with the international standards and by constantly assessing the performance.

The study has some limitations, however, the following: However, the study has some limitations, the following: It only seeks to determine the success of green innovation as a competitive advantage factor and only looks at 5-star hotels in Amman, which could limit the generalizability of the results. Further studies may consider other factors like leadership style, organizational culture and technological adoption and apply the study to other parts of the world and to other types of hospitality sectors with more sophisticated analysis.

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Appendix A

Measurement items of the study variables

Measurement scale: All items were measured using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Section 1. Measurement items for green innovation (16 items)

Dimension	Code	Measurement Item
Green Product Innovation	GPI1	The hotel designs its services in a way that minimizes negative environmental impact.
	GPI2	Environmentally friendly materials are used in providing hotel services.
	GPI3	Hotel services are designed to be reusable or recyclable where possible.
	GPI4	Environmental considerations are incorporated into service development decisions.
	GPI5	The hotel continuously innovates its services to comply with environmental standards.
Green Process Innovation	GPrI1	The hotel uses environmentally friendly technologies in its operational processes.
	GPrI2	Operational processes aim to reduce waste and harmful emissions.
	GPrI3	The hotel rationalizes energy and water consumption in its operations.
	GPrI4	Waste recycling or reuse is practiced within hotel operations.
	GPrI5	Green standards are applied consistently in operational processes.
	GPrI6	Continuous improvement initiatives target environmental efficiency.
Green Administrative Innovation	GAI1	The hotel adopts administrative policies that support environmental sustainability.
	GAI2	Environmental responsibility is integrated into management practices.
	GAI3	Employees are encouraged to participate in green initiatives.
	GAI4	Environmental performance is considered in employee evaluation.
	GAI5	Hotel management supports environmental innovation initiatives.

Sources: Adapted from Song & Yu (2018); Khazal & Diab (2019); Awan et al. (2021); Begum et al. (2022); Arici & Uysal (2022); Ismaeel et al. (2025).

Section 2. Measurement items for competitive advantage (18 items).

Dimension	Code	Measurement Item
Flexibility	FLX1	The hotel can modify its services according to customer needs.
	FLX2	The hotel adapts quickly to changes in market demand.
	FLX3	New services can be introduced with minimal operational disruption.
	FLX4	Service delivery processes are flexible and responsive.
	FLX5	Management efficiently responds to unexpected changes.
Cost	CST1	The hotel reduces service costs through efficient resource utilization.
	CST2	Green practices contribute to lowering operational costs.
	CST3	The hotel offers services at competitive prices.
	CST4	Cost control systems are effectively implemented.
Delivery	DLV1	Hotel services are delivered on time as promised.
	DLV2	The hotel responds quickly to customer requests.
	DLV3	Service delivery speed exceeds that of competitors.
	DLV4	Internal communication supports timely service delivery.
Quality	QLT1	Hotel services meet customer expectations.
	QLT2	The hotel complies with international service quality standards.
	QLT3	Continuous evaluation enhances service quality.
	QLT4	The hotel maintains consistency in service performance.
	QLT5	Customers perceive hotel services as high quality.

Sources: Adapted from Abdulaziz (2024); Jaruwit (2023); Khazal & Diab (2019); Al-Bashabsheh & Al- Assasfeh (2022).

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