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Artificial intelligent towards hotels' competitive advantage. An exploratory study from the UAE

Samer Ali Hussein Al-shami, Abdullah Al Mamun, Elsadig Musa Ahmed and Nurulizwa Rashid

Abstract

Purpose – *Hotel industry is witnessing a radical change as a result of technology interaction such as artificial intelligence (AI) in service tasks. As a result of this transformation, the pattern of service delivery based on human interaction has been changed to digital interaction. This brought opportunities to the hotels industry and consolidate its competitive advantage. However, the understanding gap still existed in both practical implementation and literature, especially in developing countries. Therefore, this paper aims to explore how hotels use AI to carry out services tasks.*

Design/methodology/approach – *The authors adopted the qualitative research method through Semi interviews. The sample was purposively selected from five 5-star hotels in the UAE, meanwhile, the managers were the targeted respondents.*

Findings – *Through content analysis, the authors find that the UAE hotels use AI in managing trip planning, reception service and room services. The authors also find that there are four key drivers that improve the performance of AI, which include AI infrastructure flexibility, strategic alignment, management and skills. Finally, the authors found four indicators of the impact of AI on hotels, which are quality, cost and market share and customers satisfaction.*

Originality/value – *This study is one of few studies that explored the use of AI in the hotels industry and discussed how AI influence several aspects of hotels performance and helped them to attain their competitive advantage. This study is also one of few studies and the first study in UAE to explore the key drivers of AI performance in UAE hotels.*

Keywords *Performance, UAE, Artificial intelligence, Hotel*

Paper type *Research paper*

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Introduction

Technology is an essential tool that facilitates daily activities where they have become ubiquitous to human life. Recently, the prevalence of artificial intelligence (AI) has become increasingly popular, as we are surrounded by AI, from drones to virtual helpers, and programmatic translation provision (Carrio *et al.*, 2017). A concrete definition of AI is deemed impossible as this notion is vast and dynamic. AI's basic definition is established based on two key components, namely, autonomy and adaptiveness. Although AI systems are not rapidly developing, continuous growth is charted annually. Many industries have experienced significant changes from these innovations and scholars believe that AI will substantially impact almost every aspect of human life.

AI facilitates specific tasks for employees in the hotel industry including gathering, analysing and using large statistical data for future forecasts to identify guests' preference and make their vacations more comfortable. Over the years, hotel operators adopt various digital strategies to increase profitability, efficiency, management decision-making and

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boost quality, reinforcing customer loyalty (Verganti *et al.*, 2020). Previous work in the field of tourism and hospitality technologies centres on self-service users and the role of technology in improving service quality. These studies were relatively general where hotel specialisations and divisions are not relevant factors. Larger hotels or hotel chains in developed countries tend to be a popular focus, eliminating research on both large hotels in developing countries and smaller hotels worldwide. The hotel marketplace is competitive and hotels are struggling to achieve competitive advantage by offering unique differentiation.

Many studies have shown that both hotel guests and managers can take advantage of hotel technology. Several researchers were interested in getting an insight into the hotel industry's future. Jasonos and Mccormick (2017) forecast the future of the hospitality business restaurant where business experts were interviewed. The authors investigate how smart technology will evolve within the hospitality field by 2025. Technologies are widely used in restaurant and hotel sectors, offering self-service restaurants and digital hotel receptions. The study concludes that the hospitality industry will continue to use technology and deliver modern and user-friendly facilities would be needed.

The Fourth Industrial Revolution has greatly influenced various aspects of society, including how companies operate. Studies exploring AI innovations are becoming more prominent where researchers focus on investigating the technological impact and the performance of hotel services. Considering this, Bowen and Whalen (2017), identify the following four trends in technology: big data, social media, online communities and sharing economy. They discussed the impact these trends have on hospitality and tourism, which raised implications for managers. Ivanov and Webster (2017) conducted their study on tourism and hospitality industries and the implementation of robots and service automation where AI and robotics were found to have a profound impact on hotels and restaurants. Another research provides a glimpse of the current companies in tourism and accommodation, gauging whether the adoption of robots and automated services is considered (Tussyadiah and Park, 2018).

Several previous studies centres on the effect of technology on customer engagement, guest satisfaction, use of self-service technologies and AI understanding, however, the relationship between AI technology and luxury brand identity remains minimal (Naumov, 2019). Despite few studies on AI in the hotel industry have been conducted such as Jasonos and Mccormick (2017), Ivanov and Webster (2017), Tussyadiah and Park (2018), most of the paid attention on AI adoption and describe the future industry rather than providing a clear understanding about the use of AI technologies in hotels and how they affect several aspects of hotels services. In addition, most of the past studies conducted in developed countries. Therefore, this research explores the drivers, usage and impact of AI in the hospitality industry, particularly in UAE hotels, one of the developing countries. For this purpose, the following three research questions have been formulated as outlined below:

RQ1. What are the drivers of using AI technologies for the provision of hotel services among hotel operators in the UAE?

RQ2. How are AI technologies adopted for the provision of hotel services among hotel operators in the UAE?

RQ3. What are the impacts of using AI technologies for the provision of hotel services among hotel operators in the UAE?

Artificial intelligence technology in the hotel industry

Hospitality is the main source of the country's GDP where hotels play a key role in transforming this industry. With a large number of travellers from all around the world, hotels are eager to maximize their profitability and market share by offering innovative personalized services and products (Richard, 2017). Each hotel provides a different

experience to guests, thereby, keeping up with the latest technologies and is crucial. The hospitality industry develops technology interaction through AI to improve service quality and operation efficiency to meet customers expectation in both quality and price. Thus, innovation assumes the role of a key driver in building the industry's competitive advantage. The role of AI in hotels can be expounded via Clayton Christensen's perspective of disruptive innovation (King and Baatartogtokh, 2015). There are the following four main elements in the disruption theory: market leaders are improving on a sustained innovation trajectory; they fulfil customer needs; they are capable of responding to disruptive threats; officers end up wallowing due to disruption. On other word, once the disruptive product gains a foothold in new or low-end markets, the disruptors are on a path that will ultimately crush the incumbents (Christensen and Raynor, 2013).

There are several aspects of disruption in the hotel industry including online travel agencies and accommodation platforms. The third-party services offered by travel agencies such as booking and reservations, as well as tours and holiday packages are replaced with online resources (Al-Shami *et al.*, 2021). The advent of mobile technology promoted the use of AI technologies (Borràs *et al.*, 2014), as AI can perform things that are too difficult or risky for human persons besides quickly automating activities. AI influences the overall travel industry and various aspects of the hotel industry including communication, customer preferences, hotel optimization and enhancing user experience.

Hospitality services are interactive, as there is contact between a provider (host) and a recipient (guest). The communication skills in hospitality encompass oral fluency and providing good service. The host-guest relationship in the hotel industry is based on the following two complementary truths: the interaction in service and the emotional labour of guest experience (Lee *et al.*, 2018). Instant messaging is an actual form of contact where AI through smart bots or talk bots (Chatbots) enables computer programmes to conduct voice control or text-based conversations (Cain *et al.*, 2019; Nuruzzaman and Hussain, 2018). This autonomy is the robots' ability to achieve tasks by intelligence, mobility and sensory abilities without real human interaction. In hotel rooms and visitors, chatbots can be made available in the form of a smartphone app, on tablets and televisions. Customers can send messages or chat with a bot to obtain the necessary details and services. Programming a bot accurately can facilitate tasks such as meals and drinks order, customize dishes, handle reservations or booking a taxi, by providing comprehensive information concerning the provided services (Ananeva, 2019). Moreover, room facilities can also be managed by advanced bots providing information and deliver services through intelligent programme ordering. Chatbots and robots are now beginning to substitute human interactions, replacing the host and taking off the responsibilities of human staff.

Despite AI affordances, this technology negatively influences job vacancies. PricewaterhouseCoopers projects that in the early 2030s, 25% of employees in the USA hospitality industry will be programmed, and around 73% of employee activities will have the potential for robotics (Ananeva, 2019). The lack of human interaction, inadequate service recovery and reduced interpersonal contact with service staff, influence customers' satisfaction, especially with those who are less experienced with technology and guest-host interactions. Therefore, AI adoption in the hotel industry is heavily dependent on technological and labour cost, as well as customers' culture and openness to AI services (Cain *et al.*, 2019; Ivanov and Webster, 2017).

Methodology

In line with its aim, this study uses an exploratory approach through in-depth interview involving managers of selected hotels. Considering that the selected participants may have direct experience with the use of AI tools, this method allows the researchers to obtain participants' real-world experience within a contextualized naturalistic setting. The collected data is bound to provide rich insights into participants' feelings and everyday practices

concerning AI tools. Positioned within the interpretivist paradigm, the meaning-making process is based on the interaction between the researchers and the interviewees.

The semi-structured interviews were conducted with five assistant managers from 5-star hotels in the UAE, namely, *Atlantis the Palm*, *Shangri-La Hotel*, *Park Hyatt Abu Dhabi Hotel*, *Ritz-Carlton Abu Dhabi* and *Grand Canal*. These hotels were chosen as managers from the 5-star hotels are most likely able to provide a comprehensive description of the experience and feelings of using AI in the hotel industry. An initial invitation to participate in the interview was sent to 12 managers between April and May 2020. However, only five of them agreed to be interviewed. The interviews were carried out by an assigned researcher using pre-defined semi-structured questions to ensure consistent interview protocol. Reflecting on the research questions, the interview questions encompass the following three broad themes which are: the motivation to use AI, how AI is used and the impact of using AI in the respective hotels. The interviews were conducted in English, and each interview lasted approximately 40–60 min. The interview sessions were scheduled and recorded via the Webex online platform with the consent of the interviewees. The interview data were transcribed verbatim and cross-checked by fellow interviewees to ensure the validity of the responses.

Subsequently, the collected data were managed and analysed manually. As for the data analysis according to specified themes, a cyclical qualitative analytic approach (Eriksson *et al.*, 2020) was adopted via two-level analysis. As proposed by Saldana (2015), the first analytical level focused on the structural coding of the data where data was categorised according to specific initial categories. The second level of analysis focus on comparing various specific categories to construct and establish patterns in the outcome, where an inductive approach was adopted for data analysis. By establishing the hotel as a unit (case) of analysis, each interview transcripts were coded accordingly and later contrasted where the outcome of the analysis reflects the findings within an individual case and between different cases. The findings of the research are expounded as follows:

Findings

This research aims to explore the effects of AI on the competitive advantage of hotels in the hospitality industry. For this purpose, three themes, namely, the motives, the use and the impact of using AI in UAE hotels were investigated. The first theme focuses on the drives of AI usage in the hotel industry, whilst the second theme reflects how AI is being adopted in the hotel. Finally, the third theme indicates the effects of using AI in spurring the growth of the hotel industry. The themes are further elaborated in the following section.

Motivations to use artificial intelligence in UAE hotels

Current studies provide considerable attention to the effect of AI and its contribution to technical and managerial functions. However, the effectiveness of AI application and performance is dependent not only on how to use it but also on its competencies. In this case, the motivation to use AI can be further classified into the following four themes: flexible infrastructure, AI strategic alignment, AI management and AI resources.

Flexible infrastructure. Resource-based advocates emphasised that the success of firms in achieving their competitive advantage is dependent on their rare and valuable resources. AI infrastructure flexibility is important to facilitate and smoothen the workflow. According to Interviewee D:

> AI can handle multiple tasks that are traditionally performed by human and manage a variety of information about the hotel. This is important for our hotel because it provides timely data and concurrently achieves the given tasks in the hotel well.

The AI's flexibility in connectivity is another important factor that plays an important role in motivating the use of AI as responding to customers on time can influence customers' satisfaction and loyalty. It also influences hotels profitability because time is money. According to Interviewee A:

> AI's connectivity and ability to communicate with other components, both internal and external, is very important to both our hotel and our customers because it enables us to effectively manage customers' relationship.

Artificial intelligence strategic alignment. AI strategic alignment reflects the relationship between AI and corporate strategy. From this perspective, hotels can adopt AI to facilitate corporate strategy and achieve better performance with strategic AI alignment. According to the literature on strategic AI alignment literature, the shared understanding between AI and business executives enables the assignment of more efficient resources and respond to the environment and various opportunities such as innovations. Interviewee C confirms that:

> The AI ability to easily reconfigure tasks and to fit them specifically enables our hotel to gain trust from both our partners and customers.

Interviewee A also added that:

> AI strategy and alignment of given tasks are important to effectively and efficiently utilize both time and resources to achieve tasks and allow innovations with minimum risk.

Artificial intelligence resources. The organization's ability to process knowledge, i.e. the ability to create, acquire, transmit and integrate information. It is also the behavioural change that reflects the new cognitive situation and is important in terms of organisational performance. AI offers a method to encourage organisational learning, which consequently improves organisational performance. However, AI applications are new and require hotels to build learning capacity through adaptation and experimentation.

Interviewee B:

> We are still faced with several challenges in operating AI and adjusting AI programmes to carry out specific tasks. Thus, we adopt other hotels' models in AI adoption and integration. This enabled us to minimize errors and improve problem-solving, which helped in improving our productivity.

Interviewee D also confirms that:

> It was a challenging task when we wanted to programme the AI robot to allow service customizations in the serving room. Thus, we engaged a technology developer to install the AI programme and train our staff based on the experimental approach. This helped to increase our competencies in problem-solving skill and improve quality. (Table 1)

Table 1 Motivations to use AI in UAE hotels

Motivation	*Interviewee*	*Themes*	*Outcome*
AI infrastructure flexibility	Interviewee D	AI task performing capacity	Ability to handle multiple tasks Ability to manage a variety of information Timely response when it comes to order and task
	Interviewee A	AI connectivity	Facilitate both internal and external communication with other components
AI alignment	Interviewee C	AL reconfigures easily	Ability to easily reconfigure and fit according to specific tasks
	Interviewee A	Ability to use information	Hotels able to use information and time efficiently and effectively
AI resources	Interviewee D	AI adoption	Adapt other hotels' models in AI
	Interviewee B	AI experimental	Install AI programming and train staff based on the experimental approach

The use of artificial intelligence in UAE hotels

Technological advancement is likely to have a significant impact on how work is undertaken (Brougham and Haar, 2017). In lieu of the second issue, the following three themes have emerged from the analysis of the interview data: trip planning, reception service and room service. These services involve customer interactions and providing quality services for customer's satisfaction.

Trip planning. Trip planning influences guest satisfaction and loyalty, especially if the planning is flexible and includes a variety of services and products. However, effective planning depends on accurate and flexible communication giving rise to two challenges. Firstly, the hiring of more staff and long working hours. Secondly, assuring the quality of communication, which may be difficult to control. Therefore, the integration of AI in trip planning is a need mainly for hotels with large capacities, such as 5-star hotels in the UAE. The use of AI and its impact on hotel quality was confirmed by Interviewee A, who mentioned that:

> One of our hotel missions is to provide smooth trip planning with zero error. Thus, we adopted AI in planning and managing the trips. Our hotel provides a complete trip service through AI, which includes booking ticket, room, food, internal transport, and others.

The use of AI technology in the hotel industry goes beyond achieving quality to meet customer preferences and this affects customers' loyalty as proposed by Interviewee B:

> We always had difficulty managing guests' trip, especially when high customizations are involved such as special services and products. Thus, we resort to AI to solve this problem, which helps to meet our guests' preferences.

Both interviewees highlighted how AI provided improved quality for trip planning, such as providing complete service, avoiding errors in planning, managing and customizing the trip. This usage enables hotels to minimise deficiencies and strategize to boost their service quality.

Reception service. Hotels should integrate intelligent technology to meet changing consumer expectations (Leung, 2019). Thus, hospitality services knowledge that can be programmed and performed by AI should be explored. In this study, the use of AI is found to facilitate reception service. This facilitation shifts the traditional market based on direct interaction between guests and hotel employees to programmed hotel services and immediate responses to the guest. For example, Interviewee C points out that:

> Reception and information desks are important and consume our employees' time to inform and direct guests, especially when they speak different languages. Thus, we used a robot via AI to assist our guests directly.

Leading hotels in the arena competition strive to achieve the highest level of quality by providing integrated services that include travel, accommodation, entry facilities and internal transfers. This integration requires significant effort from staff members in documentation, follow-up and responding to customers' preferences warmly. Interviewee A provides explains how the use of AI addresses this problem for reception service:

> Our hotels strive to offer better service to customers. It was very difficult to sustain a customer-centred approach. To do so, hotels are required to recruit, train, and pay for a variety of services. This costs us a lot and the quality still depends on the staffs' performance. Therefore, we adopt Chatbots to manage customers' information immediately through Facebook Messenger or WhatsApp.

AI was used to automate the reception service due to its advantage in reducing the cost of hiring and training staff by offering a standardized work performance and immediate response rate.

Room services. Room services play a major role in hotels' performance and their competitive advantage as a good room service influence guests to extend their stay in the hotel. Additionally, it can also influence customers loyalty and increase positive word-of-mouth via social media or face-to-face interaction. However, achieving high-quality room services is difficult as customers have strong preferences and demands. Thus, adopting AI has become a necessity rather than an opportunity for 5-star hotels. According to D:

> We adopted AI to facilitate room service management and control. We used a simple voice command to give our guests complete control of room lighting and temperature as well as the television instead of being confused with how to find a favourite channel. The voice command can even open or close the drapes in some rooms.

The quality of meals served is also an important driver in achieving competitive advantages in hotel services. The challenge lies in offering a menu that can cater to guest's preferences as taste preference differs across individuals. Thus, catering to guests' needs consumes time and effort, especially when the order is unavailable in the kitchen, increasing the cost of service. Therefore, technology interaction in room service is important to facilitate meals ordering and customisation, especially for hotels located far from the heart of the city where restaurants are readily available.

According to E:

> We use AI room service to facilitate customizing and ordering food either from our kitchen or other restaurants such as Subway, McDonald, and other partner restaurants. (Table 2)

The impact of using artificial intelligence in UAE hotels

The interviewees also revealed how the use of AI successfully influence the way the human resource is used and how it leads to a transformation in hotel operations. These findings provide an indication that AI will replace or provide the opportunity to relocate resources. The following three themes were identified as the impact of AI use in hotels: improved information quality reduced service cost and improved market share.

Service effectiveness. Guests are often keen to understand the services offered by the hotel in organizing the trip, from room services to insurance and internal transportation. To offer such services, the regulation of information exchange must be effective. The use of AI greatly improves service quality through faster processes that cater to customers' preferences. Interview D mentioned that:

> The use of AI enables us to share our hotel information and services with potential guests, giving them autonomy over their trip.

Table 2 Use of AI in UAE hotels

AI Usage	*Interviewee s*	*Themes*	*Outcome*
Trip planning	Interviewee A	Planning the trip	Booking ticket, room, food, internal transport and others
	Interviewee B	Customizing the trip	Special services and products
Reception service	Interviewee C	Managing reception	Facilitate reception processes, shorten the time and cater to customers' language
	Interviewee A	Managing information desk	Managing customers information immediately
Room services	Interviewee D	Room control	Control of room lighting and temperature, as well as the television
		Room security	Open or close the drapes in some rooms
	Interviewee E	Food order	Facilitate customizing and ordering food either from their kitchen or other restaurants

Hotels are not the only niche for AI hospitality because travel agencies now offer guests to customize an AI travel plan to them, but many would be happy to make an offer because their preferences are met without planning. Therefore, hotels have to extend their services through providing customers a chance to design their services and products. According to Interviewee C:

> AI improve our service quality by assisting our guests to customize their trips and suggesting good trips as well. This helps to solve two problems: time spent in customizing the trips and provide information about other options.

Providing hospitality services is a complex task as human behaviour is dynamic. Providing AI technology improve response time and offers guests to cater to their preferences.

Service efficiency. Hotels require accurately designed strategies for both internal and customers to ensure costs operation efficiency and maximisation of profit. The integration of AI is advantageous to both hoteliers and guests. Hotel marketing and sales systems require chatbot computer software to learn all they can about the customer – their tastes, behaviours and responses.

According to Interviewee B:

> The use of AI dramatically reduces working hours, especially during the holiday season. AI helps in answering questions and solving problems, enabling us to provide good quality at lower costs.

AI also assist hotels in fully using their capacity and reduce time in communication and documentation. Interviewee C stated that:

> Through AI, we reduced service cost by fully utilising our hotel capacity. The AI enables our hotel to provide personalized concierge services with real-time requests and recommendations.

Improved market share. The quality and accuracy of customers' information are important factors in commercial services such as the hotel industry because the accuracy of data helps consolidate the market policy for the hotel. The database also assists in developing direct, medium and long-term implementation strategies according to market requirements and changes. This development maximizes the market share of the hotels and is impossible to meet without AI interaction.

Interviewee D mentioned that:

> The use of AI provides us with an amazing database about our customers, which enable us to be more innovative in marketing strategy. It strengthens our relationship through easy communication and timely response to customers' needs regardless of customer quantity and time.

AI also provide necessary data necessary to increase the efficiency of the hotel by summarising the customers' demographic and geographic data, as well as their service preferences, constructing a successful service model.

Interviewee E stated that,

> The use of AI enables our hotel to be more innovative in customizing the services according to customers' preferences and culture. We have so many customers from different countries and with different religions. With AI, we can easily customize the services and manage our hotel capacity to meet customers' satisfaction. (Table 3)

Discussion

This paper aims to explore the drivers of AI adoption, AI usage in hotels and its impact. To achieve this aim, three questions were developed. The first question was developed to uncover the drivers of AI use among hotel operators in the UAE. This study has reported

Table 3 Impact of using AI in UAE hotels

Themes	*Interviewees*	*Sub-themes*	*Outcome*
Service effectiveness	Interviewee D	Knowledge sharing	AI enable customers to share information with hotels and design their services
	Interviewee C	Quality of information	Improve the quality of information that enables guests to customize their trips besides suggesting good trips
Service efficiency	Interviewee B	Time effectiveness	Reduce working hours, which the provision of good quality at a lower cost
	Interviewee C	Efficient use of resources	Enable efficiency by fully using hotel capacity
Improved market share	Interviewee D	Innovative ideas	Improve innovative marketing strategies
	Interviewee E	Market innovation	Improve market share based on customers' demographic and geographic traits

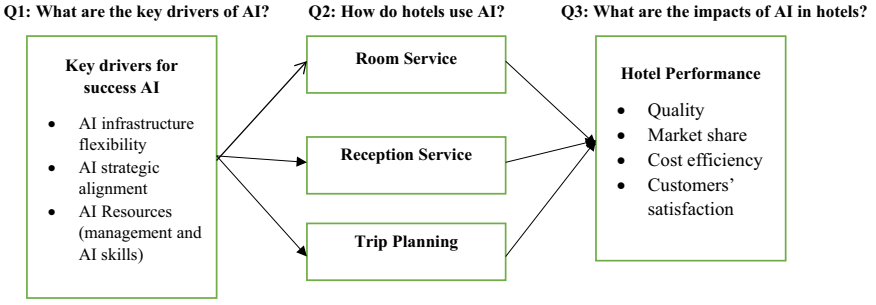
three main factors that motivate hotels to use AI, which include the flexibility of infrastructure, alignment and resources for AI. The AI infrastructure flexibility improves hotels tasks and services by enabling staffs to handle multiple tasks. Using Chatbots, AI allows hotels to improve service quality in both their functional and technical processes, automating tasks that are traditionally performed by service employees, manage a variety of information and responding promptly (Prentice *et al.*, 2020). Furthermore, AI alignment is an effective motivation for using AI as it is easily reconfigured to fit specific tasks and meet guests' needs effectively. This is supported by Gabriel (2020), who claims that AI design should create the greatest happiness for the largest number of people or sentient creatures. Finally, hotels also use AI by adopting the models and technologies from other hotels or through developing AI programmes and training staffs based on an experimental approach. Additionally, UAE hotels were shown to efficiently use AI in room services, notably in room control, food and security purpose.

The second research question on the use of AI in UAE hotels is addressed via three main findings including trip planning, reception service and room services. The use of AI potentially leads to significant savings, elimination of human error and higher service quality. UAE hotels tend to use AI technologies to facilitate trip planning and management, assisting guests to customize their experiences and services for the trip. There are many issues that guests are concern about, such as health-care services, especially in the time of Covid-19 (Jiang and Wen, 2020). The hotels use AI in managing reception through facilitating the reception process in a timely manner besides catering to customers' preferred language. AI minimizes human interaction error, improving service efficiency.

The third question concerns the influence of AI technologies on several aspects of hotel performance in the UAE. The impact of AI can be seen in three main areas, namely, service effectiveness, service efficiency and improved market share. AI technology facilitates the effectiveness of trip management and implementation by providing information on tourist site, including popular places, food and cultures. This information can assist guests to easily customize their trips and allows them flexibility (Tussyadiah and Park, 2018). AI technologies also facilitate the efficiency of services. Hotel robotics is often used with other enabling technologies such as facial recognition, automated payment, drone delivery and self-driving cars. These services reduce the time and cost associated with achieving hotel tasks (Sánchez-Medina and C-Sánchez, 2020). As knowledge is a key driver in developing an accurate strategic plan and delivering innovation, AI capabilities in knowledge transfer and management provide a solution for innovative marketing strategies. Findings show that information provided by AI on the market and customers enable customers to share innovation development.

Overall, AI is an effective tool to achieve a competitive advantage. In the hotel industry, this study addresses the following three interrelated axioms of AI in the industry: the motivation

Figure 1



Source: Authors

for using AI, areas of use and the effect of AI use, as shown in Figure 1. The motivation factors of using AI determine the way that hotels use AI technologies whilst both motivation factors and the use of AI influence hotel performance.

Theoretical contribution

This study is one of few studies and the first in the Arab Region that discusses how AI technologies influences several aspects of hotel performance. Given the paucity of empirical studies on the effective factors of AI technology in the hotel industry, this study provides valuable results and shows the effective factors of AI that influence hotels industry performance. In addition, this study provide a clear understanding on how to use AI technologies in hotel services. Finally, this study develops a model that determines how the interaction between AI factors and uses influence hotels performance. Hotel management is one of the most important pillars of competitive advantage, which, in turn, affects not only the profitability of the hotel but also its competitive sustainability in global and local markets. This study provides a road map for hotel managers on how to exploit AI technologies in the improvement of hotels' performance according to empirical results extracted from leading hotels in the UAE rather than inductive expectations.

Limitations and recommendations for future research

This exploratory research addresses the issues related to the use of AI in the service industry and is not without limitations. Firstly, findings show that a majority of UAE hotels use AI in managing trip planning, reception service and room services. However, there are many areas where AI can add value to the hotel industry such as security and entertainment, which were not investigated in this study. The use of AI for marketing and promotional purposes is also less emphasized in this context, although studies are indicating the potential usage of AI for marketing (Eriksson *et al.*, 2020). Thus, future research can further explore further areas where AI can provide added value to hotels and their customers. Secondly, AI is a complex innovation and many factors can influence AI performance. Thus, future research can address this limitation by investigating technical and managerial factors. This requires interviewing AI experts instead of hotel managers. It is also difficult to ensure how AI influence the wide scale of hotel performance through interviews. Therefore, future research can extend to the improvement of the methodology and use longitudinal research. The findings of this study demonstrate that the adoption of AI has the potential to contribute to competitive advantage. The challenges in using AI for competitive advantage such as digital readiness and business culture seem worthy for future inquiry.

References

Al-Shami, S., Al-Hammadi, A.H., Hammadi, A.A., Rashid, N., Al-Lamy, H. and Eissa, D. (2021), "Online social networking websites in innovation capability and hotels' performance in Malaysia", *Journal of Hospitality and Tourism Technology*, Vol. 12 No. 1, pp. 72-84.

Ananeva, D. (2019), *Artificial Intelligence as Disruptive Innovation in the Hotel Industry*, University of Lapland, Faculty of Social Sciences.

Borràs, J., Moreno, A. and Valls, A. (2014), "Intelligent tourism recommender systems: a survey", *Expert Systems with Applications*, Vol. 41 No. 16, pp. 7370-73809, doi: 10.1016/j.eswa.2014.06.007.

Bowen, J. and Whalen, E. (2017), "Trends that are changing travel and tourism", *Worldwide Hospitality and Tourism Themes*, Vol. 9 No. 6, pp. 592-602, doi: 10.1108/WHATT-09-2017-0045.

Cain, L.N., Thomas, J.H. and Alonso, M. (2019), "From sci-fi to sci-fact: the state of robotics and AI in the hospitality industry", *Journal of Hospitality and Tourism Technology*, Vol. 10 No. 4, pp. 624-650, doi: 10.1108/JHTT-07-2018-0066.

Carrio, A., Sampedro, C., Rodriguez-Ramos, A. and Campoy, P. (2017), "A review of deep learning methods and applications for unmanned aerial vehicles", *Journal of Sensors*, Vol. 2017, doi: 10.1155/2017/3296874.

Christensen, C.M. and Raynor, M.E. (2013), *The Innovator's Solution: Creating and Sustaining Successful Growth*, Harvard Business Review Press.

Eriksson, T., Bigi, A. and Bonera, M. (2020), "Think with me, or think for me? On the future role of artificial intelligence in marketing strategy formulation", *The TQM Journal*, Vol. 32 No. 4, pp. 795-814, doi: 10.1108/TQM-12-2019-0303.

Gabriel, I. (2020), "Artificial intelligence, values, and alignment", *Minds and Machines*, Vol. 30 No. 3, pp. 411-437, doi: 10.1007/s11023-020-09539-2.

Ivanov, S. and Webster, C. (2017), "Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies – a cost-benefit analysis", *International Scientific Conference "Contemporary Tourism – Traditions and Innovations*, Vol. 27 No. 28, pp. 1501-1517.

Jasonos, M. and Mccormick, R. (2017), *Technology Integration for Restaurants & Hospitality Industry in the Year 2025 Degree Programme Degree Programme in Tourism*, Haaga-Helia University of Applied Sciences.

Jiang, Y. and Wen, J. (2020), "Effects of COVID-19 on hotel marketing and management: a perspective article", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 8, pp. 2563-2573, doi: 10.1108/IJCHM-03-2020-0237.

King, A.A. and Baatartogtokh, B. (2015), "How useful is the theory of disruptive innovation?", *MIT Sloan Management Review*, Vol. 57 No. 1, p. 77.

Lee, J., Ok, C.M., Lee, S.H. and Lee, C.K. (2018), "Relationship between emotional labor and customer orientation among airline service employees: mediating role of depersonalization", *Journal of Travel Research*, Vol. 57 No. 3, pp. 324-341, doi: 10.1177/0047287517696978.

Leung, R. (2019), "Smart hospitality: Taiwan hotel stakeholder perspectives", *Tourism Review*, Vol. 74 No. 1, doi: 10.1108/TR-09-2017-0149.

Naumov, N. (2019), "The impact of robots, artificial intelligence, and service automation on service quality and service experience in hospitality", *Robots, Artificial Intelligence, and Service Automation in Travel, Tourism and Hospitality*, pp. 123-133, doi: 10.1108/978-1-78756-687-320191007.

Nuruzzaman, M. and Hussain, O.K. (2018), "A survey on chatbot implementation in customer service industry through deep neural networks", *Proceedings - 2018 IEEE 15th International Conference on e-Business Engineering, ICEBE 2018*, pp. 54-61, doi: 10.1109/ICEBE.2018.00019.

Prentice, C., Dominique Lopes, S. and Wang, X. (2020), "Emotional intelligence or artificial intelligence–an employee perspective", *Journal of Hospitality Marketing & Management*, Vol. 29 No. 4, pp. 377-403, doi: 10.1080/19368623.2019.1647124.

Richard, B. (2017), "Hotel chains: survival strategies for a dynamic future", *Journal of Tourism Futures*, Vol. 3 No. 1, pp. 56-65, doi: 10.1108/JTF-06-2016-0018.

Sánchez-Medina, A.J. and C-Sánchez, E. (2020), "Using machine learning and big data for efficient forecasting of hotel booking cancellations", *International Journal of Hospitality Management*, Vol. 89, p. 102546, doi: 10.1016/j.ijhm.2020.102546.

Tussyadiah, I.P. and Park, S. (2018), "Consumer evaluation of hotel service robots", *Information and Communication Technologies in Tourism 2018*, pp. 308-320, doi: 10.1007/978-3-319-72923-7_24.

Verganti, R., Vendraminelli, L. and Iansiti, M. (2020), "Innovation and design in the age of artificial intelligence", *Journal of Product Innovation Management*, Vol. 37 No. 3, pp. 212-227, doi: 10.1111/jpim.12523.

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