TOURISM & HOSPITALITY STUDENTS' PERCEPTION TOWARDS THE USE OF ROBOTS IN SERVICE ORGANIZATIONS: A QUALITATIVE STUDY IN INDIA

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ABSTRACT

The study examined tourism and hospitality (T&H) students' perception of the use of service robots in organizations. Using purposive sampling, 80 students of T&H programs were interviewed online, and data was analyzed through thematic analysis. The findings showed that a majority of respondents had shown a favorable perception of robots. While Indian students think that robots may offer several benefits for organizations, T&H entrepreneurs must make provisions to deal with the obstacles associated with robot adoption. The major challenges are employee resistance, technological glitches, services with no human touch, significant operational costs, human-robot interaction, cost of training & repair, and robot-friendly organizational design. They also believe that service organizations should balance the work of employees and robots in such a way where technologies should perform repetitive tasks while employees could deliver warm and personalized services. They prefer humanoid robots in human-touch service industries to humanize services. The study also recommends that educational institutions must incorporate courses on modern technologies into academic programs to meet future challenges and job requirements of the service sector. The findings have several implications, and further research directions are suggested.

INTRODUCTION

Growth in guest arrivals, technological advancements, changing preferences of increasingly sophisticated customers, delivering memorable travel experiences, dynamic nature of business operations, and striving for customer loyalty force hospitality managers to differentiate themselves

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from the competition and search for innovative sources of competitive advantage (Kala & Bagri, 2016). After the outbreak of the COVID pandemic, T&H sector is experiencing multifold challenges, including cost reduction, pressure to increase productivity, delivering contactless services, reducing customer perceived risks, and delivering memorable customer experiences to remain competitive. Several authors (Kuo et al., 2017; Bowen & Morosan, 2018; Ivanov et al., 2018a, 2018b; Tung & Au, 2018; Tussyadiah & Park, 2018; Belias & Varelas, 2019; Ivanov & Webster, 2019; Murphy et al., 2019; Ivanov et al., 2020; Qiu et al., 2020; Yu, 2020; Vatan & Dogan, 2021) have recommended that adoption of modern technologies, especially robots, can help T&H organizations to make operations more efficient, deliver distinctive customer experiences, and gain competitive advantage. The usage of robots is evolving swiftly and several service sectors including healthcare, education, tourism, and hospitality are implementing to remain competitive in the changing business landscapes. With noteworthy prospects for the future, innovative technologies such as robotics, augmented reality, virtual reality, and artificial intelligence (AI) are currently progressing, particularly in the T&H settings. The application of robots and contemporary state-of-art technologies could provide intelligent, more automated, individualized, and prophetic practices (Tussyadiah & Park, 2018; Belias & Varelas, 2019).

Although the use of robots in the hospitality sector is in the nascent phase, industry experts believe it will gain momentum and turn into an explosion (Bowen & Morosan, 2018). The Henn-na Hotel in Nagasaki, Japan, was the first hotel in the world to be completely staffed by robots. However, the hotel fired almost half of the robots due to some technical failures (Hertzfeld, 2019). 'Connie' at Hilton Hotel, 'A.L.O.' at Aloft Hotel, 'Dash' at Crowne Plaza, Yobot at Yotel Hotel, and 'Cleo' and 'Leo' at the Hotel EMC2 are some examples of robot adoption in the hospitality sector. In 2019, Alibaba group launched its AI and robot-equipped hotel 'Fly Zoo' in China. These efficient technologies can replace human efforts and perform tasks that are currently performed by individuals even more effectively and accurately (Belias & Varelas, 2019). Although the application of robot creates a more customized and extraordinary experience for hotel guests and reduce labor costs for hotels, these technological disruptions have radically transformed the way business processes are managed and executed.

According to PWC, by the 2030s, 25% of hospitality jobs in the United States will be automated (Gupta, 2018). The CEO of H.I.S. (H.I.S. introduced robots in its Henn-na Hotel), pointed out that more than 50 percent of jobs

in the Japanese hospitality sector be performed by robots and automated technologies (Semuels, 2018). The McKinsey Global Institute estimates that by 2030, between 400 million and 800 million jobs will be automated (Meyer, 2017). A joint study by MIT and the Boston Consulting Group (2017) found that 84 percent of the 3,000+ executives, managers, and analysts interviewed believe that their organizations can gain a sustainable competitive advantage by implementing AI and other automated technologies (Ransbotham et al., 2017). Greater accuracy and accountability, analysis of big data, security improvements, waste reductions, reduce labor cost, and higher guest satisfaction were identified as some of the significant performance benefits of AI and automation to service organizations (Manyika et al., 2017). Further advancements and penetration of robots will make this innovative technology more accessible, affordable, faster, and more trustworthy than humans (Li et al., 2019).

Despite the growth of robots in service organizations, there are few academic researches on the subject. These researches have primarily focused on how customers perceive robots (Ivanov et al., 2018a, 2018b; Ivanov & Webster, 2019; Yu, 2020), human-robot interaction (Tung & Au, 2018; Tussyadiah & Park, 2018), the attitude of hospitality manager's towards robots (Ivanov et al., 2020; Vatan & Dogan; 2021), robot characteristics (Simmons et al., 2011; Mori et al., 2012; Strait et al., 2017; Murphy et al., 2019; Qiu et al,. 2020; Yu, 2020), and other allied issues (Kuo et al., 2017; Choi et al., 2019; Li et al., 2019; Go et al., 2020; Ivkov et al., 2020; Park, 2020; Seyitoğlu & Ivanov, 2020).

Nevertheless, none of the previous studies addressed the Indian T&H perspective on robots, as well as the perception of aspiring professionals toward the adoption of robots in the Indian T&H organizations. Hence, the present work attempts to examine the students' perception of the possible application of robots in T&H sector. A study of this nature is justifiable in the Indian context because of the following reasons. First, the travel and tourism sector is one of the high-performing sectors of India. The Indian travel and tourism sector contributed nearly $194 billion, around 10.3% of GDP during 2019, and provided 8% of total employment (World Travel & Tourism Council, 2020). As per the travel and tourism competitive index of World Economic Forum, the rank of India is 34 (World Economic Forum, 2020). Second, India, one of the fast-growing economies, has witnessed increasing growth in the hotel industry, as evident by the fact that several international hotel brands have already established in the country or are seriously plotting their entry or expansion strategies. Third, India has around 500 million people in the age group of 5-

24 years, which is the largest globally. Majorities of young generation customers are tech-savvy and prefer technological solutions. Webster (2021) emphasized that demographical changes are the major drivers of automation and robotization. Lastly, previous studies have pointed out that the most empirical researches on robot adoption centered in developed economies, whereas the situation in developing countries is somehow neglected. Indeed, understanding the perception of prospective managers towards robot adoption would be significant for service organizations, tourism and hospitality stakeholders, and academicians in developing countries like India. In this way, the researcher expects that the present work will contribute significantly to the literature by addressing the present gap.

LITERATURE REVIEW

Chen and Hu (2013) termed robots as "intelligent physical devices" competent enough to perform intended functions with the capability of autonomy, mobility, and sensory. The Robot Institute of America, a trade association of robot manufacturers and users, defines robots as "a reprogrammable multifunctional manipulator designed to move material, parts, tools, or specialized devices, through variable programmed motions for the performance of a variety of tasks." In recent years, the application of service robots to provide outstanding services has been increasingly gaining attention in T&H organizations (Ivanov et al., 2018a). Several studies have now been undertaken to comprehend the current trends of T&H organizations and the preparedness of guests and industry practitioners to accept robots. Some major studies undertaken within the T&H sector are presented below to know the perception or attitudes of hotel employees, customers, public, and professionals towards robot adoption in hotels.

Kuo et al. (2017) interviewed academicians and practitioners using a SMART SWOT ranking survey and found that the Taiwan hospitality industry has the potential to adopt service robots. They identified six aspects, namely government support, the capability of market development and future development of the robotics industry (demand side), capabilities for technology development, raising money, and talent development (supply side) that influence the development of service robots, and the strategic mindset of service innovation in the Taiwanese hotel industry. This indicates that based on purpose and capabilities, hospitality organizations could reconfigure their unique resources to develop

competitive robotics solutions. The findings of Li et al. (2019) demonstrate that hotel employees having higher perceptions of AI are more likely to have higher turnover intentions. They acknowledged that workplace job characteristics, hours spent, interpersonal interactions, and payment models will be affected by robotization. Interestingly, they found that when the firm provides more employee support, the intention to leave decreases.

Similarly, Vatan and Dogan (2021) found that the word 'robot' elicits negative emotions in Turkish hotel staff. Employees expressed concern about hotel robotization, which they fear will reduce the need for the workforce and increase unemployment. Service robots would be a source of goodwill for hotels, attracting guests and helping hotels to compete in the market. However, increasing the usage of robots will instill fear in employees, potentially leading to a higher attrition rate. Besides offering several benefits and advantages, Vatan and Dogan (2021) discovered that robots might create problems during robot-guest interactions. Ivanov et al. (2020) investigated Bulgarian hotel managers' opinions regarding service robots and discovered that managers were apprehensive to adopt robots because they feared they would diminish service quality. Hotel managers agreed, however, that robots would be appropriate for performing repetitive, dirty, dull, and dangerous tasks in hotels, while employees should perform tasks requiring social skills and emotional intelligence. This indicates that employees would concentrate on establishing the guest relationship by providing individualized services and meaningful interactions.

In addition to organizational and employees' perspectives, several studies have been undertaken to investigate the attitude of customers towards the implementation of robots in hospitality organizations. Ivanov et al. (2018a) revealed that males were more positive than females towards the adoption of service robots in hotels. Contrary to this, Ivanov et al. (2018b) found that females were slightly more favorable towards robots than males in the context of Iran. Compared to older consumers, young respondents were more skeptical towards the memorability, pleasure, and excitement of their interaction with robots. These studies, conducted in Russia and Iran, established that respondents prefer robotization in basic support services such as logistics/transporting goods, providing information, and processing payments. They believed that service robots could provide information in more languages, deliver more accurate information, and calculate better than employees. However, robots' ability to perform only in a programmed setting, misinterpret a command, and malfunction during service were the apprehensions of respondents.

Additionally, participants' attitudes toward robots were significantly and positively associated with their perceptions of the experience of being served by robots and feelings of memorability, pleasure, and excitement (Ivanov et al., 2018a, 2018b).

From a sample of more than 1000 customers representing over 87 countries and territories, Ivanov and Webster (2019) investigated the perceived suitability and intention to use robots in the T&H businesses. The findings revealed that providing information, housekeeping activities, processing bookings, payments, and documentation were perceived as the areas for robots' services. Interestingly, the study found that the application of robots was found unacceptable in activities requiring human-robot interaction, personal touch from service personnel, and requiring the guest to provisionally offer his body to a robot (e.g., massages, or hairdressing). Qiu et al. (2020) indicated that the humanlike and intelligent qualities of robots positively influence the hospitality experience of customers. They also suggested that customers' demand for warm services with a personal touch makes it challenging to replace employees with service robots completely. By working cooperatively, robots and employees could facilitate a distinctive hospitality experience. Researchers suggested that hospitality managers could improve their overall experiences by providing more humanlike and more intelligent robots. According to Reis et al. (2020), robots outperform humans when executing standardized jobs due to their mechanical and analytical nature. They also revealed that, in some cases, robots have not yet reached the technological advancement required to completely replace humans, but AI-enabled robots will be able to substitute employees' intelligence.

Tung and Au (2018) examined 329 customer reviews related to human-robot interactions (HRIs) and customer experiences written on TripAdvisor, Agoda, Yelp, and Booking.com platforms for four robot-enabled hotels (Yotel New York, Aloft Cupertino, Henn-na Hotel Japan, and Marriott Residence Inn LAX). The study found that robotic services significantly influenced human perceptions towards novel experiences and thus, customers were interested to interact with the robots. Researchers also reported some challenges regarding language ability, voice commands, and anthropomorphism. Tung and Au (2018) further caution hospitality managers about guests' feeling of discomfort with robots in terms of interactions and obtaining services, given that HRIs are still relatively new in T&H context. Tussyadiah and Park (2018) also established that the human-robot interaction dimensions of anthropomorphism, perceived

intelligence, and perceived safety all had a substantial impact on robot adoption in hotels.

The appearance of robots is another important characteristic in robot adoption research. If a robot is to execute human-like functions, it is believed that it would be superior if a robot is physically and functionally comparable to an individual. However, some studies found that customers prefer machine-like or zoomorphic robots to humanoid robots. Mori et al. (2012) found that humanoid robots will be observed as creepy and consequently less friendly for the service. Similarly, Strait et al. (2017) also revealed that uncannily humanlike characteristics of robots result in negative perceptions of customers. Using data mining techniques and thematic content analysis of YouTube reviews, Yu (2020) revealed that participants' perceptions were negative towards humanlike robots and generated a feeling of discomfort. However, users were more receptive to robots with machine-like characteristics. According to Fan et al. (2016), when customers are alone, they would choose traditional services to automated services. It implies that in the hospitality sector, the application of humanlike robots could be practical when used in public and vice-versa.

From the students' perspective, a recent study by Ivkov et al. (2020) examined the attitude of T&H students towards the adoption of service robots in hotels. They found that expected business outcomes (e.g., cost reduction, efficiency, improvement in revenue, and greater market share) and robots' performance aspects (swiftness, accuracy, and consistency) are the major significant aspects of service robotization. The application of service robots in T&H organizations would have significant impacts on its business, job requirements, and expectations from future employees. Limited academic studies on students' perception towards adopting robots in T&H organizations motivated the researcher to undertake this work.

To summarize, several drivers have necessitated the use of service robots in T&H organizations. Technological advancements, digital-savvy customers, rapid digitalization, the perceived usefulness of technology, and the reduction of high labor costs have been integral in influencing customers' and organizations' preferences for robotization (Kim et al., 2021). In addition, the COVID-19 pandemic has also influenced the adoption of technological solutions in service organizations. Concurrently, a number of academic studies have focused on the use of service robots in T&H organizations. The majority of the research employed Venkatesh and Davis's (2000) technology acceptance model as theoretical framework for assessing stakeholders' acceptance and adoption of robots. Despite the

rapid expansion of robotics in the T&H industry, research on potential managers' perceptions of new technologies and the role of educational institutions in closing the gap by updating course content is still limited.

METHODOLOGY

Thematic analysis is a widely used technique for investigating the perspectives of various research participants and reporting themes found within the qualitative data set. A thorough thematic analysis can yield reliable and insightful results (Braun & Clarke, 2006). Thematic analysis was employed to explore the perception of 80 respondents, focus more on explanation than measurement of phenomena, and understand the similarities and differences in insights provided by respondents. Thematic analysis helps in summing up the significant elements of a huge dataset by requiring the investigator to take a structured methodology to process data and generate a clear and organized final results (Vatan & Dogan, 2021). The prospective respondents for the study were students of T&H courses. To suit the research context, three recognized Indian Universities offering T&H programs, were chosen. The researcher announced the study context to prospective students. Eighty students were selected and interviewed using purposive sampling.

Semi-structured interviews were conducted. The previous works of Kuo et al. (2017), Bowen and Morosan (2018), Tung and Au (2018), Li et al. (2019), Ivanov (2020), Ivanov et al. (2020), and Vatan & Dogan (2021) were used to develop interview questions. Two professors of tourism, hospitality, and technology adoption domain reviewed the set of interview questions. The following questions were designed to accomplish the objectives of the study:

(a) How do you perceive the adoption of robots in service organizations?

(b) What are the possible advantages/disadvantages of robots' adoption in T&H organizations?

(c) Which hotel/restaurant/airport services do you accept to be delivered by robots?

(d) If a service organization plans to utilize robots for operations, then what should be the appearance of the robot? Why?

(e) Do you have any courses related to robotics and AI in your current academic program?

Over the course of eight weeks, online interviews were conducted (between September-November 2020). Each interview lasted 20-30 minutes. Some interviews were recorded with the consent and later transcribed, whereas others were limited to researcher notes. All of the interviews were conducted in English. Ten pages of notes were prepared during the interviews. The transcript of the interviews consisted of 54 pages. To achieve the research objectives, categories, sub-categories, and statements were analyzed. The six phases of the thematic analysis suggested by Braun and Clarke (2006) were employed correctly to identify insightful themes/categories. In addition, summative content analysis, proposed by Hsieh and Shannon (2005) was used to better comprehend categories and sub-categories. In summative content analysis, keywords are identified before and during data analysis based on the interest of researchers or related literature. Two faculty members and four respondents reviewed the categories to ensure validity, reliability, and consistency. Some statements were taken directly from interviews, while others were taken from researcher notes and reworded as best as possible.

FINDINGS

In Table 1, the demographic characteristics of the respondents are presented. Descriptive analyses indicated that 45 (56.2%) participants were less than 20 years old, 27 (33.8%) were 21-25 years old, and the remaining were older than 25. 60% of the sample were male. Considering the educational level of participants, 65 (81.2%) were in their graduation program, while 15 (18.8%) were pursuing their postgraduate program. The graduation programs include BBA Tourism, BBA Aviation Operations, Bachelor in Hotel Management, and BBA Marketing, whereas the postgraduate programs consist of MBA Tourism and MBA Aviation Management.

Table 1. *Demographic profile (n=80)*

Demographics		F	%
Age	Less than 20 Years	45	56.2
	21-25 Years	27	33.8
	More than 25 Years	8	10.0
Gender	Male	48	60
	Female	32	40
Level of education	Under Graduate	65	81.2
	Post Graduate	15	18.8

Perception towards Robots

Firstly, the perception of respondents was examined towards robots and how robots will change modern service organizations. In response to this, respondents shared their views towards perceived benefits and challenges in the applications of robots. Table 2 summarized the categories and sub-categories related to perception towards robots. A majority of respondents mentioned the positive perception towards robots by highlighting the benefits like reduced human effort, guests' delight in receiving services from robots, and improved operating efficiency, increase customer experience, deliver error-free services, responsive and prompt service delivery, and contactless services. The following are some of the responses to this sub-category from the respondents:

"I believe it will reduce human efforts. Robots will be able to complete more tasks in less time." (R12).

"Robots will increase guests' excitement. I believe it will also provide error-free services in a timely and responsive manner." (R45).

"It will improve the operational excellence of hotels. It will undoubtedly arouse the customer's curiosity and make them want to experience it. During the pandemic, it will also ensure contactless services." (R50).

Table 2. *Perception towards robots in service organizations*

Category	Sub-category	Frequency
Positive Perception	Reduce human efforts	40
	Increase experience	12
	Error-free services	6
	Exciting to get services from robots	32
	Responsive and prompt service delivery	18
	Contactless services	12
	Increase operational efficiency	23
	Politer than humans	7
Negative Perception	Issues related to operating/giving a command	43
	Resistance by elderly guests	8
	Loss of employment	27
	Provide standardized services only	5
	Service without emotions	15

However, respondents also mentioned negative aspects of robots such as issues related to robots' operations or giving service commands, loss of employment, lack of emotions, and resistance by guests, especially by elderly customers. Based on the frequency, respondents mentioned a reduction in human work and excitement to receive services from robots as significant advantages to robot adoption. On the other hand, they specified

that dealing with robots or giving commands to robots would be a major issue with guests. The following are some of the responses to this sub-category from respondents:

"I believe that robots and similar technological advancements in the service industry will result in job losses." (R2).

"Although robots will increase guests' curiosity, guests, particularly elderly customers, will undoubtedly encounter difficulties in interacting with and commanding robots." (R75).

"Tourism & hospitality is human-touch industry. Emotions in employee-guest interactions are critical to the success of this human-intensive industry. Human emotions contribute to the customer experience. Robots have no emotions and will not provide services with feelings." (R23).

Table 3. *Possible advantages with robot adoption*

Category	Sub-category	Frequency
For Service Organization	Source of competitive advantage	43
	More customers to experience new technological innovation	22
	Multilingual	8
	Attract young customers	19
For Business Operations	Assist humans in delivering correct and prompt services	12
	Error-free services	16
	24×7 services	23
	Reduce unproductive working hours	6
For Guests	Superior customer experience	14
	Responsive and prompt service delivery	30
	Contactless services	17
	Guest satisfaction	10

Possible advantages and Disadvantages of Robots

Tables 3 and 4 summarized the potential advantages and disadvantages of robots in service organizations. There are three categories of possible advantages and disadvantages, namely, service organization, business operations, and guests. Respondents mentioned that competitive advantage, responsive and quick services, 24×7 services, attracting young customers, and contactless services are significant benefits of robots. They also pointed out that superior customer experience, ability to speak many languages, and error-free services will consequently increase guest satisfaction. The following are some of the responses to this sub-category from the respondents:

"Robots can work 24×7, provide prompt services, and attract more customers for hotels. Consequently, hotels can gain competitive advantages." (R40).

"Robots can assist hotel employees in delivering correct and prompt services. Robots can speak several languages and thus, can interact with guests more personalized manner." (R58).

"During the pandemic, guests are more concerned about hygiene and contactless services. Robots can be used in hotels to provide safe and hygienic services." (R27).

Table 4. *Possible disadvantages with robot adoption*

Category	Sub-category	Frequency
For Service Organizations	High operating cost	43
	Employee resistance	32
	Cost of training and repair	20
	Changes in organizational design	11
	Lack of competent workforce to handle robots	4
For Business Operations	Unable to give a personal touch to services	15
	Technological malfunctions	27
	Lack of persuasion	9
	Not being able to tackle unique problems promptly	13
For Guests	Lack of human touch in services	56
	Less friendly than human	20
	Customer irritation if the service failure	6
	Resistance by elderly guests	30

Respondents also mentioned the potential disadvantages of robot adoption. The top possible disadvantages of robot adoption were services with no human touch, significant operational costs, resistance from employees and elderly guests, and technological malfunctions. The following are some of the responses to this sub-category from respondents:

"The cost of installing robots is excessively high. Robot adoption necessitates a change in physical facilities, employee training, and the hiring of a workforce to maintain robots." (R78)

"Glitches in technology are fairly common. Robot malfunctions may lead to customer irritation and dissatisfaction." (R30).

"Humans provide warm, personalized, and customized services with emotional aspects. Robots are incapable of feeling emotions or understanding the specific needs of guests. Because of this lack of emotional connection and personalization, it will be difficult to implement robots in service organizations." (R21).

Services delivered by Robots

Results presented in Table 5 clearly show that respondents believe that robots can be used in providing basic, repetitive, and less-human intensive services. In hotels and restaurants, robots should be used in three areas of service operations, namely, reception/customer service, food & beverage

services, and housekeeping. The primary services that can be robotized are welcoming guests, providing information, delivering room orders, cleaning the hotel rooms and facilities, luggage carrying, taking orders in the restaurant, and check-in and check-out. Mirroring the findings of Ivanov and Webster (2019), the study found that students believed that these support services would be easiest to robotized as these activities would face the least resistance from guests.

Table 5. *Services effectively provided by robots*

Service Organizations	Category	Sub-category	Frequency
Hotel/Restaurant	Reception/Customer Service	Welcome guest	62
		Check-in & Check-out	25
		Carrying luggage	47
		Escort to room	15
		Providing Information	27
		Payment	20
	Food & Beverage Service	Room delivery of foods	53
		Taking orders	20
		Serving food & beverage	12
		Making drinks in the bar	6
		Table cleaning	26
	Housekeeping	Cleaning the room	53
		Cleaning hotels areas & facilities	18
		Taking & delivering customer orders	30
Airport	Airport Operations	Provide flight information	60
		Check-in counters	40
		Bag drops	32
		Cafes and other facilities	12
		Airport maintenance (Cleanliness, support activities)	25

Robot Appearance

In tourism and hospitality, the interaction with and evaluation of service robots are more direct. Appearance is an important factor that influences the perceptions of employees and guests towards acceptance of robots in services organizations. Realizing the fact that appearance seems a decisive element in accepting robotic services, several researchers examined the customers' preference towards robot appearance and the impact of appearance on robot adoption (Simmons et al., 2011; Strait et al., 2017; Murphy et al., 2019; Yu, 2020). On enquiring about the appearance of robots, respondents indicated that humanoid robots should be used in T&H organizations. A majority of respondents (90%) prefers humanoid robots.

However, a few respondents stated that machine-looking and animal-looking (zoomorphic) robots could be employed in less interactive services.

Table 6. *Appearance of robot*

Category	Sub-category	Frequency
Robot Appearance	Humanoid	72
	Machine-looking	6
	Zoomorphic	2

The following are some of the responses to this sub-category from the respondents:

"The hospitality industry is known as the 'human-touch industry'. Human-like robots will provide guests with a human-like experience. This will aid in the acceptance of robots by guests." (R70).

"Humanoid robots can be used to develop robot-human interactions and emotional connections. Guests will be less willing to accept machine and animal-like robots in the hospitality industry, and they will be more resistant to the use of non-human robots." (R58).

"I believe that service organizations should use humanoid robots to make it easier for people to interact with them. Because of this, people will find it easier and more comfortable to adopt this technology. Humans are attracted to humans the most beautiful. As a human, I prefer to interact with other humans rather than strange machines or animals." (R65).

"I prefer machine-like robots that accurately represent technology. I find humanoid robots creepy." (R44).

Courses-Related to Robots and Artificial Intelligence

Previous studies (Ivanov, 2020; Ivkov et al., 2020) have emphasized that robots and AI will grow and change employees and businesses. Therefore, it is mandatory for the future workforce of the T&H sector must have sufficient knowledge of robot usages and applications. With this intention, the researcher enquired about the courses related to robots and AI in the educational programs of tourism and hospitality students. Surprisingly, academic programs of students do not have any courses on robots, automation, and AI. Some of them have gained basic knowledge of such technological advancements from MOOCs and workshops. The following are some of the responses to this sub-category from the respondents:

"I am a student of Aviation course. I do not have any subject related to robots and AI. However, in some courses, I have been given an overview of robots, self-checking devices, and artificial intelligence. But, I believe that a full subject on Robots and AI must be taught to me." (R31).

"As an undergraduate student, I believe that the industry will be completely different in the coming 2-3 years. Competitive pressure, technological advancement, the growth of robotics, and the COVID pandemic are some of the drivers of these radical changes in the hospitality sector. Robots are here to stay in service businesses. Therefore, I strongly believe that our course curriculum must have courses related to robots, artificial intelligence, cybersecurity, and emerging technologies. This will certainly help us in getting jobs and performing effectively." (R5).

"I took two Coursera courses to understand emerging technologies better. The course content was extremely beneficial in understanding the impact of modern technologies on business organizations." (R20).

Table 7. *Courses-related to robotics in academic programs*

Category	Sub-category	Frequency
Academic degree	Full dedicated credit course	0
	Not such course	62
	Small coverage in some courses	18
Value-added course	Certificate course	0
	Workshop	4
	MOOC (Coursera etc.)	8

DISCUSSION AND IMPLICATIONS

This study sought to examine how T&H students think about the use of robots in service organizations. Data obtained from the interviews with 80 Indian students of T&H programs were evaluated by thematic analysis and summative content analysis. The results indicate that students are supportive of implementing robots in T&H organizations. The technophile nature of the young generation is the main reason for this perception, as Ivanov et al. (2018a) suggest. The findings show that respondents are not uniformly in favor of or opposed to the introduction of robots but have mixed feelings about their use in organizations. The key sub-categories were reduced human effort, customers' excitement about robot services, and better operational efficiency. However, they highlighted the challenges such as the proper functioning of robots, inhuman services, unemployment, and poor acceptance among elderly customers. Robots could enable smarter and more efficient processes in the post-COVID phase, when every organizations strives to reduce costs, give distinctive customer experiences, and maintain a safe physical environment.

As the adoption of robots in the Indian T&H industry is still in its initial stages, robotization of services would be a matter of competitive differentiation for organizations (such as hotels, restaurants, airports, etc.)

and could attract guests. On the other hand, service firms must plan for difficulties associated with robot implementation, such as staff and guests' reluctance to use robots, technical faults, considerable operational costs, human-robot interaction, and robot-friendly workplace architecture. Supporting the findings of previous researches (Ivanov et al., 2018a, 2018b; Vatan & Dogan, 2021), this study attests that students believe that robots could undertake a variety of routine and simple tasks in the T&H industry. Initially, robots should be introduced in services where service organizations face less employee resistance. It is believed that services that require human and emotional skills would be more challenging to robotize. Robots should be used in other operations gradually, based on feedback, customer acceptance, employee readiness, and adequate technological infrastructure.

Possible Advantages

- Source of Competitive Advantage
- Responsive and Quick Service Delivery
- 24×7 Services
- Attract Young Customers
- More Customers to Experience New Technological Innovation
- Contactless Services

Possible Disadvantages

- Lack of Human Touch in Services
- High Operational Cost
- Employee Resistance
- Resistance by Elderly Guests
- Technological Malfunctions
- Cost of Training & Repair

Robot in Service Organizations: Students' Perception

Services Delivered by Robots

- Welcome Guest
- Provide Information
- Taking & Delivering Customer Orders
- Cleaning the Service Facilities
- Luggage Carrying
- Check-in & Check-out

Appearance

- Humanoid

Courses on Robots in Academic Curriculum

- No Course on Robotics, AI and Automated Technologies
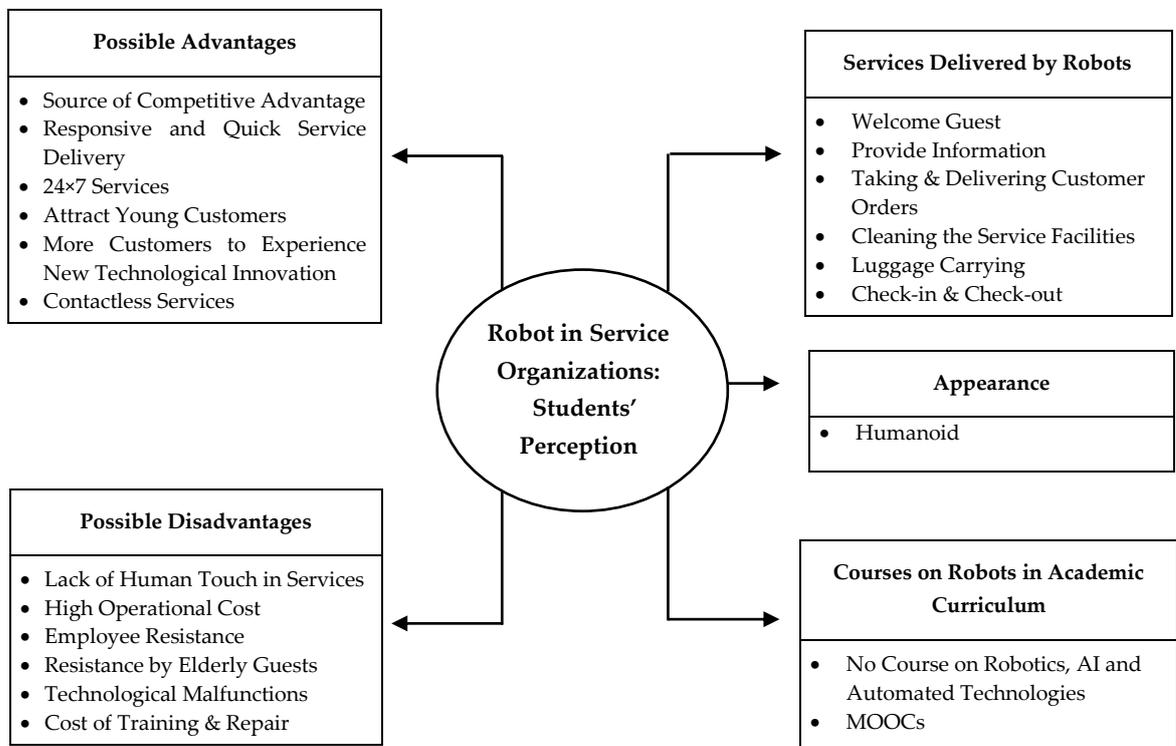- MOOCs

Figure 1. *Robot in service organizations: Summary of findings*

In terms of appearance, humanoid robots were preferred by 90% of respondents. In this high human-touch industry, aspiring professionals support the concept of the humanoid robot to humanize services. It is thought that when a robot has a humanoid appearance, people expect it to behave similarly to humans. Students also perceived that the T&H organizations should use machine-like and zoomorphic robots. In contrast to Bartneck and Kanda (2007), Ivanov et al. (2018b), and Yu (2020), this

study discovered that the more humanoid the robots appear, the more likely customers will be attracted to them. Human-like robots will form emotional bonds with guests, which may result in increased trust. Similar to human-human interaction, Tung and Au (2018) emphasized that humanoid robots can help establish human-robot relationships and social interaction.

Modern technology will transform the nature of work, job positions, and expertise required by the T&H professionals and consequently raise the fear of job loss (Ivanov, 2020). Since advanced technologies such as robotics, AI, machine learning, blockchain, and automation are taking shape every day, today's students must be more prepared for technological changes than any previous generation. Automation would create new technology-based job positions and generate demand for employees with degrees in advanced technologies. Surprisingly, students' academic curriculum does not include any courses on robotics or AI. Students stated that they learned the fundamentals of AI and robotics through MOOCs or workshops. While automation and digitalization trends continue to evolve, higher education institutions must recognize the importance of incorporating technology-related courses into academic programs. Ivanov (2020) flagged up that robotics or AI modules are not incorporated in curricula of tourism/hospitality programs and suggested that it warrants immediate attention. It would be difficult for aspiring managers to match the industry's requirements if they lack sufficient technological knowledge. Incorporation of these courses in the academic curriculum will also reduce the fear of students from technological advancements, changing nature of jobs, and job expectations.

According to the World Economic Forum, a large proportion of organizations will have adopted advanced technologies by 2022, and thus, strongly recommends governments and educational institutions to focus on rapidly improving education and skills, with a particular emphasis on science, technology, engineering, and mathematics. According to a recent Microsoft study, by 2030, students will need to have mastered two aspects of this new world by the time they graduate: (a) the ability to use ever-changing technology such as AI, and (b) the ability to work effectively with others in a team to solve problems. Therefore, to develop a competent workforce for the future, higher education institutions must incorporate courses on modern technologies into academic programs. These courses will help students to realize the requirement and significance of technology for the T&H sector. Webster (2021) opined that the demographic changes are a driver for how governments, industry, and the citizenry will have to

convert into a more robotized economy. Considering the huge labor market, unskilled labors and limited job opportunities, developing and less developed countries should be more careful in framing policies towards increasing automation.

CONCLUSION AND FUTURE DIRECTIONS

Of late, the application of robots and similar other technologies in service organizations has increased. Hence, it is critical to address robot adoption in the T&H settings, as well as its potential marketing implications. In the post-COVID, the T&H organizations should use the robots strategically to provide intelligent solutions, improve efficiency, and deliver memorable customer experiences. Based on the findings, the present study suggests that service organizations should balance the work of employees (high-touch) and robots (high-tech) in such a way where technologies will perform repetitive works, and employees could deliver warm and personalized services. T&H entrepreneurs need to be aware of the fact that human-robot interaction is still relatively new in service organizations and therefore, the preparedness and acceptance of service personnel and customers should be assessed before employing such technologies. Since academic research on robot adoption in the T&H sector of emerging nations is still in the early stage, and there is no specific research on this area in the Indian context, the study is anticipated to fill a critical gap in the literature.

There are several exciting areas for future research. A future study could undertake a longitudinal approach, examining changes in students' perceptions and preparedness over time. In future research, managers could be interviewed to know their perceptions of competitive (dis)advantages of robots and AI in service organizations. Future research might concentrate on analyzing the curriculum of tourism and hospitality programs to assess the inclusion of modern technologies content and students' perceived learning. As the COVID pandemic appears to be recurrent, future studies may investigate the changing perception of managers, employees, and guests toward robotization. In addition, scholars should investigate the influence of robot appearance on guest satisfaction. Lastly, a comparison of robot adoption aspects (such as customer trust, organizational challenges, etc.) in various developed and emerging economies would also be interesting to explore.

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