Technology Application and Hotel Innovating Performance: The Moderating Role of Smart Hotel Systems

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Abstract

Purpose – At present, technology applications play a critical and pivotal role in enhancing operational efficiency and guest satisfaction; therefore, this paper aims to explore the determinates of the relationship between technology applications degree and innovation performance by mediating the role of smart hotel systems and their impact on raising the level of services in the hotel industry.

Design/Methodology/Approach — This study uses a random sampling method to obtain Aqaba's five-star hotel guests and management members. The data were analyzed using the partial least squares structural equation modeling (PLS-SEM) technique, also known as variance-based structural equation modeling.

Findings — The paper's results indicate that smart systems satisfy the criteria for leading technology applications and innovation performances.

Research limitation/implication — based on employees' resistance to change, guest acceptance, implementation of technology, data security risk, and smart systems installation cost in the hotels. This paper contributes to smart hotel systems research by providing efficient operations, leading technology applications, and developing innovative performance to raise the service and competitiveness in the market; therefore, they are expected to help researchers in theory testing and to shape the sample features; final results should be considered cautiously.

Practical implication — Smart systems' role in technology applications could be implemented as an innovation development instrument.

Originality/ Value — This paper's contribution depends on the lack of practical comprehension of technology applications, innovation performance, and the moderating role of smart hotel systems.

Keywords: Applications Technology, Smart Hotel Systems, Innovation Performance, Guest experience, Operation efficiency.

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التطبيقات التكنولوجية ومستويات نجاح تنفيذ أنشطة الابتكار داخل الفندق:الدور الوسيط للأنظمة الذكية في الفنادق

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ملخص

الغرض: تلعب تطبيقات التكنولوجيا دورًا حاسمًا ومفصليًا في تعزيز الكفاءة التشغيلية ورضا الضيوف. لذلك، يهدف هذا البحث إلى استكشاف محددات العلاقة بين درجة تطبيقات التكنولوجيا وأداء الابتكار من خلال دور الوساطة لأنظمة الفنادق

التصميم/ المنهجية/ الأسلوب: استخدمت هذه الدراسة أسلوب العينة العشوائية للحصول على آراء نزلاء الفنادق خمس النجوم في العقبة وأعضاء الإدارة فيها، وتم تحليل البيانات باستخدام أسلوب نمذجة المعادلات الهيكلية الجزئية الأقل مربعات

(PLS–SEM) والمعروف أيضًا باسم نمذجة المعادلات الهيكلية القائمة على التباين.

النتائج: تشير النتائج وفقًا للبحث إلى أن الأنظمة الذكية هنا تلبي معايير تطبيقات التكنولوجيا الرائدة وأداء الابتكار.

محدودية البحث/ الأهمية: بناءً على مقاومة الموظفين للتغيير، وقبول الضيوف، مخاطر أمن البيانات، وتنفيذ التكنولوجيا، وتكلفة تركيب الأنظمة الذكية في الفنادق. تساهم هذه الورقة في أبحاث أنظمة الفنادق الذكية من خلال توفير عمليات فعالة، وتطبيقات تكنولوجية رائدة، حيث يساهم هذا البحث في دراسة أنظمة الفنادق الذكية من خلال توفير عمليات تشغيلية فعالة، وتطبيقات تكنولوجية رائدة، وتطوير أداء الابتكار لرفع مستوى الخدمة والتنافسية في السوق. لذلك، يُتوقع أن يساعد الباحثون في اختبار النظريات، وبسبب خصائص العينة، يجب النظر إلى النتائج النهائية بحذر.

الأهمية العملية: يمكن أن يكون دور الأنظمة الذكية في تطبيقات التكنولوجيا أداة لتطوير الابتكار.

الأصالة/ القيمة: تعتمد مساهمة هذا البحث على نقص الفهم العملي لتطبيقات التكنولوجيا وأداء الابتكار والدور المعدل لأنظمة الفنادق الذكية.

الكلمات المفتاحية: التطبيقات التكنولوجية، أنظمة الفنادق الذكية، أداء الابتكار، تجربة الضيوف، الكفاءة التشغيلية

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Introduction:

Smart hotels become a new pattern of hotels that is not common nowadays, and there is a tremendous development in both the tourism and hospitality industries, which cause an increase in market competition, as a result of which the facility's operational costs are increasing with a decrease in management efficiencies to raise the level of services provided. Therefore, technological development has left a significant impact on the services provided by the hotel facility (Ezzaouia & Bulchand-Gidumal, 2020). The considerable growth in the technological sector has resulted in the introduction of new smart technologies in operational fields that have led to changing the form of operational processes within the facility, as it has reduced the level of operational costs and improved the level of management competencies in adopting these technologies to enhance the level of competition and how to manage its activities with the required efficiency (Karajgikar et al., 2016). Recent studies indicate that technological development and its entry into the tourism and hotel sectors contributed to improving the level of service provided and changing the behavior of internal activities through the use of smart technology systems, which left a clear impact on customer experiences during their stay and with an increase in the level of satisfaction (Ercan, 2019). Most organizations implement technology to increase innovation performance in the sectors and to improve product and service quality. Most organizations implement technology to increase innovation performance in the sectors and raise product and service quality. The hospitality industry is the most commonly growing industry and has the potential to apply technology and encourage innovation performance. In this case, the hotel industry has changed into one of the most important sectors in the market. This is because hotels have a high appeal among the public in terms of economic, social, and cultural aspects. The hospitality industry is a series of business activities that provide services primarily to tourists, by providing an atmosphere of comfort, temporary residence, and a place for tourists. With the high interest of tourists coming to a country, it offers a greater value for the hospitality industry and becomes profitable for the country concerned. Generally, the hotel industry promises great results and good prospects for hotel owners and stakeholders (Ezzaouia & Bulchand-Gidumal, 2020). The global technological evolution has brought a radical change and a potential to all aspects of human life. As for different technological aspects, it satisfies the needs of human life (Al-Shourah & Al-Shourah, 2020). People can easily, quickly, and efficiently finish their jobs through the latest technology innovation. Innovation performance is a technology that changes the

existing method into a new, better, effective, and efficient way (AAS Mohammad et al., 2023). Technology innovation, or generally innovation, has a broad definition and refers to the availability of new technology and how to use it to achieve goals. The difference between innovation and technology itself is the goal of the existence of new methods of organization or new ways of improving. Technology has no value if it does not achieve goals when in use. It just becomes technology, not an innovation (Y Sana'H, 2021).

Technology application degree and hotel innovating performance are intricately linked with smart hotel systems serving as a critical moderating factor (Han et al., 2021). Past researches indicate that the technology application degree has a significant impact on innovation performance. Other past researches too indicate that innovation performance has a significant impact on smart systems; therefore, the gap this study highlights is that there are not enough studies to develop innovative performance and implement smart technology in the hotel sectors to improve operational efficiencies, and by examining the impact of smart applications on the personal experiences of guests in the hotel sectors (Miočić et al., 2012). This research seeks to investigate if and in what ways hotel innovating performance has been affected by the adoption of TSA (Malkawi et al., 2023). The strategy is to demonstrate the benefits of a new method of classification for small and medium-sized hotel firms, specifically the one that relies on the use of smart IT systems in improving efficiency and the hotel product (Branch, J. A. & Aqaba, J). This could act as a differentiation method and allow smarter spending on IT to achieve its desired results. Despite a large body of work highlighting the potential benefits of IT adoption in service industry firms, there is still little direct evidence relating to the levels of technology expenditure to firm performance. This is also true for measures of technology expenditure and use, with most TSA studies simply assuming that more is better (SAR Khan et al., 2021). It is therefore difficult to define what constitutes effective use and determine the appropriate IT resource levels. This research aims to act as a platform from which further research in this area can build upon (Chege et al., 2020). The main goal of this paper is to explore the determinants of the relationship between technology application degree and smart hotel systems and their impact on raising the level of services in the hotel sectors (Kamasak, 2015) and measuring the positive impact of smart hotel systems on innovating

performance to enhance the comparative advantage and customer satisfaction in the hotel sectors (Yang et al., 2021).

Review of the Literature

A smart hotel and its characteristics

Modern Hospitality Industry (Smart Hotel System) is a term used to describe the hotel system. Smart hotel is an automated or integrated computer software used to provide services to hotel management and guests (NF Awara et al., 2022) The general tasks of a hotel can be described as follows: Make reservations manually, Send out guest register occupancy information, c) Check guest arrival and guest accommodation, d) Accept payments, both in advance and full, e) Prepare and send out guest invoices, f) Check out of the hotel, g) Update and record guest information including name, city, company, address, telephone, etc. (Sharma & Gupta, 2021). It assists hotel managers/staff in controlling hotel operations, such as guest status (available, full, etc.), room status (dirty, ready to be cleaned, etc.), and room status. The general tasks of a guest hotel, besides adjusting room reservations, also contain tasks for guests checking in/out, reviewing bills created during their stay, producing reports like most popular guest hotels, name listing, reading hotel facilities information, etc. Given the number of tasks and activities carried out, this tool has to have a complete computer-based system (Stringam & Gerdes, 2021). Smart hotel is one of the smart buildings. The concept of a smart building is defined as the optimization of building operations through centralized management and control. This is achieved by integrating building systems through network communication in an efficient manner (O Van Cutsem et al., 2020). Several technologies are widely applied in this concept to handle energy management and interior services. In the future, internet technologies will be accompanied by smart sensors that involve the physical world to a greater extent (Wynn, P Jones - 2022). The business needs for seeking the development of smart buildings are to achieve economic incentives, such as advanced tenant services, energy management to save money, and the collection of environmental data for publicity. Smart hotel systems aim to increase hotel competitiveness by providing services that attract customers and help the hotel be user-friendly and efficient (Abdelmoaty & Soliman, 2020). In a hotel context, being smart points to systems that can fulfill each guest's legitimate desires, needs, and expectations, improving their experience, comfort, and health. (M Domanski – 2020). The guests bring to the hotel several desires, needs, and expectations that go from simple and innate requirements from human civilization, like being well received and well treated, to the unique desires

and great expectations of people on vacation and business travel (Kim & Han, 2020). Besides these particular requirements presented by each guest, we expect people to try to act (as well guests as employees, managers, and enterprise investors) according to their culture, education, training, and access to information and opportunities, within the limits imposed by the capacity to do of the guests and enterprise stakeholders, translated by infrastructure, capital, human resources, public and private regulations, market behavior, and social-environmental practices (Kim et al., 2021).

Technology applications:

Technology applications (TAs) play a crucial role in managing the hotel industry. Furthermore, it contributes to increasing productivity, reducing operating costs, and adding a value to the services and products provided to customers (Bilgihan et al., 2011). The service provider has begun to develop technology through sustained management decisions to increase work efficiency and improve employee productivity and customer satisfaction by obtaining service through the provided technological application (Oltean et al., 2014). The comprehensive application of innovative information and technology techniques and systems plays an important role in the hotel industry and is considered very competitive (Mustafa et al., 2022). Furthermore, understanding technological applications is a key to strategic management and an important source for the competitiveness of the hotel industry (Napierala et al., 2020). It helps the management work better and facilitates customer requests. Examples of technology that provides services in the hotel sector include the Internet, website, email, Wi-Fi, reservation engines, reservation systems, customer relation management systems (CRMs), property management systems (PMSs), mobile notification applications, and social media platforms (Ezzaouia & Bulchand-Gidumal, 2020).

Innovative performance:

Prior studies indicate that innovative performance is crucial and necessary for any service organization nowadays, as its ability to innovate and implement due gives it a better position in the competitive environment in the hotel industry (Antunes et al., 2017). Therefore, smart service organizations have become more closely linked to innovative performance than ever before, as innovative performance has become a cornerstone for any service industry to achieve the required effectiveness. While providing unique solutions to the organization and its customers (Basadur et al.,

2002), researchers confirmed that innovative performance has become an approved approach to the success of service organizations, whether to create and implement new services or modify existing services available while developing them to accommodate and meet the desires and needs of their customers to remain in a competitive environment (Al-Sabi et al., 2023).

Hypothesis development and research framework

Technology applications and innovation performance

TAs offer a great opportunity to have a competitive advantage in the market (Martín-Rios et al., 2019). It has been proved that TAs had a positive and significant link with innovation performance (Nwangene et al., 2019). Prior studies showed that TAs confirmed a positive impact on innovation performance (Yunita et al., 2019). Similarly, both TA dimensions (leading and efficiency) were found with a strong and positive relationship to innovation performance (Karim Suhag et al., 2017). TAs are positively associated with innovation performance (Danso et al., 2020).

H1: TA has a positive impact on hotel innovation performance.

H2: Smart hotel system has a positive impact on hotel innovative performance.

Technology application and smart hotel systems :

Smart hotel systems play a significant role in operation efficiency and guest service experiences. Customers demand TAs in the hotel industry, which may significantly enhance their intentions to pay a visit, and it is considered a vital factor in the hotel industry option to raise the visiting intentions (Bilgihan et al., 2016). Prior studies point out that the TAs in the hotel industry, such as voice/facial recognition, sensors, and mobile devices, may affect guest acceptance of technology; therefore, more TAs will be more likely to be used. Otherwise, customers perceive TAs easy to use, and they are more confident in adopting smart hotel systems (Yang et al., 2021).

H3: Technology application has a positive impact on smart hotel systems.

Methodology of the study:

This section describes and explains the operation and statistical method process, data collection, and data analysis to answer the research questions while considering ethical issues and limitations. This paper is quantitative

because it gives a digital description that quantifies this phenomenon or its size to find the relationship between TAs, innovation performance, and the moderating role of smart hotel systems in the industry. It will be majored by two dimensions (leading of technology and personal guest experience).

Sample of the study:

The population of this paper involves 320 persons divided into management members and guests at the five-star hotels in Aqaba randomly. It enables us to obtain a set of real results because all members of society can represent the study community, and thus the process of generalizing the results becomes something that can be done easily, and through this tool, which is considered one of the most important data collection tools. The researchers distributed 50 questionnaires to the guests and 50 questionnaires to the management members, representing 100% of the total of the distributed questionnaires. Structural equation modeling (SEM) method with PLS 4 software was used to analyze the selected samples to examine the moderat of smart hotel systems, AT, and innovation performance effect in terms of personal guest experience and operation efficiency to adopt the results and recommendations through Aqaba hotels.

Table (1): Sample percentage of the original population

Population	Sample	Percentage (%)
320	100	31.25 %

Table (2): Distribution of the research sample

Category of sample	Repetition	Percentage (%)
Management Member	50	50 %
Guests	50	50 %

Data Collection Tools:

The questionnaire was designed based on theoretical literature and was distributed to the guests and management members in the five-star hotels online. The questionnaire was divided into two sections (leading technology and personal guest experience in Aqaba's five-star hotels) to examine the operation efficiency and sustain a competitive advantage (Leguina, 2015).

Limitations of the Study:

Several potential limitations of this study pertain to management resistance to change, guest acceptance, technology implementation, data security risk, and smart systems installation costs in the hotels.

Ethical Issues:

Smart hotel systems offer multiple benefits to the hotel industry especially when integrated with AT and innovation performances. However, the ethical issues in the hotels may include transparency, guest privacy, and environmental sustainability to ensure that technological advancements are both beneficial and ethically sound and to ensure that technological advancements are both beneficial and ethically sound. Furthermore, we will trade the sample and data in an ethical way (respect of person, honesty, benevolence, and justice). We will deal with data honestly and fairly without causing any harm to the information that is going to come from the employees who work in hotels. The distribution of the questionnaire is to the employees in five-star hotels for scientific research only.

Statistical Analysis:

Data will be analyzed using descriptive statistical methods to describe the basic characteristics of the sample. Quantitative analysis will be conducted to analyze the relationships between study variables using logistic regression or multiple analysis techniques.

Data analysis and result:

Assessment of the measurement model

We have used a causal-predictive structural equation modeling (SEM) method with PLS 4 software to examine and estimate the interactive relation between the model variables. Covariance-based SEM (CB-SEM) is based on the indeterminacy of item scores (Rigdon et al., 2017). Conversely, PLS-SEM operates on fixed latent scores and aims to maximize the prediction of endogenous components rather than the model fit (Hair et al., 2019). PLS-SEM can deal with complicated structural models as second-order models and small sample sizes, and it is not strict on data normality. Figure 1 shows the loading items of different scales and shows the significance R2 of each variable within the inner model. Figure 2 shows the significance level of each scale item in the outer model and the significance level of the relationships between the variables within the inner model.

Figure (1) Measurement model

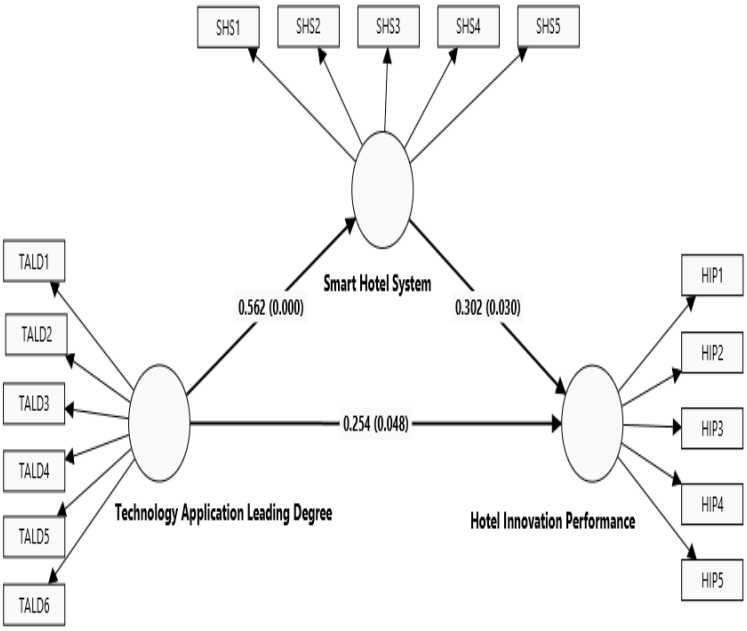

Figure (2) significance level

Table (3) Mean & Stander division (SD)

Measures	Mean	SD
Hotel Innovation Performance	3.98	.807
Smart Hotel System	4.01	.763
Technology Application Leading Degree	4.03	.615

The items model loadings presented in Figure 1 were mostly above the 0.7 threshold, and their respective β-value and p-values were vital in Figure(2). Together with Cronbach's alpha (α) >.70, composite reliability (CR) >.70, and average variance extracted (AVE) >.50 values are presented in Table 2. Furthermore, Table 3 shows that the Fornell–Larcker criterion was satisfied as the square of each variable's AVE is greater than the inter-correlations.

Table (4) Reliability & convergent validity

Instruments	A	CR	Rho	AVE	R^2
Hotel Innovation Performance	0.860	0.860	0.900	0.643	0.241
Smart Hotel System	0.880	0.894	0.912	0.676	0.316
Technology Application Leading Degree	0.909	0.914	0.930	0.688	

Table (5) Divergent validity based on the Fornell–Larcker approach

Measures	**1**	**2**	**3**
Hotel Innovation Performance	0.802		
Smart Hotel System	0.444	0.822	
Technology Application Leading Degree	0.423	0.562	0.830

The preceding sections established the models' reliability and validity. The coefficient of estimation for the structural model is reported in Table 4. The observed direct impact of TA leading degree on smart hotel system is positive and significant ($\beta = .562$, $\rho = .000$), the direct effect of smart hotel system on hotel innovation performance is positive and significant ($\beta = .302$, $\rho = .030$), and the direct impact of TA leading degree on hotel innovation performance is positive and significant ($\beta = -0.245$, $\rho = .048$). The mediating impact of smart hotel systems on the association between TA leading degree and hotel innovation performance is significant ($\beta = .170$, $\rho = .027$) (See Table 4). Moreover, the variance explained by the model R^2 is .241 translated as 24.1% for hotel innovation performance in Table (2). Falk and Miller (1992) set a benchmark for R^2 values and argued that the lowest recommended level should be 0.10. The R^2 in our study showed a large effect.

Table (6): Direct and indirect effects

Relationships	**B**	**T**	**P**
Smart Hotel System -> Hotel Innovation Performance	0.302	2.171	0.030
Technology Application Leading Degree->Hotel Innovation Performance	0.254	1.982	0.048
Technology Application Leading Degree ->Smart Hotel System	0.562	5.784	0.000

Indirect effect

Technology Application Leading Degree -> Smart Hotel System-> Hotel Innovation Performance	0.170	2.206	0.027

Note: β, beta value; ρ, ρ-value; T, T-value

Theoretical implications:

According to the results from the hotel industry, theoretical and practical contributions in the research area of smart hotel systems, leading technology application, and innovation performance will be presented as follows: the study's variable along with its structure is confirmed valid and reliable among the staff working in the hotel industry (Bilgihan, et al., 2011). Therefore, the research instrument is considered a valid technique and could be used by other researchers in developing countries with different contexts. Generally, smart hotel systems leverage advanced technologies like the Internet of Things (IOT), artificial intelligence (AI), and huge data to enhance guest experiences and operational efficiencies. Innovation performance in organizations, especially when adopting new technologies like smart hotel systems, is multifaceted. These implications impact business operations, competitive positioning, and long-term sustainability. Leading TAs are profound and far-reaching (Kim et al., 2020). They encompass enhanced operational efficiency, improved customer experiences, a more dynamic and skilled workforce, stronger competitive positioning, and better financial performance. Additionally, they contribute to effective management and positive environmental and social workplace impact. However, achieving these benefits requires careful planning, strategic investment, and commitment to continuous improvement and adaptation to technological advancements. These results show several important issues regarding the relationship between the leading TA and innovation performance mediating by the smart hotel systems to enhance the operation efficiency and guest experience (Prajogo et al., 2006). This study confirmed that smart hotel systems significantly impact the leading TA and innovation performance in the hotel industry.

Practical implications:

The tangible benefits of integrating smart hotel systems led to improved guest experience and education, operation efficiency, staff training, data security, and cost-saving. Through a culture of improvement innovation, hotels can further optimize their performance and obtain a competitive edge. Innovation performance is evident in tangible improvements across various business operations and strategies (Ebersberger et al., 2012). By effectively leveraging innovative technologies, organizations can achieve greater efficiency, enhance customer satisfaction, optimize financial performance, and build a sustainable competitive advantage. However, these benefits require a strategic approach, investment in training, and a culture that embraces continuous improvement and adaptation. Leading TAs are extensive and transformative (Chen et al., 2013). They enhance operational efficiency, improve customer experience, drive financial performance, and provide a competitive edge. However, successful implementation requires strategic planning, investment, and a focus on change management to address potential challenges. Smart hotel systems are extensive, offering significant improvements in operational efficiency, customer experience, strategic management, and financial performance. While challenges such as high initial investment and integration issues exist, the long-term benefits of adopting smart technologies can provide a substantial competitive edge and drive a sustainable growth in the hospitality industry (Parmar et al., 2019).

Conclusion:

This study aims to investigate and explore the relationship between innovation performance and leading TAs by mediating the role of smart hotel systems in the hotel industry in Aqaba-Jordan to enhance the guest experience and operation efficiency. Therefore, empirically examining the relationship between the leading TA and innovation performance by mediating the role of smart hotel systems to enhance guest experience and operation efficiency in the hotel industry. Accordingly, existing literature added new knowledge that shows the link between innovation performance, leading TAs, and smart hotel systems. The empirical results that develop the model in this paper are supported by the proposed hypothesis and bridge the gap between the variables of the study. The empirical results demonstrate that smart hotel systems have a significant relationship between leading TAs and innovation performance, and they show an excellent relationship between leading TAs and innovation performance to enhance operation efficiency and guest experience. Finally, smart hotel systems have also revealed a positive impact on innovation performance in the hotel industry.

Therefore, this study found that leading TAs and innovation performance are critical variables that have a positive impact on the organizational outcomes in the hotel industries (Al-Sabi et al., 2023).

Recommendations:

Practical Recommendation:

- Investment should be enhanced in smart hotel systems continuously to ensure innovation and improve guest experience.
- Technology training should be improved by providing intensive training programs for hotel managers on how to use smart systems to ensure operational efficiency and innovation.

Future Research Recommendations:

- We recommend that future researchers should study the economic impact of applying technology in Aqaba hotels.
- We recommend that future researchers should study the impact of local culture on technological innovation in Aqaba hotels.

References:

Abdelmoaty, G. & Soliman, S. (2020). Smart Technology Applications in Tourism and Hospitality Industry of The New Administrative Capital, Egypt. *Journal of Association of Arab Universities for Tourism and Hospitality*, 19(2), 102-129.

Alam, A., Uddin, M., Yazdifar, H., Shafique, S., & Lartey, T. (2020). R&D investment, firm performance and moderating role of system and safeguard: Evidence from emerging markets. *Journal of Business Research*, 106, 94-105.

Al-Sabi, S., Al-Ababneh, M., Masadeh, M. & Elshaer, I. (2023). Enhancing innovation performance in the hotel industry: the role of employee empowerment and quality management practices. *Administrative Sciences*, 13(3), 66.

Antunes, M., Quirós, J. & Justino, M. (2017). The relationship between innovation and total quality management and the innovation effects on organizational performance. *International Journal of Quality & Reliability Management*, 34(9), 1474-1492.

Bagadiya, D. & Kathiriya, K. (2024). *The Future of Hotel* (A Symbiosis of Automation and Human Interaction.).

Bilgihan, A., Okumus, F., "Khal" Nusair, K., & Joon-Wuk Kwun, D. (2011). Information technology applications and competitive advantage in hotel companies. *Journal of Hospitality and Tourism Technology*, 2(2), 139-153.

Bilgihan, A., Smith, S., Ricci, P., & Bujisic, M. (2016). Hotel guest preferences of in-room technology amenities. *Journal of Hospitality and Tourism Technology*, 7(2), 118-134.

Shniekat, N., Jawabreh, O., & Saleh, M. (2021). Efficiency and effect on the competitive advantage of management information systems (MIS) in classified hotels in the city of petra; type of management as moderator. *Academy of Strategic Management Journal*, 20, 1-18.

Chege, S., Wang, D. & Suntu, S. (2020). Impact of information technology innovation on firm performance in Kenya. *Information Technology for Development*, 26(2), 316-345.

Chen, S., Huang, M. & Chen, D. (2013). Exploring technology evolution and transition characteristics of leading countries: A case of fuel cell field. *Advanced Engineering Informatics*, 27(3), 366-377.

Danso, B., Xuhua, H. & Fuseini, O. (2020). *Technological innovation and firm performance among star rated hotels in Ghana*. IOSR J. Bus. Manag, 22, 1-10.

Domanski, M. (2020*). The concept of a smart hotel and its impact on guests' satisfaction, privacy and the perception of the service quality*.

Ebersberger, B., Bloch, C., Herstad, S. & Van De Velde, E. (2012). Open innovation practices and their effect on innovation performance. *International Journal of Innovation and Technology Management*, 9(06), 1250040.

Ercan, F. (2019). Smart tourism technologies: applications in hotel business. *Theory and practice in social sciences*, 528-546.

Ezzaouia, I., & Bulchand-Gidumal, J. (2020). Factors influencing the adoption of information technology in the hotel industry. An analysis in a developing country. *Tourism Management Perspectives*, 34, 100675.

Fluelling, M. (2022). *Performance Strategies to Increase US Federal Government Employees' Productivity* (Doctoral dissertation, Walden University).

Han, D., Hou, H., Wu, H., & Lai, J. (2021). Modelling tourists' acceptance of hotel experience-enhancement Smart technologies. *Sustainability*, 13(8), 44-62.

Jawabreh, O., Masa'deh, R. E., Yassen, T., & Alshurideh, M. (2023). *The Impediments of the Application E-Business to Classified the Restaurants in the Aqaba Special Economic Zone*. In The Effect of Information Technology on Business and Marketing Intelligence Systems (pp. 767-780). Cham: Springer International Publishing.

Kamasak, R. (2015). Determinants of innovation performance: A resource-based study. Procedia-Social and Behavioral Sciences, 195, 1330-1337.

Karajgikar, A. Dhange, S., Kulkarni, N. & Jaybhaye, P. (2016). Smart Hotel Automation System. *IJSTE-International Journal of Science Technology Engineering*, 2(12), 75-78.

Karim Suhag, A., Solangi, S., Larik, R., Lakh, M. & Tagar, A. (2017). The relationship of innovation with organizational performance. *International Journal of Research-Granthaalayah*, 5(2), 292-306.

Khan, S., Godil, D., Jabbour, C., Shujaat, S., Razzaq, A. & Yu, Z. (2021). Green data analytics, blockchain technology for sustainable development, and sustainable supply chain practices: evidence from small and medium enterprises. *Annals of Operations Research*, 1-25.

Kim, J. & Han, H. (2020). Hotel of the future: exploring the attributes of a smart hotel adopting a mixed-methods approach. *Journal of Travel & Tourism Marketing*, 37(7), 804-822.

Kim, J., Lee, M. & Han, H. (2020). Smart hotels and sustainable consumer behavior: Testing the effect of perceived performance, attitude, and technology readiness on word-of-mouth. *International Journal of Environmental Research and Public Heal*th, 17(20), 7455.

Kim, J., Montes, A. & Han, H. (2021). The role of expected benefits towards smart hotels in shaping customer behavior: comparison by age and gender. *Sustainability*, 13(4), 1698.

Leguina, A. (2015). *A primer on partial least squares structural equation modeling* (PLS-SEM).

Leung, R. & Law, R. (2007). Information technology publications in leading tourism journals: A study of 1985 to 2004. *Information Technology & Tourism*, 9(2), 133-144.

Malkawi, E., Fahmawee, E. A. A., & Jawabreh, O. (2023). Assessments of Guest Technologies in Five Stars Hotel at Aqaba Special Economic Zone Authority (ASEZA).

Martín-Rios, C. & Ciobanu, T. (2019). Hospitality innovation strategies: An analysis of success factors and challenges. *Tourism management*, 70, 218-229.

Miočić, B., Korona, L. & Matešić, M. (2012, May). Adoption of smart technology in Croatian hotels. In 2012 Proceedings of the 35th *International Convention MIPRO* (pp. 1440-1445). IEEE.

Mohammad, A., Aldaihani, F., Alrikabi, S., Alshurideh, M., Abazeed, R., Al-Husban, D. & Al Kurdi, B. (2023). *Customer awareness towards green marketing mix in 5-star hotels in Jordan*. In The effect of information technology on business and marketing intelligence systems (pp. 2157-2176). Cham: Springer International Publishing.

Mustafa, E. (2022). *Technology in Hotel Sector. In Technology application in aviation, tourism and hospitality: Recent developments and emerging issues (pp. 73-87)*. Singapore: Springer Nature Singapore.

Napierała, T., Bahar, M., Leśniewska-Napierała, K., & Topsakal, Y. (2020). Technology towards hotel competitiveness: Case of Antalya, Turkey. *European Journal of Tourism, Hospitality and Recreation*, 10(3), 262-273.

Nwangene, O., Dibua, E. & Edoko, T. (2019). Innovations as Drivers of Performance in the Hospitality Industry: A Study of Selected Hotels in Awka, *Anambra State. Innovations*, 3(5).

Oltean, F., Gabor, M. & Conţiu, L. (2014). Relation between information technology and performance: An empirical study concerning the hotel industry in Mures County. *Procedia Economics and Finance*, 15, 1535-1542.

Parmar, S., Meshram, M., Parmar, P., Patel, M. & Desai, P. (2019). Smart hotel using intelligent chatbot: A review. International Journal of Scientific Research in Computer Science, *Engineering and Information Technology*, 5(2), 823-829.

Prajogo, D. & Ahmed, P. (2006). Relationships between innovation stimulus, innovation capacity, and innovation performance. *R&d Management*, 36(5), 499-515.

Rigdon, E., Sarstedt, M., & Ringle, C. (2017). On comparing results from CB-SEM and PLS-SEM: Five perspectives and five recommendations. *Marketing: ZFP–Journal of Research and Management*, 39(3), 4-16.

Sana'H, (2021). *The Impact of Transformational Leadership on Effective Strategy Implementation in 5-Star Hotels in Jordan.* (Master's thesis, University of Petra (Jordan)).

Sheasley, W. (1999). Leading the technology development process. Research-Technology Management, 42(3), 49-55.

Stringam, B. & Gerdes, J. (2021). *Hotel and guest room technology*. University of South Florida (USF) M3 Publishing, 17(9781732127593), 6.

Yang, H., Song, H., Cheung, C. & Guan, J. (2021). How to enhance hotel guests' acceptance and experience of smart hotel technology: An examination of visiting intentions. *International journal of hospitality management*, 97, 103000.

Yunita, S., Mahrinasari, M., Ahadiat, A., & Marselina, M. (2019). Model of improving tourism industry performance through innovation capability. *Journal of Environmental Management and Tourism*, 10(4), 853-864.