The application of Robots, Artificial Intelligence, and Service Automation in the Egyptian Tourism and Hospitality Sector (Possibilities, Obstacles, Pros, and Cons)

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Abstract

Robots (R), artificial intelligence (AI), and service automation (SA) (RAISA) technologies are greatly applied in the tourism and hospitality industry around the globe. Research on this area is getting momentum, however, investigating the topic in the Egyptian tourism and hospitality industry has been fairly neglected. This study aims to analyze the application of RAISA technologies in travel agencies and hotels in Egypt. The researchers adopted an in-depth semi-structured interview method and analyze the qualitative data collected from a sample of twenty IT managers and IT assistant managers in travel agencies and hotels. The results confirmed that there are no robots' applications in the Egyptian tourism and hospitality sector. However, there are some AI (chatbots, AI search platforms) and SA technologies adopted (digital kiosks, virtual reality, mobile check-in/out, smart rooms). The main obstacles of applying RAISA are cost and the absence of qualified human resources. From the interviewees' viewpoint, the most significant pros of RAISA are increasing the quality of services provided, improving performance, reducing human mistakes, and overcoming problems related to employees' mental and psychological state. While the cons are huge investments required and decreasing the essential human interactions between customers and employees. Additionally, the interviewees declared that the tourism and hospitality sectors are witnessing significant technological changes in Egypt vision 2030.

1. Introduction

Robots (R), artificial intelligence (AI) and service automation (SA) (RAISA) technologies have become crucial and reliable for companies. This adoption is due to the importance of these technologies on progression and profitability. Countries such as Japan, UK, USA, and China are at the top of the list as they spend billions of

dollars every year to have several RAISA applications. Dwivedi et al. (2019) confirmed that around 70% of companies would be adopting AI by 2030. They also declared that the increasing usage of AI for customer service could save 439 million dollars globally by 2023, up from 7 million dollars in 2019. Regarding robots, the latest studies affirmed that the sale of service robot units worldwide reached 109,543 in 2017, which founded an 85% increase compared to 2016, and this growth is predicted to double approximately seven times by 2021 to reach 736,000 (Berezina, Ciftci, & Cobanoglu, 2019).

The tourism and hospitality industries are not an exception to the adoption of RAISA (Murphy, Gretzel, & Pesonen, 2019). Numerous tourism and hospitality enterprises around the world have come to be more dependent on technological developments at the end of the twentieth and beginning of the twenty-first century. They provide their customers with services and products using these applications such as the internet, websites, social media, mobile applications, virtual /augmented /mixed reality, chatbots, robotics, and self-service kiosks. Tourism and hospitality setting adopt RAISA technologies which have become essential to design and deliver services to their customers (Ivanov, Webster, & Berezina, 2017). Moreover, they use RAISA not only to decrease costs, eliminate waste, and improve productivity, economic efficiency, and financial bottom line, but also to streamline operations, design service experiences, and boost revenues as well, which leads to profound transformations in their business models and the nature of work and improve the overall quality of service (Berezina et al., 2019).

RAISA applicability is widely recognized in different settings (including tourism and hospitality) and several regions and countries. There are numerous studies focused on exploring RAISA in tourism and hospitality in Japan, UK, the USA, and China, (e.g., Tuomi, Tussyadiah, & Stienmetz, 2020). However, it is noteworthy to indicate that less is known about the applicability of RAISA in the Egyptian tourism and hospitality industry. As, there is only one study published in a top-tier journal (Kattara & El-said, 2014) focused on adopting technology in the Egyptian hotels. The study investigated customers' preferences for using technology-based-self-service versus human interactions during their accommodation. Additionally, to the best of the authors knowledge, any of the previous hospitality literature has studied the following issues in the context of the travel agents and hotels in Egypt: the currently adopted RAISA technologies; their available possibilities enable applying RAISA; the application obstacles; the cons and pros of the applicability of RAISA; the future of RAISA technologies in the Egyptian tourism and hospitality industry from the managements' point of view.

Based on the above, there is a need to fill the gap and consider issues related to the implementation of RAISA in the Egyptian tourism and hospitality setting. The current study attempts to make a further contribution by identifying adopted applications of RAISA in tourism (travel agencies) and hospitality (hotels); considering the available possibilities and main obstacles for applying RAISA; exploring advantages and disadvantages of RAISA; realizing the applicability effect on employees; investigating managements plan and vision of adopting new RAISA technologies in

the future; finally, several recommendations of applying RAISA in the Egyptian hospitality and tourism sector.

2. Literature Review
2.1. Robots, Artificial Intelligence and Service Automation in Tourism and Hospitality

Tourism and hospitality companies adopt new RAISA technologies. They use RAISA to improve the quality of operations, increase productivity and profitability, decrease the workload of employees, lower labor costs and provide customers with high-tech entertainment and delight experiences (Ivanov et al., 2017; Drexler, Lapré, & Group, 2019; Lukanova & Ilieva, 2019). The robot is an intelligent physical device with a specific level of autonomy, intelligence, interactivity, mobility, and sensory abilities that let it implement tasks and actions (Wirtz, Patterson, Kunz, Gruber, & Paluch, 2018). There are three types of robots: industrial robots; professional service robots; and personal service robots (Lukanova & Ilieva, 2019). In tourism and hospitality, industrial robots and professional service robots can perform back-office operations like cutting grass and cleaning floors that practically do not interact with humans (Lukanova & Ilieva, 2019). However, personal service robots are automated technology in a physical embodiment with adaptable interfaces (Hin Ho, Tojib, & Tsarenko, 2020). Service robots which are enhanced by AI technologies are more suitable in front office operations, do more sophisticated tasks, and actively communicate with humans (Lukanova & Ilieva, 2019) Moreover, the application and adoption will be widened soon, and technological advances in robots by AI will be implemented to enable them to be more capable of serving customers in tourism and hospitality settings, and implementing various jobs (Ivanov, 2019; Ivanov & Webster, 2019).

AI is a computer system's capability to interpret external data for achieving specific goals and tasks through flexible adaptation (Haenlein & Kaplan, 2019). So, AI is acting, responding, or behaving intelligently and can undertake tasks and solve problems by learning, analyzing, and interpreting data (Prentice, Weaven, & Anthony, 2020). The most prominent examples of AI are the algorithms embedded in different kinds of software such as search engines (e.g., Google), financial platforms, chatbots, or social media networks (e.g., Facebook) (Haenlein & Kaplan, 2019; Lu, Cai, & Gursoy, 2019). Additionally, many services in the tourism and hospitality industry have already been automated by numerous AI software applications (Ivanov & Webster, 2019) like those systems integrated into robots, smartphones, and computers which are utilized in different departments in travel agencies and hotels (Berezina et al., 2019). AI undertake tasks that range from simple like Siri to more artificial superintelligence tasks like sophisticated social skills and creativity (Prentice et al., 2020). travel agencies and hotels implement AI to modernize and accelerate operations and actions, such as a reply to customers' queries, prepare and serve food and beverage, check-in/out processes, room service tasks, demands forecast, and customers' online reviews analysis (Ivanov, 2019; Justin, Bonn, & Haobin, 2019; Tuomi et al., 2020). Based on the abovementioned tasks, AI methods enable tourism and hospitality management to attract customers, identify their emotions, decrease

costs, eliminate waste, advance productivity, reduce errors, increase speed, develop accuracy, improve perceived service quality, streamline operations, design service experiences, boost revenues and enhance customer engagement (Berezina et al., 2019; Ivanov, 2019; Justin et al., 2019; Prentice et al., 2020).

SA is the foundation of self-service technologies (e.g., mobile applications, virtual reality applications, and check-in/out digital kiosks) which are defined as a service delivery method that enables customers to become producers of the service without the necessity of service staff (Davies & Miles, 1998). Hence, a common feature of SA technologies in tourism and hospitality is that they transfer the responsibility of the service delivery process from the employees to the customers who become producers of the service process, help customers to receive information about the destination (Wei, Torres, & Hua, 2016), and reduce their waiting times and service errors (Berezina et al., 2019; Ivanov, 2019). SA develops efficiency and productivity, eliminates language obstacles, reduces labor costs, and brings enjoyment and entertainment for guests (Li et al., 2019; Wirtz et al., 2018).

In addition to the previously mentioned tasks, RAISA technologies have several benefits and some risks. RAISA can: increase productivity, efficiency, and cost savings (Tussyadiah, 2020) work 24 hours each day 7 days a week (Berezina et al., 2019); expand their scope with software and hardware upgrades; fulfill their work correctly by following the scripts of service procedures during a timely manner; improve quality of their work; perform routine work repeatedly (Ivanov & Webster, 2017). They also do not continue strikes, spread rumors, discriminate against customers or employees, quit their job all of a sudden, show negative emotions, shirk work, invite pay increases, sue their employer, or get ill, etc. (Ivanov & Webster, 2017). Despite all these pros, RAISA technologies have some significant cons: the potential risk of losing human contact (guest-host connections); they lack creativity and private approach; and they will not be completely independent of human supervision (Ivanov & Webster, 2019; Tussyadiah, 2020). Additionally, they need large technological advances to be more attractive for tourism and hospitality companies and to be able to do more sophisticated tasks than current robotic technologies which are challenged by simple tasks most humans can easily do (such as turning a handle and opening a door) (Li et al., 2019).

2.2. RAISA Technology in Travel Agencies (TAs)
travel agencies drive activities and operations in their everyday work which can be divided into two major sections: 1) operations, connected with direct interactions with clients (or business-to-clients/B2C relations), and 2) internal operations and relationships with partners and suppliers (or business-to-business/B2B relations), performed outside of the client's site (Ivanov & Webster, 2019). The first group of activities (B2C) relevant to the front office operations of the travel agencies. Front office operations include all interactions with customers concerning planning, preparing, and implementing a trip (Cohen, Prayag, & Moital, 2014).

There are many RAISA technology applications adopted by travel agencies to manage B2C operations before, during, and after a trip. First, before a trip, travel

agencies can apply: AI software to enhance customers' searching and booking, chatbots incorporated in their websites, automation of payment transactions, and many other applications. A customer plans for a trip and searches online on the destination website. He/she might decide to use the services of an intermediary, rather than searching by himself/herself. In this stage and in favor of RAISA technologies, the travel agency utilizes AI software that links destinations' websites with the travel agency website. The specialized software applications directly (automatically) transfer him/her from the destination website to the travel agency website (Kelly, Lawlor, & Mulvey, 2017). These software applications behind the website ensure fully automated services and real-time availability and automatic adjustment of customers' preferences and filters (Zsarnoczky, 2017).

Travel agencies integrate chatbots in their websites to answer questions and help in clarifying details. (Ivanov & Webster, 2019). Travel agencies can adopt virtual reality which enables customers to experience a real-time simulation of a certain place of interest for them, stimulate their senses, and enhance their feelings of physical immersion into the virtual world (Wei et al., 2016; Kelly et al., 2017;). Consequently, virtual reality assists the sales process in Travel agencies by facilitating customer's decision to select a particular travel product (Kelly et al., 2017). After that, customers precede on with the payment transactions and Travel agencies usually integrate payment applications in their websites to proceed immediately with the payment, or to guarantee the booked services (Kim, Tao, Shin, & Kim, 2010).

During the trip, customers sometimes need support or additional assistance for navigation and on-site service shopping. For such cases, many Travel agencies have developed mobile applications to aggregate all travel details, often as an extension of the Travel agency's website or booking platform. Similarly, QR codes are used for obtaining useful information on the spot, or for registration and entrance tool, substituting tickets and documents (Zsarnoczky, 2017).

After the customers come back from their trip, they are invited to provide feedback through an automatic alert. Installed applications from the Travel agency's platform or website may ask the customers to evaluate and share their experience from the trip (Ivanov & Webster, 2017). Often, those evaluations may be additionally shared in social media, thus automatically disseminating the evaluation and the customer's experience among his/her friends and contacts (Keller, Schmidt, Möhring, & Bayer, 2016).

The second group of activities in Travel agencies is B2B which encompasses back-office operations and administrative procedures such as accounting, internal communication, and coordination among all employees, establishing relationships and connections with the partners (primary suppliers, other intermediaries, and institutions). Those operations might be subject to automation and substitution by machines (Ivanov, 2019; Ivanov & Webster, 2019). Travel agencies adopt specialized software and the most common features of the cover: central reservation system, booking engine, quote management, itinerary creation, customer relationship management (contact information, travel, and purchase history, personal details,

complaints management, etc.), marketing functions (options to directly share of quote products and materials from the system; possibility to insert temporary discounts and promotions), payment processing, accounting, and reporting (transactions overview, reports, and documents issuance) (Kelly et al., 2017). Some of those features are strictly front or back office-related, but since the essence of Travel agency work is to connect, most of the software functions serve both departments (Zsarnoczky, 2017). In TAs, B2B connections can perform simultaneous confirmation and allocation of the booking in the supplier's systems, and do different customized functions (Keller et al., 2016).

2.3. RAISA Technology in Hotels

Hotels adopt various RAISA applications for many purposes. Service robots designed to have a human appearance (Lu et al., 2019) and deliver different levels of services to hotel customers ranged from simple tasks to more sophisticated ones (Hin Ho et al., 2020). Some robots can greet customers, check customers in and out, carry luggage, clean rooms (e.g., Henn na Hotel, Tokyo) (Buhalis & Leung, 2018; Lin, Chi, & Gursoy, 2020). Some other robots can navigate the hotel, use the elevator, and call the guest room to deliver requested items to the customer's doorstep (e.g., Aloft Hotels) (Ivanov et al., 2017; Lu et al., 2019). Others provide information and virtual assistance to customers (e.g., SARA in Singapore hotels) (Naumov, 2019). While other robots (intelligent interactive service robots enhanced by AI) (Tussyadiah, 2020) can perform complicated tasks such as to communicate with customers, answer their inquiries about hotel facilities and services, and give them suggestions for near attractions (e.g., Hilton Hotels and Henn na Hotel) (Ivanov et al., 2017; Lin et al., 2020; Prentice et al., 2020). Accordingly, hospitality firms can adopt digital advanced robots to perform various types of services and provide customers with unique experiences for satisfying their needs in a cost-effective and cost-efficient way (Naumov, 2019). In favor of the aforementioned benefits of robots, recent statistics confirmed that around 75% of customers believe robots can enhance service experience (Lu et al., 2019).

AI has also gotten in hospitality in several ways. The most popular examples of AI technologies used in hospitality are smart hotel rooms; reviews tracking software; customer statistics monitoring software, and chatbots. AI enables hospitality managers to present intelligent/smart hotel rooms that allow the guest to interact in-room facilities via beacons and sensors (e.g., Marriott International) (Buhalis & Leung, 2018) or verbally control his/her room atmosphere (Lin et al., 2020). Hence, AI can participate in improving guest's accommodation comfortableness (Buhalis & Leung, 2018). AI applications adopted for these purposes are such as Alexa on Amazon's Echo (Alexa digital assistant) (e.g., Wynn hotel in Las Vegas) (Ivanov et al., 2017; Lukanova & Ilieva, 2019), Siri and Cortana (Lu et al., 2019). For tracking customers' online reviews, AI software like ReviewPro enables managers to track reviews on social media and travel websites for monitoring hotel online reputation (Buhalis & Leung, 2018). There are other AI software customer statistics on social networks; as it enhances hotels to recognize customers' preferences based on their previous online bookings, video recommendations on YouTube (Naik & Daptardar,

2019). Hence, hotels can properly manage online ads, and social media feeds to obtain sales growth (Naik & Daptardar, 2019). Chatbots are a significant AI technology that can be understood as software that stimulates a human counterpart that the user can interact with (written, oral, or mixed) (Ukpabi, Aslam, & Karjaluoto, 2019). Hotels can utilize chatbots integrated into massaging apps like Facebook Messenger and What's app (Tussyadiah & Miller, 2019) for replying (in different languages) to customers' inquiries (Prentice et al., 2020), and helping in hotel bookings (Naik & Daptardar, 2019). The advantage of chatbots is that it enriches the pre-arrival engagement by presenting a personalized hotel experience (e.g., Marriott Hotels) (Ukpabi et al., 2019). Additionally, Chatbots are also helpful in responding to customers' feedbacks (Naik & Daptardar, 2019). In conclusion, AI in hospitality is not only used as a tool to increase efficiency and effectiveness but also to develop customer experiences and improve performance (Buhalis & Leung, 2018).

SA is widespread in the hospitality industry. In 2016, the American Hotel & Lodging Association confirmed that 65% of hotel owners in the US had adopted mobile check-in for their customers; additionally, the Four Seasons Hotel Los Angeles at Beverly Hills declared that a 41% increase in room service revenue per-occupied room (Lukanova & Ilieva, 2019). Hence, hotels around the world adopt SA technologies such as self-service kiosks and mobile (smartphones) check-in/out applications (Tussyadiah, 2020) which enable guests to finish check-in and check-out procedures and create their room key without any assistance from front desk staff and automatically receives his/her hotel bill on his email (Ivanov et al., 2017; Shin & Perdue, 2019). Moreover, Hilton Hotels works with software companies and develops a digital kiosk at the airport's baggage claim area that makes it easy for guests to make the hotel check-in at the airport (Lukanova & Ilieva, 2019). SA not only remove the burden of routine actions from front office agents and eliminate the waiting time at the reception, but also enable employees to focus on some other essential tasks like giving a good first impression to guests depending on the value of face-to-face contact (Lukanova & Ilieva, 2019; Naik & Daptardar, 2019), improve firms' success, increase profitability, enhance service quality, standardize service delivery, reduce labor costs (Shin & Perdue, 2019), stimulate productivity and expand efficiency (Naumov, 2019).

3. Methodology
3.1. Sample
The current study aimed at investigating the applicability of RAISA technologies in the travel agencies and hotels in Egypt. To establish the suitable standards for selecting travel agencies and hotels, the researchers selected the top 10 travel agencies in Egypt and 10 hotels from several international chains. On the one hand, the researchers collected data from Travco, Meeting Point, Cairo Express, Masters Travel, Travel Ways, Flash Tours, Sky Max, UpperCrompy, Sun International, and Begas (Ministry of Tourism 2020). On the other hand, the researchers chose 10 hotel brands from international chain companies such as Marriott Bonvoy (Marriott and Sheraton), Accor Hotels (Sofitel and Movenpick), Hilton Hotels and Resorts (Hilton), and Steigenberger Hotels and Resorts (Steigenberger). Additionally, the variety of the

geographical distribution of hotels was taken into consideration to include Cairo, South Sinai, and the Red Sea. The selected sample is leading travel agencies and hotel brands around the world. In conclusion, the study depended on the abovementioned travel agencies and hotels because the likelihood of applying RAISA technologies at such enterprises is more than any other travel agency or hotel brand in Egypt.

The present study collected data from 20 IT managers and IT assistant managers. IT managers and IT assistant managers are the best-qualified employees in travel agencies and hotels to answer questions about the applications of RAISA, the possibilities, circumstances of applying RAISA technologies, and the advantages and disadvantages of such new technologies. After the twenty interviews, no additional themes manifested. As such, saturation was considered to have been achieved, and data collection was stopped (Saunders, Lewis, & Thornhill, 2016). Most of respondents were male (90%), and the majority of them were IT managers (70%) with more than 9 years of experience in the position (65%).

3.2. Data Collection and Analysis

For fulfilling the objectives of the current study, the researchers adopted the qualitative approach based on in-depth interviews. An interview is an important qualitative data collection method used for extracting more detailed information or a deep understanding of a subject or concept. Participants in an in-depth interview are encouraged and promoted to talk in-depth about the topic under study (Alshenqeeti, 2014; Srivastava & Thomson, 2009) An interview is not mandatory for a meeting, but it can be conducted over phone calls, or through various forms of applications supported by only audio or both audio and video without the physical presence (Saunders et al., 2016). The current study collected data by conducting 20 in-depth interviews via phone calls, from July to September 2020, and the researchers recorded the interviews after verbal agreement from the respondents. The duration of calls ranged between 10:50 minutes and 28:14 minutes, and the average duration of the interviews was 14:42 minutes.

The researchers conducted semi-structured interviews to explore: the currently adopted RAISA technologies at the travel agencies and hotels they are working for, the available possibilities to apply RAISA technologies, RAISA applicability circumstances and perceived difficulties related to the introduction of novel technology, the advantages, and disadvantages of RAISA applications from their point of view, RAISA technologies likely to be adopted in the Egyptian tourism and hospitality industry shortly, as well as the impact of RAISA on human resources management practices.

After collecting all the opinions and interviews' comments, the qualitative data from the interviews were analyzed through qualitative analysis. Qualitative analysis means analyzing the interview to identify the main themes that emerge from the answers of the respondents. The study identifies and analyzes the responses of the interviewees, and summarizes the data to conclude findings, and recognizes the objectives of the study.

4. Results

The researchers pointed to the IT managers and IT assistant managers in travel agencies as I1, I2, and I3…. I10 and in hotels as I11, I12, I13…I20. The comments and responses of them are explained as follows:

Travel agencies	Hotels
How far IT managers and IT assistant managers are knowledgeable about RAISA	
All the interviewees are knowledgeable about RAISA. Three interviewees are "extremely familiar", three interviewees are "very familiar", and four of them are "moderately familiar".	All the selected samples are knowledgeable about RAISA. Six interviewees are "extremely familiar", and four of them are "very familiar".
The currently adopted robot technology	
All the selected samples confirmed that the travel agencies have not adopted any robot applications in their tourism companies yet.	All the interviewees agreed that there are no robot applications in the Egyptian hotels at this moment. However, I12, I18, and I20 declared that in the new Egyptian administrative capital there are two hotels under construction and will start working soon. Both hotels compete to have strong infrastructure and facilities design that enable them to present modern hospitality services supported by new technologies such as robots. They added that these hotels would move the Egyptian hospitality industry to a new sophisticated stage allow the Egyptian hospitality industry to keep up with changes that occur around the world.
The currently adopted AI technology	
Chatbots I2 and I4 declared that their website or social media pages support chatbots. However, I1, I3, I5, and I6 confirmed that the direct interactions between service providers and customers are essential in the tourism sector. As human contact encourages customers to make purchasing decisions. **AI search platform (website)** Several travel agencies have started establishing websites that gather all their	AI technologies in hospitality are different but the interviewees are familiar with smart hotel rooms, and chatbots. **Smart room and smart meeting room** Limited smart rooms and smart meeting rooms services arose in Egypt in 2019 and exist in some Egyptian hotels, especially luxury ones. I11, I12, I14, I16, I17, and I20 concurred that their hotels' rooms; specifically, "presidential suites" have limited smart room services. These services are such as

tour packages information. This technology is used recently in travel agencies. All the interviewees agreed that their travel agencies provide these applications for their customers.

I1, I3, and I5 stated that depending on these applications the customer can not only buy airline tickets or hotels' rooms but also, s/he become able to make an electronic payment without the need to go to the front desk. So, platforms and websites enable presenting and reserving the tour programs, airline tickets, hotels' rooms, and any other component of the tourism product.

controlling light, AC, TV, windows, curtains, and other room devices using tablets or mobile applications. They also agreed that the smart room services they provide are not supported by voice assistant applications.

Regarding smart meeting room services, I17, I18, and I20 stated that they provide smart meeting room services. These services enable customers to control light, AC, curtains, windows, and many other meeting devices using mobile applications or tablets.

Chatbots

Despite the popularity of chatbots as one of the AI technologies, all the interviewees confirmed that their website or social media pages do not support chatbots. They insisted that the two main reasons for this are: First, the official website of a hotel gathers thousands of hotels under the same chain management company which makes it difficult to insert automatic responses suitable for different inquiries. Second, hospitality services diverse from a hotel to another, and it would be hard to depend on chatbots as a sufficient communication tool in that case. Additionally, hospitality enterprises in Egypt see that human contact in chatting online is more effective and appropriate in the hospitality sector.

The currently adopted SA technology

Digital kiosks
A small number of those interviewees have digital kiosks that enable customers to order services such as booking a tour or an airline ticket.
I1, I2, I3, and I4 confirmed that the use of digital kiosks is not beneficial to many customers because they do not provide advice to the customer about the best times to travel or the best tourist programs suitable for his/her interests, the

Digital kiosks
A limited number of Egyptian hotels have digital kiosks that enable customers to make check-in/out, find out and order hotel services, and many other purposes.
I16 and I17 declared that digital kiosks are utilized especially in the city center hotels, airport hotels, and hotels' business centers to provide some services to customers and reduce crowding at the front-office.

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best way to go to the destination and other important information about the tour.

Order services
travel agencies began to use mobile applications to help customers discover and request the various services offered by the company.

I1, I2, and I4 confirmed that they provide applications not limited to providing services to customers and reserving them, but these applications provide an electronic payment service.

While the interviewees I9 and I10 declared that their applications are limited to identifying and ordering the service without paying online, and they are making many efforts to overcome this problem and make the payment service available online.

Virtual reality
All the interviewees established that their travel agencies provide virtual reality applications that enable customers to watch a mini video of all the elements of the tourism product and facilities that will be provided to them during the trip. Virtual reality enables travel agencies to encourage their customers or expected customer to make purchasing decisions.

Ticket machines
All the interviewees stated that there are ticket machines in the travel agencies to sell and issue airline tickets.

Order services
Hotels in Egypt have started enabling customers to find out hotel services using mobile applications.
I11, I14, and I19 declared that several hotels in Egypt provide applications that enable customers to determine hotel services, request them, and make an online payment. While some other hotels' applications are limited to recognize and order the service without online payment. They added that the Egyptian hotels at this stage exerting efforts to develop and upgrade their applications to overcome this limitation and make online payment available.

Mobile check-in/out applications
Although mobile applications that enable check-in/out are utilized in hospitality for many years ago outside of Egypt, this technology is used recently in hotels in Egypt. All the interviewees agreed that their hotels provide these applications for customers that enable them to check-in/out without any need to contact directly with the front office employees.
I15 declared that the customer depending on these applications can not only make check-in/out, but also, can open their rooms using QR codes on their mobiles (which is called keyless solution). I18 and I20 added that some hotels provide self-complete check-in/out by enabling electronic payment without the need to go to the front desk, and some others are planning to provide this service soon.

Available possibilities to apply RAISA technologies

The interviewees I1, I2, I3, I4, and I6 confirmed that they have a strong electronic infrastructure and facilities design that helps them adopt RAISA

In general, interviewees declared that the new hotels could adopt RAISA technologies as they have strong infrastructure and facilities design that

applications. However, I8 and I9 demonstrated they can't apply new RAISA technologies according to their poor infrastructure or facilities design.	enable them to upgrade and keep pace with technological changes. However, the old hotels cannot apply new RAISA technologies according to their poor infrastructure and facilities design, and they need huge investments to improve their current ones. I8 demonstrated that the Egyptian hospitality sector is witnessing major progression because the Egyptian government focuses its efforts and investments on applying new technologies in different industries. This is obvious in the new administrative capital where the investors, as well as the government, are establishing new hotels present hospitality services depending on several RAISA applications.
RAISA applications obstacles	
I7, I8, and I10 demonstrated that the biggest obstacle they have in applying RAISA techniques is the cost. This is because the costs of developing the electronic infrastructure or operating and maintaining these technologies are very expensive. I1, I2, and I6 declared that most customers in the travel agencies have concerns about booking and paying for the tour electronically and prefer human contact with Egyptian employees who are famous for their cooperation and provide them with advice on any details of the package tour. However, I6 declared that the poor level of internet communication is one of the main obstacles to the application of RAISA. All interviewees demonstrated that they are organizing training programs for their employees to educate them on how to use these technologies.	Interviewees agreed that the most important obstacles of applying RAISA technologies in hotels are cost, the absence of the human resources who have the qualifications and skills to operate and maintain these technologies especially robots, and the type and desires of Egyptian hotels' customers. Regarding cost, I11 emphasized that the cost of upgrading infrastructure and facilities design, and purchasing, operating, and maintaining robots, SA appliances, and AI software is the main obstacle. I13 added that "technology is expensive and needs continuous upgrading". According to human resources, I13, I16, I18, and I19 said that the absenteeism of qualified local employees who can use or maintain RAISA technologies in the hospitality sector is one of the main barriers. Concerning customers' requirements and desires, I11, I12, and I17 asserted that most customers in the hotels and resorts (especially in the Red Sea and South

	Sinai) prefer human contact with Egyptian employees who are famous for their good hospitality. Accordingly, from the hospitality management's point of view in some Egyptian destinations, there is no need to apply or adopt some of RAISA technologies (especially robots) that could eliminate or decrease the direct customer-brand contacts and relationships. However, I17 and I18 declared that the case in city center hotels is different as the customers' type and needs and desires are dissimilar.
The advantages and disadvantages of RAISA technologies	
Advantages The interviewees I1, I2, I3, I4, and I5 illustrated that the applications of RAISA have many advantages, including increasing the quality of services provided, improving performance and productivity, and creating a positive image of the Egyptian travel agencies, and promoting the marketing efforts of travel agencies, saving costs of salaries. I7 and I8 explained that one of the important advantages of applying RAISA technologies in travel agencies is its role in decreasing direct contact between employees and customers, especially in the pandemic of Covid-19. I10 declared that these applications must be adopted to satisfy customers and to keep pace with the Egyptian government requirements in applying technological techniques in various industries. This will lead to noticeable progress in the Egyptian tourism sector.	**Advantages** All the interviewees confirmed that the application of RAISA in Egyptian hotels has several pros. I11 I12, I13, I15, I17 and I20 explained that RAISA technologies increase the quality of hospitality services provided, improve performance and productivity, enable the hotels' managements to control the operations, decrease errors and human mistakes, reduce problem happen according to the mental and psychological state of employees, and save costs in the long run. I14 and I16 declared that RAISA technologies are good for customers who don't need face-to-face or human contact, especially in the pandemic of Covid-19 and the need for social distance. They also expected that it will be mandatory for hotel managers to apply essential RAISA technologies that enable social distance. Further, I18 and I19 confirmed that decreasing the number of hotels' employees is one of the advantages which help managements to reduce costs of salaries.
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Disadvantages	**Disadvantages**
On the other hand, there are some disadvantages of the RAISA adoption in travel agencies. I10 one of the disadvantages of the RAISA applicability has reduced the role of mediators from the travel agency. I2 and I3 illustrated that applying RAISA technologies needs huge investment which represents a significant circumstance for travel agencies in Egypt. While interviewees I4, I5, and I7 emphasized that applying RAISA technologies decreases employee-customer contact, and the tourism industry is a service industry, this lack of communication affects the quality of the service provided to the customer.	Regarding the cons of RAISA applicability in the Egyptian hospitality industry, I12 and I14 said that RAISA needs huge investment which represents a great burden on the hotels' management in Egypt. In the same context, I13, I16, I18, and I19 declared that the absenteeism of local employees who can operate and maintain RAISA applications, will force the managers to employ foreign specialists who have the expertise to deal with these new technologies, and employ them will cost the hotels' managements additional expenditures. While, from I11, I12, and I17 point of view, applying RAISA technologies decreases face-to-face communication between customers and service providers. They added that the hotels will lose one of their features because the Egyptian hotels are known for their unique hospitality.
The impact of RAISA on human resource	
All interviewees agreed that RAISA applications are not and will not replace employees, especially in the tourism sector in Egypt, and this means that the negative effect of implementing RAISA on tourism companies' employees is to reduce the number of employees in some positions and are not completely dispensed. As for the positive impact of the application of RAISA on human resources, interviewees I3, I4, and I5 asserted these technologies will assist employees in performing their jobs in less time, with less effort, and with high quality.	On the one hand, I11, I12, I13, I14, I15, I19, and I20 stated that RAISA technologies have a positive effect on hospitality employees. They stated that these technologies are helping them in doing their jobs by saving their time and effort. Additionally, I14 and I19 declared that RAISA technologies are not and will not replace human resources in the hospitality sector, especially in Egypt. On the other hand, I16, I17, and I18 illustrated that the negative effect of the applicability of RAISA on hotels' employees is that they might decrease the number of workers in few positions. They concluded that RAISA adoption in hospitality represents a threat to employment.

RAISA technologies likely to be adopted in the Egyptian tourism and hospitality industry shortly	
I1, I2, I3, and I4 confirmed that a limited number of RAISA technologies are already applied in travel agencies. Based on this, travel agencies in Egypt strive to implement new technologies and the issuance of mandatory decisions to improve the level of service provided to keep in step with global changes in tourism.	I11, I12, I13, I16, I17, and I18 declared that several RAISA technologies are already applied in the Egyptian hospitality setting and will witness additional improvements shortly to keep pace with global progress in hospitality. This returns to that the Egyptian government is heading towards applying new technologies and issuing mandatory decisions in this regard. Additionally, I16 and I17 stated that the luxury chain hotels will have the largest portion of the progression.

5. Discussion

The findings demonstrate enrichment of knowledge on understanding the current situation of adopted RAISA technologies in the travel agencies and hotels in Egypt. First, regarding the currently adopted RAISA technologies; the interviewees confirmed that there are not any robots' applications in the tourism and hospitality sector. These results imply that the travel agencies and hotels need more support from management to develop the current robotics applications adopted. This result is in the context of Berezina et al. (2019), as they recommended that the future of robotics in hospitality is promising, and the increase in the number of robot units manufacturing and applying in different settings is expected.

Second, Hotels in Egypt have adopted AI embedded in several SA technologies such as the case in "limited smart room" and "smart meeting room" services which exist in some hotels, especially luxury ones (presidential suites). Hence. the adoption of AI applications is still narrow. This is because, tourism and hospitality management are believing that the industry in Egypt has a unique nature and is characterized by the warm interactions between service providers and customers. For example, they see that human contact in chatting online is more effective and appropriate in the tourism and hospitality sectors.

Third, based on the study findings, SA is widely adopted in the travel agencies and hotels in Egypt. They use digital kiosks especially in the city center hotels, airport hotels, and hotels' business centers; virtual reality which enable customers to watch a mini video of all the elements of the tourism product and facilities; mobile check-in/out that make check-in/out easier by allowing electronic payment without the need to go to the front desk. Although SA technologies mentioned above are utilized in tourism and hospitality for many years ago outside of Egypt, these technologies are used recently in Egypt.

Fourth, regarding the available possibilities to apply technologies, the strong infrastructure and facilities design is essential for the applicability of efficient RAISA

technologies. The results indicated that the travel agencies and hotels in Egypt have good infrastructure and facilities design-assist them to implement RAISA. However, the old ones which built for five years or more have poor infrastructure which cannot support adopting such new technologies and they need huge investments to perform improvements.

Fifth, to develop and present smart tourism and hospitality services, several challenges and obstacles need to be addressed and overcome. The findings recommended: 1) Cost: technology is expensive and needs continuous upgrading for infrastructure and facilities design, and purchasing, operating, and maintaining RAISA technologies. 2) The absence of skilled and qualified human resources who can use RAISA applications is one of the main circumstances. 3) Customers' requirements and desires: Most customers who are coming to Egypt for leisure or recreation purposes (especially the Red Sea and South Sinai) prefer human contact with Egyptian employees who are famous for their hospitality. Additionally, many of them have concerns about booking and purchasing the tour electronically. Accordingly, from the tourism and hospitality management's point of view in some Egyptian destinations, there is no need to adopt sophisticated RAISA technologies (especially robots) that could eliminate or decrease the direct customer-brand contacts and relationships. Nevertheless, the situation in city center hotels is different as the customers' types, needs and desires are dissimilar. In sum, cost, absence of qualified employees, and customers' desires are the most significant circumstances which should be overwhelmed and overcome.

Sixth, the findings showed several advantages and disadvantages of applying RAISA. On the one hand, the most significant pros of RAISA are increasing the quality of services provided, improving performance and productivity, promoting marketing, reducing human mistakes, overcoming some problems related to employees' mental and psychological state, and decreasing the number of hotels' employees and costs of salaries. This result is consistent with Berezina et al. (2019) and Drexler et al. (2019) as they confirmed that RAISA reduces errors, enable portion control and therefore cost control, work long hours, no time off, no vacation, no sick days required, decrease labor costs which account for around 33% of the total expenditures and therefore RAISA will assist in total costs reduction. Additionally, RAISA technologies are suitable for customers who do not need face-to-face or human contact, especially in the pandemic of Covid-19 and the need for social distance. It is expected that it will be mandatory for hotel and travel agency managers in Egypt to apply essential RAISA technologies that enable social distance. On the other hand, regarding the cons of RAISA applicability in travel agencies and hotels in Egypt, the results confirmed that RAISA requires huge investments for purchasing such new technologies. Moreover, as mentioned earlier, there are no qualified employees to operate or maintain RAISA applications, and the shortage of local human resources will compel management to employ foreign specialists with big salaries. One of the main cons of RAISA is that it decreases essential human interactions between customers and employees, and this type of communication is crucial from the Egyptian management point of view especially for customers who seek leisure and

recreation. This finding is consistent with the study of Kattara and El-said (2014) who investigated customers' preferences in South Sinai (Sharm El-Sheik) for using technology-based-self-service versus human interactions during their accommodation and confirmed that hotel customers prefer to be served by hotel employees rather than using innovative technology.

Seventh, according to the effect of RAISA applicability on human resources, a group of respondents agreed that RAISA technologies have a positive effect as they are helping them in doing their jobs by saving their time and effort; additionally, they will never replace human resources in the tourism and hospitality sector, especially in Egypt. However, another group of respondents declared that RAISA affects negatively because they might reduce the number of employees in some positions. They concluded that RAISA adoption in tourism and hospitality represents a threat to employment. The researchers suggested that RAISA will not replace humans in tourism and hospitality in Egypt, but it will make some changes on the sector employment conditions, affect the need for different skills to be required to match the new requirements. In conclusion, RAISA is not replacing employees, but they are helping them in doing their jobs.

5.1. Conclusion

The study illustrated that tourism and hospitality enterprises in Egypt do not adopt any of the robots' applications, but they will implement them soon. However, they are adopting some AI and SA technologies. Most travel agencies are applying AI (AI search platform- Chatbots) and SA (digital kiosks, order services, virtual reality, and ticket machines). While the hotels in Egypt are adopting AI (smart room and smart meeting room), and SA (mobile check-in/out applications, order services, and digital kiosks). The capabilities of applying RAISA in travel agencies and hotels in Egypt are the strong infrastructure in new enterprises and facilities design. However, the obstacles are cost, absenteeism of qualified employees to operate and maintain such new technologies, and the customers' preferences of face-to-face customer-employees communications. Pros of RAISA applicability are improving the quality of services, performance, and productivity, and creating a positive image of Egyptian destination, saving costs of salaries, and reducing face-to-face communication and this is consistent with the new restrictions of the pandemic of Covid-19 and social distance. Cons include the need for huge investments to be incurred by the tourism and hotel administration to apply these technologies and this represents a great burden.

5.2. Recommendations

Travel agencies and hotels' managements in Egypt should realize the significance of robots and SA applications during the pandemic of Covid-19. As, these technologies enable them to implement the social distance by decreasing the direct contact between employees and customers besides reducing the duration of the proximity between both and significantly influences the risk of infection. They also must recognize the advantages of RAISA applicability in enhancing service quality, saving costs, and creating a positive image.

Old enterprises must set budget to upgrade their poor infrastructure which cannot support adopting new RAISA technologies and recognize that this is not wasting money but applying these technologies have become necessary. Additionally, they should realize that the money they cost return to them at the long term.

Management and decision-makers at travel agencies and hotels should realize that the cost of applying RAISA at this moment could save money in the long run such as costs of employees' salaries, training expenses, and absenteeism. So, they have to change some managerial beliefs, reshape their policies, and rearrange their budget priority.

To overcome the absence of skilled and qualified human resources; tourism and hospitality management should organize training programs for their employees and train them on how to use these new technologies. Moreover, they must educate them that RAISA technologies are not replacing them, but they are helping them in doing their jobs.

The management of the travel agencies and city center hotels, that host customers traveling for business who desire fast services without long waiting at the front desk and do not give too much attention to the human contact, should start to cope with the new technological developments.

Finally, the Egyptian government, by following in the footsteps and recommendations of Egypt vision 2030, focuses its efforts and investments on applying new technologies in different industries. It should also head towards applying these technologies in the tourism and hospitality industry and issuing mandatory decisions in this regard to make them keep pace with global changes.

5.3. Limitations and Future Research
First, the current study collected data from travel agencies and hotels in Egypt. Researchers in the future should explore RAISA in other tourism and hospitality enterprises such as airports and restaurants. Second, the study concluded a general investigation of the effect of RAISA applicability on tourism and hospitality employees. Future studies need to provide more in-depth investigation and explore the extent of the impact of RAISA technology on employees' turnover, satisfaction, loyalty, and engagement. Third, the study collected data depending on one data collection method (interview), future studies should adopt different methods such as observation and questionnaire.

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تطبيق الروبوتات والذكاء الاصطناعي وأتمتة الخدمة في قطاع السياحة والضيافة المصري (الإمكانيات والمعوقات والإيجابيات والسلبيات).

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الملخص

يتم تطبيق تقنيات الروبوتات والذكاء الاصطناعي وأتمتة الخدمات (RAISA) بشكل كبير في صناعة السياحة والضيافة في جميع أنحاء العالم، ومع ذلك، فإن تناول هذا الموضوع في صناعة السياحة والضيافة المصرية لم يلق الإهتمام الكافي. فتهدف الدراسة إلى إلقاء الضوء على تطبيق تقنيات RAISA في وكالات السفر والفنادق في مصر. يتبنى الباحثون إجراء مقابلات شخصية. وتم تحليل البيانات التي تم جمعها من عشرين مديرا ومديرا مساعدا لتكنولوجيا المعلومات في وكالات السفر والفنادق. تشير النتائج إلى عدم وجود أي تطبيقات للروبوتات في قطاع السياحة والضيافة المصري. وبالرغم من ذلك، هناك بعض تقنيات الذكاء الاصطناعي (كمنصات البحث بالذكاء الاصطناعي) وتقنيات أتمتة الخدمة (الأكشاك الرقمية، والواقع الافتراضي، وتسجيل الوصول / المغادرة عبر الهاتف المحمول، والغرف الذكية). البنية التحتية القوية هي من الإمكانيات الأكثر أهمية لتطبيق تقنيات RAISA، أما المعوقات فتتمثل في التكلفة وغياب الموارد البشرية المؤهلة. تتمثل أهم مزايا هذه التطبيقات في زيادة جودة الخدمات المقدمة، وتحسين الأداء، وتقليل الأخطاء البشرية، والتغلب على المشكلات المتعلقة بالحالة العقلية والنفسية للموظفين. في حين أن من سلبيات تطبيق تقنيات RAISA أنه يتطلب إستثمارات ضخمة ، ويؤدي إلى تقليل التواصل وجهاً لوجه بين العملاء ومقدمي الخدمات. وأخيرًا، لابد من تطبيق العديد من تقنيات RAISA في وكالات السفر والفنادق في مصر. ويعود ذلك إلى أن الحكومة المصرية تتجه نحو تطبيق التقنيات الجديدة وإصدار قرارات إلزامية في هذا الصدد. بالإضافة إلى ذلك، يشهد قطاعا السياحة والضيافة اليوم تغيرات تكنولوجية كبيرة من خلال اتباع خطى وتوصيات رؤية مصر 2030.