

Robotic Services in the Hotel Industry: An Examination of Henn Na Hotels

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ABSTRACT

In recent years, the use of artificial intelligence has become an integral part of the hotel industry in Japan. Henn Na Hotels are just one example of a hotel that utilizes robotic services as its main service provider. Through document analysis, this article provides depth and discussion on how Henn Na Hotels in Japan use robotics services, the challenges they face, and the overall technological readiness of guests at the hotel. In analyzing available research articles, this paper reports the various uses of technology and guests' corresponding perceptions of utilization. Accordingly, this paper provides an overview of the different robotic features of the Henn Na Hotels. Analysis finds some displeasure of human-like robots, the fear of job replacement, and the overall quality of the robotic services affect guests' perceptions negatively. The use of robotic services in more standardized tasks is identified to increase the perceived value of the guests' stay at the hotel.

Keywords

Robotic Services, Japan, Tourism and Hospitality Industry, Henn Na Hotel, Hotel Industry, Technology

INTRODUCTION

The use of artificial intelligence has revolutionized the tourism and hospitality industry. More and more businesses in the industry rely on AI solutions, and the travel AI industry is estimated to exceed \$1.2 billion by 2026 (Chalimov, 2022). The use of AI, specifically robots, affects the way people in the industry work, and has replaced many tasks and jobs throughout the industry. Examples of robotics in the industry include robotic guides and robotic chefs at restaurants (Manthiou et. al, 2020). Using robotic services may provide tourism and hospitality businesses the ability to differentiate themselves, improve their services and improve their effectiveness (Manthiou & Klaus, 2022).

Japan is a destination that has already implemented several robotic services throughout the tourism and hospitality industry. Japan is described as one of the most technologically advanced destinations in the world (Business Insider, 2019). Their robot services have become an integrated part of the hotel industry and they have used robots to greet guests, check in and deliver room service (Business Traveler, 2020). Japan's use of AI technology and robots provides a unique opportunity to identify and examine readiness considerations such as sociocultural factors and required infrastructure to implement robotic services in hotels in other parts of the world. Accordingly, this study sought to identify how robotic services in the hotel industry are being utilized and how robotic services in the hotel industry are perceived by guests through an examination of Henn Na Hotels using a document analysis strategy of inquiry. Specifically, this research sought to answer the following research questions: 1) What is the perception of guests on their utilization of robotic services in the hotel industry and 2) What are the technologies currently being adopted by the Henna Hotels in Japan.

METHOD

A qualitative research method was chosen using an inductive approach to answer the research questions identifying the utilization of technology and perception of guests. Thomas (2006) defines the purpose of using an inductive approach to condense data into a brief summary format as well as develop a framework to easily analyze qualitative data. This research used an inductive approach to identify the existence of a well-developed rationale for the use of AI and robotic technology in the hotel industry in Japan. This approach was chosen due to the nature of the research questions and lack of a theory that brings together facts and hypothesis in the use of robotic services in the hotel industry.

To assess the infrastructure requirements of implementing robotic services in the hotel industry, a literature review with secondary data was completed with document analysis. Document analysis is a way of conducting qualitative research where collected documents and data contained within are analyzed within a certain topic (Bowen, 2009). The document analysis process started with the identification of several electronic, peer reviewed academic articles investigating the topic of robotic services used in the hotel industry in Japan. Since the development of robotic services has increased exponentially in the past decades, chosen articles were published 2017 to 2022. Each article was read and evaluated in order to gain an understanding and develop an empirical knowledge about the topic. Data were captured in a table to easily compare and contrast the type of technology, the use of the technology, the perception of the technology use by consumers and the corresponding source.

Advantages of using document analysis as a research approach is it provides a systematic approach to compile multiple data multiple sources, making the research more valid and general. The document analysis method was an invaluable part of triangulation, with the purpose of triangulating to provide a confluence of evidence that supports credibility of the findings (Bowen, 2009). As the data was easily accessible, using document analysis reduced ethical concerns that be associated with other qualitative methods.

LITERATURE REVIEW

The use of technology is rapidly increasing in all industries, and it is crucial for industries and businesses to keep up with the newest technology to stay competitive, including the tourism and hospitality industry. Kansakar, et al., (2020) states that it is crucial for the growth of businesses to adapt to the newest technology in order to attract the newest generation of technophile users with limited discretionary income. Since accommodation is central in the tourism and hospitality industry, it is necessary to evaluate this segments technology adoption. There are many different types of technologies that have infiltrated the hotel industry, referred to as the Internet-of-things (IoT), including mobile technology, virtual reality, chatbots, robotic services and much more, where many of them are interconnected.

IoT plays a major role in how the current and future tourism and hospitality industry will operate. Oracle (2022), a global cloud datacenter infrastructure, describes IoT as a network of physical objects that are, “Embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet,” (para. 1). IoT is opening up for new opportunities in the industry making experiences more efficient and personalized. Aside from the direct guest perspective, IoT also creates value in the more back-end part of the businesses in the tourism and hospitality industry, e.g., in the front desk, housekeeping and sales/marketing (Kansakar, et al., 2020). Many hotels are focused on guest-facing systems to gain the most advantage such as mobile technologies. Guest-facing systems can for example be applications for check-ins or to control IoT elements in their room. Guest-facing systems can furthermore recommend guests restaurants, experiences, and tours (Kansakar, et al., 2020). The ability to manage energy consumption is another technological advantage that hotels utilize. Newer technology enhances control and monitoring on consumption in such ways as climate and lightning control, that will automatically adjust based on natural lightning in the room or whenever the room is unoccupied.

Virtual reality can be used to provide a simulation of a travel experience before visiting a destination. This can be a great marketing-tool for businesses, helping guests with their decision making (Leung et al, 2020). The use of chatbots have increased in the hotel industry. Based on algorithms, the chatbots can communicate with guests, and have an actual dialogue in text. This technology is an efficient customer service tool for simple questions (Dash et al, 2019). Examples of robotic services include robotic concierges, robotic receptionists, robotic cleaning systems and robotic bartenders, which can be either displayed as human-like robots (anthropomorphic robots), robot-like robots and in some hotels, even animal-like robots (zoomorphic robots).

Advantages and Disadvantages of Using Technology in the Hotel Industry

There are many advantages for hotels to use various technologies. One important aspect is the cost efficiency of using technology compared to human work. Examples of cost efficiency within hotel technologies are chatbots, that saves a lot of time answering the guests’ questions manually, energy management features, that save a lot of utility costs for the hotels, and robotic services, that replace human receptionists or bartenders saves a lot of labor costs (Dash & Bakshi, 2019; Kansakar, et al., 2019). These examples lead to lower costs for a room, creating a competitive advantage in the market. Another benefit of chatbots and robotic services is that they function all hours of the day, increasing the ease of access, which leads to better customer satisfaction (Kansakar et al, 2020). Another advantage for hotels to use technology in their business model, is the ability to use the data from the technology to analyze their guests’ behavior, which can lead to

better personalization of the services and experiences (Kansakar, et al., 2020; Kansakar, et al 2019).

Safety is one challenge when it comes to robotics in tourism, since they operate through the Internet there is always risk of a cyberattack where guests personal data could be at risk (Kilichan & Yilmaz, 2020). A challenge that comes with anthropomorphic robots is when they look like humans, guests tend to expect them to possess total human abilities, and with the current technology robots have a hard time engaging with humans which can create a negative customer experience (Lo & Lee, 2020). Since robotics cannot embody human employee's empathic abilities, it becomes a challenge if a hotel wants to pursue total implementation of a robotic staff (Reis et al, 2020). Another challenge with robotics in service is their set-up. There may be a language barrier depending on how the robot is programmed and the preferred actual language of the service receiver (Reis et al, 2020).

Perceived Readiness of Service Robotics Utilization

Robotic services in the hospitality industry spark a big debate with some thinking that robots take away from the service experience whilst some believe robotic services bring more positive elements into the hospitality industry (Choi et al. 2021). However, most agree that with the current service robotic technology, hotels are not yet ready to fully replace human labor with robots, however some think that robotics could be implemented to heighten the total perceived value of the service (Reis et al. 2020). It is the quality of the interaction between the human and the robot that determines how ready people are for robotic services in hotels (Shardell, 2017). When it comes to the readiness of robotic services in the hospitality industry, some cultures are more accepting of the adaptation of service robotics than others. According to Choi et al. (2021), the Japanese culture is more accepting of robotic services than western culture. In Japan, robots have been an important part of popular culture where robots are used in animation, stories, and television. However, there are accounts in which robotic workforces have been reduced and more strategically aligned to areas where the robots are most effective and efficient (Hertzfeld, 2019). The opposite is described for the western cultures where Robots tend to be used to paint a picture of horror (Choi et al. 2021).

FINDINGS

The purpose of this research was to identify how robotic services in the hotel industry are being utilized and how are robotic services in the hotel industry perceived by guests. Specifically, this research sought to answer the following research questions: 1) What is the perception of guests on their utilization of robotic services in the hotel industry and 2) What are the technologies currently being adopted by the Henna Hotels in Japan. The data displayed in Table 1 was collected from electronic, peer reviewed academic articles and industry reports written about service robotics at Henn Na Hotels.

Table 1: Technology Utilization and Guest Perceptions in Henna Hotel, Japan

Type of robot	Use	Perception	Source
Front desk robot	Welcoming guests and checking them in. Answering basic questions from the guests. These robots are made to aesthetically represent humans or dinosaurs.	<ul style="list-style-type: none"> The technology is not fully developed yet Can't replace humans They have no feelings Split opinions about the dinosaur robot Fear of job replacement Not easy to use Guests had higher expectations 	Io & Lee (2020), Reis et al (2020) Bhimasta et al (2019)
Robot cloakroom	Taking and storing guests' coats whilst staying at the facilities.	<ul style="list-style-type: none"> Some people fear the replacement of easier jobs. 	Io & Lee (2020)
Facial recognition	Instead of using a keycard for entering a room, the guests of the hotel use a 2D facial recognition.	<ul style="list-style-type: none"> Since it is 2D facial recognition one could hold up a picture of the guests face and it would open, which causes security concerns. 	BBC Click (2015), Blorg (2019), Bhimasta et al (2019)
Cleaning robot	A robot that provides cleaning services in guests rooms and common facilities.	<ul style="list-style-type: none"> In Japan cleaning guest rooms is seen as a human job. Cleaning robots for common areas are seen as natural. Not sufficient cleaning, which require human workers to interfere 	Reis et al. (2020) Blorg (2019)
In-room robot	The in-room robots answer guests' requests about things such as controlling the television, lights, temperature etc.	<ul style="list-style-type: none"> The in-room robot only speaks and listens to Japanese which sparks irritation among international visitors. Some people are expressing fear of surveillance. 	Pleasance (2019) Crowe (2018) Bhimasta, et al. (2019)
Porter robot	The porter robot moves in the entire building and has the purpose of carrying guests bags and luggage to and from their rooms.	<ul style="list-style-type: none"> The porter robot can perform standardized tasks efficiently. Some guests express that the robot is too slow. Technical issues 	Io & Lee (2020) Reis et al. (2020)

When gathering the data of the perception of the different robotic services at the Henn Na hotels, technology is perceived to add value while demonstrating opportunities to further develop solutions and/or incapable to replace human capital. Respondents found some of the features, such as the porter robots and the cloakroom robot helpful with smaller tasks like carrying luggage. Whereas other features, especially the front desk robots, are perceived negatively. The front desk robots are as mentioned earlier represented as humans and dinosaurs, also called anthropomorphic or zoomorphic robots, respectively. It was found that the guests had a difficult

time interacting with these robots, especially the anthropomorphic robots. Because the robots looked like humans, the guests assumed that they would have more human-like characteristics such as empathy, which was not the case (Io et al, 2020).

There were many comments about the overall quality of the different kinds of technology at the Henn Na Hotels. First, guests found that the robots at the front desks could not answer more complex questions, and that human interaction was needed, which is increasing the time guests are spending on the check-in, resulting in lower customer satisfaction. One guest of the Henn Na Hotel wrote: “.... *Human and dinosaur robots are at the front to process my check-in. However, my credit card was not recognized many times during the payment, and a real person came out after all, and it took more than 20 minutes at the reception*” (Bhimasta, et al., 2019, p. 1108). This provides evidence that robots can provide basic services, but in the current state they do not meet the demands of all required services and often are associated with creating more work for employees (Hertzfeld, 2019). Furthermore, English speaking guests expressed problems with communicating with the in-room robots that only spoke Japanese, which excludes non-Japanese speakers. This affects the actions of turning the lights on and off as well as other basic service functions that are controlled by the in-room robot. Additionally, the porter robot, carrying the guests’ luggage from the reception to their rooms, has been said to move too slowly, resulting in impatient guests. All these parameters are a clear sign that the programming of the robots at the hotel still have a lot of optimizations that are needed in order to succeed.

One perception of the robotic services in the Henn Na Hotels was that it sparked conversations and concerns about job replacement for employees in the hotel industry. Robots can perform standardized tasks with a higher efficiency and accuracy than humans and because of that some guests and employees within the hotel industry expressed fear of their job being replaced by a robot (Io et al., 2020). These concerns were directed towards the robotic receptionists of the hotel, the cloakroom robot, cleaning robot and the porter robot. A way guests expressed concerns with job replacement was with the cleaning robot in the guest rooms since it is custom in Japan to have humans cleaning guest rooms instead of robots.

Throughout the document analysis process, the different types of robotic services of the Henn Na Hotels in Japan were identified. The hotel uses robotic services throughout the entire stay of a guest, receiving mixed reviews from guests and hotel workers expressing concerns with job replacement, irritation, and annoyance when the technology is not working sufficiently as believed. However, some guests have expressed appreciation for some robotics that can perform standardized service tasks with a high efficiency (Io et al., 2020). Accordingly, it was reported that nearly half of the robots used by the hotel would be reduced, aligning human and robotic workers to complete the tasks in which they are most efficient and effective (Hertzfeld, 2019).

DISCUSSION

One implication that the research demonstrates is robotic services’ ability to perform smaller and standardized tasks, such as carrying luggage. These services were perceived by guests as convenient and beneficial as they alleviate the guests from carrying out these services on their own. On contrary, this can lead to concerns about job replacement as robotic services are now able to execute tasks previously performed by humans. Another implication found in the research is the negative perception of the anthropomorphic robots. Some guests expressed displeasure by the human-like characteristics of some of the robots. Additionally, the complexity of the robots is

limited, making them inferior to human qualities and often needing more attention from employees. In general, the robotic services used at the Henn Na Hotels do not meet the quality standard one would expect from a hotel that emphasizes the usage of robots instead of human employees. This is an area that Henn Na Hotel could optimize to increase the future quality of service. Findings also provide other hoteliers insights into considerations such as what is the appropriate amount of utilization and investment into technology.

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