

POTENTIALS OF DEVELOPING ARTIFICIAL INTELLIGENCE TECHNOLOGY IN THE SRI LANKAN HOTEL INDUSTRY WITH SPECIAL REFERENCE TO COLOMBO DISTRICT

Dananjaya Duleepa^{1*}, Jayawardena Hasini², Ranasinghe Ruwan³

¹ Uva Wellassa University, Department of Tourism Studies, Sri Lanka, duleepa96@gmail.com

² Uva Wellassa University, Department of Tourism Studies, Sri Lanka, jayawahasini@gmail.com

³ Uva Wellassa University, Department of Tourism Studies, Sri Lanka, ruwan@uwu.ac.lk

Abstract

The intense competition and unpredictable challenges in hotel operations in Sri Lanka have led to the need to adopt new technologies to provide better services to guests and maximise efficiency and effectiveness. Therefore, the main objectives of this study were to examine various Artificial Intelligence tools used in hotels in Sri Lanka, explore managers' perceptions of Artificial Intelligence, and identify barriers to the implementation of Artificial Intelligence in hotels in Sri Lanka. Using a purposive sampling, 15 managers of star category hotels in the Colombo district were selected and interviewed using a structured interview method to explore the objectives. The findings derived from the thematic analysis showed that hotels in Sri Lanka have limited knowledge of AI applications and that the respondents' perception of AI technology is still at an early stage where they doubt and question its effectiveness compared to human resource services. The study found that the use of AI technology has significant potential, especially in new and emerging hotels, as these new hotels tend to engage with tech-savvy guests compared to existing hotels in Sri Lanka. Moreover, technological advancements in artificial intelligence will undoubtedly lead to an unimaginable hotel experience that will increase guest satisfaction in Sri Lanka's hotel industry.

Keywords: Artificial Intelligence, Artificial Intelligence Tools, Barriers, Managerial Perceptions, Technological Advancements

JEL Classification: O33, Z32, C80

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1. Introduction

Artificial intelligence (AI) is considered a substitute for human skills and a technological aid that is much larger, more comprehensive, and more ubiquitous. AI can be described as the development of computer systems that can perform tasks and activities that require human intelligence (Alkathairi, 2022). In this digitised era, AI technology is being used in various industries, including tourism and hospitality, as well as information technology (Popesku, 2019). According to the finding of Samala, et al. (2022), "AI can be encountered in self-driving vehicles, robotic nurses, navigation systems, chatbots, human-versus-computer games, and numerous other areas".

The global tourism industry has shown incredible growth and prosperity, as the number of international tourist arrivals has increased from 428 million in 2010 to 1,326 million in 2017. The United Nations World Tourism Organization (UNWTO, 2018) forecasted annual growth of 3.8 percent from 2010 to 2020. Considering the role that this technology plays in the hospitality industry, what is most important is that it is capable of turning traditional human functions into a smart and convenient streamlining process at any time of the day. Samala et al. (2022) findings show that every area of tourism is impacted by AI technology, including welcoming visitors, meeting their needs, and listening to them. These technologies include facial recognition tools, virtual reality programs, chatbots, robots, Google Maps AI, voice interpreters, and audio tours. Currently, the hotel industry,

* contact author

where convenience-defining innovations are most rapidly adopted, has refined its entire system by introducing numerous cutting-edge techniques to satisfy customer service. Hospitality industry players often try to exceed their customers' expectations in order to retain them in the long run. A survey conducted by Tata Consultancy Services (TCS) found that 85 percent of travel and hospitality service providers are using AI in their businesses (Samala et al., 2022) to increase customer satisfaction and provide them with exceptional service they have never experienced before.

Although Sri Lanka is known as one of the best destinations for travel, food and beverage (F&B) and hospitable services, the country's hotel sector still lacks knowledge and experience to adapt to global technological advancements. While international hotels such as Marriott International, Hilton Hotels & Resorts, Henn-na Hotels, and Caesars Entertainment are keeping up with the latest technological developments to provide exceptional service to their guests (Ivanov and Webster, 2017; Murphy et al., 2017), Sri Lanka has yet to adapt to global technologies due to perceived uncertainty and lack of experience. However, it is explored that hotels such as Alibaba's FlyZoo are fully equipped with AI robots and facial recognition technologies, where hoteliers have begun to balance human and AI technology (Luo and Pan, 2021).

The study shows the importance of exploring AI potential for the hotel industry in Sri Lanka and the opportunities to provide sensational and intelligent hospitality service to customers to retain them in the long term. Sri Lanka is one of the most popular travel and leisure destinations (Rathnayake, 2021) and has recorded 1.9 million tourist arrivals even after the bombing in 2019. However, it has been found that travelers are more likely to make their travel decisions through online platforms (Liu et al., 2020) than through a typical travel guide service. In addition, Google Travel & Trip Advisor found that 74% of customers plan their travel on the Internet, with more than 45% of customers planning their travel on their smartphone (Peranzo, 2019). However, the Sri Lankan hotel industry has not yet considered and adopted AI to make hotel operations smarter, although most countries are now moving forward with smart technology such as AI (Dalgic and Birdir, 2020).

The objective of this study is to determine the potential of AI tools that are suitable for the hotel industry in Sri Lanka, hoteliers' perceptions of AI, and the barriers to implementing AI in the hotel industry in Sri Lanka. In order to achieve the main objective of the study, the paper will include a literature review that clearly presents the status of AI in the international hotel industry compared to hotels in Sri Lanka and critically reviews the previous literature on AI technology. After a clear presentation of the methodology, the paper moves directly to the analysis and findings. The paper then provides conclusions and recommendations for the future of AI in the Sri Lankan hotel sector.

2. Literature review

2.1 Artificial Intelligence

Artificial Intelligence technology is one of the most exciting innovations in a technology-driven era that has revolutionised various industries around the globe. Artificial intelligence first appeared in John McCarthy's Dartmouth Summer Research Project in 1956 (Moor, 2006). Over the years, several AI developments followed in the form of heuristic search, character recognition, facial recognition systems, natural language processing, and the concept of mobile robotics. The AI concept has come a long way since then, shifting the power of technology. In the 21st century, AI has reached a pinnacle, and it has the potential to significantly impact individuals, organisations, and industries. Currently, however, AI is widely known as the development of computer systems capable of performing tasks and activities that require human intelligence (Dzobo et al., 2020). Its growth is most likely due largely to advanced and emerging technologies that enable engineers to harness large amounts of data, design robots efficiently, and work with improved computing power. The growth of AI has led to innovations that enhance the tourism experience related to facial recognition technologies, virtual reality applications, chatbots, robots, smart rooms, artificial intelligence in Google Maps, etc. Global hotel chains such as Marriott International, Hilton Hotels & Resorts, Caesars Entertainment, Carlson Rezidor, Accor Hotels, etc. have already implemented the systems and technologies to improve the tourism experience in the travel and hotel industry.

2.2 AI and Tourism and Hospitality Industry

AI is a timely concept that benefits the travel, tourism, and hospitality industry in today's world. Studies by Viglia, Furlan and Guevara (2014) examined AI as an emerging tool used in the travel, tourism, and hospitality industry by companies such as Tata Consultancy Services, Google Travel, Trip Advisor, etc. Moreover, a survey conducted by Tata Consultancy Services (TCS) revealed that 85% of travel and hospitality service providers use artificial intelligence in their business services (Samala et al., 2022). According to reports, this can be attributed to the rapid growth of digital travel revenue, which is expected to exceed \$800 billion by 2020 (Chawla, 2019). Moreover, Google Travel & Trip Advisor found that 74% of customers plan their trips on the Internet, with more than 45% of customers making travel decisions using smartphones (Peranzo, 2019). Likewise, the results show the tendency of customers to use the internet and self-service technologies, which would inspire marketers to integrate AI in the form of interactive and self-service technologies to provide a better customer experience. Most importantly, these surveys not only show customers' inclination toward technology, but also indicate the attribute of 'timeliness' valued by travelers in terms of the service they receive (Kim et al., 2014). According to the results, most travelers prefer self-service technologies, which are largely feasible through the use of artificial intelligence, over traditional services (Ivanov and Webster, 2017; Murphy et al., 2017).

2.3 Challenges of AI in the Tourism and Hospitality Industry

Although AI is making great strides today, it remains limited until innovative solutions are combined with emerging technologies and changing policies. As Laurent et al. (2015) explain, although AI offers monetary benefits by replacing employees and non-monetary benefits by providing customers with a unique experience, it cannot yet surpass human intelligence. However, AI is an emerging concept in the tourism industry (Ivanov and Webster, 2017; Murphy et al., 2017) that needs to solve many unanswered questions in various tourism segments to replace human intelligence.

In addition, the security of data in AI seems to be a major challenge, using blockchain technologies in facial recognition software to ensure the security of data; some countries are still reluctant to adopt facial recognition technology due to privacy and data security issues (Liu, Yan and Hu, 2021). According to Samala et al. (2022), "data security and privacy challenges include chatbots, past purchase storage, and travel". Also, one of the biggest problems with these software-driven services is that a single small malware attack can disrupt the software programs and the operations performed by the service providers, which would definitely lead to chaos.

In addition, although AI technology is advanced and forward-looking for exclusive service offerings, it is difficult for small and medium service providers to afford these technologies, as they require high investments (Murphy et al., 2017). On the other hand, people still prefer to rely on human workers for complex requests rather than technological advances if they consider them reliable (Lommatzsch, 2018).

2.4 Future of AI Applications

Numerous segments of the travel and tourism industry offer greater scope for the use of AI to improve the industry's services. AI technology is capable of transforming an entire hotel room into a desirable tourist destination. Wei's (2019) studies have shown that AI gives customers the option to transform their entire room into their preferred destination after entering the hotel room. By selecting such an option, the entire room transforms into a 3D virtual world that resembles their favorite destination.

Although facial recognition technologies have been dismissed due to privacy and security issues, future AI technologies have the potential to address these issues by incorporating more robust blockchain technologies that ensure privacy and security (Leong, 2019). Previous studies have predicted that although AI technology is currently used by only a few hotels, in the future it will be possible for robots to help hotel guests navigate to their room, carry their luggage, serve food and snacks, provide housekeeping services, etc. (Yang, Henthorne and Babu, 2020).

3. Methodology

In this study, a qualitative research approach was used, which allowed for a close and detailed examination of the study's objectives. Thus, the population of the study was the managers of star hotels registered with the Sri Lanka Tourism Development Authority (SLTDA) and the sample was purposively sampled based on the limited adoption rate of AI technology in the Sri Lankan hotel industry. With a small percentage of 5% of hotels of four and five stars in the Colombo district, the sample was set up with 15 managers of four- and five-star hotels in the Colombo district.

Although the previous studies by Bisoi et al. (2020) show that today's travel and hotel industry is using modern technology and high levels of machine learning and AI, Sri Lanka is still in the early stages of adapting to the modern technology of AI in the Sri Lankan hotel industry.

Therefore, the primary data collection was done through structured interviews with eleven interview guides to find out the actual perceptions of the managers about the possibilities of AI development in the hotel industry in the hotels of the Sri Lankan district of Colombo. The interviews lasted on average 20-30 minutes. The data collected was analysed using a thematic analysis that included a combination of predefined and new coding. The coding allowed for the collection of descriptions of specific issues in adapting to AI tools in the hotel industry. Categories and themes were also developed for advanced analysis and interpretation.

4. Results

Of all respondents, 47 percent were from 5-star hotels and 53 percent were from 4-star hotels. Of the respondents, 73 percent had 10 years of experience in the hospitality industry, while 27 percent of the respondents had less than 10 years of experience. After data collection, it was found that a significant number of hotel professionals did not have deep knowledge of AI technology.

Therefore, the collected data was analysed through a thematic analysis, developing themes and categories consistent with the objectives of the study. Therefore, the data were categorised into three main themes, and subthemes were extracted from the respondents' statements. Table 1 shows the themes that were developed during the study's data analysis.

Table 1. Themes Summary

	Parent theme	Sub Theme	Sub/sub-Themes
Objective 01	Potentiality of AI Implementation	Types of AI tools	Optimisation system Chatbot Virtual Reality
		Competence of implementation	Robots Currently operating hotels New hotel establishments
Objective 02	Perception of AI	Technologies	PMS TMS Powered assistants
		Opinions	Quality Trust
Objective 03	Barriers of AI Implementation	Internal External	Financial stability Attitude and mindset Infrastructure

Source: Developed by the Researchers based on Data Collection

After analysing the data, it was found that 100 percent of the respondents have a clear idea about AI technology, but only 53 percent of the hotels have already used AI technology, even if only to a small extent. Among them, there were different types of AI tools used by hoteliers, and they stated that the use of AI tools has allowed them to optimise the service they provide to guests and, in parallel, increase the productivity of hotel operations to improve service on the part of both guests and service providers. Furthermore, it was explored that by using AI in conjunction with a maximum contingency algorithm, hoteliers can optimise hotel services by detecting when product prices fluctuate. This was also confirmed by the results of Song and Jiang (2019), who found that this algorithm is able to

predict when prices will increase and when they will decrease, suggesting contingency values of prices. However, during the analysis, it was also found that this algorithm allows hotel reservations to be made and finances to be handled using Robotic Process Automation (RPA), which makes the work easier for the hotelier.

It was also analysed that the respondents use chatbots in their hotels to enable effective communication between guests and hotel staff. Some hotels practice installing an application with which guests can interact as needed, and the chatbot then helps them accordingly. As Gajdošík and Marciš (2019) show, guests have the opportunity to make their stay easier, faster, and more accurate by getting solutions to any kind of questions they have, as the chatbot facilitates room service, special events, the gym, other available services, attractive destinations in the vicinity of the hotel, etc. So, it can be said that AI algorithms such as the chatbot can predict the expected time of service delivery according to the guests' requirements. Moreover, virtual reality (VR) is an extraordinary experience of a strange 3D digital world that allows guests to be virtually connected at any time. Sixty percent of respondents indicated that this VR technology has not yet been adopted by hotels, although it may well be used in hotels in the near future. Apparently, robots are another type of AI that has great potential for use in the hotel industry. It was noted that few hotels have utilised the use of robots in their daily general tasks such as providing services to guests, ringing the bell for room service, working with F&B room service, etc. Similarly, hoteliers were found to have an interest in optimising technological advances to create valuable and sophisticated experiences in the minds of guests by offering them unexpected and experiential services, but there are constraints that hold them back.

However, when it comes to the competency of implementing AI into existing hotels that have been operating for two decades, 67 percent of respondents said they do not intend to switch to technological advances by moving away from their traditionally customised system. They simply assume that switching to diversified and advanced technology will be costly and a burden on daily hotel operations. In addition, it was found that hoteliers are satisfied with their existing IT facilities, which they believe will be sufficient for hotel operations for even a decade. In addition, it was studied that the establishment of new hotels would have an impact on the adaptation to AI technology. Therefore, new establishments have the capacity and ability to invest in AI and work with the latest technological advances to ensure the long-term direction of the hotel in the hospitality industry, as it is modest and new. It was important to mention that the upcoming projects in the port city of Colombo have tremendous potential for the implementation of AI in the hotels in the area.

When analysing hotel managers' perceptions of AI, it was found that they use property management systems (PMS) and table management systems (TMS) in their hotels to facilitate reservation management and hotel administrative tasks, and also to improve efficient restaurant management throughout the guest dining experience. In addition, it was found that hotels in Sri Lanka use these systems in their operations to reduce staff workload and provide efficient service to guests. For this purpose, it was analysed that systems such as Opera and TMS online were introduced in the hotels to provide convenient service for staff and guests. On the other hand, Wi-Fi is one of the common facilities that hotels offer to their guests. However, during the analysis, it has been found that Wi-Fi has enabled not only guests but also employees to operate and produce effectively in the hotel.

As AI changes the traditional view of hotel services with its ability to streamline processes, it has been observed that some hoteliers are hesitant to move forward with AI technology because its technological advances constrain the hotel's usual operations and confidence in technological advances has not yet grown among hoteliers to implement this advanced technology into hotel systems. The studies by Goh and Sigala (2020) show that AI in hotel operations is uncertain and the quality is questionable. However, the perception of AI among hotel managers is clear: they see AI as an advanced technology that provides valuable insights and optimises the guest experience by driving a new wave of innovative, responsive, and guest-centric hospitality to achieve better service quality.

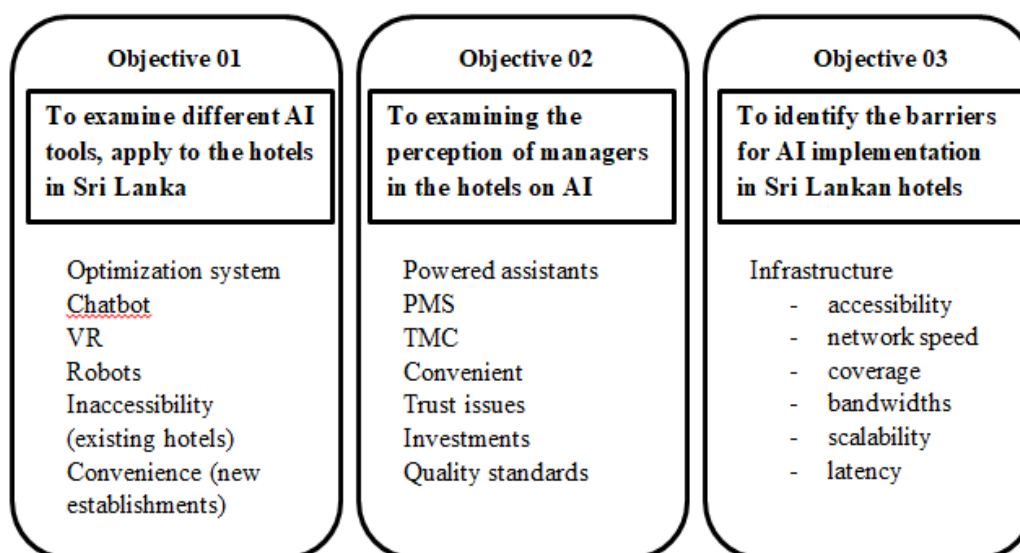


Fig. no. 1. Themes Visualisation

Source: Developed by researchers after data analysis

In analysing the third objective, identifying barriers to AI implementation in hotels in Sri Lanka, it was found that there are both internal and external barriers to adapting AI technology to hotel operations. Internal barriers such as financial capabilities and hoteliers' attitudes toward AI technology have become major constraints, as hoteliers are unsure whether AI is effective and they doubt that the system change will disrupt frequent operations. In particular, it is difficult to invest in new technologies such as AI under the current circumstances, as the financial stability of hotels in Sri Lanka is currently at stake. Therefore, it was found that hotel managers are reluctant to move forward with AI mainly due to the fluctuating financial stability and uncertainty in the development of robotic technology, as it is questionable whether the service will be accurate and on time without human involvement. According to the studies by Xu et al. (2021), it was found that AI is an important technology that should be used in the hospitality industry, but the privacy perspective remains unknown. It was found that hotel managers in hotels in Sri Lanka have little trust in AI due to its advanced mechanisms where robots and technology replace human labor in service delivery. In addition, ethical considerations and data governance in the hospitality industry were found to be questionable, as guests appear to be concerned about how hotels access and use their private and confidential information. Therefore, it is critical that hotels using guest-facing AI take responsibility when releasing new applications.

Similarly, internal barriers among hoteliers have led to limited adoption of AI services in the hotel industry. Further research found that the lack of accessible infrastructure for adopting AI technologies affects the privacy of the hotel system. Since AI is predictive software, the accuracy of the prediction is based on the raw data. Therefore, hotels require standardised infrastructure in terms of speed, reliability, network speed, and scalability in terms of high-bandwidth and low-latency networks. The analysis revealed that the hotel industry in Sri Lanka is still in the infancy of AI and hoteliers are afraid to share their internal data with outsiders due to the lack of security of the platform to protect the raw data. Therefore, it can be said that the lack of infrastructure for AI development has caused hoteliers to hesitate to adapt to AI technology. However, the explained information shows that AI poses challenges in the Sri Lankan hotel industry due to the advanced nature of the system, hoteliers are unable to adapt to the aforementioned technological system, as the industry lacks access to further developments.

5. Conclusions

From the results of the study, it appears that Sri Lankan hoteliers are still in their infancy when it comes to adapting to AI technology. The perceived value of moving workers to AI is not yet being leveraged in the hotel industry, as such technological advances are new to the country and investment in the technology is not being made by many star-rated hotels simply because they are inaccessible

and service standards are questionable. However, the potential for the Sri Lankan hotel sector to use AI tools on a regular basis has yet to be realised, even though a significant number of hoteliers have already begun using the technology on a small scale.

Nevertheless, opinions on the use of robots are still under debate, doubting that AI can provide the same human-based service to achieve guest satisfaction in terms of service offered. It is well known worldwide that the hospitality industry is driven primarily by the service offered to achieve guest satisfaction. As a result of automated robotic technology, hotels in Sri Lanka are still struggling to invest in a long-term direction for the industry in this time of crisis. However, to facilitate progressive change in the industry, hoteliers should hire young employees who can handle the latest technological changes, as they have a high level of technical understanding and are able to adapt to such technological services faster than the current workforce. In addition, the backend infrastructure needs to be consolidated to achieve high performance of AI technology. This can include both high-capacity technology platforms and data protection to create a highly secure platform (Androutopoulou, et al. 2019). However, this study provides hoteliers with guidance and recommendations on how to increase guest satisfaction by providing them with a better experience, reducing total cost of ownership, and saving time while providing them with an unimaginable experience. If AI is used effectively, the future of Lankan hospitality will be in high-end markets, where it will drive guest engagement and create loyalty. In addition, guests could save time in a number of ways, such as no longer having to wait in queues to check in, but instead being able to check in at a kiosk and check in quickly. In addition, AI will reduce wait times at restaurants. Hotels could use AI to optimise their restaurant booking systems and have robots assist in the kitchen and service. If AI is used in the hotel industry, guests will also be able to make decisions about travel and leisure times, places to visit, hotels for accommodation and product pricing. Quite simply, AI will enable guests to optimise their stay both in and out of the hotel.

Analysing the potential of AI in different segments of the Lankan hotel industry will be a future research area where it could be applied in different geographic areas, regions, and most importantly, in different types of hotels.

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