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HUMAN V ROBOT: THE APPLICATION OF SMART TECHNOLOGY IN THE HOTEL INDUSTRY

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HUMAN vs. ROBOT: THE APPLICATION OF SMART TECHNOLOGY IN THE HOTEL INDUSTRY

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Abstract

The current use of robotics, artificial intelligence, and service automation (RAISA) illustrated that innovation developed very quickly and had an enormous impact on how consumers use tourism services. This study aimed to determine how tourism and hospitality employees dealt with the pandemic, particularly when implementing the protocol called physical distance in the new normal era. This study also intended to discover our hospitality industry's readiness to confront a new normal era by applying technology to serve guests. This study conducted semi-structured interviews with 15 stakeholders. The findings indicated that the government and hotel management exploit this occurrence to enhance service quality, explicitly emphasizing hotel consumer comfort and safety. It was posited that the issues associated with the interaction between humans and robots extend beyond budgetary considerations, readiness, and maintenance. A crucial aspect to consider was robots' potential replacement of service uniqueness, particularly in developing countries. Integrating robotics and artificial intelligence (AI) inside the hotel industry may need to reevaluate the hospitality and tourism education curriculum.

Keywords: COVID-19, hospitality, human talent, smart technology, hotel.

Introduction

One recent crisis that has changed the world is the COVID-19 pandemic. According to Gossling, Scott, and Hall (2021), the COVID-19 pandemic has been a problem in the hospitality and tourism industry, especially hotel businesses. Gossling *et al*. (2021) claim that the sector has been significantly impacted globally due to this pandemic. For effective crisis management in the future, it is essential to comprehend a crisis (such as the COVID-19 pandemic) and the immediate post-crisis reaction (Waller & Abbasian, 2022). It is critical to apply the lessons discovered during crises to foresee upcoming challenges (Japutra & Situmorang, 2021; Zhang, Song, Wen, & Liu, 2021). The industry has had many problems due to the global pandemic, including decreased commercial income, quarantine intervals, border closures, and travel restrictions. Around the world, specific hotels and resorts are compelled to shut down or scale back their operations.

The pace of technological advancements is currently experiencing significant growth in the domains of information, communication, and technology (ICT) within the business sector (Acquila-Natale, Chaparro-Pelaez, Del-Rio-Carazo, & Cuenca-Enrique, 2022; Buhalis, Papathanassis, & Vafeidou, 2022; Ajmal, Khan, Shad, Alkatheeri, & Jabeen, 2023). According to de Souza, Mendes-Filho, and Buhalis (2019), technology will facilitate the integration of all stakeholders within the tourist sector. Technology has the potential to facilitate a significant transition within the tourist business, leading to enhanced competitiveness for organizations and a fundamental alteration of the tourism destination (Buhalis, 2020). A substantial number of studies in hospitality and tourism have examined the hotel industry's readiness for intelligent technology applications for improving service quality. Nevertheless, these studies focus on the user's behavior (e.g., self-service technologies, hotel reservation websites) (Han, Hou, Wu, & Lai, 2021; Park, Kwun, Park, & Bufquin, 2022) and hotel attributes (e.g., hotel safety, convenience, and control) (Kim & Han, 2020). To date, there still needs to be more investigation in balancing the intelligent technology applications (e.g., robotics and AI) for improving service quality and experience in the hotel industry (Choi, Choi, Oh, & Kim, 2020). Likewise, these recent studies were conducted in developed countries such as the USA (Park *et al*., 2022), South Korea (Kim & Han, 2020), and Hong Kong (Han *et al*., 2021). Only a few studies have been conducted in developing countries, but mostly in tourist destinations (de Souza *et al*., 2019; Azis, Amin, Chan, & Aprilia., 2020). For example, de

Souza *et al*. (2019) focus on evaluating the advertising effectiveness of the tourist destination in Brazil. Robotics and AI studies still have much to be desired to improve guests' experiences and satisfaction while traveling. Therefore, exploring how to balance service quality by using advanced technology, such as robotics or AI, in the hotel industry, especially in developing countries, is essential.

Several studies have discussed how robotics and AI could take human jobs soon (Bowen & Morosan, 2018; Ivanov & Webster, 2019; Reis, Melao, Salvadorinho, Soares, & Rosete, 2020). For example, Bowen and Morosan (2018) argued that robotics will majorly disrupt the hotel industry. Using robots would give a different quality of service because guests would expect a consistent outcome, especially regarding data and information. Unfortunately, adopting robots and AI applications presents a high cost for hotel finances (Ivanov & Webster, 2019). The high price commenced from the costs of robot acquisition, installlation, maintenance, electricity consumption, and hiring a specialist to operate and maintain the robots. Furthermore, using robots and AI can threaten jobs in hotels. Even though many hotel guests prefer human-to-human interaction (Reis *et al*., 2020), robots and AI could save labor costs and be attractive to guests who like to experience or serve by robots and AI.

Various studies have examined the usage of innovative technology (e.g., AI, robotics, IT applications) to improve the guests' experience and service quality in the hospitality and tourism industry (Pillai, Haldorai, Seo, & Kim, 2021; Kim, Kim, Badu-Baiden, Giroux, & Choi, 2021; Yang, Song, Cheung, & Guan, 2021). For example, Yang *et al*. (2021) investigated the guests' acceptance and experience of intelligent hotel technology toward the visiting intentions. They conducted mixed methods by gathering eight interviews and 648 surveys in China. The research findings indicate that individuals in the younger and early middle-aged demographic exhibit a greater inclination towards selecting smart hotels as their preferred accommodation option. This preference can be attributed to their heightened receptiveness and enthusiasm towards engaging with intelligent hotel technology. Similarly, Kim *et al*. (2021) investigated customers' preference for human or robot service during a health crisis (e.g., the COVID-19 pandemic). This quantitative study was conducted in the USA by collecting 134 surveys. They concluded that hotel customers prefer robot service to human service in hotels, especially after the COVID-19 pandemic. The situation after the COVID-19 pandemic pushed the industry to explore technology's role in ensuring hygiene, cleanliness, and sanitation are ready in the hospitality and tourism industry, especially in hotels (Pillai *et al*., 2021). Therefore, this study explores the readiness of the hotel industry to use innovative technology in developing countries such as Indonesia.

Nevertheless, studies have found that many hotel industries face challenges using innovative technology to improve service quality *(*Pillai *et al*., 2021; Yang *et al*., 2021), particularly in developed countries. The present study assembles shreds of evidence from multiple stakeholders (e.g., hotel managers, hotel customers, and policymakers) in a developing country (i.e., Indonesia) to examine the readiness of the hotel industry to use innovative technologies (e.g., AI, robotics, IT applications). Mainly, the objectives of this study are to seek the following questions: (i) How ready are hotels to use innovative technology applications to improve service quality? (ii)What are the challenges for hotels in applying innovative technology to produce a high-service quality

The paper starts with exploring intelligent technology in the hospitality and tourism industry. Next, the discussion was presented regarding humans versus robots in the hotel industry. Following that, methodology, findings, and discussion are discussed. Finally, the conclusion and implications are presented.

Innovative Technology in the Hospitality and Tourism Industry

Various studies have investigated the use of smart technology to improve service quality in hospitality and tourism (Azis *et al*., 2020; Shen, Sotiriadis, & Zhang, 2020; Ammirato, Felicetti, Linzalone, & Carlucci, 2022; Park *et al*., 2022). For example, Park *et al*. (2022) investigated the comparative analysis of customer service quality assessments between human interaction services and self-service technology, focusing on the five aspects of reliability, competence, efficiency, tangibility, and enjoyment. Their studies adopted a quantitative survey and collected 275 samples from hotel consumers in the United States using an online marketing firm. They concluded that hotel consumers considered efficiency vital in determining their service satisfaction regardless of the service delivery options. Similarly, Choi *et al*. (2020) examined the influence of human-robot interaction from the perspective of hotel employees and guests in Hong Kong. The study focused on the dimensionality of service quality of hotel service robots. A mixed-method approach was used for two different groups of five-star hotels. They used a focus group for 16 managers in the first group

and 400 questionnaires for the second group. They believed innovative technologies could influence the quality of service, which brings a positive guest experience and effectively creates a memorable visit. Tourism businesses (e.g., hotels, restaurants, and local shops) must comprehend these smart technologies' substantial requirements and expectations (Ammirato *et al*., 2022). Therefore, the present study examines hotel businesses' readiness to apply smart technologies to improve their service quality from multiple stakeholders (e.g., hotel managers, a policymaker, and hotel consumers) (Azis *et al*., 2020).

The Debates of Human vs. Robots in the Hotel Industry

Robots and AI (artificial intelligence) were predicted to make up around 25 percent of the workforce in the hospitality industry by 2030 (Bowen & Morosan, 2018). According to Bowen and Morosan (2018), this advanced technology would take hotel services to a different level. Artificial intelligence (AI) has the potential to handle the consumer data that organizations possess efficiently. The travel business encounters two primary issues in information management: selecting relevant information and effectively utilizing such information. The potential and uses of information inside effectively managed customer relationship management systems are extensive, necessitating the utilization of artificial intelligence in software programs or robots to fully harness the value of this information (Ivanov & Webster, 2019).

Similarly, implementing robotics in the hotel industry will enable providing services that were financially unfeasible before (Reis *et al*., 2020). For instance, autonomous vehicles, classified as robotics entities, are anticipated to transport passengers from the airport. If the guests still need to complete the check-in process at the hotel, the vehicle can facilitate their check-in and configure their smartphone to function as a key. Also, the car can recommend nearby dining establishments near the hotel. Nonetheless, the robotic and AI system not only facilitates a commendable initial encounter for the clientele on behalf of the lodging establishment but also generates supplementary benefits by economizing the customer's resources in terms of both finance and time (Reis *et al*., 2020). These two advanced technologies have significantly enhanced the level of engagement compared to the typical traveling journey experience for hotel guests. Therefore, this study explores whether hotel leaders could balance the roles of service robots and human employees (Xu, Steinmetz, & Ashton, 2020; Song, Zhang, & Wu, 2022).

The Challenges of Intelligent Technology Application in the Hospitality and Tourism Industry

Several scholarly investigations have explored the obstacles to enhancing sustainability within the tourist sector (Erol *et al*.., 2022; Fourie & Santana-Gallego, 2022; Buhalis, Leung, & Lin, 2023; Li, Zhou, & Huang, 2023). Erol *et al*. (2022) argue that integrating blockchain peer-to-peer systems within several information technology sectors, such as food, logistics, and agriculture, can bolster sustainability within the tourism industry. A complete literature review was conducted in order to identify the issues. The data was subsequently examined by a panel of twenty-five specialists from various European countries such as Turkey, Denmark, Germany, the United States, and Canada. Following this analysis, structural modeling techniques were employed to identify the contextual connections between the difficulties. The findings of their research indicate that in order to ensure the long-term viability of the tourism sector, it is imperative for key stakeholders, such as top-level executives and government officials, to demonstrate a firm commitment to offering assistance and executing well-designed information technology initiatives.

Similarly, Buhalis *et al*. (2023) investigated the potential of the Metaverse as a forthcoming disruptive technology, facilitating immersive encounters inside virtual and tangible settings. This study presents a conceptual framework that explores the potential of the Metaverse to change travel experiences while also acknowledging the potential disruptions that may arise. Several elements have been identified that challenge the growth of Metaverse in the tourist and hospitality industry. The authors posit that the effectiveness of networking infrastructure, such as internet connection speed, is a crucial in developing the Metaverse. Additionally, the availability and affordability of enabling devices play a significant role in facilitating access to the Metaverse.

Furthermore, the authors highlight the importance of competent platforms that empower users to engage with the Metaverse fully. Lastly, the willingness and readiness of consumers to embrace and utilize Metaverse technologies are critical factors in its successful adoption. However, the progress of technology, such as the emergence of service robots, social media platforms, mobile devices, and the Internet of Things, can potentially enhance tourist experiences within the tourism business. This effort may be achieved by establishing a dynamic ecosystem that generates value for all parties involved (Buhalis *et al*., 2019). Nevertheless, the researchers contend that implementing intelligent technology is a multifaceted undertaking that presents challenges in various contexts, particularly amid the

COVID-19 epidemic (Aldao, Blasco, Poch-Espallargas, & Palou-Rubio, 2021). Hence, this study elucidates the consequences of the inadequate technological infrastructure amidst the COVID-19 pandemic.

Research Methods

Design and Approach

The present study has utilized an interpretivist paradigm, which is well-known for its ability to aid researchers in understanding subjective and socially constructed interpretations. Various strands of interpretivism vary in their approaches to practical implementation (Bell, Bryman, & Harley, 2019). For instance, phenomenologists, who investigate the nature of existence, prioritize examining participants lived experiences. This approach entails exploring participants' recollections and interpretations of their own experiences. This interpretative paradigm is aimed at something other than attaining truth. However, the aim is to offer plausible explanations derived from diverse experiences and viewpoints (Barbosa-Neves, Wilson, Sanders, & Kokanovic, 2023). The primary objective of the current investigation is to get insights into the influence of intelligent technologies on managerial aspects and hotel operations. Experience, perceptions, and meanings, commonly called 'verstehen,' are significant elements in academic discourse (Bryman, 2012). The chosen epistemological framework has been employed in order to facilitate our comprehension of the subject matter.

This study aims to investigate the experience of hotel managers, hotel consumers, and a policymaker in exploring hotels' readiness to use innovative technologies to improve their service quality. Our study has utilized inquiries of "why" and "how" in order to acquire a more profound understanding (Robinson, Solnet, & Breakery, 2014). In a precise manner, this paper utilizes an inductive, qualitative methodology employing a case study design to obtain an in-depth analysis of the perceptions and insights of the participants according to their professional experiences (Creswell, 2014). A case study approach was deployed to provide distinctive perspectives on the circumstances of diverse scenarios (e.g., the COVID-19 pandemic) by deploying semi-structured in-depth interviews (Robson, 2011).

Data Collection and Participants

This study collected primary data from in-depth interviews with stakeholders such as hotel managers, hotel consumers, and a policymaker from the Greater Jakarta area, known as *Jabodetabek* (Jakarta, Bogor, Depok, Tangerang, and Bekasi). The selection of the Greater Jakarta area as the study's setting was based on two main considerations. Initially, our research scope encompassed not just Jakarta but also extended to Tangerang in the Banten province, as well as Bogor, Depok, and Bekasi. Furthermore, the Greater Jakarta area has a greater degree of diversity in terms of hotel kinds and variations in the market's consumer preferences.

The researchers opted for semi-structured interviews as a means to allow participants to provide more comprehensive insights by means of improvisational questioning. Nevertheless, investigations are still predetermined in accordance with the framework of research inquiries (Silverman, 2013). The researchers employed purposive sampling to select the most suitable individuals who could answer the research inquiries (Campbell *et al*., 2020). Brinkman and Kvale (2015) assert that selecting participants should be guided by their qualifications, abilities, and industry expertise. As such, a deliberate choice was made to include hotel managers, hotel consumers, and a policymaker as representatives of the many stakeholders within the Indonesian hotel business. The present study examined at various hotel managers purposively from different departments in the local and international hotels to get better insights into how quality service is implemented. The authors selected managers who possess a minimum of one year of work experience at their respective hotel and a policymaker who involved in human talent development in the Ministry of Tourism and Creative Economy. Subsequently, the participants chosen for this research as hotel consumers include both individuals who engage in leisure and business travel and have consistently availed the services of hotels with four and five-star ratings on a monthly basis throughout the preceding year. As a result of their active involvement in the advancement of the hotel sector in Jakarta, Indonesia, these three actors could exchange valuable perspectives and knowledge regarding the subject matter. They range from macro to micro levels that pertain to the significance of intelligent technology in enhancing service quality.

The researchers disseminated invitations to participants by means of their email addresses or by utilizing the Whatsapp social media messaging tool, leveraging their professional network. At the outset, a total of 21 individuals provided their response to this request. Nevertheless, a number of individuals made the decision to postpone their planned visits for a variety of reasons. Some were unable to provide the necessary time, while others were unable to secure authorization, as they asserted that their accommodations were concerned about safeguarding their privacy. Finally, 15

participants responded to participate in the study (Table 1). Of these were seven hotel managers, seven hotel consumers (four leisure consumers and three business consumers), and a policymaker. The names of all participants were anonymized during the duration of the study. The interview questions were designed specifically for the three distinct categories of actors in order to elicit the most suitable responses pertaining to the research questions and objectives (Silverman, 2010).

Table 1
Data Participants

Participant	Department	Status
MA	Human Resources	International Hotel
MD	Food & Beverage Division	International Hotel
MH	Marketing	Local Hotel
MJ	Health and Recreation	International Hotel
MN	Rooms Division	Local Hotel
MR	Rooms Division	International Hotel
MS	Food & Beverage Division	International Hotel
IM	Ministry of Tourism	Policymaker
CA	Hotel Consumer	Leisure
CC	Hotel Consumer	Leisure
CH	Hotel Consumer	Business
CK	Hotel Consumer	Business
CM	Hotel Consumer	Leisure
CO	Hotel Consumer	Leisure
CL	Hotel Consumer	Business

Data Analysis

Nvivo software was used to manage and analyze our data (Bazeley & Jackson, 2019). The interviews were conducted in Indonesian and transcribed into Indonesian, then translated into English. The initial data coding process commenced with identifying patterns, facilitating the development of familiarity, and the reorganization and identification of theme matrices derived from the transcriptions of the interviews (Robson, 2011). In the initial phase, the interview transcription process reduced the data. Subsequently, emergent topics and themes were discerned, pertaining to the participant's perceptions of the potential enhancement of hotel service quality through intelligent technology (Gibson & Brown, 2009). In the study's second phase, the transcripts were analyzed to identify key topics and themes that aligned with our research objectives. This process resulted in the generation of a substantial number of conceptual solution nodes. In the third stage of the study, the conceptual solution nodes were systematically organized into distinct categories and subcategories. This approach was adopted to prevent the imposition of inflexible classifications that could potentially lead to divergent interpretations, as perceived by the researchers (Yousaf, 2021).

During the subsequent phase, an analysis was conducted to identify and thoroughly investigate thematic commonalities. The coded data was then organized by linking conceptual nodes to significant themes. The transcripts underwent multiple verification rounds to guarantee precision and uniformity during the coding procedure. The themes were examined in order to assess the existence of overlapping nodes, which were afterward combined into a singular node. The refinement of the nodes was carried out by taking into account their conceptual proximity, guaranteeing that nodes within specific categories and themes were interconnected while maintaining their distinctiveness. During the concluding phase, the data were interpreted through a process that involved reaffirming the discovered results by examining the pertinent literature, thus facilitating a more theoretically informed analysis. Iteratively analyzing the construction of subcategories, categories, and themes was enhanced to establish the theoretical connection and establish ties with the theory and study objective. The authors ensured the quality and trustworthiness of this research in line with Lincoln and Guba (1985), which used criteria of credibility, transferability, dependability, and confirmability. Credibility was established by triangulating several interview findings, using various theoretical frameworks, and conducting thorough document examinations. The researchers assured transferability by consistently comparing the outcomes with individual conditions and then describing the industrial context. This criterion allowed for the creation industry databases that could be applied in various industrial-research settings. To ensure dependability, all recordings, notes, and other forms of documentation were stored for assessment and auditing. Confirmability was established through the authors' deliberate efforts to prevent their personal beliefs or theoretical perspectives from influencing the overall objectivity of the research.

Results and Discussion

The COVID-19 Pandemic Has Changed the Way Hotel Operates

The COVID-19 pandemic is impacting business worldwide in many aspects, primarily political, economic, social, cultural, defense, and security, as well as the welfare of all individuals in this country. The impact of this pandemic on Indonesia's tourism has been problematic since the tourism industry is one of the industries contributing significantly to the country's

economy. The tourism sector includes recreation areas, hotels, restaurants, and destinations that have been vital for the growth of the tourism industry. All of the participants addressed their concern about the situation, especially when their financial condition was hit hard,

"We acknowledged that our revenues are falling because there are no tourists or hotel guests during this lockdown due to government regulations from both our country and others. One thing we need to do is to cut our costs." (MA, Human Resources Division, International Hotel).

This manager *(MA, Human Resources Division, International Hotel)* explained that one of the solutions is to lay off employees. Even though there may be better ways, and it is hard to do, the hotel needs to do so to balance its budget, ensuring the hotel can run its operation; otherwise, the hotel can be closed. On the other hand, the pandemic is also a detriment to the hotel service affected during the pandemic due to the limited number of employees at the hotel. One of the hotels consumers *(CM, hotel consumer, leisure)* highlighted the limited number of employees working, which can sacrifice the service quality to the guests and close some hotel facilities.

Few health protocols are enforced in hotels to minimize the physical distance between employees and guests. Some regulations have to be imposed on hotels, changing how they communicate. For example, one manager *(MH, Marketing Department, Local Hotel)* mentioned that their hotel uses a social media app to order room service or request room amenities from the housekeeping department because they do not put a telephone in their room.

The Readiness of Robots and AI in Indonesian's Hotel Industry

Technology adoption has to be supported by the tourism ecosystem, such as human talent, sufficient internet infrastructure, technological capabilities, and educational sources. Basic technology applications such as cashless payment, digital menus, mobile applications, and intelligent control in guest rooms (e.g., entertainment center, air conditioning, lighting) have been used at hotels in Indonesia. Indeed, a few international hotel brands have applied more advanced technology in their property to increase their service quality, such as mobile check-in systems, kiosk check-in systems, and robot cleaning systems. This technology adoption has to be supported by an improved ecosystem. One of the crucial ecosystems is the employee skills and competency in running this technology. A policymaker addressed his concern regarding the usage of robotic machines in the tourism industry,

"We focus on developing our human talent with multiskilling, and we just cannot depend on technology as a whole. I believe human talent is still considered a key factor to be developed and still bring uniqueness to Indonesian hospitality" (IM, policymaker, Ministry of Tourism.)

He added that our government is fully committed to developing human talent to improve the quality and quantity of the tourism workforce. This situation also brings to developing tourism education specifically about crisis management.

"How many tourism schools include crisis management in their curriculum? We have started thinking about this because of the COVID-19 pandemic. We need to know what to do when another pandemic happens again."

Another manager (*MA, Human Resources, International Hotel*) was reluctant to bring technology before human talent. She knows many errors in daily operations and administration due to human error. However, she believes other reasons exist to replace them with robotic technology. Technology usage might not be the core value of hospitality because hospitality service still needs a human touch and cannot be replaced by advanced technology such as robotic machines. Subsequently, she mentioned that the local human talent is still prepared to accept this development. However, IM (policymaker, Ministry of Tourism) accepts that the local human talent has to be ready because the other world has been using automatic technology, so it will be a matter of time before the local talent is ready; otherwise, it would be the end of the workforce.

The Challenges for Hotels in Adapting Technology Applications in Indonesia

Many participants were reluctant to discuss the prospect of adapting technology applications such as robots and AI. They were hesitant about using robots or AI due to the uniqueness of Indonesian service to their guests. Indonesian hospitality is well known for its politeness, sincerity, and humility. Indeed, hotel guests could find them distinctively in various places in Indonesia. For example, how Balinese from Bali welcome their guests might have a different touch and feel than the way of Batak Toba people from North Sumatra. These differences present their experiences differently to their guest of how various places could provide different atmospheres for their visitors.

Nonetheless, these multiple destinations may give hotel guests different experiences, but they show the uniqueness of Indonesian hospitality. These service

traits cannot be produced using a robot or AI. One of the managers concerned regarding the value of adopting the advanced technology,

"We need a substantial restructuring if we decide to adopt these kinds of technology. We need to look very carefully at which one is our core value and which one is not. Our core value in hospitality services will be difficult to be replaced by robots or AI" (MD, Food and Beverage Division, International Hotel).

One manager (*MR, Rooms Division, International Hotel*) feared these robots and AI could steal human jobs. However, at the same time, He also knew that sooner or later, he had to start thinking to find a person capable of operating them. Similarly, the policymaker recognized the problem ahead,

"We have to be ready, regardless of what our position is right now (terms of its competencies and readiness). The other side of the world has utilized the automation equipment far ahead of us. We must prepare ourselves; if we do, we can stay caught up. (IM, policymaker, Ministry of Tourism).

Many hotel managers agreed that to finance this kind of technology is another issue. They believe due to its high price, the hotel would have instead focused on different matters such as building renovation, improving hotel features, or expanding its brand.

There are mixed insights from hotel consumers regarding using robots and AI in a hotel. For example, one hotel guest *(CC, hotel consumer, leisure)* believed that the hotel should improve their health protocol and social distancing by providing robots in some parts of cleaning and administrative jobs (e.g., check-in and check-out, ordering food) in this post-pandemic era. Another guest *(CH, hotel consumer, business)* mentioned that she would agree with using robots in the short term. Still, for the long time, she preferred having a human provide services for her in a hotel because it looked so humane and natural.

Discussion

Adopting advanced technology is crucial for the hotel industry, especially after the COVID-19 pandemic (Buhalis *et al*., 2019). However, the researchers argue that the hotel industry still faces challenges implementing advanced technology in daily operations (Sun, Lee, Law, & Zhong, 2020). The hotel industry needs to acknowledge the substantial importance of the technology needed. Similarly, the hotel industry should have sufficient human talent to ensure the technology runs smoothly. The study participants identified several problems pertaining to local talent's skills and competencies, such as the capabilities of operating an automatic technology (Buhalis, 2020; Ivanov, 2020, Buhalis *et al.*, 2023). With some international hotels ready to adopt advanced technology, local talent must accept the progress of artificial intelligence and robotics. This system will encompass a range of technical capabilities, including but not limited to guides, chefs, room service servers, housekeepers, hotel porters, etc. (Ivanov & Webster, 2019). However, more competencies and education are needed to ensure individual capabilities. Local talent needs to get their education starting in the early years to ensure exposure to this advanced technology knowledge (Situmorang & Japutra, 2024).

The utilization of intelligent technology has enhanced the overall experience and service quality for visitors in the hotel and tourism sector (Kim *et al*., 2021; Pillai *et al*., 2021; Yang *et al*., 2021; Buhalis *et al*., 2022). However, the researchers argue that not all hotel services can implement innovative technology at their properties. Many developing countries still depend on their cultural uniqueness to bring their service to be distinguished (Patiro *et al*., 2023). The hotel recognizes that to have capabilities of running intelligent technology. The hotel has to be sufficient financially enough. On the other hand, robotics and automation technology are essential during the COVID-19 pandemic due to social and physical distancing. Health protocol becomes more necessary and pushes hotels to balance guest contact, especially when a pandemic comes again in the future.

Conclusion and Implications

This study highlights various challenges and strategies of how hotels can accept technology implementation to improve service quality in the hotel industry. It also explains how the tourism ecosystem affects the readiness of the hotel industry (Buhalis *et al*., 2019; Kim & Han, 2022). Our study argue that our local talent must prepare their skills and knowledge to ensure they are ready for the future since the technology is much developed and wanted in tourism (Pillai *et al*., 2021). This condition is different from previous literature results, in which the usage of robots have been perceived as the next potential of quality service in hotel (Ivanov & Webster, 2019; Reis *et al*., 2020). Human versus Robots' challenges are more than financial, readiness, and maintenance, but also how service uniqueness cannot be replaced by robots, especially in developing countries. This research generates several recommendations for the managerial implications that can be highlighted from this study. First, tourism education must prepare its curriculum to

face the robot and AI in the future. Therefore, it is necessary to have the topic introduced to students early in their education. The implications of having technology acceptance ready is starting as early as possible for tourism education. Subsequently, this knowledge transfer also needs to be supported by the capabilities of lecturers, ensuring the effectiveness of the skills being transferred (Situmorang & Japutra, 2024). This situation means the government had to prepare a seminar or conference for university lecturers to be exposed as early as possible. Third, this recommendation goes to the hotel industry implementing technology for their customers. The recruitment of local human talent has to be prepared to clarify the qualifications. The collaboration between the hotel industry, vocational schools or universities, and government regulation must be in line to ensure they support each other.

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