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A Systematic Literature Review on Artificial İntelligence Applications in Tourism Marketing

Yakup Durmaz[1*], Miraç Yücel Başer[2]

[1]*Deapartment of Marketing, Faculty of Economics Administrative and Social Sciences, Hasan Kalyoncu University, Gaziantep, Turkey*

[2]*Department of Business, Graduate School of Social Sciences Hasan Kalyoncu University, Gaziantep, Turkey*

***Corresponding Author:** Yakup Durmaz, Deapartment of Marketing,Faculty of Economics Administrative and Social Sciences, Hasan Kalyoncu University, Gaziantep, Turkey*

ABSTRACT

This study aims to theoretically investigate artificial intelligence applications in tourism marketing. Artificial intelligence applications that develop depend on technological progress wereinitiated and involved in various business processes. Global companies are focused enhance their efficiency by investingin artificial intelligence technology in various Processes from management to marketing. Marketing that becomesa crucial field is becoming an essential work division that has used artificial intelligence applications. Artificial intelligence that offers options such as personalized product recommendations to purchase attitudes based on prediction is also becoming popular in tourism. In this context,the present study aims to impact artificial intelligence on companies and tourists examining potential artificial intelligence applications in tourism marketing.

Keywords: *Artificial Intelligence, Marketing, Tourism Marketing*

INTRODUCTION

In the 1950s, researchers' efforts to improve the autonomous learning capabilities of computers led to the development of a new landmark concept, artificial intelligence (Lu, 2019), which changed the shape of existing business processes. In this direction, marketing is among the business processes affected by artificial intelligence technologies (Verma et al., 2021). Being aware of the impact that the artificial intelligence market, which is expected to reach $126 billion in 2025, will have on the business world, global companies such as Google and Spotify have already started to integrate artificial intelligence technologies in marketing (Vlacic et al., 2021).

Data analytics, natural language processing, sentiment analysis, in-store experience optimization, and various artificial intelligence applications are becoming increasingly important in marketing for consumer satisfaction and personalized product recommendations (Huang and Rust, 2022a). Thanks to artificial intelligence, deep learning, and machine learning, it significantly affects digital marketing, eliminating the time spent on advertisements that disturb consumers. In this way, it helps make efficient decisions for consumers and increases profitability by reducing business costs (Haleem et al., 2022). Kumar et al. (2019) state that artificial intelligence provides benefits to managers in terms of branding and consumer management. In this respect, artificial intelligence technologies have potential in various parts of marketing. On the other hand, considering that artificial intelligence technologies are used within the scope of marketing products and services in various sectors, tourism marketing is also promising. Because, of the personalized modeling provided by artificial intelligence, tourism enterprises can now provide personalized tourism services by analyzing user information and creating personal travel programs (Xie and He, 2022; Doborjeh et al., 2022). In this direction, it is aimed to contribute to the relevant literature by examining the promising artificial intelligence applications used in tourism marketing.

LITERATURE REVIEW

The literature Review can be explained under the following headings.

Artificial Intelligence and its Components

Although the roots of artificial intelligence (Demir et al., 2019), which is among the Industry 4.0 technologies, are not known precisely, it is thought to be based on a short story called 'Runaround' published by Science Fiction writer Isaac Asimov in 1942 (Haenlein & Kaplan, 2019). The concept of artificial intelligence (Buchanan, 2005), whose main turning point was in Alan Turing's article on designing computers to act intelligently in 1950, was first used in a summer research project organized by John McCarthy in 1956 (Copeland & Proudfoot, 2007). Artificial intelligence basically refers to the science and engineering of making intelligent machines and intelligent computer programs (McCarthy, 2007). Encyclopedia Britannica (2022) describes artificial intelligence as 'the ability of a digital computer or computer-controlled robot to perform tasks usually associated with intelligent beings'. By definition, artificial intelligence can be ahead or behind humans in terms of superiority when it is considered as the features of smart machines that exhibit performance equivalent to human capabilities. For example, while artificial intelligence can perform many calculations faster than humans, perception and decision-making lag behind humans (Ertel, 2011). In this respect, Russell & Norvig (2010: 2-5) divide the definition of artificial intelligence into four groups as humane thinking, humane behavior, rational thinking, and rational behavior. While defining artificial intelligence in terms of humane thinking and humane behavior, human characteristics such as speaking, seeing, acting, problem-solving, decision making or learning are taken into consideration; While defining artificial intelligence in terms of rational thinking and acting rationally, it is taken into account that the system does the right thing by considering what it knows. In this direction, artificial intelligence is also described as 'software (probably hardware) systems designed by people who act in physical and digital dimensions by sensing their environment, collecting data and interpreting this data, when given a complex purpose' (Samoili et al., 2020). Considering that artificial intelligence basically refers to systems with capabilities equivalent to human intelligence, artificial intelligence should have the following capabilities (Pennachin and Goertzel 2007):

- The ability to solve general problems in a non-limiting way as humans can
- Ability to efficiently solve specific problems in specific areas
- Ability to use their expertise together
- Ability to learn from other intelligent systems and its environment
- Ability to solve problems better as experience gains

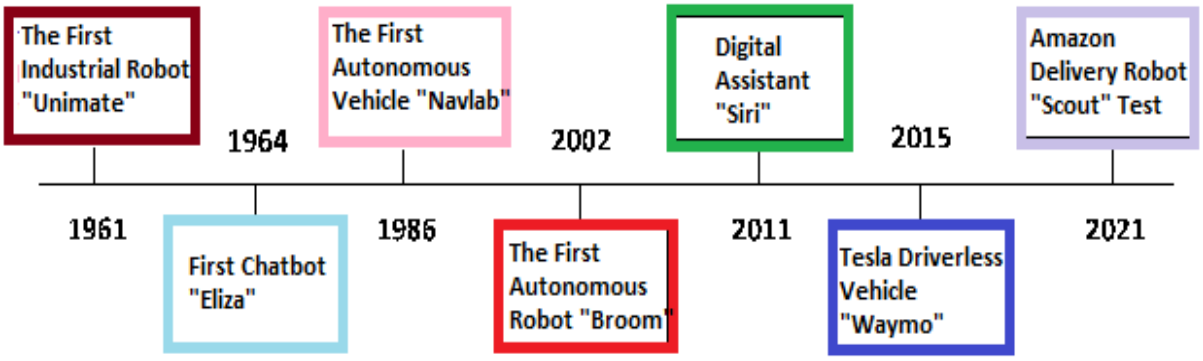

Figure1. *Artificial Intelligence Timeline (Connor, 2022; Anyoha, 2017; Marsden, 2017)*

As stated above, artificial intelligence has various abilities such as problem-solving or learning over time. In this respect, it is grouped within itself according to its abilities, differing from the programs in which the things it will do are predetermined (coded) and from traditional computers with relatively low intelligence (Wang, 2019). Kaplan & Haenlein (2019) divide artificial intelligence into three groups:

- It describes features consistent with analytical artificial intelligence-cognitive intelligence. These artificial intelligence systems use what they have learned from their past experiences in the decisions they will take. Systems used by companies to detect fraud are examples.
- It describes features consistent with human-inspired artificial intelligence-cognitive intelligence and emotional

intelligence. Unlike analytical artificial intelligence, it understands human emotions such as happiness, surprise, and anger and takes these emotions into account in the decision-making process. Companies can use these systems to get to know the staff better when hiring new staff.

- Humanized artificial intelligence-in addition to cognitive and emotional intelligence, also have social intelligence. Although there are artificial intelligence systems that develop in imitating people and behaving like humans, humanized artificial intelligence is still among the projects that are likely to be in the future.

Many technologies in our lives, from smart assistant Siri to robotics or from facial recognition systems to autonomous vehicles, are examples of artificial intelligence (Lu et al., 2018; Shabbir and Anwer, 2015). The element that makes these technologies artificial intelligence is the components they have. Because artificial intelligence basically covers a multidisciplinary technology covering machine learning, deep learning, computer vision, natural language processing, artificial neural networks, and expert systems (Hangl et al., 2022: 5; Zhang and Lu, 2021: 4; Pannu, 2015). In this direction, artificial intelligence sub-technologies are tried to be expressed below.

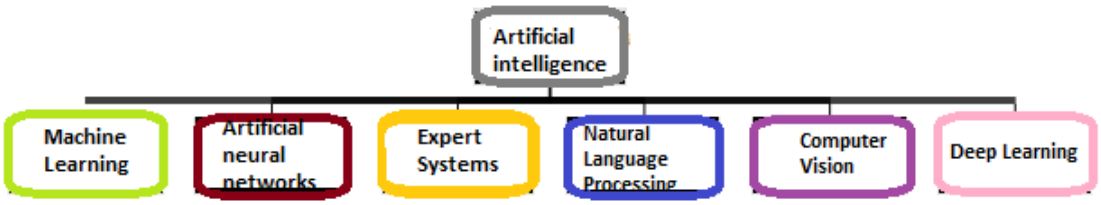

Figure2. *Artificial Intelligence Sub-Technologies (Hangl et al., 2022; Zhang & Lu, 2021; Pannu, 2015).*

Machine learning: Machine learning covers algorithms that enable computers to learn, focusing on how computers can improve themselves with experience (Mitchell, 2006). In other words, it is expressed as the process of creating computer systems that develop automatically with experience and learn continuously (Ayodele, 2010a; Ayodele, 2010b). For this purpose, machine learning is used in various fields such as fraud detection, credit scoring, recommending the best offer, determining whether a bank customer can pay the loan or not, and making a medical diagnosis using symptoms (Janiesch et al., 2021; Agrawal et al., 2017).

Deep learning: Deep learning, which is the most popular sub-branch of machine learning (Lu, 2019) allows computers to use neural networks with different layers, evaluate the output of the previous layer of each layer as input, and obtain high-level information from low-level information such as sound and image, and (Zhang et al., 2018; Wang & Sng, 2015). For example, Siri, the virtual assistant offered by Apple, can respond to users' requests and questions by using the information it collects thanks to deep learning (Chen & Lin, 2014).

Artificial neural networks: The mathematical models consisting of interconnected artificial neurons that process information are artificial neural networks (Pannu, 2015). Artificial neural networks are used in various moments such as business, engineering, and medicine. Because it can perform better than traditional statistical techniques such as regression analysis. For example, considering that it is difficult to obtain accuracy in modeling financial time series and exchange rate forecasts, higher accuracy rates are obtained with artificial neural networks (Walczak, 2019).

Computer vision: Computer vision, which is a science that examines how machines see, includes the use of computers and cameras instead of the human eye in tasks such as perceiving, identifying, measuring, and tracking objects (Zhang & Lu, 2021; Russell & Norvig, 2010). Various vision systems, from face recognition to systems that automatically classify microscope images of cells, have been developed based on machine learning and computer vision (Mitchell, 2006). For example, the 'Amazon Go' smart market, which does not require a cashier, benefits from deep learning computer vision technology (Lu, 2019).

Natural language processing: It covers how to program computers to process natural language data correctly (Shinde & Shah, 2018). Natural language processing, also known as computer linguistics, is a sub-branch of computer science that deals with learning,

understanding, and producing the content of human language. It provides convenience in human-machine communication and can learn from various human languages offered online (Hirschberg & Manning, 2015). Chatbots that imitate the human language and respond to users' questions are an example of natural language processing (Flasinski, 2016).

Expert systems: It is a sub-branch of artificial intelligence that uses certain expertise to solve problems at the human level (Nagori & Trivedi, 2014). Expert systems are basically intelligent computer systems with professional knowledge and experience. It can solve problems by modeling people's ability to solve problems (Zhang & Lu, 2021). 'DENDRAL', developed by Stanford University for the chemical analysis of Martian soil, is accepted as one of the first systems in which field-expert information is coded (Lucci & Kopec, 2016).

Artificial Intelligence Usage Areas

Artificial intelligence, which is the cornerstone of Industry 4.0, is used in various fields such as finance, health, agriculture, manufacturing, retail, security, education, transportation, and the public (Anagnostou et al., 2022; Lu, 2019). So much so that global companies such as Google, Tesla, Uber, Amazon, and UPS are renewing their existing business models using artificial intelligence technologies (Lee et al., 2019). When the applications of artificial intelligence in different sectors are examined, applications that improve clinical diagnosis and decision-making performances in the field of health come to the fore (Yu et al., 2018).

For example, motion detection devices developed for stroke disease help in early diagnosis by detecting the symptoms of the disease (Jiang et al., 2017). FinTech services, which are currently used in the finance sector, bring innovations, especially to the banking field, together with artificial intelligence. While artificial intelligence can realize futures contracts without a sudden collapse thanks to algorithms by providing efficiency in banking (Lui & Lamb, 2018), it can provide 24/7 financial support thanks to robo-advisors (Belanche et al., 2019). In agriculture, another area where artificial intelligence is used, water, plant protection, and soil fertility can be increased by using artificial intelligence-supported technologies (Kühl & Mohr, 2021). With the sensitive crop management technique, it is aimed to grow products suitable for the soil and the process can be followed from the planting of agricultural products to their storage (Eli-Chukwu, 2019). In education, as in many fields, various artificial intelligence technologies such as smart schools, and personalized and distance education are foreseen (Chen et al., 2020). For example, the online teaching environment MOOC is becoming a popular practice for education and assessment. Thanks to natural language processing and deep learning, MOOC can evaluate student participation, behavior, and outcomes (Alam, 2021). Artificial intelligence is thought to be a smart solution for complex transportation systems that are difficult to manage. Applications such as automatically detecting traffic accidents and predicting traffic conditions are among the artificial intelligence technologies in the field of transportation (Abduljabbar et al., 2019). On the other hand, artificial intelligence provides promising solutions against increasing information security due to technological developments. Because, thanks to artificial intelligence, network attacks can now be detected quickly and security defense can be performed (Lu, 2019: 20). Reis et al. (2019) state that artificial intelligence technologies are integrated relatively slower in public services compared to other areas, and they are generally concentrated in industrial areas with the private sector and public partnerships. However, artificial intelligence applications that have potential in public services such as data visualization that will help in security services by analyzing terrorist acts and criminal activities in a predictive way or chatbots that will help immigrants seeking asylum in paperwork are also foreseen (Wirtz et al., 2019).

Artificial Intelligence Technologies Used in Marketing

Marketing refers to the process in which businesses interact with customers and establish strong relationships with this interaction, rather than sales and advertising (Kotler & Armstrong, 2018). In a way, it focuses on motivating purchasing and meeting consumer needs (Kotler et al., 2017). The traditional marketing approach (Hair et al., 2018), which has changed with the support of digital transformation and big data in the 21st century, has started to turn to artificial intelligence applications such as emotional analytics that define the emotions of consumers while watching advertisements

(Huang & Rust, 2021b). Because consumers' demand for technological experiences by becoming more conscious of technology has led businesses to new technologies (Kumar et al., 2021) and global companies such as Spotify, Google, and Under Armor have used artificial intelligence-based platforms (Amazon Lex) to increase customer interactions in their marketing activities. , IBM Watson, Google Assistant) (Vlacic et al., 2021).

In the relevant literature, audio, text, and image processing systems (Jarek & Mazurek, 2019), predictive analysis, data mining (Chintalapati& Pandey, 2022), expert systems, and case-based reasoning (Wierenga, 2010), understanding customer preferences, making sales forecasts (Mehta et al., 2022), determining the right target audience for optimum advertising results, offering personalized pricing, and better communi-cating with consumers by suggesting products and services (Le et al., 2022) is seen to be used in marketing for various purposes. For example, predictive systems of artificial intelligence can provide products and services on a predictive basis by determining which product consumers can buy (Davenport et al., 2020). Kumar et al. (2019) state that thanks to scalable deep learning, computing power can be increased, and customer experience can be improved by presenting product offers that exactly match the needs of the consumer. In this case, while artificial intelligence helps consumers to make efficient decisions, it can increase profitability by reducing costs for businesses. Because deep learning and machine learning, which are sub-technologies of artificial intelligence, significantly affect digital marketing thanks to their ability to analyze data, eliminating the time spent on advertisements that disturb consumers (Haleem et al., 2022).

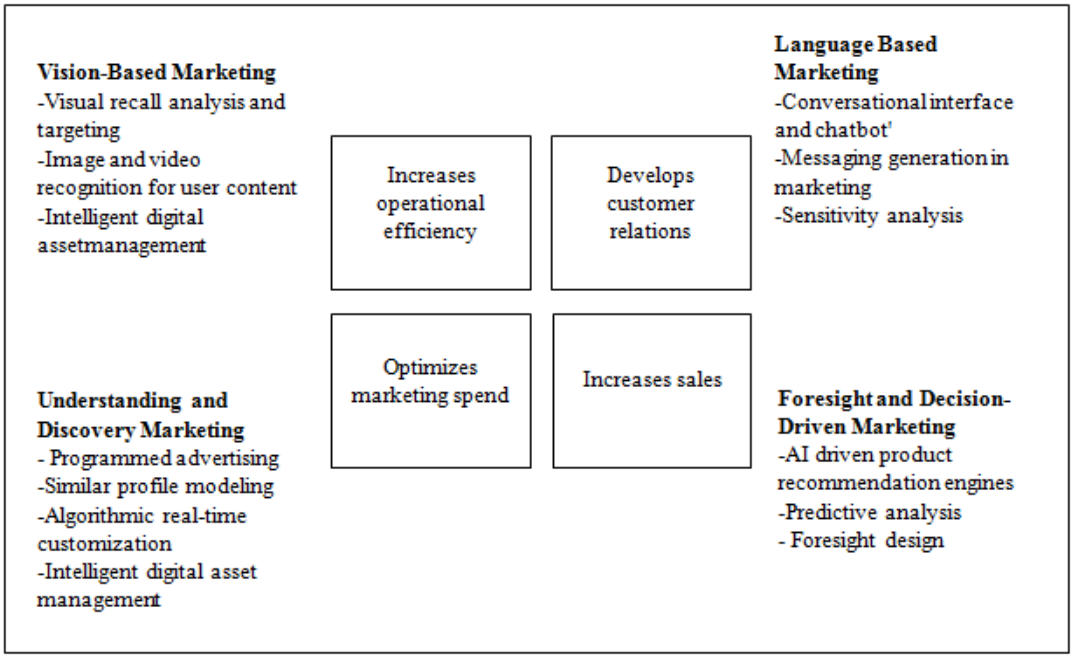

Figure3.*Use of Artificial Intelligence in Marketing (Keleş et al., 2017)*

Keles et al. (2017) As can be seen in Figure 3, artificial intelligence applications used in marketing are divided into four different categories. According to this:

- Visually oriented marketing-by predicts the output of invisible data, for example, by analyzing consumer behavior, and optimizing in-store design helps in making decisions.
- Language-focused marketing - Thanks to artificial intelligence technologies such as chatbots based on natural language processing, more natural and effective communication with consumers can be achieved compared to traditional call systems.
- Thanks to discovery-oriented marketing-machine learning algorit- hms, businesses can develop their marketing strategies to reach the most potential consumer audience.
- Forecasting and decision-oriented marketing-artificial intelligence can predict their future actions and purchasing decisions by analyzing consumers.

Artificial Intelligence Applications for Tourism Marketing

Increasing computing power, availability of data, and machine learning algorithms have made artificial intelligence gain importance (Huang & Rust, 2021b), making artificial intelligence applications available in various industries. One of the sectors where artificial intelligence has the potential to be used is the tourism and travel industry. Thanks to artificial intelligence, tourism businesses can now collect and analyze user information and offer personalized tourism services according to users' preferences (Xie & He, 2022). In a way, personal travel programs can be created by reaching predictions about the behavior of tourists with personalized modeling (Doborjeh et al., 2022). Ahani et al. (2019) have found that customized marketing strategies can be created for different customer segments by analyzing the data in TripAdvisor, thanks to the machine learning approach. Similarly, Deng & Li (2018) analyze 20 thousand Flickr images of New York City taken by foreigners and suggest that suitable images can be selected in the promotion and marketing of the destination thanks to machine learning. Artificial intelligence has led to the applicability of smart travel assistants. Intelligent travel assistants act as autonomous travel agents, combining various services and providing the user with an affordable travel opportunity. In this context, it is expected that artificial intelligence will create a new type of marketing through travel assistants (Bulchand-Gidumal, 2022).

One of the artificial intelligence applications that have potential in tourism marketing is chat robots. Chatbots based on artificial intelligence algorithms can offer special offers as they communicate with the consumer by understanding the wishes, intentions, and feelings of the users (Arsenijevic & Jovic, 2019), and it is predicted that they will increase the quality of products and services in marketing activities (Zsarnoczky, 2017). Chatbots assist in sales and marketing, with 24/7 consumer support and advice on travel issues (Pillai and Sivathanu, 2020). Considering that tourist products and services cannot be tested before purchasing, virtual reality application comes to the fore. The experiential nature of virtual reality helps tourists to market to destinations by providing realistic information. Because tourists can make more conscious decisions by having a real experience with virtual reality before their travels (Guttentag, 2010). On the other hand, maximum likelihood algorithms that suggest the most suitable prices for the future using the previous data on flight and hotel prices can be suitable for cost-effective holiday marketing to consumers (Samala et al., 2022). It is thought that service robots, which have started to take place in tourism businesses and create a desire for a new experience in consumers, will be effective in terms of tourism marketing. Tourism businesses can gain a competitive advantage by incorporating robotic services into their brand strategies (Tuomi et al., 2021). Because the developments in the functional capabilities of service robots cause them to come to the fore in marketing for consumers looking for a different experience (Ercan, 2020).

Conclusion

It is understood that the advances in artificial intelligence technologies will create added value by creating opportunities for businesses and improving social life for consumers. Potential applications of artificial intelligence to related studies show that farmers will obtain more efficient products, and consumers can make financial transactions without being exposed to fraud.

Marketing is one of the most convenient areas where artificial intelligence technologies can be integrated. Businesses will have the opportunity to implement their personalized campaigns in real-time thanks to artificial intelligence, and they will be able to achieve a return on investment and provide an enhanced consumer experience (Chintalapati & Pandey, 2022). In addition, it is predicted that artificial intelligence applications, which have the potential to better recognize the consumer and attract potential consumers by processing big data, will lead to the improvement of negative attitudes of consumers and marketing efficiency (Keleş, 2017). In this respect, artificial intelligence is promising in marketing research, strategic marketing, and marketing operations.

The flexible structure of tourism and the fact that the product produced is based on intangible services brings marketing to the fore. Thanks to artificial intelligence-based smart travel assistants and maximum likelihood algorithms, tourists will now be able to experience travel at the most optimal

prices that match their preferences. In a way, artificial intelligence will allow tourists to make future holiday recommendations by processing information about their past travels. On the other hand, in addition to chatbots that offer the opportunity to quickly and effectively solve the needs of consumers 24/7, service robots used in hotels can be used as marketing elements in hotels. In marketing activities for consumers looking for a new and unique experience, service robots will serve as attractive touristic products and will be beneficial in the advertisement and promotion of the business. On the other hand, with virtual reality applications, it will be possible to introduce tourists to the experience before purchasing. As a result, it is seen that artificial intelligence technologies are necessary for the effective and efficient execution of marketing activities in the tourism sector based on human service. Because businesses will not only be able to advertise products and services using artificial intelligence but also will be able to develop new services based on tourists' past experiences (Samala et al., 2022; Tuomi et al., 2021; Pillai & Sivathanu, 2020; Guttentag, 2010).

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