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## **APPLICATIONS FOR THE USE OF “ROBOT” IN SERVICES IN TOURISM ENTERPRISES**

### **Abstract**

The digital revolution that started with Industry 3.0 developed with Industry 4.0, allowing artificial intelligence and robot technologies to take place in many areas. The rapid development of technology and the corresponding change in consumer needs have forced many sectors to adapt to changing conditions. The dynamics of the fourth industrial revolution accelerated this change and started to play an important role in the preferences of both businesses and consumers. Artificial intelligence and robot technologies, which are among these dynamics, are both indispensable for people's daily lives and are expressed as technological innovations that many businesses apply. Examples of robotic applications, which have started to be seen in service industries after industrial industries, have started to be seen in tourism services. In addition to the Hen-na Hotel, the first and only example in the world, which provides service entirely with robots in Japan, the examples of businesses in which human employees and robots take place are increasing day by day. The aim of this study; The aim of this study is to examine

the application examples for the use of robots in the presentation of tourism services based on human-human communication. For this purpose, within the tourism services; Hotel businesses, food and beverage businesses, tour guiding and services in airports are evaluated and examples of robot use that have started to be implemented in these areas are given. When the examples are examined, it is possible to use robots to help human workers in the majority of applications. Based on these applications, which are considered as the first applications, predictions are made for the future of tourism enterprises.

**Keywords:** Industry 4.0, Artificial Intelligence, Robot Technologies, Tourism Businesses

## **TURİZM İŞLETMELERİNDE YER ALAN HİZMETLERDE "ROBOT" KULLANIMINA YÖNELİK UYGULAMALAR**

### **Öz**

Endüstri 3.0 ile başlayan dijital devrim Endüstri 4.0 ile gelişerek yapay zekâ ve robot teknolojilerinin birçok alanda yer almasına imkân sağlamıştır. Teknolojinin hızlı bir şekilde gelişmesi ve buna bağlı olarak tüketici ihtiyaçlarının değişmesi birçok sektörü değişen koşullara uyum sağlamak zorunda bırakmıştır. Dördüncü endüstri devriminin dinamikleri söz konusu değişimi hızlandırarak hem işletmelerin hem de tüketicilerin tercihlerinde önemli bir rol oynamaya başlamıştır. Bu dinamikler arasında yer alan yapay zekâ ve robot teknolojileri de hem insanların günlük hayatlarının vazgeçilmezi hem de birçok işletmenin başvurduğu teknolojik yenilik olarak ifade edilmektedir. Sanayi endüstrilerinden sonra hizmet endüstrilerinde de görülmeye başlayan robotik uygulamalara yönelik örnekler turizm hizmetlerinde görülmeye başlamıştır. Dünyada ilk ve tek örneği Japonya'da yer alan tamamen robotlar ile hizmet sunan Hen-na Otel'in yanı sıra insan çalışanlar ile robotların birlikte yer aldığı işletme örnekleri gittikçe çoğalmaktadır. Bu çalışmanın amacı; temeli insan-insan iletişimine dayanan turizm hizmetlerinin sunumunda yer alan robot kullanımına yönelik uygulama örneklerini incelemektir. Bu amaç doğrultusunda turizm hizmetleri içerisinde; otel işletmeleri, yiyecek-içecek işletmeleri, tur rehberliği ve havalimanlarında yer alan hizmetler değerlendirilerek bu alanlarda uygulanmaya başlayan robot kullanımına yönelik örneklere yer verilmiştir. Örnekler incelendiğinde uygulamaların büyük bir çoğunluğunda robotların insan çalışanlara yardımcı olmak amacıyla kullanılması söz konusudur. Henüz ilk uygulamalar olarak değerlendirilen bu uygulamalardan yola çıkarak turizm işletmelerinin geleceğine yönelik tahminlerde bulunmaktadır.

**Anahtar kelimeler:** Endüstri 4.0, Yapay Zekâ, Robot Teknolojileri, Turizm İşletmeleri

### **1. Introduction**

Industry concept; It is defined as an economic activity that produces highly mechanized and automated material goods. All technological advances experienced with the start of industrialization are defined as "industrial revolutions" (Şahin and Kaya, 2019, p.13). Fossil fuels have an important role in the industrialization process, which means that manpower is replaced by machines (J.L. Outman and E.M. Outman, 2003). It is seen that coal in the first

industrial revolution and oil in the second industrial revolution changed the technological and economic conditions in production, consumption and transportation (Janicke and Jacob, 2009). The first industrial revolution is called Industry 1.0, the second industrial revolution is Industry 2.0, the third industrial revolution is Industry 3.0 and the fourth industrial revolution is Industry 4.0.

With Industry 1.0, it is seen that the production activities carried out by masters and apprentices in workshops belonging to families were replaced by machines with the first industrial revolution (Şahin and Kaya, 2019, p.13). Industry 1.0 first started with the mechanization of spinning and weaving in the UK's textile industry (Schwab, 2018, p.25). Later, it spread to Europe and America and developed. With Industry 1.0, it is very important to provide production with machines for faster and easier production (Jasperneite 2012; Kagermann, et al., 2013; Lasi et al., 2014; EBSO, 2015, p.4; Hermann, et al., 2016; Moeuf et al., 2017; Durmuş, 2019, p.3). The effect of the first industrial revolution on tourism has been as a result of the developments in the steam-operated transportation elements and the acceleration of locomotive production (Özdoğan, 2019, p.4). In the 18th century, with the increase of these machines and the advancement of technology, steam engines began to be used on ships and locomotives (EBSO, 2015). The use of the steam engine has been effective in the use of transportation vehicles, especially railways. The opportunity to travel quickly, cheaply and comfortably by rail has played an important role in helping people reach new and distant markets. (Mahiroğulları, 2005: 42; EBSO, 2015). It is known that a tour of 571 people was carried out in 1841 by Thomas Cook using steam trains and railways.

The tour organized for Teetotalers Club members to a festival in Loughborough, 20 km from Leicester, England, is the first organized tour (İçöz, 1998, p.169). It is known that Thomas Cook, which has established a worldwide travel agency in thirty years, has stopped all its commercial activities as of September 23, 2019 (Thomas Cook, 2019).

It is stated that Industry 2.0, which is also expressed as a technological revolution, started after the 1840's, which provides greater production opportunities thanks to superior electrical technologies (Durmuş, 2019, p.3). The main drivers of the second industrial revolution are England, Germany, USA and Japan (Mahiroğulları, 2005, p. 42; EBSO, 2015). With the transformation of the energy source obtained in Industry 1.0 into electrical power, it was possible to use mass production techniques in Industry 2.0. Thanks to mass production technologies, which mean the standardization of products and processes, it has enabled the production of products above consumer demand. Thus, a production-oriented marketing approach has emerged in marketing (Xu et al., 2017, p.311; Alçın, 2016; Şahin and Kaya, 2019, p.15). The effect of Industry 2.0 on tourism is the emergence of a new and large tourism market with the increase in population and welfare. With the emergence of collective travel opportunities in this period, new marketing methods such as tour operators, organized tours, travel packages and brochures were used. In 1872, Thomas Cook organized the first world tour with a ship named "oceanic" (Lickorish and Jenkins, 2006).

Industry 3.0, which started in the 1950's, is considered a digital revolution with the rise of computers and industrial automation. It is stated that in the last half of the 20th century, the widespread use of electronic and information systems allowed production to become even more automatic, and this situation changed the whole world (Xu et al., 2017, p.311). Internet, computers, digital products and solutions took the lead in Industry 3.0.

The reason why digital products are preferred for businesses is that they have the ability to be reprogrammed and solve a problem compared to old machines. New digital machines have enabled both the increase in production capacity and the emergence of new markets. Examples of this situation are China and India. After catching the third industrial revolution, it is seen that people living in these countries moved away from rural areas and settled in high-tech cities such as Beijing, Shanghai and Mumbai. Manufacturing is developing from mass production to mass customization and new strategies are being developed for production with programmable machines (Özdoğan, 2019). Computer and communication technologies used in the production stages enable much smaller products to take place in people's daily lives.

Therefore, it is said that the need for manpower is gradually disappearing as machines begin to exist in daily life outside of business life (EBSO, 2015). The communication of computers, one of the main actors of the third industrial revolution, with each other is provided via the internet. The Internet is expressed as a global network that enables digital data transfer. Although the internet, which is also defined as a computer network, started to be used in the middle of the third industrial revolution, it seems that it started to become widespread in Turkey in the early 1990's (Özdoğan, 2019, p.18.). It is seen that the developing information technologies with Industry 3.0 increase the supply and demand for tourism worldwide (Kiprutto et al., 2011). In 1953, a twin-engine Vickers Viking was designed, which took a group of 36 people on two-day tours to Lyon, Barcelona, Madrid, Tangiers, Casablanca and Agadir, taking a break (Gierczak, 2011).

The concept of Industry 4.0 was first used as a 2020 high-tech strategy at the Hannover Trade Fair in Germany in 2011 (Zhou, et al., 2015, p.2147). It is stated that the only creator of the Fourth Industrial Revolution is the developments in the fields of informatics, communication and internet technologies (Banger, 2018, p.19). The development and dissemination of internet applications represents the most important power of this period. Developments in internet infrastructure cause new transformations in automation, data flow and production technologies (Kaya and Şahin, 2019, p.17). The aim of Industry 4.0 is to introduce a production model in which personalized digital products and services are highly flexible through simultaneous interactions between products, people and machines used during production. For example, a factory that accepts consumer orders or manufactures directly and ships the required product has a strong influence on the traditional e-commerce sales model. Industry 4.0 not only affects German industry and even international industrial development, but also creates a driving force that will guide future production by changing traditional industrial production methods. It is thought that production will become smarter in the future with the use of digitalization of industrial production systems (Zhou, et al., 2015, p.2147). Thus, with Industry 4.0, the concept of "being smart" enters the literature (Çelik and Topsakal, 2017). The concept of smart; Big data is defined as the economic, technological and social developments brought about by new communication methods and information exchange (IoT, NFC, GPS, etc.) technologies (Gretzel et al. 2015).

Harrison et al. (2010), on the other hand, conceptualize the concept of smart as the use of real-time and real-world data integrating, sharing, modeling and visualization in order to make more operational decisions (Hermann, et al., 2016, p.3929). The concept of "intelligent" is the processes in which almost all of the work, which requires a human hand in production, is completed with machines (Şahin and Kaya, 2019, p.18). In this system, industrial processes are reorganized, provided that people, machines, products and data are integrated with each other

(Hermann, et al., 2016, p.3929). Intelligent systems provide personalized production in thousands of different forms, not in one type, from desired products instead of unwanted products. Developing technologies make it possible to see the final version of a product in all its details before it is produced. In Industry 4.0, not only the production part of the work, but also the qualities of the products produced are important (Şahin and Kaya, 2019, p.22).

The most important elements that distinguish the fourth industrial revolution from the previous revolutions are; sensor, data, information and process. You ask; It is defined as sensors that convert both physical and chemical signals such as heat, light and humidity into data. "Data"; It is carried out by selecting and classifying the collected data in accordance with its purpose. In "Information", the collected data is passed through an artificial intelligence algorithm, preventing mistakes made before. After the necessary data is collected from the sensors and converted into information, the decision maker becomes a "process" (Şener and Eevli, 2017, p.26-28). Among the basic dynamics of the fourth industrial revolution, there are many technological developments such as big data, cloud computing, nano technologies, 3D printers, augmented reality, internet of things, artificial intelligence, robot technologies. Thanks to the industrial revolutions and the developing technology, tourism businesses are also becoming increasingly digital. Therefore, the aim of this study is to include application examples of robot technologies with artificial intelligence in tourism enterprises depending on technological advances. In line with the purpose of the study, only artificial intelligence and robot technologies, which are among the basic dynamics of Industry 4.0, are included.

### **1.1 Artificial Intelligence**

One of the most important sub-titles of the technologies in Industry 4.0 is artificial intelligence. The concept of artificial intelligence, machines; It is defined as transferring the intelligence that people have and thus enabling people to do the things they can do (Özdoğan). Artificial intelligence is a science that aims to enable machines to make comparisons, use previous information, plan, communicate, perceive, learn, and relocate, and thus benefit from machines that have become smart (Demirhan, 2010).

It is stated that artificial intelligence emerged as a science in 1955. John McCarthy, a professor of mathematics at Dartmouth, carried out a project for machines to use language, create abstractions and concepts, and solve problems that humans can solve (Reese, 2018, 76). It is predicted that artificial intelligences will be able to communicate with each other in the future.

As examples of common Artificial Intelligence applications; Social networks such as Amazon, which offers recommendations based on previously purchased products, Facebook and LinkedIn, which offers friend and connection recommendations. In addition, Netflix, which provides online movie streaming service, announced that 75% of the movies watched by users in 2012 consisted of movies suggested by algorithms (Fan, 2020, p. 45-47). Artificial intelligence technologies, which mean creating intelligent computer systems (Wisskirchen et al. 2017, p. 10), are frequently involved in daily life. With Google Maps, which predicts the traffic and suggests shortcuts, it is possible to reach the destination faster, to automatically respond to e-mails on smart phones, and to watch new programs thanks to Netflix suggestions. With machine learning, it is possible to be closer to intelligent machines (Fan, 2020, p.40).

## **1.2 Robot Technologies**

When it comes to artificial intelligence, the first thing that comes to mind is robots with a physical body. But while this is generally true, Artificial Intelligence is basically software. While the goal of those who coined the term artificial intelligence in the 1900's was to enrich computers, it is seen that the meaning of this concept developed over time and started to find a place in many fields. One of them is robot technologies (Adalı, 2017, p.280).

Robot; They are machines that can be programmed through a computer and are capable of performing a series of complex actions automatically (Banger, 2018, p.71). It is known that the word Robot, which is derived from "robota" meaning "secondary labor" in Slavic languages, was first used by Czech playwright Karel Capek. The word robot means Captive in Czech (Siciliano and Khatib, 2019, p.4; Murphy, et. al., 2019; Murphy, et. al., 2017, p. 105; Doğan, 2020). The Turkish Language Institution defines the word robot as "an automatic tool that can be used to perform various tasks with magnetism to perform a certain job" (Turkish Language Institution, 2020). The Robotics Institute of America (1979) defines a robot as "a multifunctional, reprogrammable mechanism designed to move materials, parts, tools or special devices with programmed movements to perform various tasks" (Bilim and Teknik, 2019).

It is known that the field of artificial intelligence, which started with the conference held at Dartmouth College in 1956, continued with the construction of the first robot in 1961. In the following ten years, besides becoming a life facilitator, it also developed dreams for the future. An example is the robot Rosie in the cartoon Jetsons. The realization of Rosie the Robot means that machines learn by observing and understand human values. There are also frightening scenarios, such as the fearsome rebel supercomputer HAL 9000 in Stanley Kubrick's movie "2001: A Space Odyssey" (Schwab and Davis, 2018, 168). In real life, the most beautiful robot example of artificial intelligence with human appearance is Robot Sophia (Şahin and Kaya, 2019,110).

Sophia is a humanoid robot created by Hanson Robotics with the abilities of neural networks, expert systems, machine perception, speech, natural language processing, recognizing human faces, recognizing various gestures, seeing emotional expressions, imitating various parts of the brain (Hansonrobotics, 2020).

Humanoid robots also serve as personal assistants and companions (AI International, 2017). Depending on the development of technology, many things used in daily life become interconnected thanks to the "Internet of Things"; It enables the development of elements that enable robotic technology such as artificial intelligence, image processing, speech recognition and autonomous systems. Therefore, it supports the design of faster, stronger and smarter robots (Uludağ İhracatçı Birlikleri Genel Sekreterliği, 2017, p. 3).

Robots that perform tasks given by humans have sensors that detect physical data in the real world, such as motion, light, sound, heat, impact and pressure. In addition, they have efficient processors and large memory. Robots with these features are able to learn from their mistakes and adapt to the new environment (Uludağ İhracatçı Birlikleri Genel Sekreterliği, 2017, p. 6). In addition to being used mostly in medicine, diagnosis and surgery, artificial intelligence and robotic technologies are seen to be used in education, transportation, military, social sciences and many other fields (Kayıkçı and Bozkurt, 2018, p.55). Robots are being developed that will travel to Mars, help nurses and even produce themselves (Hardesty, 2013;

Murphy, 2016; Conner-Simons 2016). Akin robotics company produces humanoid robots. Some of the robots produced by the company provide waiter service in cafes in Konya. (Kayıkçı and Bozkurt, 2018, p.55).

At the 2019 summit of the World Tourism and Travel Council (WTTC), held in Seville, Spain, it was noted that 47 percent of business branches will change in the next 15 years with the use of technological developments and robots (Turizm Güncel, 2019). According to the research of Bank of America, it is predicted that 10% of the tasks undertaken by robots in the production processes will reach 45% in 2025 (Digital Bursa, 2019). In this context, it is thought that robot technology will increase exponentially in the coming years and will create radical changes in many different fields. Robots can communicate with the outside world thanks to the information-communication hardware and software embedded in them. Robots that make decisions and act on their own without any intervention are called autonomous robots. Depending on the diversity of these features, they can also be semi-autonomous. According to the work done by the machines in the robot category; They vary as medical operation robots, industrial robots, service robots (Banger, 2018, p.71). Robots used in tourism enterprises are called service robots. Developments in robot technologies have also started to show themselves in the tourism industries within the service sector (Koç, 2014, p.9; Gladstone, 2016). Services are produced in tourism enterprises. Therefore, robots assigned in the tourism industry are considered as service robots. Service robots come in two different types. The first is fixed robots whose fixed positions do not change. The second is mobile robots with the ability to change positions.

Mobile robots can be wheeled, fly, have more than one arm, can serve underwater, can perform activities such as cleaning floors and pools, bringing materials to rooms, carrying luggage, mowing lawns and providing entertainment services (Ivanov and Webster, 2017: 77). Service robots used in hotels perform tasks such as welcoming guests, taking orders, preparing food, room service, cleaning, checking-in / check-out, providing information about the business or the city (Ivanov and Webster, 2017: 75; http -9). In addition, these robots can work 24/7 and can repeat the same task hundreds of times without complaining (Ivanov and Webster, 2017). Service robots are recognized as one of the most effective and dramatic technologies of the future in the tourism industry (Tung and Law, 2017).

In a study conducted by Travelzoo (2016) with 6211 people from Brazil, Canada, China, France, Germany, Japan, Spain, England and the USA, it was concluded that two-thirds of those traveling abroad would benefit from the fact that robots are involved in the tourism industry, in terms of providing unlimited services in different languages. has been reached. In addition, it is stated in the study that robots will be an important asset in the tourism sector by 2030. (Bowen and Morosan, 2018, p.731; Hospitalitytech, 2019).

Today, there are application examples of robotic labor in hotel businesses, food and beverage businesses, travel businesses, airports and other tourism areas.

- Alibaba, known as the online shopping giant, exhibits the first example of a hotel equipped with artificial intelligence in China under the name FlayZoo. The hotel, which has 290 rooms, is known as the first "hotel of the future". At this hotel, services such as registration at the reception, light control and room service are automated. Guests can enter the hotel with face recognition system. Afterwards, access to hotel services is provided with the help of the key card given to the guest (Şahin and Kaya, 2019, p. 112; Brennan, 2019).

• Henn na Hotel in Nagasaki, Japan, is the first hotel to have working robots. Opened in July 2015, the hotel finds 186 robots, including a luggage-carrying arm robot, transport robots, a female robot and a dinosaur robot at the reception desk, desktop robots for indoor customer service, and robotic cleaners. "Henn na Hotel", an experimental hotel project, offers a comfortable stay by combining the latest technologies such as the use of various robotic labor and minimum human effort (Ohlan, 2018; Osawa et al, 2017, p. 219; Jarvis, 2016; p.219; Pierce, 2015).

• At the Hilton McLean Tysons Corner hotel in McLean, Virginia, USA, a 60 cm long robot named Connie works, developed by IBM in 2016. In addition to asking personal questions to the robot, guests coming to the hotel can obtain information about the interior of the hotel, the hotel's surroundings, food and beverage and travel. Thanks to the machine learning of artificial intelligence, it increases the quality of service by learning new things and using what they have learned later. It is aimed to develop the robot named Connie, which started service in Tokyo, and spread it to other chains (Ivanov et. al., 2017, p.1506; Gagliardi, 2016).

• Aloft Cupertino Hotel in California, A.L.O. employs a robot-butler developed by the Savioke Robot Company. Robot A.L.O. It undertakes the task of taking the materials such as soap, shampoo, sheets, towels to the room and the dirty laundry to the laundry. It has a uniform and a nameplate just like other human employees (Ivanov, et. al., 2017, p.1506; Trejos, 2014).

• Another example of robotic labor developed by Savioke is the robot Relay. Serving at Starwood hotels, Relay delivers guests' requests for food, beverage, towels, and pillows from various units. Social media sharing of guests about the hotel strengthens the image of the hotel (Ipar, 2020, p. 122).

• At the Marriott Hotel in Belgium, the robot named "Mario" can speak 19 different languages. "Mario", who weighs 6 kg and is 57 cm, can inform the guests about the activities both inside and outside the hotel after giving their room keys (Tuyed, 2019).

• In a hotel named YOTEL operating in New York, 300 pieces of luggage are transported in one day with the help of an industrial robot named Yobot. Therefore, guests can quickly define their check-in process (Social Tables, 2019).

• The smart assistant produced by Arçelik is used in Divan hotels in Turkey. Arçelik's assistant can be used to obtain information about rooms, hotel services, weather conditions, cinemas or restaurants. Thus, added value is created for the guest who prefers the hotel (Şahin and Kaya, 2019, p. 52).

• Robots work in the kitchen of the Spyce Restaurant opened in Boston, USA. Menus are ordered via touch screens. There are also human workers for some tasks that robots cannot do, such as guiding robots and decorating finished dishes. After the robot kitchen completes the process of preparing and serving food, the robots can also do their own cleaning (Robotic Kitchen, 2018).

• 10 robot waiters 1.2 meters in length work in a restaurant in Kunson, China. Robots working in the restaurant perform the tasks of taking orders, cooking rice, frying potatoes and serving them to customers. In addition, robots are used in the advertising and promotion campaigns of the restaurant (İbiş, 2020).

• Touch Restaurant operates in Istanbul Ataköy. As in the examples abroad, after ordering

from touch tables, the table is serviced by robots named "Rozzy" and "Robi" (Touch Restrouant, 2020).

- Ada is a service robot with a length of 1.5 meters and a weight of 36 kg. The robot developed by Akin Robotics in Turkey; taking orders, delivering orders from the kitchen to the table, communicating with customers, distributing brochures, dancing, doing simple kitchen chores and working as a receptionist (Akin Robotics, 2020).

- Multilingual-speaking and understanding Pepper is a semi-humanoid robot manufactured by SoftBank Robotics and "recruited by TUI, the world's leading integrated tourism group. TUI is the first travel business in the world to combine robotic technology in this way. The robot assists visitors and colleagues with daily questions and problems (TUI Group, 2018).

- Robot Pepper is also used in Pizza Hut restaurant chains in the Far East and Shanghai. The robot named Pepper can take orders and receive payments from customers (Yılmaz, 2018). "Pepper" uses voice recognition and artificial intelligence technologies to communicate with customers. In addition, thanks to the system developed with the cooperation of Pizza Hut and Master Card, the orders of the customers are easily transmitted to the kitchen of the restaurant. Pepper receives payment from customers when the process is completed (Ivanov et. al., 2017).

- Flippy, the world's first robotic kitchen assistant who learns by himself and gains new skills, prepares hamburgers thanks to his robotic arms integrated in the kitchen section. This robotic service is thought to facilitate daily life and tourism travels for the disabled (Digital Trends, 2020).

- There is a Japanese Hajime restaurant in Thailand, where 4 robot waiters work. The restaurant, which has been operating since 2010, takes orders from touch screens on every table. Within minutes, the robot dressed as a samurai comes to the guest's table to deliver the orders (Pieska et al., 2013).

- Waiter robots working in Robolshef Restaurant operating in Tehran, Iran, like others, provide order taking, serving and receiving payment services. Guests can play games at the digital tables while waiting for their orders (Türkiye Turizm, 2020).

- "Rhino" is a guiding robot at the Deutsches Museum in Germany. Rhino has features such as sharing information about artifacts, route planning and mapping by accompanying visitors. It can transfer images to different parts of the world with the help of the Internet (Burgard et al., 1999).

- The robot "Minerva", which is in the National Museum of American History in Washington, USA, performs tasks such as accompanying the guests, conveying information to them and entertaining them (Erbay, 2017).

- In Robot Tawabo, it accompanies visitors to Tokyo tower and informs them (Capnary, 2016, p.549). The robot "Sepulka", which performs the same tasks, is in the Polymus Museum in Russia. "Sepulka" introduces the museum to the visitors and takes an active role in educational activities (Boyraz, 2011).

- The robot in the Toyota Kaikan Exhibition Center in Japan, unlike the others, has some human gestures and facial expressions. By recognizing the name cards of the visitors, they can communicate with them one-to-one (Yıldız, 2018, p.4689). In the Quai Branly Museum in

Paris, the robot Berenson walks among the visitors and records their reactions to the artifacts (Gümüş, 2019, p.25).

- At Shenzhen Airport in China, the robot "Anbot" responds to the security needs of passengers and the airport. Thanks to its ability to detect and scan passengers' faces, Anbot detects potential criminals and initiates tracking and recording of suspicious persons. There are patrolling robots with cameras and detectors at many airports in China (Turizm Global, 2020).

- At Seoul Incheon Airport, South Korea, passengers are accompanied by the robot "Troika" to the boarding gates. In addition to showing the gate numbers to the passengers, the 140 cm tall robot can also provide information about the weather conditions in the city they are going to, the airport map, and possible flight-related delays (EuroNews, 2018).

- Robot "Spencer", on the other hand, is designed to help guide passengers to the flight gates at Schiphol Airport. Airport managers' use of robotic labor; It has been in order to easily solve the reasons such as delays, loss of way and language problems of passengers (Teknoloji Gundem, 2019). Spencer is also used by KLM Airlines to improve the travel experience of tourists (Özdemir Akgül, 2019).

- Junko Chihira, a robot manufactured by Toshiba, works at the tourism information center in Tokyo. The full-time robot has the features of welcoming visitors, informing about current events and speaking many languages, including sign language (Öz, 2018).

## **CONCLUSION AND RECOMMENDATIONS**

It is possible to talk about great changes since the existence of humanity. While Homo neanderthalensis was mentioned about 50 thousand years ago, Homo sapiens caused their extinction by not leaving an ecological environment in which they could survive. Homo sapiens (us today), who replaced Neandertalensis, will evolve into digital and be replaced by Homo digitalis. An artificial and virtual world where digital thinking will replace human thought is considered our new future (Walsh, 2020). Technological developments, which are accepted to have started with the industrial revolutions, have an important place in human life because they make people's lives easier. It is seen that the digital opportunities offered by the third and fourth industrial revolutions are not only in the industrial sectors but also in the service sectors. Tourism services, one of the service sectors, have to be digitalized in order to keep up with the changing consumer demands and the age.

Tourism services are expressed as labor-intensive services. Considering that the human-human relationship has a very important place, digitalization started with simple artificial intelligence applications such as keeping customer records with automation systems, making reservations with the help of online channels, providing certain services to guests with the help of applications, but it is seen that machines have increased and started to take place in robotic applications today. There are examples where these applications have been tried for many services within the tourism industry.

It is seen that robotic applications from hotel enterprises are used in various parts of the enterprises to communicate directly with the guests or to provide assistance to the working human staff. It is aimed to provide services such as c-in and c-out operations, bellboy service, room and floor cleaning with artificial intelligence-containing machines or human-like robots in hotel businesses. In addition to these services, some hotel businesses are also preferred for other services such as room service, laundry service and information provision for guests. In the

application examples outside the Henn-na hotel in Japan, it is seen that hotel businesses prefer to use robots to assist their staff. However, it is predicted that hotel businesses that use robots will increase in the future.

In the examples applied in food and beverage businesses, it is seen that robots are mostly preferred in the kitchen, in the service, in receiving payment and in welcoming customers. It is also possible to come across robotic applications that sing and dance to entertain customers. With the declaration of the COVID-19 outbreak as a pandemic by the World Health Organization (WTO) on March 11, 2020, SoftBank started to produce new robots as a result of the increased demand for robot workers by businesses (Euro News, 2018). The use of robots in food and beverage businesses enables standardization in portioning and cooking processes. When looking at the robot examples used for tourist guidance, it is seen that they are mostly used in closed areas. Considering the terrain structure and the mobility of the robot, it is considered that it is difficult to have robot tourist guides in the open area yet in today's technology. Robots working at airports are; It offers services such as welcoming passengers, providing information, translation in different languages, baggage handling and cleaning.

There are examples where it is possible to use robot technologies in almost all of the services in the tourism industry. Therefore, the fact that robot technologies are now being used in certain processes shows that this situation will increase in the future. It should not be ignored that there are many opportunities provided by artificial intelligence and robotic technologies, as well as negative aspects such as unemployment. However, despite its negative aspects, neither societies nor businesses can give up technology (İbiş, 2020, p.417). The fact that robotic applications in the tourism industry are generally of a first nature requires some time in terms of evaluating the positive and negative aspects of this situation. The continuation of the applications or the emergence of negative situations will provide an idea about whether it is suitable for the tourism industry in terms of future robotic applications. Instead of the presence of artificial intelligence robots in every area, artificial intelligence should be used in a way to increase human abilities, freeing people from routine work, solving more important problems and creating more time to deal with guests.

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