Journal of Smart Tourism Vol. 1 No. 3 (2021) 17-20

DOI: https://doi.org/10.52255/smarttourism.2021.1.3.4

Journal of Smart Tourism

ISSN: 2765-2157 (Print) 2765-7272 (Online) Journal homepage: http://strc.khu.ac.kr/

Empirical Research Article

Opportunities and Challenges of Utilizing Service Robots in Tourism Industry: A Tool for Recovery from COVID-19 Pandemic

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Abstract

Technology and tourism have become inseparable, and technological innovations propose new services to the tourism industry. During the current pandemic, service robot usage has increased more than at any other time which comes with advantages and disadvantages. This paper discusses the opportunities and challenges of utilizing service robots in the service industry during and after the pandemic crisis. The study follows a content analysis methodology. Findings indicate that service robots are easy to access, offer an alternative form of communication, reduce costs and boost operational safety; in contrast, robotics increase unemployment and cause anxiety and depression among the demoralized employees.

Keywords

opportunities; challenges; tourism technological; service robots; unemployment; pandemic

1. Introduction

The 21st century is known as the era of science and technology, but people are still facing viral infection, from the human coronavirus 229E and human coronavirus OC43 in 1960 (Geller & Greenberg, 2012) COVID-2019. The outbreak of the virus has not only been a public health emergency but has also had a catastrophic effect on the economy, trade, social intercourse, politics, international relations, production, and service (Samarathunga, 2020). The tourism industry is one of the hardest hit by the COVID-19 pandemic.

Face-to-face services are the nature of the tourism industry. Service providers and service receivers have close face-to-face interaction, but because of the pandemic, maintaining social distance has become mandatory, so service robots started to be the substitutes for humans (Ivkov et al., 2020; Jiang & Wen, 2020). Utilizing service robots offers new opportunities to the service sector in the current pandemic period (Odekerken-Schröder et al., 2020; Yang et al., 2020). According to Seyitoğlu and Ivanov (2020), during the COVID-19 pandemic, service robots could be an efficient and effective means of achieving physical distancing in the process of serving regular customers, quarantined people, or those who are COVID-19 positive. Moreover, Parvez (2020) stated, robotic machine learning algorithms work as virus-killing devices in the housekeeping department of hotels, airports, and airlines.

Utilizing service robots presents some challenges, such as unemployment, complexity in human resource management (HRM) decision-making, management's difficulties in choosing and employing robots, and time management for online-based services (Dredge et al., 2018), as well as demoralization and robotic anxiety among employees. The purpose of this study is to present an analytical review of current literature to help professionals to recognize, manage, valorize and understand the opportunities and challenges of utilizing service robots in tourism digitalization and to support the recovery of the hard-hit industry.

2. Methodology

This research is an analysis of literature review about the use of robots in tourism industry during and after COVID-19 pandemic. We considered numerous ICT-related studies in tourism and hospitality journals for data collection in the area of opportunities and challenges of service robots. The theoretical framework associated with the key objectives and selected appropriate keywords for the systematic search in four online databases, namely:

- ScienceDirect (www.sciencedirect.com);
- Sage Journals (http://online.sagepub.com).
- EBSCOhost's Hospitality and Tourism Complete (http://search.ebscohost.com);
- Emerald Management eJournals (www.emeraldinsight.com); and

First, we search full-length journal papers including conference papers and research notes to enable the current state of service robots-related findings and discussion in the tourism and hospitality literature. Second and most significantly, were analyzed only those papers published during the COVID-19 pandemic period (2019 to 2021) to ensure the information

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Received 15 April 2021; Received in revised form 14 August 2021; Accepted 26 August 2021

presented was current. We used relevant keywords (service robots and COVID-19, advantages of service robots in tourism, challenges of service robots in tourism, use of service robots in tourism, and hospitality during and after COVID-19) in the search. All the collected data was piloted twice, and all selected papers were matched to ensure reliability. The decision to include a paper was based primarily on its direct relevance to the topic of service robots' applications in tourism and hospitality. Finally, 121 sample papers were collected and generated for analysis.

3. Findings

All papers were read by the researchers and content analysis was performed. The articles were categorized into the main topics as outlined below.

3.1 Impact of COVID-19 on Tourism

COVID-19 pushed the world back to an ancient lifestyle after lockdown, quarantine, restricted face-to-face communication, and limited close contact (Hao et al., 2020). As a result, hotels, restaurants, coffee shops, and other service industries have been maintaining strict rules to keep partially open for local customers (Zeng et al., 2020). Moreover, because of the travel restrictions, both the airline industry and the cruise industry have also been hit hard. Share prices of three top cruise lines have dropped dramatically (Klebnikov, 2020) and 80% of flights were canceled worldwide (IATA, 2020). These estimations have not only impacted the demand for tourism but have also changed tourist behavior, which directly impacts millions of jobs and revenue (Wen et al., 2021).

3.2 Utilizing Service Robots in Tourism During COVID-19

During the COVID-19 pandemic, service robot use has increased to maintain everyday activities, as well as helping the tourism industry to recover from the crisis (McKinsey & Company, 2020). According to Tuomi et al. (2020), in the hospitality context, robots can be used for front-of-house and back-of-house tasks, such as customer care and service, cooking, and delivery. Service robots are also categorized according to their internal and external operations: support (dealing with routine tasks, freeing human employees to focus on complex situations), substitution (replacing human employees completely in a sequences of services encounter), differentiation (offering service businesses a unique chance to attract customers' interest), improvement (utilizing resources more efficiently), and upskilling (changing service employees' required skill sets and transforming existing roles). Zeng et al. (2020) said that robotics company Cloud Minds employed fourteen robots in the hospitality field. Further, Toh and Wang (2020) mentioned that in February 2020 in Beijing, Meituan Dianping (a food delivery giant) employed service robots in its partners' restaurants to deliver food from kitchens to customers and delivery staff.

3.3 Opportunities of Utilizing Service Robots in Tourism

There have been numerous examples of the benefits of robots in maintaining social distance in daily services (Stankov et al., 2020). Indeed, the consumer's demand for robotic services for safety purposes has increased. Therefore, rapidly growing utilization of service robots in tourism is highlighted in major current research (Fusté-Forné, 2021; Misrahi, 2018; Wan et al., 2020; Yin et al., 2021), because a service robot is a mechanical device programmed to perform primitive tasks used in service (Kazak & Dorofeeva, 2019). In the tourism and hospitality business service robots can be used as follows: (a) in the front line several collaborative robots may work, (b) artificial intelligent robots' involvement in management, (c) works-concierges; (d) robotic terminal at the airport, hotel, and other related service areas; (e) in the current situation service robots' performance increased as waiter robot (Wan et al., 2020), robot chef (Fusté-Forné, 2021), cleaners' robot (Parvez, 2020) and delivery robots (Yin et al., 2021) in hotel and restaurant. According to Kazak and Dorofeeva (2019, p. 1409), "reducing the cost of drives by 45-50% will reduce the cost of collaborative robots by 20%; and the exception of the wave gear drive set-30% of the cost of the drive."

3.3.1 Product and Service Processing by Robot Chefs

During the COVID-19 pandemic, hospitals, hotels, and restaurants employed service robots and drones for transferring goods from one place to another and serving customers (Demaitre, 2020). For example, in Alibaba's Hema restaurant, robots have not been used for cooking foods but do serve the dishes to customers (Zeng et al., 2020). According to Fusté-Forné (2021), Robot chefs are a current trend, maximum people would like to visit those restaurants to enjoy the new way of cooking and test the foods, moreover, people think that robots are smart, fast, and clean than human chefs. Besides timing is one of the most important issues, in robotic service time maintain accurately and human chefs may forget but robots never forget any task or ingredients of food making.

3.3.2 Product and Service Serving by Waiter Robots

The online market concept has naturally been emphasized by technology devices, and the virtual tourism market may grow rapidly. After the first wave of COVID-19, Wuhan's citizens steadily adopted robotic services, such as self-driving automobiles for regular supplies; the concept of self-driving vehicles also highlighted safe transport for residents and tourists (Zeng et al., 2020). The adoption of waiter robots in the tourism and hospitality industry has increased dramatically after the impact of COVID-19, many researchers identified that even though waiter robots do not have the same luxury of a static surrounding but to follow the social distance waiter robots' popularity has increased by assisting in the serving of typical beverages and foods (Wan et al., 2020).

3.3.3 Product and Service Delivery by Drone

In the absence of human staff, robots do proxy for product delivery to customers by drone (Bhattacharya et al., 2019), even though drone use for delivery purposes is not new but it become popular during and after COVID-19 and this method is a safer, more accurate and punctual service (Chamola et al., 2020). During and after the pandemic, consumers have had to accept a new service technic in which touchless services are prioritized and reflected appropriately as a means of avoiding the spread of disease (Choe et al., 2021). According to Zeng et al. (2020), during the pandemic, the use of drones was noticed in deliveries and communicating voice advice to remind the public to maintain social distance in public spaces.

3.4 Challenges of Utilizing Robots in Tourism

The major challenge of utilizing robots in tourism is financial (Samala et al., 2020) because hard-hit entrepreneurs may not be willing to make any new investment. For example, Dubai airport made a huge investment in a robotic face recognition entry system. The high cost of investment, maintenance, and modification and employees' unwillingness connect with fear of unemployment as big challenges (Chamola et al., 2020; Pearlson

et al., 2019). However, current popularity of robots in service industry impact employees psychologically and it increases performance risks and psychological risks, which divert to a negative influence on robotic adoption (Choe et al., 2021). Precisely, the outbreak of COVID-19 completely mixed up the employees' psychological and physical health also disturbs the relationship between performance and commitment (Aguiar-Quintana, et al., 2021).

3.4.1 Technological Unemployment

COVID-19 and technology have transformed the traditional tourism business, and automation has put human employment at risk (especially entry-level employment). Therefore, a huge number of qualified employees have migrated to other stable industries (Samarathunga, 2020). At present, many airports implement service robots to ensure safety and social distance (Ivkov et al., 2020). They also mentioned that the usefulness of robots increases the demand for service robots, so the pandemic has directly affected employment and careers (Keskin, 2020). In Japan, many hotels have replaced frontline employees with communicating robots. In the UK, restaurants and the foodservice sector have increased their interest and investment in robots (Tuomi et al., 2020).

3.4.2 Demoralize Employment

During and after the lockdown, even though tourism organizations reopened partially, employee numbers have been reduced (Keskin, 2020), so current employees are demoralized by the risk of unemployment. According to Karatepe et al. (2020), job insecurity may cause demoralized employees to do regular tasks less effectively. Moreover, responding to the same questions from customers generates a lot of mental fog (Gao et al., 2020). The increase of robot uses During the COVID-19 crisis in the hospitality industry decrease the job opportunity in general and divert some jobs to a skilled level, in this condition Aguiar-Quintana et al. (2021) described that "job demands may turn into job stressors when meeting those demands requires high levels of employees' efforts to the extent that they find it difficult to recover."

3.4.3 Robotic Anxiety among Employees

Camilleri (2018) stated that the majority of tourism employees do not have proper training in technological usage, so when robots are used in service or production, employees feel uncomfortable, anxious, and frustrated. Lee and Cranage (2018) mentioned technology anxiety causes distress and nervousness at work, and this anxiety has an effect on their regular everyday activities. During the COVID-19 crisis, job resources in tourism and hospitality industry decreased histrionically, and this impacted employees' psychological, physical health, social status, and organizational involvement as well as maximize their anxiety and depression (Aguiar-Quintana et al., 2021). Consistent with the COR theory, people experience stress when they don't have resources available (Hobfoll, 1989).

4. Conclusion and Recommendations

Since the beginning of the COVID-19 outbreak, the significance of contactless services in hospitality industry has been underlined ever. And a lot of researchers are concerned about utilizing service robots the right way, so utilizing service robots have positive and negative impacts on tourism and hospitality. Nevertheless, there has been no research on the opportunities and challenges of utilizing service robots and future of services industry after COVID-19. This study explored the perceived advantages of utilizing service robots as well as highlighted the challenges which have not been directed before. The findings of this research will advance the thoughtful variations that have arisen in employees' perception of unemployment risk by robotic adoption during and after the COVID-19 pandemic.

Whereas service robots as a tool to maintain social distance were particularly highlighted (McKinsey & Company, 2020). Not only have service robots quickly replaced human employees as servers in many sectors, but they have also become a requirement for future tourism services. Utilizing service robots in tourism is still in the early stages and not widely available, but the willingness of 72% of managers or industry leaders indicates increasing employment of robots currently and in the post-pandemic period, even though robots reduce the warm welcome and friendly environment required by hospitality. Before the COVID-19 pandemic broke out, robotic use was limited, but currently, robots are used as control devices, in facial recognition, as biometric attendance devices and smart keys, and for online assistance to control and keep a record of individual customers and human collaboration in the workplace.

COVID-19 is predicted to be a long-term crisis, so apart from the economic loss, tourism also faces an image crisis affecting the future careers of tourism students. Therefore, Keskin (2020) suggests, to handle the complexity of tourism ecosystems and virus protection, three mechanisms (management, employees, and stockholders) may decide to employ service robots for a better future. Future studies may focus on empirical service robot advantages and disadvantages, unemployment, and customer acceptance levels through primary data to see whether customers, managers, and employees agree. Finally, future research may shed light on the financial benefits of utilizing service robots in the post-pandemic period.

Declaration of competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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