# Exploring the Balance of Automation and Human Touch: A Literature Review on AI and Robotics Adoption in the Hospitality Industry


## Abstract

### Purpose

This work explores how different technologies and machines impact the hospitality and hotel business and identifies whether artificial intelligence (AI) and robotics can replace humans in the hospitality and hotel industry.

### Research Methodology

The study will use a qualitative-method approach, starting with a literature review to understand the hospitality industry's technological advancements and AI and robotics' potential role. The analysis will assess the economic implications of AI and robotics adoption, considering cost savings, efficiency gains, and customer satisfaction.

### Findings

The research indicates that while technology and machines have improved operational efficiency and reduced costs in the hospitality industry, the human touch remains crucial for delivering exceptional guest experiences. This study has analyzed and discussed the implications of AI adoption in the labor-intensive hospitality and hotel sector from various perspectives, thereby deriving meaningful academic and practical insights.

**Practical Implications** - This research will offer crucial insights into the hospitality industry's transformation and the delicate balance between automation and the human touch.



**Keywords:** Hospitality Industry, Artificial Intelligence (AI), Robotics, Guest experience, Automation, Technology Adoption, Automation, Human Touch.




1. **Introduction**

Like many other service sectors, the hospitality and tourism sectors are human-dependent to provide the best customer experience in any establishment around the globe (Lukanova & Llieva, 2019). Since the inception of the hospitality and hotel business, the requirement for a trained workforce at a specific budget has been in demand across the industry. Starting from security check-in at the hotel entrance through the parking, at the entrance of the hotel reception, or the reception desk during performing any reservation process and registration activities, and even accommodation/dining-in/in any other in-house facilities is the service quality is dependent on the daily involvement of trained professionals in their respective areas to facilitate the guests. However, the scenario of the present hospitality industry is very different as compared to that of the previous century (Kong et al., 2023). At present people or customers have become selective as well as aggressive in demanding standard guest service from any hotel and restaurant (Ma et al., 2017). "The smart hotel concept emerged around 2008 and has attracted attention in recent years (Prentice et al., 2020). Smart hotels are intelligent hotels with a range of new information and communication technologies (ICT), using AI and service concepts to provide customers with a new experience of intelligence. Through global computer networks, smart hotels directly manage and integrate their technical systems and technological operations (Mariani & Borghi, 2021). These integrate contemporary IT, such as the IoT, cloud computing, mobile internet, smart devices, and big data (Solakis et al., 2024), to provide customers with improved service experiences and far higher levels of personalization" as explained in the previous research (Buhalis & Moldavska, 2022). Today having personalized guest service has become more necessary than ordinary hotel services. As many of the leading international and national brands have occupied the market and are providing facilities at a competitive price; people have the option to locate any hotel at any given time according to their choice. Therefore, it is always a challenging task for any hotel or hospitality business owner to keep their prospective clients/guests satisfied to survive in this competitive market. Customers are firm and demand receive quick service from these establishments (Wu et al., Customers Satisfaction on Robots, Artificial Intelligence and Service Automation (RAISA) in the Hotel Industry: A Comprehensive Review, 2023) in less time and is why the demand for technology and automation appeared in the hospitality business (Naumov, 2019). As internet facilities, automation, and digitalization happened, it became easier for individuals to locate any hotel or restaurant in any specific location according to their choice. The improvisation of the Central Reservation System (CRS) to the Global Distribution System (GDS) connected all hotel accommodations at a single point, which is helping individuals in booking a hotel room by using

the internet. Innovation of Smartphones on the other hand made things easier for all at a fingertip. By using any individual website or mobile application, people can go to the hotel website, can check the availability of rooms, check-in and checkout timings, amenities, and other facilities that a hotel is providing to a particular destination at a standard price. Earlier people had to wait to complete billing formalities during arrival and departure but to reduce that wastage of timing many hotel and hospitality sectors have introduced self-service vending machines to support visitors with a digitalized platform. They provide uniform guest service with accuracy and deliver it according to the Standard Operating Procedure (SOP) of a hotel or any hospitality establishment, which is a critical task if provided manually. Here, Information Technology (IT), Artificial Intelligence (AI), Robotics, and IoT have played important roles in providing guest service timely and effectively. The utilization of Artificial Intelligence, Robotics, and other innovations systemized the business of Hospitality in the past ten years. There are multiple academic institutions like universities, colleges, business schools, and training centers, which are running professional courses for undergraduate, postgraduate, doctorate, and post-doc to support the industry and academia. Every year thousands of hospitality professionals are joining to support this industry. People are placed globally in different areas of hospitality segments like airlines, cruise, and shipping, flight catering services, hotels and resorts, and other customer service segments. However, post-pandemic during the new normal a different picture has been observed in the past two and half years where hospitality and tourism sectors majorly affected due to the widespread coronavirus (Chon & Hao, 2024)X. The hospitality industry faced the challenges of staff layoff; retrenchment from employment and other severe situations reported (Pagaldiviti & Roy, 2023). The government had declared that operations must be performed with a limited number of staff to avoid the further spread of infection among the community and potential guidelines were imposed to improve contactless guest service in the entire industry (Gautam, 2021). The use of semi-automated and fully automated systems in the Hospitality industry (Nayyar et al., 2018) is not so very new but in the past two years, the frequency of use of these devices, which have optimized the level increased by almost 80% in most of the hotels globally (Nam et al., 2021). However, this immediate change caused anxiety and fear of survival among hospitality professionals due to less recruitment, job loss, or employee cut-off issues (Kansakar et al., 2019). Hospitality services and facilities are need-dependent (Nailon, 1982), which is why there is always a need

for human interaction to provide personalized services to an individual guest (Yanw & Mattila, 2017), as the understanding of human emotions is also a necessary parameter in the hospitality business (Akdu, 2020). Multiple types of research have already been performed in the field of Artificial Intelligence or Robotics and Automation used in the Tourism, Hospitality, and Hotel Management sectors. It is a valid topic does not convey the uniqueness of the research. Therefore, it is essential to articulate how this study differentiates itself from existing literature more explicitly (Xu X. , 2018) (Li Y. , 2019) (Zhang et al., 2018). At present there are multiple Smart Hotels have started their business in different cities. They are offering a wide number of in-room dining experiences, along with the theme of virtual reality and voice recognition and voice command systems (Pestek & Sravan, 2020) to the guest so that individuals can experience the luxury of their brands in their figure tip (Ercan, 2019). The present market shows the value of goods, which is already available in multiple properties at a competitive margin. Operators must seek out new technology and tools to better serve customers and stay afloat in a competitive industry by offering competitively priced products in multiple properties (Koo et al., 2017) (Dalgic & Birdir, 2020).

### 1.1. Research Objectives

The objectives of this research are:

a. To identify how new technology, especially artificial intelligence, and robots, will affect the hospitality and hotel sector in terms of operational efficiency, cost management, and service quality.
b. To review whether artificial intelligence and robots can fully replace human customer service representatives, while also pinpointing the aspects of automation where human connection is still necessary to ensure guests are satisfied.

## 2. Review of Literature

As explained, we are already undergoing the fourth industrial revolution and particularly in this era the improvisation of emerging technologies has changed our way of life and lifestyle through robotics, artificial intelligence (AI), nanotechnology, Quantum Computing (QC), the internet-of-things, Fifth-Generation Wireless Technologies (FGWT) (Navio-Marco et al., 2019), and fully autonomous vehicles (Tussyadiah, 2020). It was challenging during the 3rd Industrial Revolution

as the adaptation of technological advancement was “fuelled by data and machine learning” (Schwab, 2017). However, during the fourth industrial revolution due to the advancement of technology and the ever-increasing demand for productivity; machines are getting connected through various interfaces to support the service industry without human involvement. There are already many standard systems and mechanisms installed at most hospitality and service establishments that can respond and reply to any individual through specific commands, signals, or gestures (Addo & Yagci, 2014). Therefore, at present most hotels and hospitality establishments have started decreasing manpower over machines or digitalization.

Researchers have expressed their point of view in their research work that at present in the service and tourism industry the demand of the customer has increased at its peak so the expectation from the hospitality establishments also increased compared to the past 10 years (Tsang & Hsu, 2011) (Leung et al., 2013) (Huang & Hsu, 2008). Researchers have quoted that “in high customer contact settings, service robots perform better than humans when performing standardized tasks, as a result of their mechanical and analytical nature (Reis et al., 2020).” However, to reduce workload and to improve productivity followed by authentic guest service; most hotels are taking the help of various technologies like Artificial Intelligence, ChatGPT, Robotics, and other machines (Bisoi et al., 2020). According to the observations of the researchers and hoteliers these Service Robots (SR) did not achieve the desired productivity and intellectuality compared to human service and emotional attachments in every hospitality business segment (Kervenoael et al., 2020). As hospitality services are very much perishable and need-dependent (Reisinger et al., 2001); the demand for experienced and trained manpower is always on the higher side. Therefore, to match the demand of the customer increase productivity, and reduce the wages of staff salaries hotels, restaurants, and most of the hospitality sectors depend upon technological support (Hwang et al., 2023). Researchers have supported that machines may achieve the accuracy than human labor but they cannot achieve human sentiments as it's only have program and application software to run the mechanism (Gursoy et al., 2019). Many times researchers have mentioned that in the service industry and like in many other sectors customers need of human touch with whom they can talk understand or able to share their emotions to make the opposite people understand what he or she is looking for (Xu et al., 2023). At present the development of technology and advancement of artificial Intelligence and robotics are one of the trends to facilitate the customer. As we all know the hospitality and Hotel sector

are labor-intensive, so technological innovation has started to embrace the delivery of prompt service to the customer (Ahmad & Scott, 2019). Therefore, the use of all these software artificial intelligence robot waiters and many other technological developments (Hamdany et al., 2019) become so famous that Hotel operators and hospital service providers are using these facilities more and more to reduce labour costs and to improve service standards. In the 21st century, the expectation from the people has increased in such a way that the hospitality and tourism business (Baker & Magnini, 2018) is almost run by software and by the usage of different online platforms (Curtis, 2016). For making itineraries to book a restaurant table are taking the help of Google by using their smartphones to locate the restaurant according to their menu choice and financial capabilities (News, 2013). In today's world people have every option to reach any destination virtually by using different websites which are providing different features of the destination with the help of virtual reality and modern technologies (Fan et al., 2016) to the customer (Kuo et al., 2017)? Even in a restaurant people are watching the digital menu instead of traditional manuals (Anup et al., 2017) which are generally mounted on the world and are presented by any waiting staff to any guest (Louie et al., 2014). People have every option to book their order or to cancel it according to their choice or they can keep their booking for the future (Anurag, 2018). At present many hospitality and Hotel establishments (Azis et al., 2011) are relying on security robots and technology which are more efficient than humans in providing prompt service where humans have the possibility of minor errors (Bayern, 2018). In this regard researchers have also expressed that these mechanisms or robots (Boiano et al., 2019) can only perform their task depending on the program or the common has been installed (Beerli & Martin, 2004). A major portion of the customer in the hospitality business is always in favour of technology development (Bulanov, 2023) and the usage of fully automatic systems (Chavre & Ghotkar, 2016) whereas a billion guests are in favour of human service from whom they can achieve human emotion (Chawla, 2019), effective communication, and the level of service in exchange of money (Dirican, 2015). The main reason behind this is it can offer better comfort and help with accurate information and services compared to a human (Pillai & Sivathanu, 2020).

There are so many robots and artificial intelligence are there in the market involved with the service industry offering different levels of comfort and help to the customer (Hallo et al., 2012). The hospitality industry is already merging with different artificial intelligence through

customer-friendly interfaces which are offering standard services daily. This growing interest among humans in the development and use of new interfaces for interaction; caused humans to use technology naturally. The use of interface must be transparent between human and machine like the machine or the technology must allow the human to interact with different surfaces without any cognitive effort. But compared to the expectation the situation is much different. Even experienced employees are relying on artificial intelligence or different user surfaces only to solve a regular issue that could be resolved by simple communication. For example: to communicate with the individual guest inside a guest room individual receptionist communicates through a voice recognition system to inform any individual guest in a particular room. To book a cab or a prepaid taxi or even prepare a cappuccino or a specific coffee an individual can use specific comments for using Alexa to fulfill his demand. As recorded in the previous research at present people are in favour of ordering food online from any suitable restaurant according to their choices (Pagaldiviti & Roy, 2023); even people are expecting the fastest delivery for their order through drone services (Hwang et al., 2019) which almost became a practice for many of the developing countries in the world (Hwang et al., 2021). During checkout or at the time of guest registration usually, people had to wait in a large queue. However, this situation has become more primitive, and people can use an express checkout system or fully automatic vending machine to complete their transaction process and they do not have to wait anymore (Mamun et al., 2024) (Kumar et al., 2018). Most manufacturers are trying to introduce new technology that can produce and prepare specific food items on the range without a single involvement of any Chef or cook to reduce human labor and cut off the salary wages (Jung et al., 2017). Many researchers have shown their concern upon interacting with a robot or getting your product through a machine instead of a human being (Kaushik et al., 2010). Most individuals who do not have any experience or do not have any assistance in using those self-service terminals or interfaces; main face the challenge while visiting any hospitality establishment (Kim & Hardin, 2010). It is very true that to attract the majority of the population of society is the way to adopt (Kim et al., 2014) technology artificial intelligence robotics and other different surfaces to increase revenue but on the other side of society who are directly or indirectly involved with this industry in terms of employment production and other related services (Ivanov & Webster, 2019); these adaptations of technology may cause serious trouble for the 30% (Kumar et al.,

2016) of this total world population in terms of loss of employment if the use of technology cannot be used wisely (Issa et al., 2016).

The involvement of machines and technology not only helps the service sector on a large scale but also causes a reason of anxiety in society (Leong, 2019). There are many arguments and discussions already in the process of whether artificial Intelligence (Moraga-González & Wildenbeest, 2008) and technology (Marouane et al., 2014) can exterminate human beings from the hospitality and tourism industry (Lommatzsch, 2018).

### 2.1. Areas Where Artificial Intelligence Has Replaced Manpower:

In the past 10 years, we have observed the effective development of hospitality and Tourism businesses all over the world. Therefore, the requirement for sufficient flight and other transport services has also increased. Various hospitality sectors, such as customer service, reception, travel desk, ground staff management at airport terminals, and reservation and booking counters, have seen an increase in the use of AI and robots (Patel, Airport passenger processing technology: a biometric airport journey, 2018) have already replaced humans in most places due to the use of the (Nagaraj S.-2. , 2020) self-service terminal (Murphy et al., 2017).

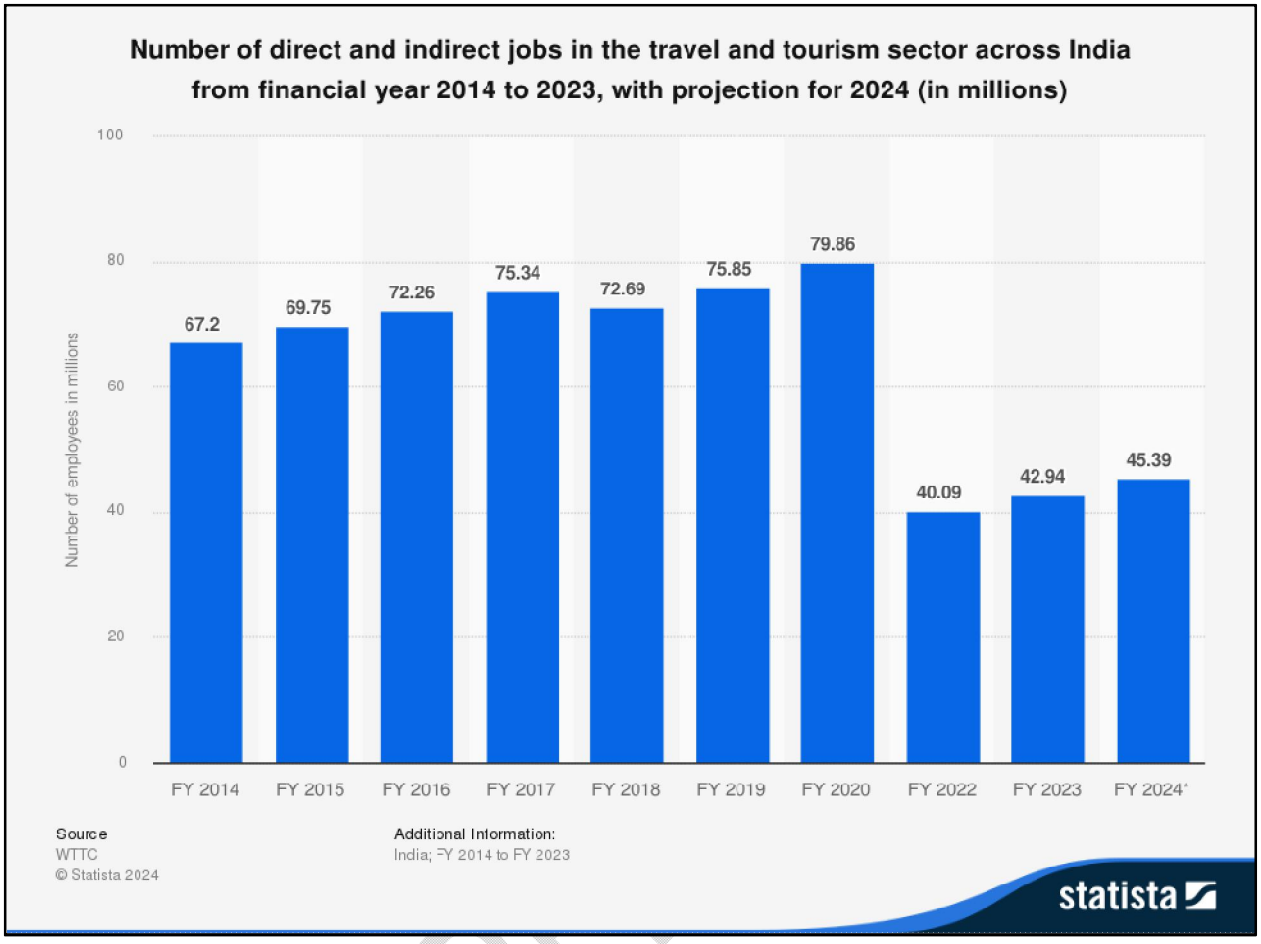


***Figure – 1: Number of direct and indirect jobs in the travel and tourism sector across India from financial year 2014 to 2023, with projection for 2024 (Keelery, 2024)***

Figure 1 shows that in the past 10 years, the generation of employment because of travel and tourism from 2014 to 2023 was a really uh unpredictable scenario for India in the development of employment and revenue generation. However, the above figure confirms that the past three years 2022 to 2024 weren't that progressive as the impact of search COVID-19 was the reason for the decrease or the loss of employment and revenue generation during this period.

Most International airports in different countries are using express check-in self-service terminals (Robinson, 2017) through which passengers can register themselves for web check-in without the help of any individual or ground staff (Nagaraj & Singh, 2018). At the hotel reception, people already have multiple visual displays (Çöl et al., 2023) that show the location and the layout of different places (Enciso et al., 2018) within a hotel which already reduces the

number of staff who used to work in that establishment as guest service attendant (Nagaraj & Singh, 2019). Many of the kiosks and fast-food restaurants or quick-service restaurants (Oh et al., A chatbot for psychiatric counseling in mental healthcare service based on emotional dialogue analysis and sentence generation, 2017) are using audio-visual systems (Wu et al., 2020) and the display screen to sell their commodities (Klouvidaki et al., 2023) to the customer (Kavitha et al., 2022) which has reduced the number of staff who used to work in restaurants as host or hostesses (Esposito et al., 2022). people even get their product at the food counter just by the announcement of the token number along with the name of the customer using an audio-visual system. In the 90s most of the renowned hotels and Hospitality chains had a turnover of 1000 guest room attendants and public area attendants to clean different surfaces however after 2000 when multiple machines like vacuum cleaner upright vacuum cleaners and other products occupied the market for the sake of productivity and accuracy (Patel, 2018) those establishments reduced their staff turnover as one single machine can perform the task of 10 number of people at a same time (Oh et al., 2017). These machines are self-sufficient require only an individual to operate and can perform rigorous cleaning work in very little time (Lodgher, 2009). The recent studies "*Implications of AI in Hotel Housekeeping Operations*" and "*Robot Cleaners in tourism venues: The Importance of robot-environment Fit on consumer evaluation of venue cleanliness*" (Hoang & Tran, 2022) (Srivastava & Tyagi, 2024) confirm that housekeeping services in hospitality establishments are keeping changing. When talking about kitchen or cooking the environment of different appliances and machines is unavoidable (Retamal & Schandl, 2018). It is very rare we able to see anybody is grinding different spices manually rather than doing the same with the help of any mixer grinder or processor. For most of the multiple complex hotel hospitals and other establishments for the cleaning of the corridor or lobby instead of using regular bucket mob and water have scrubbing machine or fully automatic floor cleaner which can clean the enter surface with lint-free cleaning in less time. Therefore, at present, we can see only a nominal number of public area attendees who mainly work in the different places of any business or city hotel to perform any cleaning task. Especially after the infection of the pandemic when every government enforced lockdowns and social distancing to avoid the further spread of infection among the community (Yang et al., 2020). Most hospitality establishments have reduced staff along with the implementation of new technologies like fully automatic sterilizing and sanitizing systems (Shin & Kang, 2020) for this surface as well as human, and digital face

recognition systems along with photo capture, signature, and finger impression detector, robot waiter for cleaning the floor surface as well as the tabletop, and fully automatic floor cleaning robots to continue their business during this challenging time. It is very unfortunate for those hospitality workers who lost their jobs during the pandemic not able to join their previous organizations as they are continuing to drive with the help of those technologies and advancements. The Indian hospitality industry has been quick to adopt online meeting tools such as Blackboard, Zoom, Google Meet, and Microsoft Teams to streamline internal communications and projects (Girgen & Kole, 2024). Training employees, communicating internally, developing strategies, and coordinating across several sites have all benefited greatly from these resources (Jawabreh et al., 2023). Thanks to their supplier, partner, and stakeholder collaboration, they have also reduced costs and increased efficiency. Additional ways in which virtual meetings have increased consumer involvement include online consultations, virtual tours, and event hosting. There will be even more operational flexibility and improved visitor experiences brought about by virtual meetings as the sector fully embraces digital transformation. (Zeng et al., 2020) (Kumar & Akoijam, 2021) (Milton & Moyeenudin, 2022) (Choi et al., 2021). most people have to leave their jobs (Shah et al., 2021) or be laid off (Kang et al., 2021) without any faster instruction from their organization (Khawaja et al., 2022). At present, most of the hotel business is run by online travel agent systems or OTAs (Wu et al., 2020). They are main responsibilities are to put a variety of hotel room tariffs (Arya et al., 2023) at a single window from where visitors can book their desert hotel depending on criteria like location price facilities, and others (Martin-Fuentes & Mellinas, 2018) (Marković et al., 2020).

There are multiple areas in the hospitality industry where we can see the emerging trends of Artificial Intelligence and its innovation for guest service. (Flavián & Casaló, 2021). Artificial intelligence is one of the important tools that can multitask which can Undertaker hospitality staff. There are multiple possibilities for information technology and artificial intelligence to operate multiple tasks and reduce human by increasing efficiency and productivity standards. (Li et al., 2019). If any service staff is aiding the guest say by serving food and if it could be done through automated ordering or self-ordering terminal; it will reduce the risk of order cancellation after placing the order. As in recent times, hotel order takers face many challenges during rush hours. It is very common for any guest to cancel the order once it is placed in the POS (point of sale) machine by the order taker. Therefore, using automation will reduce the risk of order

cancellations and transaction issues during service hours. (Adak et al., 2022) (Banga & Peddireddy, 2023). Artificial intelligence is leading in data management and operational effectiveness. (Shalimov, 2022). Most of the hotels are using PMS (property Management system) which collects the data of all the guests throughout the operation hour and keeps a track record of every piece of information introduced between the guest and the employee, feedback, and guest. (Phillips, 2022) Complaints, even the order of food, etc. There are possible chances for the hospitality business shortly that both artificial Intelligence and service roads will operate the hotel reception and the guest interaction. This artificial intelligence will anticipate the guest requirements in such a way that the visitors do not have to carry much of the document for validation during their stay. (Ganaban, 2023). These interfaces will be more efficient in recognizing any individual based on the record in their PMS. (Moyeenudin et al., 2018). The advancement of technology happened through the guest introduction by using effective direct messaging and online chatting services. (Lacalle, 2021). These facilities have a recording system along with the capability to answer simple questions and requests. The facility of Chatbots and auto messaging systems (Rodrigues, 2023) Already become famous on many social media platforms and on different websites which allows their customer to get satisfactory answers to their questions 24/7. For example: "SAM" is an intelligent chatbot used in the hotel industry for booking hotels. (Wolhuter, 2022). (Yang et al., 2021) Elaborated in their research that gradually hospitality and tourism sectors are adopting the multiple use of artificial intelligence and augmented reality to deliver more efficient guest service.

Data analysis is one of the latest inventions and capabilities of this software and mechanism for the hospitality business (Hsu & Tseng, 2022). It can easily analyze the data of the potential customer which will help the hotel managers to understand the percentage of revenue generation for individual days. There are software and interfaces that can analyze the review of multiple properties based on web ratings for individual properties. Present studies on using artificial intelligence and human interface for using digital concierge show that few hotels are in favor of using service robots to increase efficiency during offering any concierge assistance (Liu et al., 2024) (Selem et al., 2023). Multiple programs have been performed to make it more efficient to provide information like making itineraries, booking private vehicles, booking flights, and even locating a spot in a restaurant within a locality. This process has not only improved the guest

experience but also helped the hotel operators hire a smaller number of employees (McLean & Barhorst, 2022).

Many foreign visitors usually visit different establishments and face the challenge of the interpretation of different languages. (Samala N. et al., 2020). However, this situation has been controlled by the chatbot translator to help the customer in a much easier way. It has not only reduced the issues of the hotel receptionist in communicating with a foreigner who is not familiar with the local language. (KILIÇHAN & YILMAZ, 2020). This specific chatbot translator can write or record the words of the customer through voice recognition systems. (Ruel & Njoku, 2021). We can hope that in the coming future will see hotels with fewer receptionists and conceived or reservation attendants which will be only operated by machines with equipped artificial intelligence interfaces to solve guest queries. (Hollander, 2023).

### 2.2. Areas Where Artificial Intelligence and Machines Cannot Replace Human

Service-dependent hospitality and tourism businesses are always human-dependent. Virtual reality, automation, robotics, and artificial intelligence have played the dominant role in providing futuristic services to the masses, but it has the limitation of imagination which cannot be achieved without human emotions. (Manigandan & Raghuram, 2022). Most of the self-service


***Figure: 2 Use of Artificial Intelligence in different sectors of Hotel and Hospitality Business***

Interfaces at different hotels and restaurants provide customer customer-friendly experience based on programming and input. But beyond those application and program data, these third-generation interfaces can't fulfill the needs of the customer. Creating a recipe by service robot or automation is possible but to do the experiments based on available ingredients is only possible by a chef. In labor-intensive markets of the Third World countries including India, the cost of automation may not be viable as an alternative to cheap labor that can be exploited to the fullest. (Sandilyan & Pathak, 2022)

Robots may assist the visitor with specific greetings but cannot achieve the affection of human touch. (Yu et al., 2022). According to the data of many of the research, machines could perform multitasking initiates based on programmable data; it has no ability beyond that. (Afza & Kumar, 2018).

## 3. Methodology

In this study, a **qualitative research methodology** has been employed through a comprehensive **literature review** to investigate the subject matter. The primary aim of this methodology is to analyze, synthesize, and interpret the existing body of knowledge on the topic by reviewing relevant published literature. This approach enables the researcher to gain in-depth insights, identify patterns, and generate new perspectives without conducting primary data collection. A systematic review and analysis of findings from several research that mostly rely on language and text to describe and summarize the synthesis's conclusions is known as narrative synthesis, used in this review paper. In addition, a thorough assessment of the literature was conducted to investigate AI in the hospitality sector. The literature and data were sourced from multiple databases including EBSCO, Google Scholar, Scopus, Web of Science, and ScienceDirect books and research articles. Studies that defined artificial intelligence (AI) in the hospitality sector in detail, were published, composed in English, and underwent peer review were the requirements for inclusion.

## 4. Key Findings

The hospitality industry has seen significant improvements in operational efficiency, cost reduction, and accuracy due to technology and AI-driven automation. Automated systems, data analysis, and robotics optimize hotel services by assisting with routine tasks, minimizing human error, and enhancing efficiency during peak hours. AI systems, like virtual assistants and automated check-ins, improve guest satisfaction. However, the human element remains essential in the sector. While machines and AI enhance service quality, fully automated approaches present challenges for guests who may struggle with technology or value personal interaction. The research suggests that technology should complement human roles to maintain the authenticity and emotional connection critical to exceptional guest service. AI and robotics are not yet equipped to replicate the empathetic and intuitive aspects of human service. A collaborative approach, integrating AI with human staff, is essential to avoid disruptions in service quality. Investing in training employees and customers to interact effectively with automated systems can enhance guest experiences.

## 6. Conclusion and Recommendation

The functions of the Hospitality industry are operated through human touch. Whenever we talk about personalized guest service, we always think of professionals who will be providing us with authentic guest service. However, machines and artificial intelligence have introduced a new dimension in Hospitality Services to improve the experience and the service quality. The main reason behind this is to reduce guest complaints as well as minimize the error. Considering the present situation after the pandemic, where contact and touchless services became one of the necessities to support hospitality. Undoubtedly, technological development and the introduction of artificial intelligence machines and automation have already taken place in many of the Hospitality sectors to support humans. Most hotels are using AI to analyze different trends and guest behaviour so that employees can provide them with effective service. In many developed countries still, it is a challenge to depend on AI and robotics automation to operate Hotel operations. Still, few of the hotels are using artificial intelligence like Alexa which is generally installed in a guest room to avoid less physical interaction. In the post-COVID scenario, we have already noticed that many of the hotels and Hospitality brands are using artificial intelligence for guest service which has become easier for a few technologically sound customers, who know how to use this system. But for most of the people, it became a challenge to interact with.

**Therefore, while using this artificial intelligence robotics or humanoid robots or different machines will be some recommendations for a better future:**

i. AI is to be used in collaboration with human presence to avoid disruption of service due to technical issues.

ii. Automation or humanoid robots can be used as support services during peak hours. Both human interface and machine speed and precision are necessary for offering prompt service to the guests.

iii. Human Service cannot be replaced by machines as support for any individual machines or robots or other IOT will not be enough as it doesn't have any emotion.

iv. If any establishment is trying to upgrade its facilities with automation, it must keep trained professionals to train other employees and customers.

v. Scientific innovation should not be a barrier to human life. The reason for innovation should be limited to support and uplift mankind.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

**Disclaimer: - This manuscript was presented in a Conference.**

**Conference name: 43rd IBIMA CONFERENCE, 26-27 June 2024, Madrid, Spain**

**Available link: - https://ibima.org/accepted-paper/will-machines-replace-humans-in-the-hospitality-business/**

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