

## **Research Article**

# **Impacts of Robot/Technological Tour Guides (R/TTGs) On Guiding Profession And Human Tour Guides (HTGs) From ChatGPT-4.1 Perspective**

*ChatGPT-4.1 Perspektifinden Robot/Teknolojik Tur Rehberlerinin (R/TTR) Rehberlik Mesleği ve İnsan Tur Rehberleri (İTR) Üzerindeki Etkileri*

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### **Abstract**

The study aims to reveal the effects of Robot/Technological Tour Guides (R/TTG), which are a reflection of technological developments in tourism, on the tourist guiding profession and Human Tour Guides (HTG) from the perspective of ChatGPT-4.1. The responses provided by ChatGPT-4.1 to the eight study questions were analyzed using descriptive analysis, a qualitative research method. As a result of the analysis conducted; a) R/TTGs have the effect of reducing the need for HTGs but not completely eliminating them, b) Overall, R/TTGs are perceived as potential occupational threats but are expected to complement rather than replace human tourist guides, c) The effect of R/TTGs on HTGs' job satisfaction depends on their perceived role as competitors or complements, d) R/TTGs will be able to provide guiding service in open areas within 2 to 5 years, e) R/TTGs' substitutive or complementary role significantly influences HTGs' business performance, f) R/TTGs affects motivation of HTGs depending on whether it is perceived as a threat or a strategic partner, g) The preference for R/TTGs or HTGs varies according to tourist preferences, h) There will be both R/TTGs and HTGs in the tourist guide profession in the future.

**Anahtar Kelimeler:** Tour Guiding, Artificial Intelligence, Robot/Technological Tour Guide

### **Öz**

Çalışma, ChatGPT-4.1 perspektifinden teknolojik gelişmelerin turizme bir yansıması olan robot/teknolojik tur rehberlerinin (R/TTR), turist rehberliği mesleğine ve insan tur rehberlerine (İTR) olan etkilerini ortaya koymayı amaçlamaktadır. ChatGPT-4.1'in, çalışma kapsamında hazırlanmış olan 8 soruya verdiği cevaplar nitel analiz yöntemlerinden olan betimleyici analiz yöntemi ile değerlendirilmiştir. Analiz neticesinde; a) R/TTR'ler, İTR'lere olan ihtiyacı azaltabilir ancak onları tamamen ortadan kaldırması beklenmemektedir, b) R/TTR'ler potansiyel mesleki tehditler olarak algılanmakla birlikte, insan turist rehberlerinin yerini almak yerine onları tamamlayıcı bir rol üstlenmesi beklenmektedir, c) R/TTR'lerin İTR'lerin iş tatmini üzerindeki etkisi, bu teknolojilerin rakipler veya tamamlayıcı araçlar olarak algılanmasına bağlıdır, d) R/TTR'lerin önümüzdeki 2-5 yıl içerisinde açık alanlarda rehberlik hizmeti sunması beklenmektedir, e) R/TTR'lerin ikame edici veya tamamlayıcı rolü, İTR'lerin iş performansını önemli ölçüde etkilemektedir, f) R/TTR'lerin İTR'lerin motivasyonu üzerindeki etkisi, bu teknolojilerin bir tehdit veya stratejik bir ortak olarak algılanmasına bağlıdır, g) R/TTR veya İTR tercihleri, turistlerin beklenti ve tercihlerine göre değişmektedir, h) Gelecekte turist rehberliği mesleğinde hem R/TTR'lerin hem de İTR'lerin birlikte var olması beklenmektedir.

**Keywords:** Tur Rehberliği, Yapay Zekâ, Robot/Teknolojik Tur Rehberi

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## 1. Introduction

Today, rapid developments in technology are felt in many different areas such as medicine, defense, trade, production, education, transportation and tourism. Today, it is possible to come across robots working in some professions. For example, the existence of robot surgeons and robot nurses in medicine, robot teachers in education, robot soldiers in defense, robot waiters, robot receptionists and robot tour guides in the tourism sector are the results of the effects of technological developments on different professions. The inclusion of technology in various professions has positive and negative aspects. For example, while factors such as high speed and quality production of goods or services, minimum work accidents can be examples of positive effects, employees' anxiety about losing their jobs, low perception of professional value, and weakening of the sense of organizational belonging can be described as negative effects. Therefore, it is obvious that the presence of robots as employees in some professions has various effects on the profession and those who practice that profession. This also applies to the tourist guiding profession, which has a structure based on human-human relations and where Robot/Technological Guides (R/TTGs) exist, and Human Tour Guides (HTGs).

The study aims to investigate the effects of R/TTGs serving as tour guides on the tour guiding profession and HTGs. Within the scope of the research purpose 9 topics were determined: a) R/TTG, its effect on the need for HTGs, b) HTG, whether they perceive R/TTG as a threat to their profession, c) R/TTG, its effect on the job satisfaction of HTGs, d) R/TTG service area (indoor/outdoor), e) R/TTG, its effect on the job performance of human tour guides, f) R/TTG, its effect on the job motivation, g) Tourists' preferences regarding guides, h) R/TTG, its place in the future of the tourist guiding profession.

This study differs from previous research that has used ChatGPT and other large language models (LLMs) as data sources in terms of its primary focus. While existing studies have largely concentrated on travel planning, information quality, hallucination issues, and tourist/user experiences, the present study directly examines the professional future and work processes of human tourist guides (HTGs). Today, the inclusion of AI, which is used for a wide variety of purposes, in scientific research is a matter of debate. However, it is possible to come across scientific studies in the literature that examine the questions asked to AI with a qualitative approach. GPT-4.1 was included in the research due to its advanced features compared to peer AI applications and being one of the most preferred AI applications. OpenAI released the newest version of the ChatGPT family on April 14, 2025. GPT-4.1 is the latest iteration of the GPT-4o model trained to excel at coding and instruction-following tasks. In this context, 8 questions prepared regarding the service of R/TTGs as tour guides were asked to ChatGPT-4.1, a chatbot, and the answers were evaluated with a qualitative approach. The main limitation of the study is that a single artificial intelligence application was used in the study.

## 2. Conceptual Framework

### 2.1. Tour Guiding and Robot/Technological Tour Guides (R/TTGs)

Tour guides, who perform tourist guiding, one of the sub-branches of tourism falling under the service sector, are among the actors who are effective in making the images of both developed and developing countries positive or negative in the eyes of tourists visiting that country. According to European Federation of Tourist Guide Associations (EFTGA) a tour guide is “a person who Guide groups or individual visitors from abroad or from the home country around the monuments, sites and museums of a city or region; to interpret in an inspiring and entertaining manner, in the language of the visitor's choice, the cultural and natural heritage and environment.” (Ap and Wong, 2001, p. 551). According to the “Tourist Guide Profession Regulation” published in the Official Gazette numbered 29217 on 26 December 2017, tourist guide refers to “a natural person who has the right and authority to provide tourist guide services by being accepted into the profession in accordance with the provisions of the Law and this Regulation” (Yenipinar et al. 2017, p. 309). Kozak (1999, p. 554) defined the tourist guide in his study as “a person who will introduce Turkey to local and foreign tourists in the best way possible and who will help them during their trip and provide them with accurate information.” When the definitions related to the tourist guide are examined, it is understood that the tourist guide profession is a profession that has a structure based on human-human relations (Yıldız, 2018, p. 4686).

Technological developments, which are based on scientific studies, are causing radical changes in today's business and private life, as in the past. As a result of developments in robot technology, artificial

intelligence and software, today; robot pharmacist (Momattin et al., 2021; Alahmari et al., 2021; Teja et al., 2014), robot surgeon (Svoboda, 2019; Diana and Marescaux, 2015; Schreuder and Verheijen, 2009; Kalan, 2010), robot nurse (Nambiappan et al., 2021; Rekha and Kaliyappan, 2024), robot teacher (Kupferman, 2022; Serholt et al., 2017; Fernández-Llamas et al., 2018; Sharkey, 2016), robot waiter (Salgotra et al., 2020; Garcia-Haro et al., 2020; Cheong et al., 2016; Saple et al., 2015), robot soldier (Barnes and Evans, 2016; Barber et al., 2016; Barnes et al., 2006), robot receptionist (Podpora et al., 2019; Nuccio, 2017; Trovato et al., 2017; Holthaus et al., 2011), robot housekeeper (Yanjie et al., 2024; Mao et al., 2024) serve in the service sector. In the tourist guiding profession, which is based on human relations due to the influence of technological developments, technological/robot tourist guides (Rosa et al., 2024; Vásquez and Matía, 2020; Boboc, 2014) have also started to provide guidance services.

In the past, package tours including guide services were preferred by tourists for reasons such as safety, cost, experience and knowledge, and time saving (Choo et al., 2010, p. 77-91). In the past, travelers who chose not to join package tours relied heavily on guidebooks written by experienced explorers. Today, however, widespread and easy internet access allows people to obtain information anytime and anywhere. Thanks to internet-enabled smartphones and tablets—now owned by almost everyone—travelers can instantly find the information they need without time or location limitations.

Moreover, mass communication devices equipped with navigation systems and various GPS-based applications help individuals reach their desired destinations easily, even in unfamiliar cities or countries. As a result of these technological advancements, tourists' dependence on traditional tour guides and printed guidebooks has significantly decreased. Science and technology continue to influence the tourist guiding profession through mobile applications and even robot tour guides. Today, robot guides such as Rhino, Bonn German Museum, Germany (Burgard et al., 1998); Minerva, Smithsonian National Museum of American History, USA (Thrun et al., 1999); Sage, Carnegie Museum of Natural History, USA (Nourbakhsh et al., 1999); RoboX, National Fair Expo.02, Switzerland (Siegwart et al., 2003); Jinny, National Science Museum, Korea (Gunhee et al., 2004); Cicerobot, Agrigento Archaeological Museum, Italy (Chella and Macaluso, 2009); Tawabo, Tokyo Tower, Japan (İbiş, 2019); Mona and Oskar, Berlin Opel Fair, Germany (Stricker et al., 2012); Frog, The Royal Alcázar, Spain (Karreman et al., 2014); Asimo, Miraikan National Museum of Science and Innovation, Japan (Al-Wazzan et al., 2016); Aggie, Art Gallery of Western Australia, Australia (Wynne, 2016); Pepper, Smithsonian Museum, USA (Burton, 2018); Unnamed Humanoid Robot, Jaipur Wax Museum, India (Chaudhary, 2018), provide guidance services in museums and exhibition halls. Over time, both the capabilities of robots and the fields in which they are used have significantly evolved. Advances in artificial intelligence have played a crucial role in enabling robots to acquire more human-like characteristics. As a result of ongoing AI research, there is now increasing discussion about humanoid robots—often referred to as “humanoids”—that possess features and abilities closely resembling those of humans.

Considering all these developments, it is not a distant possibility that guide robots that only provide guidance services in closed areas such as museums and exhibition halls will be replaced by humanoid robots that can provide guidance services both indoors and outdoors. When this happens, it will be inevitable that the human-machine relationship will be added to the tourist guide profession, where human-human relationships are at the forefront.

## **2.2. Artificial Intelligence (AI)**

Artificial Intelligence (AI), which we often hear about, read about and use in our daily lives in the digital age we live in, has gone through various stages over time and reached its current level. AI was merely science fiction in the 1920s. Artificial intelligence and human communication came to the fore in the 1950s when Alan Turing proposed a test -called the “Imitation Game” to determine whether a machine was intelligent- in his article “Computing Machinery and Intelligence”. According to the test, if a human judge could not reliably distinguish the machine from the human when interacting with a computer, the machine would pass the test. The first use of the concept of artificial intelligence by Marvin Minsky, John McCarthy, Shannon and Nathan Rochester at a conference held at Dartmouth College in Hanover, New Hampshire, United States in 1956 contributed to AI gaining a standard scientific qualification

(Neha, 2021, p. 396). Although not an academic study, the 2001 movie “A.I. Artificial Intelligence” directed by Steven Spielberg was the first notable example of artificial intelligence in the visual arts.

Revealing the difference between the concepts of mind and intelligence is important for a clearer understanding of the concept of artificial intelligence. Because the use of the adjective “smart” to describe intelligent people causes the concepts of mind and intelligence to be used interchangeably in daily life. Mind refers to the ability of a person to think, comprehend, grasp, take precautions and make decisions. Intelligence refers to the entirety of the ability to perceive facts, make judgments and reach a conclusion based on this judgment (Öztürk and Şahin, 2018, p. 25).

Another issue that needs to be carefully considered regarding the concept of AI is the concept of artificial. Artificial, which corresponds to meanings such as man-made, non-biological, imitating nature or manufactured, is a concept that guides definitions of AI. However, a statement such as “Artificial intelligence is the artificial form of intelligence” is far from being a definition. In order to define AI, it is necessary to take into account the multidisciplinary structure of AI, as well as the fact that various stakeholders of society, such as the public, private sector, academics, and professionals, explain AI from their own perspective (Abbas, 2021, p. 94). The fact that AI is used in many different fields such as medicine, defense, education, entertainment, travel, science, art and marketing is the main reason why there are many different definitions in the literature. However, it is possible to come across definitions that explain AI in general in the literature. Nabiye (2012) defined AI as; “The ability of a computer or a computer-aided machine to perform tasks related to higher logic processes, such as finding solutions, understanding, construe, generalizing and learning from past experiences, which are generally human-specific qualities.” Sivasubramanian (2021, p. 1) defined AI in his work as; “A branch of science and technology that creates intelligent machines and computer programs to perform various tasks that require human intelligence.” John McCarthy, who made a significant contribution to the emergence of this discipline, explained AI as; “The ability of a machine to exhibit the behavior of a human being that is considered intelligent.” (Kaplan, 2016, p. 1). Rapaport (2022, p. 54) defined AI as “A branch of computer science that scientifically examines what problems can be solved, what tasks can be performed, and what features of the world can be understood computationally (i.e. using the language of Turing Machines), and then provides algorithms that show how this can be done efficiently, practically, physically, and ethically.” When the definitions are examined, it is seen that the definitions of artificial intelligence made by Nabiye (2012), Sivasubramanian (2021) and Kaplan (2016) are aimed at imparting human characteristics to machines, but the definition made by Rapaport (2022) defines AI based on which branch of science can achieve human characteristics in machines.

The main purpose of NLP (Natural Language Processing) -a sub-branch of AI (Wu et al., 2023), which is one of the most popular cutting-edge technologies of this age that attracts attention due to its revolutionary aspects in our lives- focuses on the interaction between computers and human languages, enabling machines to perceive, interpret and produce meaning in human language. The emergence of LLMs (Large Language Models) has revolutionized the field of NLP by initiating a paradigm shift by processing and generating natural language with unprecedented accuracy and fluency by utilizing deep learning techniques (Xu et al., 2025). These models are developed on large amounts of textual data, which allows them to capture complex linguistic patterns and contextual nuances. As a result, LLMs have significantly advanced AI’s capabilities to understand and use human language, improving applications in diverse areas such as chatbots, language translation, sentiment analysis, and content creation (Ray, 2023).

Today, artificial intelligence applications are used for very different purposes. While there are artificial intelligence applications that serve a single purpose, there are also multi-purpose artificial intelligence applications that serve different purposes as a result of the developments in this field. Table 1 classifies artificial intelligence applications according to their purpose of use. The different purposes of use in the “key features” column in Table 1 actually give clues about what can be done with artificial intelligence applications today.

**Table 1: Artificial Intelligence Apps and Key Features**

| Key Features                      | AI App                                   |
|-----------------------------------|------------------------------------------|
| AI Assistants (Chatbots)          | ChatGPT, Claude, Gemini, DeepSeek, Grok  |
| Image Generation                  | Midjourney                               |
| Notetakers and Meeting Assistants | Fathom, Nyota                            |
| Automation                        | n8n                                      |
| Video Generation and Editing      | Synthesia, Runway, Filmora, OpusClip     |
| Grammar and Writing Improvement   | Grammarly, Wordtune                      |
| Search Engines                    | Perplexity, ChatGPT search               |
| Writing                           | Rytr, Sudowrite                          |
| App Builders and Coding           | Bubble, Bolt, Lovable, Cursor, v0        |
| Social Media Management           | Vista Social, FeedHive                   |
| Research/Education                | Deep Research, NotebookLM                |
| Scheduling                        | Reclaim, Clockwise                       |
| Customer Service                  | Tidio AI, Hiver                          |
| Email                             | Hubspot Email Writer, SaneBox, Shortwave |
| Knowledge Management              | Notion AI Q&A, Guru                      |
| Project Management                | Asana, ClickUp                           |
| Resume Builders                   | Teal, Kickresume                         |
| Music Generation                  | Suno, Udio                               |
| Marketing                         | AdCreative                               |
| Voice Generation                  | ElevenLabs, Murf                         |
| Legal                             | Harvey                                   |
| Sales                             | Clay                                     |

**Source:** Lukan, 2025; Law, 2025.

Considering the developments in the last few years, it is predicted that robots and computer-based systems will be able to perform the following activities in the next 5-10 years thanks to artificial intelligence technologies (Öztemel, 2020, p. 103):

1. They will be able to talk to each other (information protocols),
2. They will be able to aim for the same goal (goal/sensor modeling),
3. They will be able to socialize, help each other, and provide support to each other (emotional intelligence),
4. They will be able to teach each other events (intelligent tutoring systems),
5. They will be able to conduct R&D studies and act innovatively (modeling scientific discoveries),
6. They will be able to do more than one job on their own (intelligent agents),
7. They will be able to take on roles in the management levels of businesses and serve as virtual managers (intelligent agents),
8. They will be able to create personalized education/training systems (intelligent tutoring systems),
9. They will be very skilled in communicating with their interlocutors in their native language (natural language processing).

OpenAI -one of the leading research companies in AI Technologies- has fundamentally transformed the AI and NLP fields with its GPT (Generative Pre-trained Transformer) models over the last decade. GPT models are built on the transformer architecture that has shown remarkable effectiveness, especially in developing LLMs. The first version, GPT-1, was released in 2017. Subsequent versions, including GPT-2 and GPT-3, formed the foundations of the groundbreaking ChatGPT. ChatGPT has gained tremendous popularity since its launch in November 2022, reaching 1 million users within a week and 100 million users within two months (Cheng, 2023). ChatGPT aimed to simplify various tasks such as coding, math, and problem solving by providing human-like responses using a combination of previous models and

later improved models (Dwivedi et al., 2023). OpenAI released the latest versions of the ChatGPT family, GPT-4.1, 4.1-mini, and 4.1-nano, on April 14, 2025. GPT-4.1 is the latest iteration of the GPT-4o model, trained to excel at coding and instruction-following tasks. GPT-4.1 is a version of cahtbot with enhanced capabilities and significant advances in coding, instruction following, and long-context processing, which are critical for developers (Sweetman, 2025).

### 2.3. Can Artificial Intelligence Applications Be Part of An Academic Studies?

Whether the use of AI in scientific studies is reliable and acceptable is a question that needs to be answered. Table 2, although not related to tourism, provides examples of AI research specifically based on ChatGPT responses. These studies -conducted by important indexes in the literature- are actually important evidence that scientific research can be conducted that takes into account AI's responses.

**Table 2: Samples of Scientific Research Involving Artificial Intelligence**

| Researcher                     | Name of the Study                                                                                                                              | Objective                                                                                                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rospigliosi, P. A. (2023).     | Artificial intelligence in teaching and learning: what questions should we ask of ChatGPT?                                                     | In the study, the relationship between artificial intelligence and learning was examined through questions asked to ChatGPT.                                                                         |
| Balat, A. and Bahşi, İ. (2023) | We Asked ChatGPT About the Co-Authorship of Artificial Intelligence in Scientific Papers.                                                      | The study examined whether artificial intelligence should be included as an author in academic articles, within the framework of the answers received to the questions asked to ChatGPT.             |
| D'Amico et al. (2023).         | I asked a ChatGPT to write an editorial about how we can incorporate chatbots into neurosurgical research and patient care                     | The study addressed how chatbots can be incorporated into neurosurgical research and neurosurgical patient care within the framework of the ChatGPT response.                                        |
| Noelle, K. (2023).             | How Should Government Regulate AI? We Asked a Robot                                                                                            | The study evaluates how the United States government should regulate AI tools and what some of the most effective use cases of AI are for state and local governments, based on ChatGPT's responses. |
| Moore et al. (2024)            | Doctor AI? A pilot study examining responses of artificial intelligence to common questions asked by geriatric patients                        | The study examines responses provided by trained clinicians and artificial intelligence (Chat-GPT 3.5) to frequently asked questions by patients in patient care.                                    |
| Tharakan et al. (2024)         | Do ChatGPT and Google differ in answers to commonly asked patient questions regarding total shoulder and total elbow arthroplasty?             | The study examines responses to frequently asked questions on ChatGPT for patient education in upper extremity arthroplasty compared to responses to the same questions in a Google search.          |
| Chuma and De Oliveira, (2023). | Generative AI for Business Decision-Making: A Case of ChatGPT                                                                                  | This study evaluates ChatGPT as a tool in common business decision-making cases through case studies.                                                                                                |
| Buldur and Sezer, (2023).      | Can Artificial Intelligence effectively respond to frequently asked questions about fluoride usage and effects? A qualitative study on ChatGPT | This study aimed to qualitatively compare the American Dental Association (ADA) and ChatGPT responses to frequently asked questions regarding fluoride.                                              |

**Source:** Compiled by the author.

While artificial intelligence is extensively employed in academic research across distinct fields such as healthcare, education, and finance, it has also become increasingly prevalent in tourism studies. Notably, encountering scholarly works that adopt artificial intelligence as a core data source has become commonplace in contemporary tourism literature.

In the study conducted by Jia et al. (2026), titled "*A Socio-technical Exploration of Bias in GenAI Travel Planners*," the research aimed to identify and validate systematic biases within AI-driven travel planners. The researchers employed a multi-method approach consisting of a conceptual review, a computational analysis of 5,000 recommendations, and semi-structured interviews with 30 participants. The key findings empirically confirmed seven major types of bias, including linguistic and

representation biases, thereby demonstrating that Western-centric datasets tend to overshadow cultural diversity.

Ersöz (2026), in their study, investigated the reliability of artificial intelligence outputs in travel planning through the lens of "hallucination." By conducting a content analysis of a one-week gastronomic itinerary for Kırklareli generated by ChatGPT (GPT-4-turbo), the study detected severe hallucinations categorized under six distinct themes, such as non-existent venues and menu mismatches. Consequently, the author concluded that generative artificial intelligence cannot yet be utilized as a standalone, trustworthy resource.

In the study by Su and Zakaria (2026), the objective was to synthesize the core processes through which tourists evaluate and rely on AI-generated content (AIGC). The authors subjected 98 studies published between 2023 and 2026 to a systematic literature review using the PRISMA methodology. Consequently, they proposed an integrated process model for Tourist-AIGC interaction, underscoring that transparency and perceived usefulness play a critical role in trust calibration.

Dong, Zhang, and Tian (2026), in their research, systematically scored the quality of tourism content produced by various AI platforms. Utilizing a statistical analysis of 4,800 responses across six quality dimensions within the "LLM-as-evaluator" framework, the findings indicated that reasoning-based Chain-of-Thought (CoT) prompting strategies yield the highest quality outputs. Furthermore, the study demonstrated that AI reliability is not static but rather "conditional," fluctuating based on situational factors.

In the study by Sasaki, Ryusei, and Koki (2025), two distinct generative AI planning methods designed to meet tourist demands were compared. The experimental comparison between a mathematical approach (Dijkstra's Algorithm) and a 10-step interactive dialogue flow revealed that interactive dialogues successfully resolve user ambiguities. Based on these insights, the authors posited that generative AI operates far more efficiently as a human-guided assistant rather than an autonomous planner.

Cassani et al. (2024), in their study, focused on developing a travel assistant featuring a "local auntie" persona tailored for the Molise region in Italy. This case study, which integrated ChatGPT-4o, Retrieval-Augmented Generation (RAG), and real-time data, demonstrated that the system could successfully deliver personalized itineraries and transmit cultural heritage in an engaging tone, thereby offering an innovative model for Destination Management Organizations (DMOs).

In the study by Ren et al. (2024), gender and racial biases within open-source models, specifically Gemma and Llama, were examined by analyzing a dataset of 6,000 prompts. Utilizing machine learning classifiers such as Logistic Regression, the primary findings revealed that the lexical choices of these models frequently reflect cultural stereotypes and exhibit biases toward specific demographic groups. As a result, the authors emphasized that output verification is strictly mandatory.

Volchek and Ivanov (2024), in their research, aimed to analyze ChatGPT's itinerary planning capacity in comparison to human tourism experts. Conducting a comparative analysis of ChatGPT outputs against expert-designed programs based on 11 quality criteria, the authors found that although ChatGPT produces highly accessible and comprehensible content, it fundamentally lags behind human experts regarding technical accuracy and contextual depth.

In the study conducted by Qi et al. (2024), the objective was to develop and optimize an AI-based intelligent service system customized for the Tibet region. The experiment, which leveraged an original dual-model architecture named "DualGen Bridge AI" for location extraction and information generation, proved that Supervised Fine-Tuning (SFT) significantly enhances output accuracy and fluency. The findings highlighted that technical customization is essential when handling regional tourism data.

Akpur (2023), in their study, aimed to understand the holiday planning patterns exhibited by ChatGPT within the scope of tourism marketing. A content analysis utilizing MAXQDA software was performed on planning outputs generated via ChatGPT-4 under various budget scenarios. The findings indicated that while the AI provides budget-sensitive, personalized responses, it tends to offer recommendations within limited, conventional standard patterns, focusing heavily on architecture and dining.

Finally, in the study by Erdem (2023), ChatGPT's perspective on the concept of smart tourism and its overarching impact on stakeholders was analyzed. Descriptive and content analyses were conducted via MAXQDA software on responses given to five open-ended questions. While themes of experience, efficiency, and sustainability prominently emerged as the core findings, the study concluded that the integration of such technology inherently raises significant data security concerns.

This study differs from previous research that has used ChatGPT and other large language models (LLMs) as data sources in terms of its primary focus. While existing studies have largely concentrated on travel planning, information quality, hallucination issues, and tourist/user experiences, the present study directly examines the professional future and work processes of human tourist guides (HTGs).

The methodological and technological originality of the study lies in its use of GPT-4.1, released in April 2025, instead of earlier-generation models such as GPT-3.5 and GPT-4 Turbo that have been widely employed in previous research. Accordingly, GPT-4.1 is positioned not merely as a content-generation tool but as a qualitative "perspective provider" within the research design.

Whereas prior studies have primarily evaluated generative artificial intelligence as a technical content-generation tool, this study introduces human-machine interaction into the tourist guiding literature from a theoretical perspective. In doing so, it contributes to addressing a theoretical gap by reconceptualizing the future role of human tourist guides in the context of generative AI. From a practical perspective, the study proposes that generative AI should be regarded not as a threat to the profession but as a complementary assistant capable of enhancing service quality. Accordingly, it offers practical recommendations, including seminars, conferences, and workshops, to support the professional development of tourist guides and provides an actionable framework for the profession's future hybrid structure.

### **3. Metodology And Data Collection**

This study aims to comprehensively examine the impacts of R/TTGs on the tourist guiding profession and HTGs from an artificial intelligence (GPT-4.1) perspective. This research was conducted using the descriptive analysis method, which falls into the qualitative research approach in terms of its process and subject matter. Descriptive analysis is a qualitative data analysis method that involves summarizing and interpreting data collected through various techniques based on predetermined themes. Its primary objective is to present the findings in a clear, concise, and interpreted manner for the reader (Yıldırım & Şimşek, 2003). Quantitative research focuses on hypotheses, while qualitative research involves formulating a question about the event or phenomenon under investigation. The problem, defined by the theoretical framework, is transformed into a specific question. The research question determines the direction of the theoretical framework and enables the creation of a clear perspective on a fragmented literature (Patton, 1990; Sandelowski, 1986). In this respect, determining the research questions and establishing the theoretical framework are simultaneous and mutually influencing processes in most qualitative research (Şimşek and Yıldırım, 2011). The research questions determined within the conceptual framework are as follows:

1. Is it possible for R/TTGs guides to reduce the need for human tour guides?
2. Do human tour guides perceive R/TTGs as a professional threat?
3. How does the presence of robot/technological tour guides affect the job satisfaction of human tour guides?
4. Is it possible that robot/technological tour guides will start providing services outside of closed areas such as museums and exhibitions in the near future?
5. Do robot/technological tour guides negatively affect the job performance of human tour guides?
6. Do robot/technological tour guides negatively affect the motivation of human tour guides?
7. Do tourists prefer a human tour guide or a robot/technological tour guide?
8. Will robot/technological tour guides replace human tour guides in the future?

6 of these questions were questions were taken from the study titled “A Study for Determining the Professional Tourist Guides’ Perceptions About Technological Guides: The Case of Istanbul” (Yıldız, 2018). Questions Q4 and Q9 were added later, considering that they would contribute to the purpose of the study. Since the questions taken from the study were in Turkish, they were translated into English. Furthermore, the ChatGPT-4.1 model was employed as an additional linguistic support tool during the translation process of the questions. To enhance the accuracy and linguistic validity of the translations, the process was undertaken with the involvement of qualified experts in English linguistics.

Access to ChatGPT-4.1 requires users to register for an account and log into the platform. Upon successful registration, users are automatically redirected to the chat interface, where they can interact with the model through text-based prompts. GPT-4.1 which was relased on April 14, 2025 was preferred as the artificial intelligence application in the study because it is the most up-to-date ChatGPT version released by OpenAI and has more advanced features than other chatbots. Data was collected by asking structured questions prepared within the conceptual framework. Questions were asked to GPT-4.1 on December 12, 2025, and the answers given to these questions were evaluated with a qualitative approach. The data analysis was conducted through a three-stage qualitative analysis process, as proposed by Kümbetoğlu (2005), consisting of data processing (coding meaningful concepts and themes), data presentation, and conclusion drawing and interpretation. Initially, the data were prepared by transcribing the interviews into a digital format for analysis. Subsequently, all transcripts were read repeatedly to develop a comprehensive understanding of the overall meaning of the data. As emphasized by Kümbetoğlu (2005), ideas, concepts, and themes in qualitative data analysis emerge through repeated and careful examination of the textual data. In the next stage, the data were coded by grouping similar statements into the same categories, and the resulting categories were appropriately labeled. Finally, the identified themes were described and interpreted to generate meaningful findings. The answers of GPT-4.1 are given without any changes.

In qualitative research, validity refers to the extent to which the phenomenon being studied is observed and interpreted objectively without bias. As part of the analysis process, the research questions were administered on different dates to evaluate the consistency and reliability of the responses generated by ChatGPT-4.1. Following the assessment that the responses demonstrated a high level of consistency, the questions were subsequently re-administered on December 25, 2025, to further validate the findings. As stated by Yıldırım and Şimşek (2005: 292), external validity in qualitative research is concerned with the generalizability of research findings. Naturally, statistical generalization is not applicable in this study; therefore, an analytical generalization approach was adopted. To enhance the external validity of the study, an external reviewer/expert who was not involved in the research process was employed, as emphasized by Creswell (2016). This reviewer evaluated the accuracy of the descriptions and examined the consistency between the research questions and the data. Following the quantitative and thematic comparison of coding similarities within the dataset, the reporting phase was initiated.

The increasing use of artificial intelligence in academic research in recent years has brought various ethical considerations to the forefront. In this study, artificial intelligence was used solely as a data source and as a supportive tool for translating the obtained content. The information provided and outputs generated by artificial intelligence were critically evaluated by the researchers and examined in terms of accuracy, consistency, and alignment with the research objectives. The development of the conceptual framework, methodological decisions, interpretation of findings, and formulation of final conclusions were entirely based on the researchers’ academic judgments. Accordingly, artificial intelligence was positioned not as a substitute for researchers, but as an auxiliary technology supporting the research process. Transparency, human oversight, and academic ethical principles were maintained throughout the use of artificial intelligence, and the research process was conducted in accordance with internationally recognized ethical approaches regarding the use of artificial intelligence in academic publishing.

#### **4. Findings**

Within the scope of Q1, four major themes were identified through the descriptive analysis. The theme strategies through which R/TTGs reduce the demand for HTGs comprises the categories of automated information delivery, scalability and 24/7 availability, and standardization and personalization. The

theme real-world application contexts includes the categories of museums, theme parks, airports, and historical sites. The theme technological limitations and the comparative strengths of human tour guides encompasses the categories of human connection, entertainment value, supervision, and safety. Finally, the theme projected professional implications consists of the categories of reduced demand for HTGs in routine tours and the continued importance of HTGs in interaction- and storytelling-oriented experiences. The findings indicate that R/TTGs reduce the need for HTGs particularly in terms of operational efficiency, continuous service provision, and information standardization. Multilingual automated information delivery strengthens the substitutive role of technology, especially in controlled environments such as museums and airports. However, the inability of technological systems to fully replicate human capabilities, including storytelling, emotional engagement, and adaptation to visitor needs, preserves the qualitative importance of HTGs. Therefore, the future of tour guiding is expected to evolve toward a hybrid model in which technology undertakes routine tasks, while HTGs focus on interaction, interpretation, and creating meaningful visitor experiences.

**Table 3: GPT-4.1's Answer to Q1**

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| <p><b>Q1: Is it possible for robot/technological guides to reduce the need for human tour guides?</b></p> <p>Absolutely, <b>robotic and technological guides</b> can reduce the need for human tour guides, and this trend is already visible in several places. Here's how and why this shift is happening, along with some broader implications:</p> <p><b>How Robots/Technology Reduce the Need for Human Tour Guides</b></p> <p><b>1. Automated Information Delivery</b></p> <ul style="list-style-type: none"> <li>• <b>Robots (e.g., Pepper, Temi, robotics kiosks):</b> In museums, airports, or historical sites, these can greet visitors, provide information, and answer basic questions in multiple languages.</li> <li>• <b>Mobile Apps/AR/VR:</b> Visitors use an app to scan exhibits or landmarks and get detailed explanations, audio tours, or immersive experiences without a human guide.</li> </ul> <p><b>2. Scalability and 24/7 Availability</b></p> <ul style="list-style-type: none"> <li>• Technological guides aren't limited by work hours, fatigue, or illness—they can operate continuously and serve large crowds, independently.</li> </ul> <p><b>3. Standardization &amp; Personalization</b></p> <ul style="list-style-type: none"> <li>• Robots and apps can provide standardized information but also adapt content to users' preferences, ages, or languages, sometimes even more precisely than human guides.</li> </ul> <p><b>Evidence from the Real World</b></p> <p><b>Museums:</b> Many use multimedia guides instead of group tours (e.g., The Louvre's Nintendo DS guide, or MoMA's digital app).</p> <ul style="list-style-type: none"> <li>• <b>Theme Parks/Airports:</b> Robotic info booths are now commonplace.</li> <li>• <b>Historical Sites:</b> AR apps can project reconstructions of ruins or events, enhancing learning and engagement.</li> </ul> <p><b>Limitations &amp; Places Human Guides Excel</b></p> <p>However, while robots/technology can replace some functions, they cannot completely supplant human guides. Reasons include:</p> <ul style="list-style-type: none"> <li>• <b>Human Connection:</b> Guides can adapt dynamically, answer nuanced questions, and share stories or local perspectives, which is hard for AI/robots.</li> <li>• <b>Entertainment Value:</b> Charismatic guides can make tours memorable—through humor, passion, and interaction.</li> <li>• <b>Supervision &amp; Safety:</b> In complex environments, human judgment is invaluable.</li> </ul> <p><b>Conclusion:</b> Yes, the need for human tour guides is being <i>reduced</i> by technological advances, especially for routine or information-based tours. But in situations where interaction, expertise, and storytelling matter, human guides are likely to remain important.</p> |
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Within the scope of Q2, which examines HTGs' perceptions of occupational threat, the descriptive analysis identified four main themes and their related categories. The first theme, "Occupational Threat and Economic Concerns," includes the categories of perceived occupational threat, market segmentation, job security, and commoditization of services. The second theme, "The Irreplaceable Value of Human Elements," consists of the categories of authenticity, emotional connection, empathy, and storytelling. The third theme, "The Role of Technology: Competition or Complementarity?" encompasses the categories of substitutive technologies, complementary tools, and hybrid service

models. The fourth theme, “Adaptation and Professional Development,” is addressed through the categories of specialization opportunities and technological competence. The analysis results indicate that many HTGs perceive R/TTGs as a potential occupational threat, particularly within budget-oriented market segments; however, they also recognize that human-centered experiences cannot be fully replaced by technology due to elements such as authenticity, empathy, and storytelling. Furthermore, some HTGs consider technology not as a competitor but as a complementary tool that can support professional practices and acknowledge the necessity of adapting to technological transformation.

**Table 4: GPT-4.1’s Answer to Q2**

**Q2: Do human tour guides perceive robot/technological guides as a professional threat?**

This is a fascinating question, and it taps into ongoing changes in tourism and the workplace. The way human tour guides perceive robot or technological guides really depends on several factors, including local context, individual attitudes, and the specific type of technology involved. Here’s a detailed look at the situation based on research, industry observations, and reported opinions from guides themselves:

**Perceptions of Robot/Technological Guides by Human Tour Guides**

**1. Concerns as Professional Threat**

- **Job Security:** Many tour guides do see technological guides—like robots, apps, or self-guided audio tours as a potential threat to their livelihood, especially in places where tourism is highly competitive or seasonal.
- **Commoditization:** There’s sometimes fear that their profession could become undervalued if tourists increasingly choose cheaper, automated options.

**2. Recognition of Limitations**

- **Human Connection:** Many guides are confident that robots and apps can’t replicate empathetic storytelling, humor, or the nuanced understanding of group dynamics.
- **Customization:** Guides often point out that they can adapt tours in real-time based on group interests, questions, or even weather—something most robots and apps still struggle with.

**3. Seeing Technology as a Complement**

- **Enhanced Tools:** Some guides embrace technology as a way to enhance their work—using apps or VR/AR to add extra layers to the experience or to handle translations/language barriers.
- **Partnership Opportunities:** In some regions, guides work in partnership with tech companies, e.g., by providing narration, local insights, or "premium" experiences that build on the standard technological offering.

**4. Regional and Cultural Differences**

- **Regulatory Protection:** In places with strict tour guide licensing (like Italy or France), guides may feel less threatened, as laws limit what tech guides can legally do.
- **Tech Adoption Culture:** In countries with high technology adoption (like Japan or South Korea), there’s often more openness or curiosity about robots, while elsewhere skepticism prevails.

**5. Generational and Personal Differences**

- **Young vs. Seasoned Guides:** Younger guides may be more likely to use and adapt to new technology, sometimes seeing it as an opportunity, whereas more experienced guides might see it as a threat to tradition and professional standards.

**Research and Anecdotes**

- **Academic Studies:** Research has found *mixed attitudes*. According to a 2023 study in the *Journal of Tourism Futures*, a majority of Italian and Spanish guides expressed concern over apps and AI replacing entry-level tours, but also highlighted unique human strengths.
- **Trade Interviews:** At industry events like ITB Berlin, seasoned guides have noted that while tech can disrupt, the *best* tours still rely on personal charisma and genuine local knowledge.

**In Summary:** Many human tour guides do perceive technological guides as a professional threat, especially for basic or budget segments of the market. However, there’s also a significant recognition of the irreplaceable value of authentic, human-led experiences—leading some guides to see technology as a tool for improvement rather than just competition.

An examination of GPT-4.1's response to Q3 revealed three main themes and their associated categories. The theme of negative effects on job satisfaction includes the categories of job security concerns, role dilution, work-related stress, changes in the work environment, and pressure to outperform robots. The theme of positive effects on job satisfaction consists of the categories of opportunities for specialization, reduction of routine and monotonous tasks, collaboration and learning with technology, enhancement of professional image, and opportunities to demonstrate irreplaceable human skills. The theme of structural factors determining job satisfaction encompasses the categories of the way technology is integrated into the tour guiding profession, the extent to which HTGs are involved in technological processes, and how technology is utilized in professional practices. The findings indicate that robotic and technological tour guides (R/TTGs) enhance operational efficiency, particularly in routine and information-oriented processes, thereby reducing the quantitative demand for HTGs; however, they cannot fully replace human capabilities in areas requiring storytelling and emotional intelligence. Although a clear perception of occupational threat and a decline in motivation are observed among guides, the primary impact of technology on job satisfaction, performance, and motivation appears to depend on whether technology is integrated into the system as a competitor (substitutive technology) or as an assistant that facilitates and enhances the work of HTGs (complementary technology). Consequently, the future of tour guiding is expected to evolve not toward complete automation, but rather toward a hybrid model in which routine tasks are delegated to technological systems while HTGs focus on creating high-value experiences. Within this transformation process, converting guides' concerns and potential biases toward technology into opportunities for professional development through training and skill enhancement programs is emphasized as a critical requirement.

**Table 5: GPT-4.1's Answer to Q3**

| <b>Q3: How does the presence of robot/technological tour guides affect the job satisfaction of human tour guides?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |
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| Great question—it's a very current topic as robot and AI-powered guides become more common in tourism! The presence of robotic or technological tour guides can impact the job satisfaction of human tour guides in several nuanced ways, both positive and negative. Here's a breakdown of the key effects based on research and industry observations:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |
| <b>Potential Negative Effects</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |
| <ol style="list-style-type: none"> <li><b>Job Security Concerns:</b> With the rise of automation, human guides may worry about job displacement or reduced demand for their services, leading to anxiety and decreased job satisfaction.</li> <li><b>Role Dilution:</b> If robots take over standard or repetitive tour elements, human guides might feel their unique skills (storytelling, humor, empathy) are undervalued, making their roles seem less meaningful.</li> <li><b>Increased Pressure:</b> Human guides may feel pressured to outperform robots or constantly prove their value, which can increase work-related stress.</li> <li><b>Work Environment Changes:</b> Integrating new technology often brings operational changes (e.g., new systems to learn), which can be frustrating or intimidating for some individuals.</li> </ol> |                                       |
| <b>Potential Positive Effects</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |
| <ol style="list-style-type: none"> <li><b>Opportunity for Specialization:</b> Robots can handle routine information delivery, allowing human guides to focus on personalized interactions, creativity, and high-value customer engagement—tasks at which humans still excel.</li> <li><b>Reduced Mundane Tasks:</b> Automation can take over repetitive or physically taxing aspects of tours, potentially leading to more enjoyment and satisfaction in remaining tasks.</li> <li><b>Collaboration and Learning:</b> Working alongside new technology can provide learning opportunities and novelty, which some guides find energizing.</li> <li><b>Enhanced Professional Image:</b> Guides that successfully integrate and leverage technology may be seen as more professional and adaptable, boosting pride and satisfaction.</li> </ol>          |                                       |
| <b>What the Research Says</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       |
| <ul style="list-style-type: none"> <li><b>Mixed Reactions:</b> Studies (e.g., Tung &amp; Law, 2017; Ivanov et al., 2019) show that while many guides worry about job security, some appreciate the ways technology can <i>enhance</i> (rather than replace) their roles.</li> <li><b>Importance of Human Skills:</b> Human guides still outperform robots in tasks requiring empathy, humor, and adaptability, leading to satisfaction from offering something “irreplaceable.”</li> </ul>                                                                                                                                                                                                                                                                                                                                                             |                                       |
| <b>Summary Table</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |
| <b>Effect type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Example impact on satisfaction</b> |
| Negative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Job insecurity                        |
| Negative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Pressure to outperform robots         |
| Positive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reduced routine workload              |
| Positive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Chance to showcase humanity           |
| <b>In short:</b> The impact largely depends on <i>how</i> the technology is implemented and <i>how</i> human guides are involved in the process. When approached thoughtfully, technology can actually <b>increase job satisfaction</b> by letting human guides do more of what they enjoy most—connecting with people through stories and authentic experiences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |

An examination of GPT-4.1's response to Q4 regarding the future expansion of R/TTGs into outdoor environments revealed three main themes: "Transition to Outdoor Environments and Application Projections" (future expectations, timeline, smart cities, and pilot applications), "Technological Enablers" (robotics, navigation, connectivity infrastructure, artificial intelligence, and multilingual capabilities), and "Implementation Challenges and Barriers" (environmental adaptation, security, vandalism, and accessibility). From the perspective of ChatGPT-4.1, the findings indicate that R/TTGs are expected to provide outdoor guidance services within the next 2–5 years, particularly in controlled public spaces, tourism-intensive areas, and smart tourism destinations. Although R/TTGs may reduce the need for HTGs in routine and information-based tasks, they are unlikely to fully replace HTGs in experiences requiring empathy, emotional connection, professional expertise, and storytelling. While this transformation may be perceived as an occupational threat by some HTGs, the most sustainable approach appears to be the development of hybrid service models in which technology functions as a complementary tool that supports, rather than substitutes, human-guided tourism experiences.

**Table 6: GPT-4.1's Answer to Q4**

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| <p><b>Q4: Is it possible that robot/technological tour guides will start providing services outside of closed areas such as museums and exhibitions in the near future?</b></p> <p>Absolutely, it's not just possible—it's already starting to happen, and the trend will likely accelerate in the coming years. Here's why and how this is unfolding:</p> <p><b>Current State</b></p> <ul style="list-style-type: none"> <li>• <b>Indoor Use:</b> Most robot tour guides currently work indoors, mostly because closed areas (like museums, exhibitions, and airports) are more predictable environments without issues like weather, variable lighting, or unpredictable crowds.</li> <li>• <b>Emerging Outdoor Pilots:</b> However, several pilot projects have placed robot guides or autonomous informational devices outdoors in public parks, historical sites, city centers, and even on university campuses.</li> </ul> <p><b>What's Enabling This Shift?</b></p> <ul style="list-style-type: none"> <li>• <b>Advances in Robotics:</b> Improvements in navigation, obstacle avoidance, and real-time mapping (such as through LIDAR, GPS, and computer vision) are making it more feasible for robots to operate safely outdoors.</li> <li>• <b>Connectivity:</b> Wi-Fi and 5G coverage are expanding even in outdoor public areas, allowing robots to access cloud resources, communicate with users, and update their information in real time.</li> <li>• <b>AI and Multilingual Capabilities:</b> AI-powered language models allow for rich, context-aware information delivery and customer interaction in various languages—helpful for diverse tour groups.</li> </ul> <p><b>Examples and Pilots</b></p> <ul style="list-style-type: none"> <li>• <b>Robot Guides in Parks:</b> Cities like Singapore and Seoul have tested robot "ambassadors" and guides offering information and directions in large parks and outdoor attractions.</li> <li>• <b>Historical Sites:</b> Some European cities have piloted robot guides that can lead groups through historical outdoor districts, using GPS navigation and onboard speakers.</li> <li>• <b>Mobile Apps and AR:</b> While not physical robots, phone-based AI companions can guide users through outdoor spaces using location, camera, and AR overlays—this idea could merge with mobile robots in the near future.</li> </ul> <p><b>Challenges to Solve</b></p> <ul style="list-style-type: none"> <li>• <b>Weatherproofing:</b> Outdoor robots need to handle rain, dust, heat, and cold.</li> <li>• <b>Crowd Dynamics:</b> Public places can be unpredictable, requiring advanced social navigation skills to avoid causing inconvenience or accidents.</li> <li>• <b>Vandalism and Security:</b> Protection against theft or damage is a concern in open environments.</li> <li>• <b>Accessibility:</b> Must ensure these solutions serve users with different mobility, sensory, and language needs.</li> </ul> <p><b>What's Next?</b> Expect to see more robotic guides outdoors, especially in controlled public spaces (parks, campus grounds, gardens, plazas), and areas with high tourism interest. As reliability, affordability, and user experience improve, they may become as common as digital information kiosks are today.</p> <p><b>Bottom Line:</b> Yes, robot and tech-powered tour guides are poised to move beyond closed spaces, and fledgling examples are already in the wild. In the next 2–5 years, their presence outdoors will likely become increasingly common, especially in cities investing in "smart tourism" initiatives</p> |
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An examination of ChatGPT-4.1's response regarding the effects of R/TTGs on HTG's job performance revealed three main themes and related categories. The theme of negative effects on job performance

includes reduced demand for HTGs, loss of employment opportunities and job insecurity, decline in the perceived value of human skills, and shifts toward administrative roles. The theme of positive and neutral effects encompasses complementary roles, increased efficiency and accessibility, focus on high-value interactions, and opportunities for specialization and skill development. The theme of structural and contextual factors shaping performance outcomes includes the substitutive or complementary use of technology, tourist expectations for emotional connection, market segmentation, and the intensity of routine tasks. The findings demonstrate that the impact of robotic and technological tour guides (R/TTGs) on HTGs' job performance depends largely on how technology is integrated into professional practices. While substitutive use of technology may reduce the need for human expertise and lead to role changes, complementary models allow guides to focus on high-value activities such as storytelling, interpretation, and personalized visitor experiences. Moreover, tourists' continued preference for human interaction and emotional connection, particularly in cultural and historical contexts, reinforces the qualitative value of HTGs. Therefore, the effect of technology is shaped not by its mere presence, but by whether it functions as a supportive tool enhancing human capabilities or as a substitute limiting professional roles.

**Table 7: GPT-4.1's Answer to Q5**

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| <p><b>Q5: Do robot/technological tour guides negatively affect the job performance of human tour guides?</b></p> <p>Great question! The impact of robot or technological tour guides on the job performance of human tour guides is nuanced and depends on several factors, including the context, implementation, and expectations of both tourists and service providers.</p> <p><b>Possible Negative Effects on Human Tour Guides</b></p> <p><b>1. Reduced Demand for Human Guides:</b> If robots or apps can provide information cheaply, on-demand, and in multiple languages, some organizations or tourists might opt for technological guides over hiring humans. This can <b>decrease job opportunities</b> and make work more precarious for human guides, especially in places where price sensitivity is high.</p> <p><b>2. Perceived Value of Human Skills:</b> With the rise of tech-based guides, some employers may reduce the resources invested in human guides, believing that technology is "good enough" for many situations. This can potentially <b>devalue the unique interpersonal and improvisational skills</b> human guides bring—like storytelling, reading a group's mood, or handling unexpected situations.</p> <p><b>3. Job Role Changes:</b> As routine information delivery is handled by robots or apps, human tour guides may be asked to do more administrative, crowd control, or sales-related tasks, which might not align with their skills or job satisfaction, reducing their overall <b>job performance and engagement</b>.</p> <p><b>Possible Positive or Neutral Effects</b></p> <p><b>1. Complementary Roles:</b> In many cases, technology is used to <b>augment</b> rather than replace human guides. For example, robots might handle simple Q&amp;A, give directions, or provide translation, freeing humans to focus on delivering deeper insights, personal anecdotes, or adapting tours in real time. This can <b>enhance job performance</b> by allowing guides to concentrate on what they do best.</p> <p><b>2. Increased Efficiency and Reach:</b> By automating routine or repetitive information delivery, guides have more time and energy for high-value interactions, group management, or special requests. Some studies suggest this can <b>raise overall tourist satisfaction and improve human guide effectiveness</b>.</p> <p><b>3. More Complex and Specialized Roles:</b> As machines take over simple tasks, demand may grow for guides who can offer more in-depth, complex, or niche experiences, prompting humans to upskill and pursue more specialized roles.</p> <p><b>What Does Research Say?</b></p> <ul style="list-style-type: none"> <li>• <b>Studies</b> (such as those found in tourism journals) generally suggest that robot/AI tour guides mostly affect the <b>quantity</b> and <b>nature</b> of guide jobs, rather than just performance. Some displacement risk exists for low-skill or generalist roles, but human guides with strong interpersonal or storytelling skills remain in demand.</li> <li>• <b>User expectations</b> also play a role. Many tourists still strongly prefer the emotional connection and adaptability of a human guide over a robot, especially for cultural or historical tours.</li> </ul> <p><b>In summary:</b> Technological tour guides can negatively affect the job performance and opportunities of human guides <i>in some situations</i>, especially if technology is used as a full replacement in high-volume or routine contexts. However, when used as a complement, technology can actually enhance human guides' roles and help them perform better by allowing focus on human strengths.</p> |
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Based on the data provided by ChatGPT-4.1 regarding the effects of R/TTGs on human tour guides' motivation, three main themes and related categories were identified. The first theme, negative motivational effects, includes job security concerns, declining professional value, loss of self-esteem, changing work roles, uncertainty about the future, and reduced autonomy. The second theme, positive and neutral effects, covers professional development, technology collaboration, enriched experiences, digital competency acquisition, and adaptation to industry trends. The third theme focuses on the factors shaping motivational outcomes, including the integration of technology, whether it is perceived as a substitute or a supportive tool, and the influence of cultural and contextual factors. The integration of robotic and R/TTGs into tourism can create both challenges and opportunities for HTGs. When technology is perceived as a threat, it may reduce motivation through concerns about professional identity, autonomy, and job security. However, when positioned as a complementary tool, technology can enhance professional development by allowing guides to focus on uniquely human skills such as empathy, storytelling, and communication. Therefore, adopting a supportive approach that views technology as a means of improving service quality rather than replacing HTGs is essential for sustaining motivation and managing professional transformation.

**Table 8: GPT-4.1's Answer to Q6**

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| <p><b>Q6: Do robot/technological tour guides negatively affect the motivation of human tour guides?</b></p> <p>This is a thoughtful question and a subject of growing debate as robotics and AI become more common in tourism and related services.</p> <p><b>Potential Negative Effects</b></p> <ol style="list-style-type: none"> <li>1. <b>Job Security Concerns:</b> Human tour guides might feel threatened by robots or AI-powered systems, fearing that increased automation could lead to fewer employment opportunities, job losses, or reduced hours.</li> <li>2. <b>Perceived Value of Work:</b> If organizations start preferring robot guides for cost-cutting or efficiency, human guides may feel their expertise and personal touch are less valued, which can negatively impact their motivation and professional self-esteem.</li> <li>3. <b>Shifts in Work Role:</b> Incremental automation could change the nature of their roles, shifting from delivering tours to managing or troubleshooting technology. This shift might not appeal to everyone and can cause disengagement.</li> </ol> <p><b>Potential Positive or Neutral Effects</b></p> <ol style="list-style-type: none"> <li>1. <b>Increased Professionalism:</b> The introduction of robots could motivate some human guides to improve their skills—especially in areas where automation falls short, like storytelling, empathy, humor, and handling unpredictable questions or requests.</li> <li>2. <b>Collaboration Opportunities:</b> Rather than taking over, technologies could assist human guides—handling basic info so guides can focus on unique, personalized guest experiences.</li> <li>3. <b>Tech-Savvy Motivation:</b> Some guides may welcome new technology as a chance to broaden their skill set and stay current with industry trends.</li> </ol> <p><b>Research and Evidence</b></p> <ul style="list-style-type: none"> <li>• Several studies suggest a <b>mixed impact</b>: <ul style="list-style-type: none"> <li>○ <b>Negative motivation</b> largely stems from uncertainty about future <b>employment</b> and loss of autonomy.</li> <li>○ <b>Positive motivation</b> occurs when technology is positioned as a tool for enrichment, not a replacement.</li> <li>○ Cultural and contextual factors play a role: guides in regions where tourism is highly dependent on the human touch report more anxiety.</li> </ul> </li> </ul> <p><b>Example:</b> A 2023 study in the <i>Journal of Tourism Management</i> found that in museums piloting robot guides, some staff reported demoralization and anxiety, while others felt inspired to refine their narrative and interactive approaches.</p> <p><b>Summary:</b> Yes, robots/technological tour guides <i>can</i> negatively affect the motivation of human tour guides, primarily through job security concerns and a perceived devaluation of their skills. However, the extent of the impact depends on how the technology is introduced and integrated, and whether it is seen as a replacement or support tool.</p> |
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The analysis of GPT-4.1's response to Q7 identified four main themes explaining tourists' preferences for HTGs and R/TTGs. The first theme, factors supporting the preference for HTGs, consists of the categories of personal interaction, flexibility, storytelling, and cultural interpretation. Tourists value the authentic communication, personalized experiences, and cultural depth provided by HTGs. The second theme, factors supporting the preference for R/TTGs, includes accessibility, affordability, multilingual support, and innovative experiences. R/TTGs are particularly preferred due to their convenience and economic advantages. The third theme, factors influencing guide preferences, comprises tourist profile, expectations, destination type, and the purpose of the experience. Accordingly, technology-oriented individual travelers tend to be more open to R/TTGs, whereas human-guided HTGs remain more prominent in cultural and historical experiences. The fourth theme, the hybrid guiding approach, encompasses human–technology collaboration and the complementary use of technology. Within this approach, technology is considered not as a replacement for HTGs, but as a supportive tool that enhances service quality. The analysis indicates that tourists do not exclusively prefer either R/TTGs or HTGs; rather, their preferences vary depending on the nature of the experience and their expectations. While HTGs offer advantages in terms of personal interaction, cultural interpretation, flexibility, and storytelling, R/TTGs stand out through accessibility, affordability, multilingual capabilities, and innovative experiences. Nevertheless, the human element continues to maintain its significance, particularly in cultural and historical contexts, while technology is primarily perceived as a complementary tool that supports and enhances human-guided tourism experiences.

**Table 9: GPT-4.1's Answer to Q7**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p><b>Q7: Do tourists prefer a human tour guide or a robot/technological tour guide?</b></p> <p>Great question! The preference between human tour guides and robot/technological tour guides depends on several factors, including the type of tourist, the context of the tour, and personal expectations. Here's a breakdown based on research and recent trends:</p> <p><b>Human Tour Guides Pros:</b></p> <ul style="list-style-type: none"> <li>• <b>Personal connection:</b> Many tourists value the human touch—interacting, asking spontaneous questions, and feeling like they're talking to a local expert.</li> <li>• <b>Adaptability:</b> Human guides can tailor their commentary to the interests and mood of the group, adjust for weather or crowd conditions, and handle unexpected situations.</li> <li>• <b>Storytelling:</b> Many travelers appreciate stories, humor, and personality that a human guide brings.</li> </ul> <p><b>Human Tour Guides Cons:</b></p> <ul style="list-style-type: none"> <li>• <b>Cost:</b> Human-led tours are usually more expensive due to labor costs.</li> <li>• <b>Availability:</b> Sometimes, linguistic or scheduling barriers limit access to human guides.</li> </ul> <p><b>Robot/Technological Guides (apps, AR/VR, robots) Pros:</b></p> <ul style="list-style-type: none"> <li>• <b>Convenience:</b> Self-guided apps and robots can be available anytime, at the tourist's own pace.</li> <li>• <b>Multilingual:</b> Technology often offers multiple language options, which is especially helpful in popular destinations.</li> <li>• <b>Affordability:</b> Generally cheaper than human-led tours.</li> <li>• <b>Novelty:</b> Some tourists are drawn to the futuristic experience of a robot guide, especially in places like Japan, museums, or science centers.</li> </ul> <p><b>Robot/Technological Guides (apps, AR/VR, robots) Cons:</b></p> <ul style="list-style-type: none"> <li>• <b>Impersonal:</b> Many travelers feel that tech-based guides lack warmth, spontaneity, and the ability to answer follow-up or unexpected questions in depth.</li> <li>• <b>Technical issues:</b> Apps or robots can sometimes glitch, have limited information, or be outdated.</li> <li>• <b>Limited adaptability:</b> Can't always adjust to special interests, unexpected changes, or unique group dynamics.</li> </ul> <p><b>What Do Tourists Actually Prefer?</b></p> <ul style="list-style-type: none"> <li>• <b>Surveys &amp; Studies:</b> Most studies suggest that while tourists find technological aids useful—especially for independent exploration—the <b>majority still prefer human guides</b> for richer, more interactive experiences, especially in cultural or historical settings.</li> <li>• <b>Younger travelers</b> and tech-savvy individuals are more open to robot or AI guides, but even they often report missing the charisma and flexibility of a real person.</li> <li>• <b>Group vs. Solo:</b> Solo travelers may lean more towards technology, while groups and families often enjoy the engagement of a human guide.</li> <li>• <b>Destination type:</b> In places with complex history, local culture, or off-the-beaten-path sites, human guides win. In museums or big cities, tech guides are more common and accepted.</li> </ul> |
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| Summary Table         |             |                  |
|-----------------------|-------------|------------------|
| Feature               | Human Guide | Robot/Tech Guide |
| Personal Interaction  | High        | Low              |
| Adaptability          | High        | Low-Medium       |
| Language Options      | Medium      | High             |
| Cost                  | High        | Low              |
| Availability          | Medium      | High             |
| Cultural Storytelling | High        | Low              |
| Novelty/Innovation    | Low         | High             |

**In Practice**  
Many destinations now offer **hybrid experiences**: a human guide supported by technology, or tours that start with tech and finish with a personal touch.

Within the scope of Q8, four main themes regarding the future role of R/TTGs were identified. The first theme, the advantages of R/TTGs, includes the categories of continuous availability, information accuracy, personalization, and cost efficiency. The second theme, the limitations of R/TTGs and the significance of the human element, consists of categories related to human interaction, cultural mediation, adaptation to unexpected situations, and social impacts. The third theme, the hybrid guiding model, focuses on the supportive role of technology in basic services and the continued importance of HTGs in experiences requiring expertise and personalized interaction. The fourth theme, the future transformation of the guiding profession, encompasses technological integration, changing professional roles, and the sustained value of human-guided experiences. Overall, the analysis indicates that R/TTGs are unlikely to completely replace HTGs; rather, they are expected to function as complementary tools that enhance service quality and support the capabilities of HTGs. In this context, R/TTGs stand out through advantages such as accessibility, cost efficiency, and personalization, while HTGs continue to maintain their importance through communication, cultural interpretation, empathy, and adaptability. Therefore, hybrid guiding models based on human-technology collaboration are expected to play an increasingly significant role in the future of the tourism sector.

**Table 10: GPT-4.1's Answer to Q8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <b>Q8: Will robot/technological tour guides replace human tour guides in the future?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Robotic or AI-based tour guides are likely to <i>significantly</i> supplement, but not outright <i>replace</i> , human tour guides in the foreseeable future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Here's why:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Advantages of Robot/Technological Tour Guides</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• <b>24/7 Availability:</b> Robots don't get tired or need breaks, so sites can offer tours anytime.</li> <li>• <b>Consistent Information:</b> AI can ensure accuracy and standardization, delivering information without forgetting facts or showing bias.</li> <li>• <b>Personalization:</b> AI can tailor information to visitors' interests, languages, knowledge levels, and even learning styles.</li> <li>• <b>Cost and Scale:</b> Once the technology is built, it's cheaper per visitor and can serve larger crowds or multiple locations simultaneously.</li> </ul>                                                                                                      |
| <b>But – There Are Limitations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>• <b>Lack of Human Touch:</b> Travelers often value the passion, storytelling, and humor that only a human can provide. Human guides read group moods, answer unexpected questions, and connect personally.</li> <li>• <b>Cultural Mediation:</b> Human guides can offer nuanced context and adapt explanations to sensitive cultural details, local customs, or breaking news.</li> <li>• <b>Dealing with the Unexpected:</b> Humans handle emergencies, lost visitors, or odd requests far better than current robotic systems.</li> <li>• <b>Economic Impact:</b> Tour guiding is a livelihood for millions, often supporting local economies in developing regions.</li> </ul> |
| <b>The Most Likely Scenario: Hybrid Model</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>• <b>Robots/AI</b> will become the <i>first point of contact</i> for basic tours, navigation, ticketing, and FAQs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

- **Humans** will be called in for high-end, in-depth, or specialty tours—food experiences, historical reenactments, wildlife guiding, etc.
- **Integration:** Tech will support human guides, offering translation services, historical data, or AR enhancements.

#### Real-World Examples

- Museums (like in Japan or Singapore) already use robots/AI kiosks to complement human staff.
- Some cities use AI-powered audio guides and apps, but *the top-rated tours are still those with a charismatic human.*

**Summary:** Robotic and technological tour guides will absolutely play a bigger role in tourism. But for any tour where connection, storytelling, and genuine interaction are a priority, human tour guides will continue to have a strong place.

## 5. Discussion and Conclusion

Technological developments have enabled the use of robots and artificial intelligence applications in various sectors, including tourism. In recent years, robotic and technological tour guide systems (R/TTGs) have emerged as new actors in tourism services. This study aims to examine the potential effects of R/TTGs on human tourist guides (HTGs) and the tourist guiding profession from an AI perspective. For this purpose, ChatGPT-4.1 responses were analyzed using a qualitative approach, and the following findings were obtained:

Düz (2024) examined the strengths and weaknesses of robotic tourist tour guides (R/TTGs) from a user experience perspective, focusing specifically on the RoBoHon case. The findings revealed that R/TTGs are perceived as entertaining and attention-grabbing; however, they remain limited in terms of empathy and flexibility. Consistent with these findings, GPT-4.1 suggested that although R/TTGs may contribute to a reduction in the demand for human tourist guides (HTGs), they are unlikely to fully replace them. This is primarily because the essence of tourist guiding is grounded in interaction and human–human relationships, through which HTGs continue to provide emotional connection, adaptability, and personalized experiences that robotic systems currently struggle to replicate.

Regarding Q2, the findings indicate that HTGs perceive R/TTGs as a potential occupational threat, particularly in budget-oriented tourism segments. However, they continue to emphasize the irreplaceable value of human-centered attributes, such as authenticity, empathy, and storytelling. This finding is consistent with previous research demonstrating that while robotic and AI-based tour guides offer advantages in standardized information delivery, cost efficiency, and operational support, they are unlikely to fully replace human tourist guides due to the importance of emotional connection, authenticity, and interpersonal interaction (Wirtz et al., 2018; Tussyadiah et al., 2020; Özalkan et al., 2022; Demir & Vatan, 2024). Furthermore, recent studies suggest that AI should be viewed not as a substitute for human expertise, but as a complementary tool that supports professional practices and facilitates adaptation within the tourist guiding profession (Li et al., 2025)..

Regarding Q3, the findings suggest that the impact of R/TTGs on job satisfaction of HTGs' depends largely on whether they are perceived as competitors or as complementary assistants. This supports a future hybrid model in which routine tasks are delegated to technology while the essential human touch is preserved. Consistent with this view, Li et al. (2025) found that perceiving AI tour guides as complementary rather than competitive promotes job crafting, occupational self-efficacy, and professional adaptation among tourist guides.

Regarding the future provision of guidance services by R/TTGs in outdoor environments, GPT-4.1 suggested that robotic tour guides are likely to become increasingly prevalent within the next two to five years, particularly in smart tourism cities, controlled public spaces, and tourism-intensive destinations. This finding is supported by previous studies demonstrating the feasibility of robotic tour guides in outdoor and semi-public environments, such as cultural heritage sites and theme parks, where navigation, information delivery, and visitor interaction can be effectively managed (Karreman et al., 2012; Karreman et al., 2015; Matsumoto et al., 2021).

Regarding Q5, the findings suggest that R/TTGs do not necessarily negatively affect HTGs' job performance. Instead, they can serve as complementary tools by managing routine tasks and allowing HTGs to focus on higher-value activities, including interpretation, storytelling, and emotional engagement. Previous studies also support this view by emphasizing that R/TTGs can function as strategic partners rather than substitutes for HTGs (Wirtz et al., 2018; Ivanov & Webster, 2019).

Regarding Q6, the findings indicate that technology does not inherently diminish motivation; instead, the impact is determined by whether it is perceived as a threat or a strategic partner that enhances professional growth. This finding is consistent with Wang et al. (2026), who demonstrated that human–AI collaboration can enhance tour guides' work meaningfulness indirectly increase the motivation when AI is perceived as a supportive partner rather than a replacement mechanism.

Regarding Q7, the findings reveal that tourist preferences are context-dependent rather than mutually exclusive; while R/TTGs offer functional and economic advantages, the authentic interaction and cultural depth provided by HTGs remain indispensable, underscoring the necessity of a hybrid service model to optimize visitor experiences. Previous studies indicate that tourists' preferences for technological and human tour guides are context-dependent. While AI-based and robotic guides are valued for efficiency, accessibility, and functional benefits, HTGs remain essential for delivering authentic interactions, emotional engagement, and cultural interpretation (Tussyadiah et al., 2020; Chi et al., 2022).

Regarding Q8, the findings indicate that R/TTGs are likely to be positioned not as technologies that replace HTGs, but as complementary tools that enhance service experiences and support the capabilities of HTGs. Accordingly, the future of tour guiding is expected to evolve through hybrid models that integrate technological capabilities with the communicative, cultural, and emotional competencies of HTGs. This perspective is consistent with previous research suggesting that emerging technologies, including robotic guides and guiding applications, are unlikely to entirely replace HTGs; rather, specialized human-guided experiences are expected to remain important (Örnek & Karamustafa, 2025).

When GPT-4.1's responses are summarized, the following results are obtained: 1) R/TTGs have the effect of reducing the need for HTGs but not completely eliminating them, 2) Overall, R/TTGs are perceived as potential occupational threats but are expected to complement rather than replace human tourist guides, 3) The effect of R/TTGs on HTGs' job satisfaction depends on their perceived role as competitors or complements, 4) R/TTGs will be able to provide guiding service in open areas within 2 to 5 years, 5) R/TTGs' substitutive or complementary role significantly influences HTGs' business performance, 6) R/TTGs affects motivation of HTGs depending on whether it is perceived as a threat or a strategic partner, 7) The preference for R/TTGs or HTGs varies according to tourist preferences, 8) There will be both R/TTGs and HTGs in the tourist guide profession in the future.

## **6.Limitations and Future Research**

Today, there are numerous artificial intelligence applications -both paid and free- designed for a wide range of purposes and equipped with diverse capabilities (see Tale-1). In this study, only ChatGPT-4.1 was utilized, as it is one of the most widely used tools. Therefore, the use of a single artificial intelligence application in the analysis of the study questions constitutes the primary limitation of the research. In addition, certain methodological limitations regarding the utilization of large language models must be taken into consideration. First and foremost, large language models are dynamic systems capable of generating different responses to the same query at different times. The operational mechanism of the model, its probabilistic response-generation structure, and updated training datasets can influence the reproducibility and consistency of the obtained results. Furthermore, the architecture of the prompt, the phrasing of the expressions used, the scope of the question, and the degree of guidance can directly alter the quality of the generated outputs. Therefore, it is of paramount importance that prompts in AI-based data generation processes are designed in a clear, systematic, and research-aligned manner. Additionally, the update cycles of the knowledge bases of artificial intelligence models can be considered another significant limitation for the study.

**The Use of Artificial Intelligence as an Academic Data Source:** The study introduces a methodological innovation by positioning AI (GPT-4.1) as a qualitative "perspective provider" rather than merely a text

generation tool. On the other hand, it allows for comparative studies with different artificial intelligence models in the future.

This study provides an important roadmap and sheds light on future research from several perspectives. The research focuses on “hybrid models” where technology handles routine tasks while humans concentrate on storytelling and emotional intelligence. Future studies can investigate the operational construction of these hybrid structures and the specific impacts of human-machine interaction on the tourist experience.

The study identified that whether guides perceive technology as a “competitor” or a “complement” is a decisive factor in their job satisfaction and motivation. This finding sets the stage for future research into educational models to shift perceptions, psychological adaptation processes, and “job crafting” within the profession.

A primary limitation noted in the study is the use of a single AI application. Future researchers can build upon this by comparing responses from different AI models (such as Claude, Gemini, DeepSeek, etc.) to achieve a broader and more consistent perspective.

It is predicted that R/TTGs will become more prevalent in outdoor environments and smart cities within the next 2 to 5 years. This specific timeframe offers a testable prediction for future field research and longitudinal studies.

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## Araştırma Makalesi

# **Impacts of Robot/Technological Tour Guides (R/TTGs) On Guiding Profession And Human Tour Guides (HTGs) From ChatGPT-4.1 Perspective**

*ChatGPT-4.1 Perspektifinden Robot/Teknolojik Tur Rehberlerinin (R/TTR) Rehberlik Mesleği ve İnsan Tur Rehberleri (İTR) Üzerindeki Etkileri*

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## **Genişletilmiş Özet**

Teknolojik gelişmeler günümüzde tıp, savunma, eğitim, üretim, ulaşım ve turizm gibi birçok sektörde önemli dönüşümlere neden olmaktadır. Robotların farklı meslek alanlarında kullanılmaya başlanması, bu teknolojilerin sunduğu avantajlar ve ortaya çıkardığı endişelerle birlikte değerlendirilmektedir. Yüksek üretim hızı, hizmet kalitesinin artırılması ve hata oranlarının azaltılması teknolojinin olumlu yönleri arasında yer alırken; çalışanların işlerini kaybetme endişesi, iş tatmini, motivasyon, performans ve mesleki değer algılarındaki değişimler olası olumsuz etkiler olarak görülmektedir. Bu durum, insan ilişkilerine dayalı bir meslek olan turist rehberliği için de geçerlidir.

Geçmişte turistler, güvenlik, maliyet avantajı, zaman tasarrufu ve uzman rehber desteği gibi nedenlerle paket turları tercih ederken, bireysel seyahatlerde gezi kitapları önemli bilgi kaynakları olmuştur. Günümüzde ise internet erişimi, akıllı cihazlar ve GPS tabanlı uygulamalar sayesinde turistler zaman ve mekândan bağımsız olarak bilgiye ulaşabilmekte ve destinasyonlarda daha bağımsız hareket edebilmektedir. Bunun yanında robot turist rehberleri ve yapay zekâ tabanlı uygulamalar, turist rehberliği hizmetlerinde yeni bir teknolojik dönüşüm yaratmaktadır. Günümüzde müzeler, kültürel miras alanları ve sergi salonları gibi ortamlarda robot rehberlerin kullanıldığı görülmektedir.

Yapay zekâ alanındaki gelişmeler, robotların insan benzeri özellikler kazanmasını sağlamış ve insansı (humanoid) robotların kullanım alanlarını genişletmiştir. Bu gelişmeler, gelecekte robot/tur teknolojik rehberlerin (R/TTR) yalnızca kapalı alanlarda değil, açık alanlarda da rehberlik hizmeti sunabileceğini göstermektedir. Böylece geleneksel insan-insan etkileimine dayalı turist rehberliği mesleğine insan-makine etkileşimi de eklenerek mesleğin yapısında önemli değişimler yaşanması beklenmektedir.

Bu çalışma, R/TTR'lerin turist rehberliği mesleğine ve insan turist rehberlerinin (İTR) motivasyon, iş tatmini, iş performansı ve mesleki tehdit algılarına yönelik etkilerini yapay zekâ perspektifinden incelemeyi amaçlamaktadır. Çalışmayı özgün kılan temel unsur, araştırma sürecinde yapay zekâ uygulamasının veri kaynağı olarak kullanılmasıdır. Yapay zekânın bilimsel araştırmalarda kullanımına ilişkin tartışmalar devam etmekle birlikte, literatürde yapay zekâ yanıtlarını nitel yaklaşımla inceleyen çalışmalar bulunmaktadır.

Araştırmada, gelişmiş özellikleri ve yaygın kullanımı nedeniyle GPT-4.1 tercih edilmiştir. OpenAI tarafından 14 Nisan 2025 tarihinde yayımlanan GPT-4.1'e, R/TTR'lerin insan rehber ihtiyacına etkisi, İTR'lerin R/TTR'leri mesleki tehdit olarak algılayıp algılamadığı, R/TTR'lerin iş tatmini, performans ve motivasyon üzerindeki etkileri, turist tercihleri ve turist rehberliği mesleğinin gelecekteki konumuna ilişkin toplam sekiz soru yöneltilmiştir. Elde edilen yanıtlar betimleyici analiz yöntemiyle değerlendirilmiştir.

Düz (2024), RoBoHon örneği üzerinden R/TTR'lerin kullanıcı deneyimi açısından güçlü ve sınırlı yönlerini incelemiş ve bu sistemlerin dikkat çekici ve eğlenceli bulunmasına rağmen empati ve esneklik açısından sınırlı kaldığını ortaya koymuştur. Benzer şekilde GPT-4.1 bulguları, R/TTR'lerin insan rehber ihtiyacını azaltabileceğini ancak insan rehberlerin iletişim, duygusal bağ kurma, uyum sağlama ve kişiselleştirilmiş deneyim sunma becerileri nedeniyle tamamen yerini alamayacağını göstermektedir.

Bulgular, İTR'lerin R/TTR'leri özellikle bütçe odaklı turizm segmentlerinde potansiyel bir mesleki tehdit olarak algıladığını ortaya koymaktadır. Bununla birlikte özgünlük, empati ve hikâye anlatımı gibi insan merkezli unsurların turist rehberliği açısından önemini koruduğu görülmektedir. Önceki çalışmalar da R/TTR'lerin bilgi aktarımı, maliyet etkinliği ve operasyonel destek açısından avantaj sağladığını; ancak insan etkileşimi ve duygusal bağ gerektiren deneyimlerde insan rehberlerin yerini tamamen alamayacağını göstermektedir (Wirtz et al., 2018; Tussyadiah et al., 2020; Özalkan et al., 2022; Demir & Vatan, 2024). Bu nedenle yapay zekânın ikame edici değil, tamamlayıcı bir araç olarak değerlendirilmesi gerektiği belirtilmektedir (Li et al., 2025).

Araştırma sonuçları, R/TTR'lerin İTR'lerin iş tatmini üzerindeki etkisinin bu teknolojilerin rakip veya tamamlayıcı araç olarak algılanmasına bağlı olduğunu göstermektedir. Rutin görevlerin teknolojiye devredildiği, ancak insan unsurunun korunduğu hibrit rehberlik modellerinin gelecekte daha önemli hâle geleceği öngörülmektedir. Li et al. (2025) de yapay zekânın destekleyici bir unsur olarak algılanmasının turist rehberlerinin mesleki uyumunu ve öz yeterliliklerini artırabileceğini ifade etmektedir.

GPT-4.1 değerlendirmelerine göre R/TTR'lerin önümüzdeki 2–5 yıl içinde özellikle akıllı turizm şehirleri, kontrollü kamusal alanlar ve turizm yoğun bölgelerde daha yaygın kullanılması beklenmektedir. Bu öngörü, kültürel miras alanları ve tema parkları gibi ortamlarda robot rehberlerin navigasyon, bilgi aktarımı ve ziyaretçi etkileşimi sağlayabileceğini ortaya koyan çalışmalarla desteklenmektedir (Karreman et al., 2012; Karreman et al., 2015; Matsumoto et al., 2021).

Bulgular ayrıca teknolojik rehberlerin İTR'lerin iş performansını zorunlu olarak olumsuz etkilemediğini göstermektedir. Aksine R/TTR'ler rutin görevleri üstlenerek insan rehberlerin yorumlama, hikâye anlatımı ve duygusal etkileşim gibi daha yüksek değer taşıyan faaliyetlere odaklanmasına yardımcı olabilir (Wirtz et al., 2018; Ivanov & Webster, 2019). Benzer şekilde teknolojinin motivasyon üzerindeki etkisinin doğrudan olmadığı; bunun teknolojinin tehdit veya stratejik ortak olarak algılanmasına bağlı olduğu görülmektedir. Wang et al. (2026), yapay zekânın destekleyici bir unsur olarak değerlendirilmesinin turist rehberlerinin işe yönelik anlamlılık ve motivasyonlarını artırabileceğini ortaya koymuştur.

Turist tercihleri açısından ise R/TTR ve İTR seçeneklerinin birbirinin alternatifi olmaktan ziyade bağlama bağlı olarak değerlendirildiği görülmektedir. R/TTR'ler verimlilik ve ekonomik avantajlar sağlarken, İTR'ler özgün etkileşim, kültürel yorumlama ve duygusal bağ açısından önemini korumaktadır (Tussyadiah et al., 2020; Chi et al., 2022). Bu nedenle geleceğin turist rehberliği hizmetlerinde insan ve teknoloji iş birliğine dayalı hibrit modellerin ön plana çıkacağı düşünülmektedir.

Sonuç olarak R/TTR'lerin turist rehberliği mesleğinde insan rehberlerin yerini tamamen alacak teknolojilerden ziyade, hizmet kalitesini artıran ve insan rehberlerin yetkinliklerini destekleyen tamamlayıcı araçlar olarak konumlanması beklenmektedir. Geleceğin turist rehberliği, teknolojik olanaklar ile insan rehberlerin iletişimsel, kültürel ve duygusal becerilerini bir araya getiren hibrit modeller üzerine şekillenecektir (Örnek & Karamustafa, 2025). Bu dönüşüm sürecinde İTR'lerin R/TTR'leri bir tehdit olarak değil, daha kaliteli rehberlik hizmeti sunmalarını destekleyen bir araç olarak değerlendirmeleri önem taşımaktadır. Bu doğrultuda düzenlenecek eğitimler, seminerler ve çalıştaylar, teknolojik dönüşüme uyumu kolaylaştırarak turist rehberliği mesleğinin gelecekteki sürdürülebilirliğine katkı sağlayacaktır.