Tourists' Perceptions Toward Using Artificial Intelligence Services in Tourism and Hospitality

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تصورات السائحين تجاه استخدام خدمات الذكاء الاصطناعي في السياحة والضيافة

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Abstract

Tourism and hospitality industry are considered one of the first industries to adopt new technologies such as robotics and artificial intelligence (AI). These technologies are growing and advancing rapidly. They are expected to bring great benefits to the tourism and hospitality industry. They can provide high quality services, enhance tourists' experiences, save time and money, eliminate human error, and perform tasks accurately and quickly. Most tourist companies, airlines, hotels, restaurants and resorts depend on providing excellent customer service to build their reputation and AI technologies can be valuable to them in many ways (i.e. voice search, AI-powered chatbots, robots, self-driving cars…etc.).The aim of this research is to identify and discuss the application of artificial intelligence (AI) services in tourism and hospitality (travel agencies; tourist companies; air ports; airlines; hotels; restaurants; museums; car rental and tour guides), in addition to investigate tourists' perceptions of advantages and disadvantages of using artificial intelligence (AI) services in tourism and hospitality. To achieve the previous aim, a questionnaire form was distributed to tourists in tourism and hospitality (March to May 2022). Data was collected from 319 tourists (155 tourism samples and 164 hospitality samples). Data was analyzed by Statistical Package for the Social Science (SPSS, V. 20). The results revealed that applying AI services in tourism and hospitality has many advantages for tourists, such as: fun and enjoyable experience; speed in performing tasks; accuracy with less human errors. On the other hand, disadvantages to using AI services can be found.

Keywords: Artificial Intelligence (AI); Tourists Perceptions; Advantages and Disadvantages; Tourism and Hospitality.

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الملخص

تعتبر صناعة السياحة والضيافة من أولى الصناعات التي تتبنى تقنيات جديدة مثل الروبوتات والذكاء الاصطناعي (AI)؛ والتي تنمو وتتقدم بسرعة، ومن المتوقع أن تعود بفوائد كبيرة على صناعة السياحة والضيافة. وذلك من خلال تقديم خدمات عالية الجودة، وتعزيز تجارب السائحين، وتوفير الوقت والمال، والقضاء على أي خطأ بشري، فضلاً عن أداء المهام بدقة وسرعة. هذا وتعتمد معظم الشركات السياحية وشركات الطيران والفنادق والمطاعم والمنتجعات السياحية على تقديم خدمة عملاء ممتازة لبناء سمعة جيدة ويمكن أن تكون تقنيات الذكاء الاصطناعي ذات قيمة بالنسبة لها من نواحٍ عديدة. يهدف هذا البحث الي تحديد ومناقشة تطبيق الذكاء الاصطناعي (AI) على خدمات السياحة والضيافة (وكالات السفر، الشركات السياحية، الموانئ الجوية، الخطوط الجوية، الفنادق، المطاعم، المتاحف، تأجير السيارات والمرشدين السياحيين)، بالإضافة إلى التحقيق في تصورات السائحين لمزايا وعيوب استخدام خدمات الذكاء الاصطناعي (AI) في السياحة والضيافة. ولتحقيق الهدف السابق تم توزيع استبيان على السائحين في السياحة والضيافة (مارس إلى مايو ٢٠٢٢). وتم جمع البيانات من ٣١٩ سائحاً (١٥٥ عينة سياحية و ١٦٤ عينة ضيافة). كما تم تحليل البيانات بواسطة الحزمة الإحصائية للعلوم الاجتماعية (SPSS، 20 .V). وأظهرت النتائج أن تطبيق خدمات الذكاء الاصطناعي في السياحة والضيافة له مزايا عديدة للسائحين مثل: الحصول على تجربة ممتعة وشيقة، السرعة في أداء المهام؛ الدقة مع أخطاء بشرية أقل. على الجانب الآخر، هناك بعض العيوب التي تظهر كنتيجة لاستخدام خدمات الذكاء الاصطناعي.

الكلمات الدالة: الذكاء الاصطناعي؛ تصورات السائحين؛ المزايا والعيوب؛ السياحة والضيافة.

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1. Introduction

In 1955, John McCarthy presented for the first time the term Artificial Intelligence (AI); he defined it as the use of science and engineering in creating intelligent machines (Smith, 2006; Rajaraman, 2014). Artificial intelligence (AI) has many definitions that can be illustrated as follows: AI means the technology that is able to achieve many goals in different environments and conditions (Naqvi, 2020); It also describes the technology of human intelligence used by regular computer systems to provide specific and smart services (Tsaih andHsu, 2018); AI refers to producing smart computer systems to solve different problems in a way similar to intelligent human behavior (Wisskirchen et al., 2017); AI can be described as the simulation and performance of human cognitive processes for example learning, thinking, perception, and the use of language (Bostrom 2017; Geisler, 2018); It can be explained as intelligent systems that are able to interpret data, make conclusions and take decisions effectively to achieve specific goals through various techniques and tools (Ivanov and Webster, 2019).

In recent years, many companies, industries, and businesses in different fields have applied artificial intelligence (AI) to provide better services and enhance customer experiences. Artificial intelligence has two main types; they are used in tourism and hospitality: 1- Pure digital hybrids that can carry out the cognitive process only (online check-in systems and mobile boarding passes), and 2- Digital physical hybrids which can perform both manual and cognitive operations (Robots) (Ivanov and Webster, 2017; Geisler, 2018; Zlatanov, and Popesku, 2019). But so far, its application in the tourism and hospitality is still limited, with a few numbers of tourist companies, airlines, restaurants, and hotels applying it. Artificial intelligence has various forms and applications such as chatbots, self-services, virtual reality, digital assistant, robots, and self-check-in and self-checkout kiosks (Ivanov and Webster, 2017; To Linh, 2019) that enable customers to obtain services independently without the need for a human help/aid (for example: online bookings, ticket reservations, check in and out at hotels, e-boarding at airports, ordering food via chatbots.... etc.) (Vakulenkoa et al., 2019; Gures et al., 2018).

In tourism and hospitality, artificial intelligence is expected to benefit the industry clearly, helping achieve significant growth, providing services efficiently, accurately, and quickly, in addition to making financial profit in a short time (Chi et al., 2022). Therefore, the current research aims to contribute to the AI scientific field in tourism and hospitality by: identifying and discussing the application of artificial intelligence (AI) services in tourist companies, airports, airlines, hotels, restaurants, museums, etc.; investigating tourists' perceptions towards the advantages and disadvantages of AI services; in addition to exploring tourists' intention to use AI services.

2. Literature Review
Artificial Intelligence in Tourism

1- Travel agencies and Tourist Companies

Currently, travel agencies and tourist companies mainly depend on the Internet to provide their services (for example: Websites, mobile applications, chatbots, QR codes, booking engines, virtual reality…. etc.), as todays customers prefer to check websites of travel agency and tourist company, find out the latest offers, services, air tickets, prices, tours, maps, timetables for different means of transportation (air, sea, fluvial, and land) and make reservations and payments online. They obtain all these services and facilities very easily and conveniently from their places of residence without the need for face-to-face interview with travel agent (Batinić, 2013; Knowles, and Westcott, 2014; Ţugulea et al., 2014; Kim et al., 2015; Ivanov et al., 2017; Turcu, and Turcu, 2017; Zsarnoczky, 2017; Sofronov, 2018).

Digital technologies and Artificial Intelligence (AI) have greatly contributed to encourage customers to participate in the service production and consumption process as they become prosumers (producer + consumer); customers are now partners not just purchasers of goods and services (Niezgoda, 2013; Alhashem, 2016; Rayna, and Striukova, 2016). Today, customers can search for information about a destination or to book a flight through chatbots integrated in websites of travel agencies and tourist companies, which can provide information about offers, weather changes, traffic and so on, answer simple questions and explain unclear information and details (Ivanova, 2019; Melián-González et al., 2019, Ukpabi et al., 2019;Zlatanov, and Popesku, 2019;Um et al., 2020).Tourist companies and travel agencies may provide virtual tours on their websites that have great emotional impact on customers' decisions regarding travel to a particular tourist destination or choosing a specific hotel (Voronkova, 2018). Customers can also book services or have information about the destination via a kiosk in front of the travel agency or tourist company available 24 hours a day (Ivanov and Webster, 2019; Ivanov, 2019; Ivanova, 2019).

Digital assistant depending on predictive analytics features can help customers in planning trips, booking hotels, flights, cost, searching for suitable destination, duration of the trip, checking suitable dates according to/ on the basis of customers' schedules, their search behaviour, preferences, personalities, behavioural characteristics stored in assistant's memory (Sumardi et al., 2017; Ivanov and Webster, 2019).

In the near future, travel agencies and tourist companies are expected to rely on artificial intelligence to perform their business accurately and efficiently. For example, they adopted kiosks and display screens to provide information about tourist destinations, travel offers, tour packages...etc. enabling customers to book various services from these kiosks in addition to their attempts to use robots as sales agents (Ivanov et al., 2017).

Moreover, digital voice assistants such as: Siri, Alexa, Google Assistant and Cortana may be linked to websites of travel agencies and tourist companies to provide information about the tourist destination, directions, flight schedules, travel advices, visa regulations, flight bookings, reservations, travel planning, transportation, accommodation...etc. and thus enable direct communication with tourists, travelers and customers, meet their needs and expectations, in addition to increase their comfort and satisfaction (Ivanov et al., 2017; Brill et al., 2019; Ivanova, 2019).

From the previous, it can be predicted that relationships and interactions between the travel agency / tourist company with their clients will transform from (human - human) to (human - machine) interactions and then gradually transform into (human - robot) interactions (Ivanov and Webster, 2019).

2- Air ports and Airlines

The new technologies would have a significant role in raising safety and security rates at airports; enhancing travellers' experiences; increasing travellers' satisfaction; providing quick and efficient security checks, reducing services' costs as well as reducing the rate of human errors (Sabatova´ et al., 2016; Medvedev et al., 2017; Gures et al., 2018).

At the airport, travellers can use various methods to check in to their flights through the web, mobile phones, self-service check-in kiosks placed at the terminals, their baggage will be transported to their aircrafts through a conveyor belt, and passengers will be checked by face recognition systems that can be integrated in e-gates. Passengers can use mobile boarding pass on their smart phones or self-scan the boarding pass via boarding card scanning machines placed at the gates as well as boarding the aircraft by self-service portals; and all of this will be done without the involvement of a human employee. Airports also provide kiosks for lost luggage that help passengers track their lost luggage

status via a smartphone.Chatbots can be used at airports to inform travellers about gate's changes, departure information, cheapest destinations, cheapest and shortest flights as well as driving directions (del Rio et al., 2016; Sabatova´ et al., 2016; Ivanov et al., 2017;Gures et al., 2018;Ueda and Kurahashi, 2018; Ivanov and Webster, 2019;Ukpabi et al., 2019;Zlatanov and Popesku, 2019; Rajapaksha and Jayasuriya, 2020).

Robots can also be adopted at airports for many tasks, such as: Directing passengers to check in areas, restaurants, gates inside the airport ; Transporting and checking bags; Checking the boarding pass for passengers; Printing luggage cards; Handing baggage to the luggage area at the airport; Carrying out cleaning tasks; Answering travellers questions; Making announcements; and Interacting and entertaining travellers by signing songs and taking pictures with them (Alexis, 2017; Ivanov et al., 2017;Samara, 2017; Thangiah et al., 2019).

Munich Airport is considered the first airport in Germany that used a robot called Josie Pepper to welcome passengers and answer their questions about shops, restaurants and gates (Munich Airport, 2018a); At Munich Airport the EasyPASS program allows passengers to scan their electronic passport (ePass) and look at the camera to finish the security check in an easy and quick self-service process (Munich Airport, 2018b; Munich Airport, 2018c). In addition to providing an advanced CT scanner to the passenger terminal that has the ability to find both solid and liquid explosives. Accordingly passengers can easily go through the scanning scanner for screening measures without the need to take out their personal devices (laptops and phones) or their drinks (soda / juice / water) (Munich Airport, 2018b; Rajapaksha and Jayasuriya, 2020).Schiphol Airport in Amsterdam has unveiled Spencer, a smart robot to guide passengers to the boarding gate as well as scan passengers' boarding passes and directing them to the departure gate (International Airport Review, 2015; IKUSI, 2018).Glasgow Airport is considered the first airport in the United Kingdom use a robot called GLAdys to entertain passengers by singing and dancing (BBC, 2016; Future Travel Experience, 2016). Another example is the Baltimore Washington International Airport (BWI), this airport uses social media (i.e. Twitter) to inform travellers about airport change, local weather conditions, security information and flight status (Alansari et al., 2019).

From the previous, it is obvious that robots are being used in many airports around the world (for example Incheon Airport in Seoul, Shenzen Airport in China,The Canadian Airport in Edmonton, Oakland Airport in California, Mineta San José International Airport and Tokyo's Haneda Airport), whether as a trial or permanently, to provide various services such as guiding passengers to the departure gate, entertainment, security, or cleaning.

Concerning airline industry, chatbots are vital to airline companies in terms of providing quality customer service, improving customer satisfaction, reducing costs, and increasing bookings and revenues. Chatbots are efficient tool to communicate with customers, answer their questions,inform them aboutgate changes and flights updates (delays or cancellations) in real time, make flight reservations receive customers comments and feedback, provide digital boarding passes and so on (Alexis, 2017;Alansari et al., 2019;Taneja, 2019; Ukpabi et al., 2019;Zlatanov and Popesku, 2019). Airlines started to encourage travellers to use new technologies for check –in procedures such as: websites, self- check- in kiosks, mobile check-in applications; this may reduce airport staff involvement, stress, waiting time, financial costs and human error (Sabatova et al., 2016; Gures et al., 2018; Ueda and Kurahashi, 2018; Taneja, 2019; Rajapaksha and Jayasuriya, 2020; Taneja, 2020). It would be beneficial for airlines to adopt digital voice assistants (Siri, Google Assistant, and Amazon's Alexa) to significantly communicate with customers and increase distribution channels, in addition to using virtual reality (VR) allows users to simulate being on site, place or destination and try before-you- buy experience; through virtual reality technologies and applications, airlines will be able to

market their services and products in an interactive and interesting way as customer will be able see his/her seat on the plane or see first-class seats, business class seats, in-flight meals, or in-flight entertainment and amusement (Harteveldt, 2016).

In recent years, many airlines have begun to use artificial intelligence applications; for example, Alex (United Airlines), Mildred (Lufthansa), and Finn (Finnair) have adopted chatbots to market their services and communicate with customers ; KLM Royal Dutch Airlines created its own chatbot named BB, it provides simple information about the destination and length and duration of flight as well as allow customers to book their tickets; Turkish Airlines presented digital boarding passes to travellers; Delta Air Lines uses facial recognition systems to identify passengers' personalities ; British Airline Easyjet uses artificial intelligence systems o forecast food and beverage demand on its flights; Taiwanese airline EVA Air has applied robot as a customer service agent to scan boarding passes, provide destination weather updates and announce duty-free offers (Benckendorff et al., 2019; Ukpabi et al., 2019; Zlatanov and Popesku, 2019).

Artificial Intelligence in Hospitality

1- Hotels

Robots and artificial intelligence have a significant influence in the hospitality industry, especially in all hotel departments. Hotels enabled customers to register, check-in and check-out, choose between several room types, read the hotel's policy and rules, confirm check in procedures with fingerprint and then getting the key card through self-service kiosks without the need to deal with any employee. Recently, due to the spread of the Coronavirus (COVID-19), various hotels have provided guests with check-in and out services as well as digital keys for entering rooms in addition to ordering room services through their smartphones, mobiles or tablets; Thus, reducing surface contact, maintaining a safe distance, no need for key cards or physical keys; that positively enhance guests' experiences, feelings of safety and security, and satisfaction, as a result of speed, secure, safe, efficient and convenient services (Ivanov et al., 2017;Torres, 2018; Ivanov and Webster, 2019;Lukanova and Ilieva, 2019;To Linh, 2019).

Virtual reality has become of great significance for hotels to present and market their services and products in a competitive way. Customers can use virtual reality to explore rooms, swimming pool, restaurant, beach and other hotel facilities virtually. These true and real virtual presentations of the hotel make customers feel like being there, in addition to, encouraging customers to make their purchase decisions (Bogicevic et al., 2019; Israel, 2019; Marzouk et al.,2019; Ivanov and Webster, 2019; Zeng et al., 2020).

Currently, hospitality companies depend on chatbots for their operations; as they obviously contributed positively to increase online bookings and sales. Chatbots have many advantages such as: Enabling users to browse websites, helping customers to make decisions quickly; enriching guests' pre-arrival experience, allowing them to book rooms and other amenities (spa treatments, airport transfers, dinner reservations....etc.), answering guests' questions in their own languages, building social relationships with clients; maintaining customer confidence in companies/ hotels (Alexis, 2017; Ivanov and Webster, 2017;Zsarnoczky, 2017; Ukpabi et al., 2018;Lukanova, and Ilieva, 2019; Ukpabi et al., 2019;Buhalis and Cheng, 2020).

Robots can perform many tasks in various hotel departments such as: front desk staff (check-in/-out services), porters, cleaning rooms, floors and swimming pools, cutting grasses at hotel garden, directing guests to their rooms, delivering services to guest rooms (extra pillows and towels, shampoo, toothpaste, ...etc.), greeting/ welcoming guests at the hotel entrance, answering guests' questions, reminding guests of hotel services and facilities, washing laundry and they perform all of these tasks

without getting tired or complaining. Robots can also be used as a marketing tool to attract hotel guests;who would like to order services because they want to see a robot delivering food and drinks. Accordingly, robots can bring joy, happiness and entertainment to hotel guestsby giving signatures, dancing, singing and taking photos with them (Ivanov et al., 2017; Ivanov, and Webster, 2017; Kuo et al., 2017; Murphy, et al., 2017; Geisler, 2018; Ivanov and Webster, 2019; Thangiah et al., 2019; Zlatanov and Popesku, 2019).

Hotels around the world have begun to use artificial intelligence and robots in marketing, distributing and presenting their services, many of them have implemented digital voice assistants (Alexa, Siri, Google Assistant) (Ivanova, 2019); which help customers in making reservations, ordering room service; it may also help guests control lighting, air conditioning and music in their rooms in an easy, speed and efficient way. For example: Henn-na hotel in Japan is considered the first hotel staffed only by robots in the world. There are three robots working at the front desk, one of them is a talking dinosaur, they greet guests and help them to check in, carry baggage, deliver room services...etc. (Alexis, 2017; Geisler, 2018; Ivanov and Webster, 2019; To Linh, 2019; Zlatanov and Popesku, 2019); The Hilton International Hotel Chain enables customers to choose their own rooms and check-in through mobile applications (To Linh, 2019); Hilton Hotel in McLean, Virginia presented "Connie" the robot to answer guests' questions, provide them with information about attractions, tour and dining advices, and hotel's facilities and services (Samara, 2017, Zlatanov and Popesku, 2019). Marriott Hotels provided a chatbot service for customers to book rooms (Ukpabi et al., 2019); two Chinese Marriott hotels have also introduced facial recognition technology to check-in (Zlatanov and Popesku, 2019)

2- Restaurants

Food is an important element of a traveller's experience; eating in different restaurants gives the customer the chance to discover different cultures and taste various types of food from many countries around the world. Therefore, restaurants can provide customers with authentic, unique, enjoyable and unforgettable experiences (Vu et al., 2019; Seyitoğlu and Ivanov, 2020).

The restaurant industry has been greatly affected by the emergence and development of artificial intelligence and robots.AI technologies include chatbots, digital voice assistants, and virtual reality; and most of them were applied in restaurants to provide and market their services; some restaurants enabled customers to order their meals and drinks from the automated menu through a kiosk / tablet on the table, and others used conveyor belts to serve meals to customers. In addition to using virtual reality in displaying and marketing meals or dining places inside restaurants to attract customers to order food or reserve a table inside the restaurant (Khan, 2015; Ivanov et al., 2017; Ivanov and Webster, 2017; Ivanov and Webster, 2019;Kumar et al., 2019;Zlatanov and Popesku, 2019).Applying chatbots in restaurants can be very useful for customers; as they could book restaurant, buy food or ask questions (prices, working hours, location…etc.) through their favourite messaging app such as Facebook Messenger, WhatsApp, WeChat and LINE without the need to download several apps. Chatbots could be linked to websites and mobile app. Customers can also: order their preferred meals; check their orders status; search restaurant reviews, photos, menus, prices, and available tables; make reservations, cancel orders or re-book and soon customers will be able to pay via chatbots. It is important for restaurants to integrate their own enhanced digital voice assistants (Siri, Alexa, Google Assistant and Cortana) to the websites to take customers' orders as well as provide information about the restaurant (special meals, vegan meals, kids meals, offers and discounts, birthday parties...etc.) (Strigér, 2017; Berezina et al., 2019; Ivanov and Webster, 2019; Kumar et al., 2019; Ukpabi et al., 2019). Lately, many restaurants have started using robots to perform various tasks, such as: Cooking; packing and serving food; collecting food utensils from tables; cleaning floors, tables and toilets; taking customers' orders; washing dishes, presenting food

menu…etc. (Cheong et al., 2015; Mathath and Fernando, 2015; Murphy et al., 2017; Berezina et al., 2019; Jang and Lee, 2020; Seyitoğlu and Ivanov, 2020).

The restaurant industry is still in its early stages regarding full service automation, but there are many examples of restaurants that have begun to use and adapt these new technologies such as: AppleBee's, Chili's, Olive Garden, and Outback Steakhouse have applied digital menus that enabled customers to order their meals via a tablet on the table; Pizza Hut presented robot Pepper to communicate with customers, take their orders and accept payments; another example is Domino's Pizza, Burger King, and Pizza Hut have created their own chatbot for food ordering, suggestions and recommendations (Ivanov et al., 2017;Zsarnoczky, 2017;Berezina et al., 2019).

Artificial Intelligence in Tourist Destinations

Today, advanced and innovative technologies are employed to operate various functions of tourist destinations as well as to enhance the quality of tourists' experience, promote their engagement, and personalize their journeys (Sinarta and Buhalis, 2018; Ivanov and Websterm, 2019; Tussyadiah, 2020).

1- Museums
According to Lee (2017), various forms of AI such as, kiosks, chat displays and audio guides have been used to provide information about museums' exhibits. In addition to, mobile applications and QR codes that enable visitors to museums and galleries to receive information about the exhibits on their smartphones. Moreover, augmented reality (AR) and virtual reality (VR) provide unique and enjoyable experiences for visitors (Kabassi, 2016; tom Dieck et al., 2016; Virto and López, 2019). Robots can also perform several tasks, such as providing information about the exhibits, answering visitors' questions, directing them to the exhibition halls or any area of the museum and cleaning the floors; for example, robots are used as guides in Tokyo's National Museum of Emerging Science and Innovation (Ivanov et al., 2017; Virto and López, 2019).

2- Tour guides
Artificial intelligence forms such as audio devices, virtual reality, QR codes or robots can be adopted as tour guides (Ukpabi et al., 2018; Virto and López, 2019; Zhang and Sun, 2019), which will significantly save human, material and financial resources. Artificial intelligence can provide tourists with interesting and diverse travel plans, depending on the vast amount of data they store related to travel locations. Tourists can also use GPS to obtain information about scenic places worth visiting in the form of pictures, texts, audios, etc.; so, they can have many travel options according to their preferences. Tourists can use their smartphones to scan QR code in the tourist areas (Zhang and Sun, 2019; Gretzel and Koo, 2021); they will immediately hear a warm and audible voice explaining the scenic sites in the languages of tourists from different countries in the world; this shows that artificial intelligence has an advantage that human guides never have.The use of virtual reality in cultural tourist attractions provides visitors with a unique visual experience that makes them feel like they are living in the history of the archaeological site. Robots can be used to guide tourists while visiting the tourist destinations; robots can interpret and explain tourist and historical sites of an area by prepared programs provided by a large number of voice translators (Jung and Michopoulou, 2019; Zhang and Sun, 2019; Tussyadiah, 2020).

3- Car Rental
The role of technology and artificial intelligence in the car rental industry is evident in several things, such as locking or unlocking the car with a card or a mobile application, as well as the use of robots through self-driving cars, which is expected to spread in the coming years. This enables customers who do not have a driving license to rent cars easily, and the accidents of self-driving cars are lower

compared to traditional cars, which benefits car rental companies by increasing the number of customers (with or without a driving license) as well as lowering insurance fees for a lower rate of accidents, which reduces the costs of car rental companies and improves their profitability (Ivanov et al., 2017). The emergence of online travel agencies (e.g., expedia.com, booking.com, rental cars, etc.) also enables customers to book travel services such as flights, hotels, transportation, and car rentals online. Today, many car rental companies have their own websites that provide detailed information about fleets and their services, including booking, confirmation, and cancellation options (Bayram, 2018). They are also available online via a mobile app (e.g., Sam) (Hasan et al., 2021)

In conclusion, the use of technology and AI in the car rental industry may help to provide better services and achieve profitability, in addition to providing competitive advantage, product differentiation, and diversification of products and services to suit the different preferences of customers (Bayram, 2018).

Applying AI in the Egyptian Tourism and Hospitality Services

The application of artificial intelligence in the Egyptian tourism and hospitality sector is in line with Egypt's vision 2030 and has many advantages, including finding solutions to many problems quickly, saving time and money, performing tasks perfectly, improving service quality, creating a positive image of Egypt, as well as reducing face-to-face contact and maintaining social distance (Touni and Magdy, 2020). According to Abdelmoaty and Soliman (2020), hotels and airports in Egypt are one of the best areas to apply AI due to their infrastructure and design (e.g., smart rooms, mobile check-in/out applications, digital kiosks…etc.), but they still depend on traditional systems. On the other hand, most Egyptian tourism companies are small and medium-sized companies that use simple forms of artificial intelligence such as online bookings, emails,text messages, chatbots,digital kiosks, virtual reality, and ticket machines (Gaafar, 2020; Touni and Magdy, 2020).

In conclusion, the application of artificial intelligence in the tourism and hospitality services in Egypt faces many challenges, the most important of which is the high cost of purchasing, operating, and maintaining robots and artificial intelligence programs (Abdelmoaty and Soliman, 2020; Touni and Magdy, 2020; Ahmed and Mennisi, 2021).

3. Methodology

The research aims to examine tourists' perceptions towards the use of artificial intelligence services in tourism and hospitality. The research used a questionnaire survey to collect data. An introduction was presented in the questionnaire, including a simple definition of artificial intelligence; different forms of AI services in tourism and hospitality; and the objective of the research. The selection of the sample based on their current use of AI services in tourism and hospitality.

Sampling

The target sample for this research was tourists using AI services in tourism and hospitality (tourism companies, airlines, airports, hotels, restaurants, etc.). Both a paper survey and an online survey were distributed to a convenience sample of tourists. The survey was carried out from March to May 2022. A total of 340 questionnaires were distributed; only 319 were valid questionnaires (155 tourism samples with a 91.1% response rate and 164 hospitality samples with a 96.4% response rate).

Survey Instrument

The questionnaire's measurements were adapted fromGursoy et al. (2019); Meidute-Kavaliauskiene et al. (2021); Chi et al. (2022); and Ribeiro et al. (2022). The measurements are applicable to use in

tourism and hospitality. The questionnaire consists of six parts: (1) Tourist demographic profile (gender, age, and education level); (2) Artificial intelligence services; (3) Advantage of artificial intelligence services; (4) Disadvantage of artificial intelligence services; (5) Tourists' emotion when using AI services; (6) Intention to use AI services. Parts three, four, five, and six were constructed using the Likert 5 scale model, with responses ranging from "strongly disagree" (1) to "strongly agree" (5). The questionnaire was tested to ensure its clarity, by distributing it to some tourists and guests and it was modified according to their notes. Data was analyzed by Statistical Package for the Social Science (SPSS, V. 20).

Questionnaire Analysis

Data Validity and Reliability

Table (1)shows that Cronbach's alpha values in the two questionnaires (artificial intelligence services in tourism and hospitality) are higher than 0.7, indicating that the data collected are sufficient, acceptable, and reliable (Shrestha, 2021).

Table 1: Cronbach's Alpha Values for the Tourists' Questionnaires

Population	Cases Valid	N of Items	Reliability Coefficient (Alpha)	Validity Coefficient
Tourism	155	34	0.951	0.975
Hospitality	164	34	0.944	0.971

Personal Information

Table (2) illustrates tourists' demographic characteristics. Concerning tourists using tourism services, it can be noted that more than half (66.5%) of the sample were male, and 33.5% were female. 78.7% of the participants were between the ages of 18–25, and more than half (67.1%) had a secondary school education. Regarding tourists using hospitality services, 60.4% of them were male, more than half (55.5%) were between the ages of 18–25, and 54.3% of the sample had a secondary school education, while 40.2% of the tourists had a university or higher institute degree.

Table 2: Tourists' Demographic Characteristics

Demographic Data		Tourism		Hospitality	
		Frequency	%	Frequency	%
Gender	Male	103	66.5	99	60.4
	Female	52	33.5	65	39.6
Age	18-25	122	78.7	91	55.5
	26-34	22	14.2	32	19.5
	35-44	6	3.9	13	7.9
	45-55	3	1.9	17	10.4
	More than 56	2	1.3	11	6.7
Education Level	Secondary School Education	104	67.1	89	54.3
	University or Higher Institute Degree	37	23.9	66	40.2

	Postgraduate Degrees (Masters or PhD)	14	9	9	5.5

According to **table (3)**, QR codes are the most commonly used form by tourists in tourism and hospitality services (63.2% and 61.6%, respectively), followed by AI search platforms and websites for tourism services (40.6%) and booking engines (50%) for hospitality services; the third form is digital voice assistance for both tourism and hospitality samples (38.7% and 47.5%).

Table 3: Artificial Intelligence Forms in Tourism and Hospitality

AI Forms	Tourism		Hospitality	
	Frequency	Percentage	Frequency	Percentage
Robots	15	9.7	5	3.04
chatbots	25	16.1	47	28.6
self-scan boarding	22	14.2	69	42
kiosks	15	9.7	3	1.8
VR	51	32.9	73	44.5
Digital voice assistance	60	38.7	78	47.5
QR codes	98	63.2	101	61.6
AI search platforms and websites	63	40.6	35	21.3
Booking engines	48	31	82	50
E-tour guide	20	12.9	14	8.5

From **table (4)**, it can be noted that tourists used AI services in travel agencies (72.2%), tourism companies (63.2%), restaurants (43.9%), and airports (41.3%) in the tourism sample. On the other hand, tourists used AI services in hotels (93.3%), restaurants (81.7%), travel agencies (59.1%), and airports (44.5%) in the hospitality sample.

Table 4: Using artificial intelligence in Tourism and Hospitality Services

AI Forms	Tourism		Hospitality	
	Frequency	Percentage	Frequency	Percentage
Airports	64	41.3	73	44.5
Airlines	24	15.5	56	34.1
Restaurants	68	43.9	134	81.7
Hotels	62	40	153	93.3
Museums	45	29	31	18.9
Tourism companies	98	63.2	62	37.8
Car rental	15	9.7	6	3.6
Heritage sites	23	14.8	9	5.5
Travel agencies	112	72.2	97	59.1
Art galleries	19	12.3	11	6.7
Tourism Fairs	11	7.1	4	2.4
Tour guides	13	8.4	21	12.8

From **Table (5)**, it can be seen that there are many advantages to using AI services in tourism and hospitality. Interacting with AI devices is fun, was the most important advantage according to the tourism sample (M = 4.03 and SD =.836); while the hospitality sample indicated that "AI devices are faster than human employees" as the first advantage for them (M = 4.06 and SD =.907); and at the same time, the second advantage for the tourism sample (M = 3.9 and SD =.854). The hospitality sample's second advantage was "Services provided by AI devices are more accurate with less human errors" (M = 3.9 and SD =.973). According to the tourism sample, the third advantage was "Interacting with AI devices is entertaining" with M= 3.9 and SD= .856. The third advantage for the hospitality sample was "Interacting with AI devices is fun" with M= 3.93 and SD= .858. The previous result is compatible with Ivanov et al. (2018); Lu et al. (2019)**;** Qui et al. (2020)**;** and Meidute-Kavaliauskiene et al. (2021). They mentioned that there are numerous advantages of adopting AI services in tourism and hospitality, such as speed, ease of use, efficiency, accuracy, answering all questions, and providing many tasks at the same time.

Table 5: Advantage of Artificial Intelligence Services

Statement	Tourism		Hospitality	
	Mean	SD	Mean	SD
AI devices are always patient, no matter how many questions you ask or tasks you require.	3.6000	.95073	3.4329	1.07470
AI devices are more polite than human employees.	3.6903	.89419	3.5854	1.05028
AI devices are faster than human employees.	3.9419	.85462	4.0671	.90758
AI devices are able to provide information in more languages than human employees.	3.6839	.87353	3.8659	1.00626
Interacting with AI devices is fun.	4.0387	.83653	3.9329	.85896
Interacting with AI devices is entertaining.	3.9226	.85687	3.5244	.92975
Services provided by AI devices are more accurate than human beings.	3.6710	.97441	3.8671	1.03989
Services provided by AI devices are more accurate with less human errors.	3.7355	.89063	3.9646	.97375
AI devices provide more consistent service than human beings.	3.6065	.95684	3.5841	1.06477
AI devices provide more consistent information.	3.7935	.85809	3.5122	1.02417
AI devices are more dependable than human beings.	3.3161	1.13821	3.5732	1.30154
Services provided by AI devices are more predictable than human service.	3.6129	.94241	3.8280	1.01011
Ability to avoid inefficient personal contacts by using AI devices.	3.5484	.94108	3.3341	1.09109

Concerning the disadvantages of artificial intelligence services (as shown in **Table 9**), the item with the highest average for the tourism sample was "Interaction with AI devices lacks social contact" (M = 3.9 and SD =.949), and the item with the lowest average was "Working with AI devices is so difficult to understand and use" (M = 2.9 and SD =1.02). According to hospitality sample, the item "AI devices can't understand persons' emotions" had the highest average (M = 3.8 and SD =.956); while the item "Learning how to interact with AI devices takes long time" had the lowest average (M = 2.6 and SD = 1.29). The aforementioned findings are in line with Khanzode and Sarode (2020),

who listed the following disadvantages of AI services: they are devoid of the human touch; as well as they take a significant amount of time and money.

Table 6: Disadvantage of Artificial Intelligence Services

Statement	Tourism		Hospitality	
	Mean	SD	Mean	SD
Using AI devices takes too much of my time.	3.3226	1.16181	3.0744	1.18956
Working with AI devices is so difficult to understand and use.	2.9226	1.02270	2.7759	1.22048
Learning how to interact with AI devices takes long time.	2.9935	1.03508	2.6134	1.29542
Human contact in service transactions are more preferred.	3.6452	1.00481	3.5610	.97323
AI devices can't understand persons' emotions.	3.7355	.98084	3.8963	.95685
Interaction with AI devices lacks social contact.	3.9097	.94915	3.7744	1.00506
AI devices may misunderstand an order or a question.	3.7097	.80556	3.5183	.99983

According to **Table (7)**, it can be revealed that tourists in the tourism sample feel satisfied while interacting with AI devices (M = 3.7 and SD =.922). They also feel pleased (M = 3.67 and SD =.918), hopeful (M = 3.61 and SD =.854), relaxed (M = 3.5 and SD =.913), and contented (M = 3.4 and SD =.945). Concerning the hospitality sample, they expressed their feelings while interacting with AI devices as follows: satisfied (M = 3.9 and SD =1.05); hopeful (M = 3.6 and SD =.915); contented (M = 3.55 and SD =1.13); pleased (M = 3.51 and SD =1.01); and relaxed (M = 3.4 and SD =1.03).

Table 7: Feeling while Interacting with AI Devices

Statement	Tourism		Hospitality	
	Mean	SD	Mean	SD
Bored	3.0645	1.04867	3.1134	1.16052
Relaxed	3.5355	.91366	3.4878	1.03015
Malancholic	2.9032	.98544	2.8073	1.27012
Contented	3.4194	.94574	3.5549	1.13101
Despairing	2.9613	.99273	3.1317	1.16491
Hopeful	3.6194	.85486	3.6951	.91597
Unsatisfied	2.8194	1.11932	2.9207	1.20828
Satisfied	3.7226	.92256	3.9756	1.05639
Annoyed	2.9226	1.00347	3.0524	1.22146
Pleased	3.6774	.91832	3.5183	1.01807

Table 8 explains tourists' intention to use AI services. The responses ranged between 3.57 and 4.0, which can be interpreted as "agree". The tourism sample mentioned "Given the opportunity, I will use AI devices" (M = 4.01 and SD =.80); as for the hospitality sample, "I will recommend others to use AI devices" was chosen (M = 3.9 and SD =.92). The tourism sample referred to "I will recommend others to use AI devices" (M = 3.9 and SD =.90), while the hospitality sample pointed to "Given the opportunity, I will use AI devices" (M = 3.8 and SD =.8 3). This result is consistent with Meidute-Kavaliauskiene et al. (2021), where "Given the opportunity, I will use robots in a service environment" was the highest average item.

Table 8: Intention to Use AI Devices

Statement	Tourism		Hospitality	
	Mean	SD	Mean	SD
In the near future, I intend to use AI devices.	3.8968	.91292	3.7561	.95366
I will feel happy to interact with AI devices.	3.9161	.93249	3.5793	1.03310
I will recommend others to use AI devices.	3.9226	.90119	3.9146	.92280
Given the opportunity, I will use AI devices.	4.0129	.80572	3.8537	.83808

4. Conclusion and Implications

This study delves into the current and future state of artificial intelligence applications in travel agencies; tourist companies; air ports; airlines; hotels; restaurants; museums; car rental and tour guides. In tourism and hospitality, AI services have various forms and applications, such as chatbots, self-services, virtual reality, digital assistants, robots, and self-check-in and self-checkout kiosks. They are expected to clearly benefit the industry, helping to achieve significant growth while delivering services efficiently, accurately, quickly and economically. Correspondingly, it can be expected that the interaction in tourism and hospitality will shift from (human-human) to (human-machine) interaction, then to (human-robot) interaction. The study examined tourists' perceptions towards the use of AI services in tourism and hospitality. Findings indicated that the majority of participants were young, and the most popular forms of artificial intelligence (AI) they used were AI search platforms and websites, booking engines, and digital voice assistants. Tourists mentioned that they mostly used AI services in hotels, travel agencies, restaurants, tourism companies, and airports. The responses of the majority of tourists in the tourism and hospitality samples were similar. They agreed that there are numerous advantages to using AI services in tourism and hospitality, such as: interacting with AI devices is fun and entertaining; AI devices are faster than human employees; services provided by AI devices are more accurate with less human errors; AI devices provide more consistent information; and AI devices provide information in more languages than human employees. On the other hand, they indicated that there are disadvantages to artificial intelligence services, including that interacting with AI devices lacks social contact; working with AI devices is so difficult to understand and use; AI devices can't understand people's feelings; and learning how to interact with AI devices takes a lot of time. The participants felt satisfied, pleased, hopeful, relaxed, and contented while interacting with AI devices. Their responses indicated that they intend to use AI services.

In conclusion, AI services can be used for providing information 24 hours a day, performing hard tasks, marketing, and entertaining, such as robots. Furthermore, the technology used should be easy to use and uncomplicated. Finally, tourism and hospitality are a humane industry and cannot be separated from human interaction. Therefore, artificial intelligence will not pose a threat to the human factor.

5. Limitations and Future Research

This study focused on AI services generally, not a specific form or type. Future studies may investigate the impact of robots or virtual reality on tourists' experiences, attitudes and behaviors, or satisfaction. Moreover, future research may examine the impact of tourists' demographic characteristics on their acceptance of AI services. Finally, researchers need to explore the economic benefits of AI services; evaluate the impact of AI services on improving service quality; and study the legal and ethical aspects of applying AI services to tourism and hospitality.

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