



EXPLORATORY STUDY ON ARTIFICIAL INTELLIGENCE IN HOSPITALITY INDUSTRY

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ABSTRACT: The primary objective of using AI in the hospitality industry is to improve both operational efficiency and the quality of the services provided. Artificial intelligence has successfully taken over the hospitality and tourist industry, and hotels are using this technology to gain an advantage in the increasingly competitive market. There is a progressive shift toward using AI in the hospitality industry, reducing the number of processes required to be carried out manually. Hotels are automating processes and simplifying their business operations due to the use of AI in their day-to-day operations. Initially, it was only utilized to simplify the marketing processes; however, in the current scenario, AI is being utilized for every aspect, such as in the welcome of the guest, the handling of luggage, helping with check-in and check-out, the provision of information, the delivery of orders for housekeeping, food and beverage items, and many more. Artificial intelligence is helping in many ways, including giving a higher degree of personalization, dealing with and following the ideas and requests of visitors, and delivering real-time responses to guest questions even when human employees are unavailable. As hotels have begun using technology to help and connect with visitors, artificial intelligence has emerged as an important tool for enhancing the quality of the overall guest experience.

Hence it becomes very important to understand the guest perspective on introducing AI in the hotel industry. With this purpose, the present research paper discussed in detail the prospects and challenges of Artificial Intelligence in hotel operations for enhanced customer satisfaction.

Index Terms - Artificial Intelligence (AI), Customer Satisfaction, Service Automation, Hotel Operations.

CHAPTER 1

INTRODUCTION

It is a common belief in the present age that companies that do not participate in the technological revolution of the contemporary period are more likely to experience a setback in their pace of overall development. To maintain consistent development and income, businesses worldwide have concluded that they must include current digital technology. The field of digitalization has seen significant change and development during the last ten years around the world. Artificial intelligence, more often abbreviated as AI, is one example of a technology that has gained widespread recognition in recent years. The path to enhanced productivity, higher economy, more efficiency, improved safety, and increased comfort has been shown by the evolution and development of digitalization with the aid of technologies such as artificial intelligence.

The path to enhanced productivity, higher economy, more efficiency, improved safety, and increased comfort has been shown by the evolution and development of digitalization with the aid of technologies such as artificial intelligence. However, the

development of such technologies has also given rise to significant worries over the implications of employing such technologies on employment, the needed knowledge and skills, wages and pay, and the very essence of labor.

It is a common misunderstanding that artificial intelligence is a replacement for human employees. However, artificial intelligence has a far greater, wider, and more extensive scope regarding technical assistance. The hotel industry has benefited from increased confidence in AI because of how it has transformed its facilities, services, and processes via AI-powered robots. To guarantee guest contentment, the hotel industry, well-known for embracing comfort-defining improvements, has modernized its system by adding many creative ideas. In addition, hotels need to keep up with and embrace the most recent revolution in industry trends to remain competitive in the hospitality industry and avoid being cutthroat by the competition. In addition, hotels have a responsibility to ensure that they provide their customers with services and experiences that meet or exceed their demands and expectations.

There is no question that the needs and expectations of guests have evolved over time, and hotels are adapting to these shifts in guest expectations to enhance the level of personalization in services, go above and beyond what guests expect, and produce experiences that are unforgettable. As a result of the implementation of technologies such as artificial intelligence, the hotel has been able to improve both its operational efficiency and its marketing strategies. This has allowed the hotel to provide better service to its guests. In addition, these technologies have improved the hotel's ability to provide better service to its guests. Using such technologies in business operations may enhance communication, save time for personnel, and even save costs.

1.1. Adoption of Artificial Intelligence in the Hotel Industry

The hotel industry is human-oriented and service-centric by nature. Because the hotel industry's ultimate goal is to cultivate a favorable impression in the minds of guests and prospective guests about the services being supplied by the hotels, the purpose is not only to sell the product but to accomplish the customers' happiness and gain the guests' continued patronage. Because of this motivation, providing high-quality service in hotels has been more significant in recent years. Hotels committed to providing high-quality service do ongoing studies into methods that may be used to fulfill the wants and demands of their guests. These hotels also formulate their strategies and policies in light of current industry changes and trends. In an industry like hotels, which has always been centered on people, it has been observed in recent years that hotels are focusing on technological developments and attempting to adopt these technological changes in their operations to meet the demands of the age. This is being done so that hotels can continue to provide services that are in line with the needs of their customers.

Even though the adoption of AI in the hospitality industry is now trendy, many compelling reasons urge people to utilize artificial intelligence in the hotel industry. The adoption of artificial intelligence in the "travel, tourist, and hotel industry" have been undertaken in recent years by businesses such as Travelzoo, Trip Advisor, TCS (Tata Consultancy Services), and Google Travel. These studies revealed some encouraging findings that bode well for the hotel industry.

Nearly two-thirds of travelers surveyed in a research study that Travelzoo carried out on 6211 said they would feel comfortable having robots care for them while traveling. 81% believe that robots would be better than people in data management, 79% claimed that robots are better at dealing with diverse languages, and 76% agreed that robots have a stronger memory than humans (Travelzoo, 2016). According to the findings of a research study that was carried out by TCS (Tata Consultancy Services), "85 percent of hospitality service providers employ AI in their company operations" (Anurag, 2018). 74% of consumers plan their tourist activity using the internet, according to reports from Google Travel Services, while 45% of users use their cellphones to plan such activity, according to reports from Trip Advisor. These statistics are based on user data (Peranzo, 2019). According to other research, eighty percent of travelers would rather use technologies to self-serve than conventional services (Peranzo, 2019). These findings make the guest trend toward internet-based and self-service technologies abundantly obvious. These findings are compelling enough to make hotels consider using Artificial Intelligence procedures inside their operations to improve the quality of service they provide to their guests. Most guests are interested in dealing with self-service technologies rather than the conventional services that may be provided with the adoption of AI in hotels, according to research studies (Ivanov and Webster, 2017; Ivanov et al., 2017).

Several other factors govern the usage of AI in the hotel industry, in addition to these findings. The dissemination of information is one of the contributing aspects. AI can deliver vast amounts of information in various languages in the most important areas. The important areas include information about room availability, room price, services provided, the procedure of checking in and

checking out, local sightseeing, activities both inside and outside the hotel, menu cards, laundry service, weather updates, travel assistance, and many more areas.

The reality is that artificial intelligence may sometimes overtake human workers since it can provide information on pre-listed areas much more quickly. This information may be provided in various formats, including but not limited to “interactive text messages, live chatbots, self-service kiosks, audio and video, virtual tours, interactive booking process, language translation, upselling, cross-selling,” and so on.

CHAPTER 2

REVIEW OF LITERATURE

According to Colombo et al. (2016), there is evidence to suggest that economic downturns may contribute to the growth and technological innovation. Automation has been highly significant in the hospitality industry to provide cleaning, food, concierge, and other service tasks because of advancements in artificial intelligence (AI), computer technology, and various other advances (Ivanov et al., 2019; Yu, 2020; Cain Lisa et al., 2019). The COVID-19 humanitarian disaster has emerged as novel applications and opportunities for robots, contrary to the beliefs of some academics who previously believed that the development of artificial intelligence and digital robots was not promising. This line of thinking was primarily driven by the desire of the hospitality sector to retain high-tech services (Bhimasta & Kuo, 2019; Osawa et al., 2017).

Marr (2020) concluded that artificial intelligence is presently being utilized to manage COVID-19, which includes delivery robots, service drones, and drones for general purposes (Yang et al., 2020). These kinds of advances raise new questions, such as “What tasks may robots do in the hospitality industry?” as well as, “How many public opinions be changed when observing the roles that artificial intelligence and robots played during the COVID-19 pandemic?” And “Where do you see hospitality and tourism robots going in the future?”

An intelligent physical device with (Chen & Hu, 2013) automated physical embodiment technology and adaptable gadgets that interact, communicate, and give experience for visitors is what an AI-based service robot is characterized as (Jorling et al., 2019; Wirtz et al., 2018). In other words, it may be characterized as Systems that function as intelligent, programmable tools, capable of perceiving, thinking, and acting to assist or enable people or to expand/improve the efficiency of individuals (Engelhardt & Edwards, 1992). They are used to provide a variety of services to guests, ranging from the most fundamental, such as greeting guests, checking them in and out, and making reservations and payments, to the most sophisticated, such as dealing with customers and advising guests on which products or services they should purchase (Lukanova and Ilieva, 2019; Choi et al., 2019, Ivanov et al., 2018; Berezina et al., 2019).

The advent of AI-based robots in the hospitality industry has impacted several areas of hotel operations. It provides a variety of services to its consumers and assists employees in finishing the tasks associated with their operations (López, Pérez, Zalama, & Gómez-Garca-Bermejo, 2013; Rodriguez-Lizundia et al., 2015).

It is said that the Henn Na Hotel in Nagasaki, Japan, which opened its doors in 2015, has the title of being the world’s first hotel outfitted with robots (Rajesh, 2015; Alexis, 2017). The hotel offers its guests a wide range of services, such as a porter service, front desk service, in-room helpers, vacuum cleaners, and a baggage storage room operated by a robotic arm. Aloft Hotels began deploying a delivery robot in 2014 capable of performing hotel navigation, using the elevator, and delivering room service orders (Markoff, 2014). Using artificial intelligence, Hilton Hotels introduced a robotic concierge named “Connie” in 2016. (Hilton, 2016). Connie can aid in connecting with in-house guests, resolving their questions and requests for services, and offering information about local points of interest.

Food and beverage activities in the restaurant industry have been automated due to the widespread adoption of artificial intelligence and robotic technology. Robots are now taking restaurant orders (Curtis, 2016). For instance, the well-known pizza joint known as “Pizza Hut” recently hired a humanoid robot known as “Pepper” to take orders from customers in a more relaxed setting. Voice recognition and artificial intelligence are only two of the elements that provide Pepper with the ability to converse with users in an efficient manner. Additionally, it is outfitted with a specialized application that enables the service robot to receive money from the guest through a credit card. The use of computerized table-side ordering at establishments including “AppleBee’s, Chili’s, Olive Garden, and Outback Steakhouse” (Hill, 2015) has elevated the quality of service to an advanced level.

The AI-powered robots at the Hema restaurant in China cook fried rice and bring it to the guest (Bhardwaj, 2018). In addition to this, the robots can create foods such as “sushi (Sushirobo, 2016), noodles (Elkins, 2015), sausage (Filloon, 2016), burgers (Momentum Machines, 2016), mixed beverages (Sloan, 2014), and coffee (Fowler, 2017)”.

CHAPTER 3

RESEARCH METHODOLOGY

The present paper studies the prospects and challenges of AI use in hotel operations for enhanced customer satisfaction. The researchers collected data with the help of a questionnaire forwarded to 200 respondents from the Delhi-NCR region who booked a specific hotel and are using AI in hotel operations for enhanced customer satisfaction.

Primary data was collected from the respondents, which we got with the help of a questionnaire. The research study questionnaire was sent to a maximum of 200 respondents, and their responses were received and recorded. For the current study, the secondary data has been collected from online and print journals, books, official reports of various renowned institutes and agencies on travel and tourism domains, various internet sources, magazines, newspapers, etc.

The hotels selected for present research are “Le Meridien (Janpath, New Delhi), The Ashok (Chankyapuri Diplomatic Enclave), Radisson (Noida), Sandal Suites, which Lemon Tree Hotels operate (Noida), Mahagun Sarovar Portico Suites (Ghaziabad) and The Leela Ambience (Gurugram)” from Delhi-NCR region.

3.1.Objective of Research

The present research work has the following objectives:

1. To provide a general overview of technological innovation and adoption patterns in the hotel industry
2. To determine how enthusiastic guests are about the use of AI in hotel operations.
3. To study guest’s attitudes about the possible employment of AI in various areas of hotel operations,
4. To examine the role of Artificial Intelligence in maintaining the quality of service and managing services.
5. To explore artificial intelligence applications in the hospitality sector.

3.2.Data Analysis & Interpretation

Table 1: Gender of the Respondents

Gender	Frequency	Percentage
Male	103	51.5%
Female	97	48.5%
Transgender	0	0%
Total	200	100.0%

Source: SPSS Output.

Table 1 provides the requested information on the gender classification of respondents. Male respondents comprised 51.5% of the total 200 respondents that participated in the study, while female respondents made up 48.5%.

TABLE 2: AGE OF THE RESPONDENTS

Age	Frequency	Percentage
Under 20	27	13.5%
21 to 30	43	21.5%
31 to 40	33	16.5%
41 to 50	27	13.5%
51 to 60	29	14.5%
Over 60	41	20.5%
Total	200	100.0%

Source: SPSS Output.

Table 2 presents the frequency distribution table, which contains information on the respondents' ages broken down into many groups. Based on the information shown in Table 2, it is feasible to draw the conclusion that out of a total of 200 respondents, 13.5% fall into the age category of being younger than 20 years old, and 20.5% are older than 60 years old. While 16.5% of respondents fall into the age category of 31 and 40, 21.5% of respondents fall into that category. On the other hand, 13.5% of respondents fell into the age category of being between 41 and 50 years old, and 14.5% fell into the age category of being between 51 and 60 years old.

TABLE 3: MARITAL STATUS OF THE RESPONDENTS

Marital Status	Frequency	Percentage
Married	117	58.5%
Unmarried	74	34%
Other	9	4.5%
Total	200	100.0%

Source: SPSS Output.

Table 3 depicts the descriptive statistics table providing information about the marital status of respondents. The total number of respondents is 200, of which 58.5% are married and 34% are unmarried. Only 4.5% of the total respondents are divorced or deserted.

Table 4: Education Levels of the Respondents

Education	Frequency	Percentage
Up to 12 th	09	4.5%
Graduation	49	24.5%
Post-Graduation	68	34%
PhD	19	9.5%
Professional Education	55	27.5%
Total	200	100.0%

Source: SPSS Output.

Table 4 throws light on the education level of respondents. It can be observed that 34% of respondents are postgraduates, 24.5% of respondents are Graduates, and 9.5% are Ph.D. holders. While only 4.5% of respondents studied up to class 12th and 27.5% completed their professional education.

TABLE 5: PROFESSION OF THE RESPONDENTS

Profession	Frequency	Percentage
Private Job	69	34.5%
Government Employee	23	11.5%
Businessman	67	33.5%
Self Employed	28	14%
Any other	13	6.5%
Total	200	100.0%

Source: SPSS Output.

It is evident from *Table 5* that the majority, 34.5%, of respondents are doing the private job, while 11.5% of respondents are government employees. However, 33.5% of respondents are businessmen, while 14% are self-employed. The remaining 6.5% of respondents are involved in some other profession.

TABLE 6: INCOME LEVELS OF THE RESPONDENTS

Income	Frequency	Percentage
Below 1 Lakh	1	0.5%
1 Lakh - 1.5 Lakhs	9	4.5%
1.5 Lakhs - 2.5 Lakhs	33	16.5%
2.5 Lakhs - 5 Lakhs	75	37.5%
5 Lakhs - 10 Lakhs	47	23.5%
More than 10 Lakhs	35	17.5%
Total	200	100.0%

Source: SPSS Output.

The frequency distribution table for the respondents' income information is shown in table 6, which displays the table. According to the table, the majority of respondents (37.5%) had a yearly income of between 2.5 and 5 lakhs INR. While the yearly income of 23.5% of respondents is INR 5 lakhs to 10 lakhs, and the yearly income of 16.5% of respondents is INR 1.5 to 2.5 lakhs. While the income of 17.5% of the respondents is more than ten lakhs INR per year, the income of 4.5% is between 1 and 1.5 lakhs INR per year. Only 0.5% of respondents have an annual income of less than one lakh Indian rupees.

TABLE 7: PURPOSE OF STAY IN HOTEL

Purpose of Stay in Hotel	Frequency	Percentage
Business	56	28%
Education	26	13%
Recreation	47	23.5%
Personal	49	24.5%
Others	22	11%
Total	200	100.0%

Source: SPSS Output.

Table 7 depicts that 28% of the respondents stayed in the hotels of Delhi-NCR for business, whereas 23.5% were there for recreation purposes; 24.5% stayed for personal reasons, and 13% for education. The remaining 11% stayed for other reasons.

TABLE 8: GUEST'S ATTITUDE TOWARDS ADOPTION OF ARTIFICIAL INTELLIGENCE

		Highly Positive	Positive	Indifferent	Negative	Highly Negative
Attitude towards the adoption of AI ingeneral	Frequency	62	119	11	7	1
	Percentage	31%	59.5%	5.5%	3.5%	0.5%
Attitude towards adoption of AI inhotel	Frequency	57	125	07	10	1
	Percentage	28.5%	62.5%	3.5%	5%	0.5%

Source: SPSS Output.

Table 8 clearly indicates that 90.5% of the sampled guests had a positive attitude towards adopting Artificial Intelligence in general. When asked about their attitude, especially toward hotels, 91% of the sampled guests responded positively.

TABLE 9: GUESTS LIKE APPLICATIONS OF ARTIFICIAL INTELLIGENCE AS FOR AS MAINTAINING THE QUALITY OF SERVICE AND MANAGING SERVICES ARE A CONCERN

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Provide a pleasurable and memorable experience	Frequency	4	19	39	103	35
	Percentage	2%	9.5%	19.5%	51.5%	17.5%
Make the work/process faster	Frequency	3	14	27	115	41
	Percentage	1.5%	7%	13.5%	57.5%	20.5%
Provide highly accurate information	Frequency	0	7	16	129	48
	Percentage	0%	3.5%	8%	64.5%	24%
Communicate in more than one language	Frequency	1	5	15	103	76
	Percentage	0.5%	2.5%	7.5%	51.5%	38%
Create a more polite environment than humans	Frequency	19	33	37	89	22
	Percentage	9.5%	16.5%	18.5%	44.5%	11%

Source: SPSS Output.

Table 9 shows that guests like multiple things about Applications of Artificial Intelligence, such as maintaining the quality of service and managing services are a concern, which mainly includes that application of Artificial Intelligence in hotels provides a pleasurable and memorable experience, makes the work/ process faster, provide highly accurate information, communicate in more than one language and create more polite environment than by humans.

TABLE 10: GUEST DISLIKES ABOUT APPLICATIONS OF ARTIFICIAL INTELLIGENCE FOR MAINTAINING THE QUALITY OF SERVICE AND MANAGING SERVICES ARE A CONCERN

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Hamper and leak the private content	Frequency	17	39	54	71	19
	Percentage	8.5%	19.5%	27%	35.5%	9.5%
Lack personal approach	Frequency	19	33	37	89	22
	Percentage	9.5%	16.5%	18.5%	44.5%	11%
Not understanding a guest's feelings and emotions	Frequency	1	3	33	113	50
	Percentage	0.5%	1.5%	16.5%	56.5%	25%
Misinterpret a guest question/order/request	Frequency	29	44	27	67	33
	Percentage	14.5%	22%	13.5%	33.5%	16.5%
Not fulfill special requests/ work only in a programmed frame	Frequency	1	5	15	103	76
	Percentage	0.5%	2.5%	7.5%	51.5%	38%

Source: SPSS Output.

Table 9 shows that guests dislike multiple things about Applications of Artificial Intelligence as maintaining the quality of service. Managing services are a concern, which mainly includes the application of Artificial Intelligence in hotels hampering and leaking private content, lacking personal approach, not understanding a guest's feelings and emotions, misinterpreting a guest question/order/request, and not fulfilling special requests/ work only in a programmed frame.

TABLE 11: REGARDING YOUR OVERALL EXPERIENCE WITH THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN THE HOTEL INDUSTRY

your overall experience of AI in Hotels		Highly Negative	Negative	Indifferent	Positive	Highly Positive
	Frequency	19	33	37	89	22
	Percentage	9.5%	16.5%	18.5%	44.5%	11%

Table 11 shows that the majority 44.5% respondents having positive as well as 11% having highly positive experience of AI in Hotels, while 16.5% having negative and 9.5% having highly negative experience of AI in Hotels. The remaining 18.5% having neutral opinion about it.

CHAPTER 4

CONCLUSION

The main purpose of the present research work was to discuss the prospects and challenges of Artificial Intelligence use in hotel operations for enhanced customer satisfaction. To achieve this goal of the research, sampled respondents were asked to choose the best suitable answer for ten attitudinal statements which were based on 5 points Likert scale, which indicates that the guests like multiple things about Applications of Artificial Intelligence for as maintaining the quality of service and managing services are a concern, which mainly includes that application of Artificial Intelligence in hotels provide a pleasurable and memorable experience, make the work/ process faster, provide highly accurate information, communicate in more than one language and create more polite environment than by humans. On the other hand, they also dislike multiple things about Applications of Artificial Intelligence as

maintaining the quality of service and managing services is a concern, which mainly includes that application of Artificial Intelligence in hotels hampers and leaks private content, lacks personal approach, not understand a guest's feelings and emotions, misinterpret a guest question/order/request and do not fulfill special requests/ work only in a programmed frame.

As for the overall experience of guests with the applications of Artificial Intelligence in the hotel industry, although there is a mixed response, most of them have a positive opinion about it.

This research study was conducted in only selected hotels of Delhi-NCR regions, so in the future other studies can be replicated in other geographical locations of the country to check whether the results are consistent. Although there will be regional differences among the respondents, such dissimilarity should be explored. This will help in evaluating whether the attitudes are culturally specific.

Also, this study was conducted only in a few selective top (expensive) hotels in Delhi-NCR regions. A similar study should be conducted for other categorizations and classifications of hotels.

CHAPTER 5

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