Case Analysis of Generative AI Adoption and Application Based on the UTAUT Theory: Taking Ctrip's TripGenie Intelligent Travel Chatbot as an Example

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Abstract

This study takes TripGenie, an intelligent travel chatbot jointly developed by Trip.com (affiliated with Ctrip) and Microsoft, as a case study. Combined with the core framework of the Unified Theory of Acceptance and Use of Technology (UTAUT), it systematically analyzes the adoption logic and application value of Generative Artificial Intelligence (GenAI) in the tourism industry. The research findings indicate that the successful adoption of TripGenie stems from its accurate matching of the performance needs of both users and enterprises, reduction of technical usage thresholds, diffusion relying on industry demonstration effects, and formation of enabling conditions through the integration of resources from both parties. Ultimately, it achieves the upgrading of user experience, business growth, and optimization of operational efficiency.

Keyword

TripGenie, UTAUT, Generative artificial intelligence, Tourism services

Introduction

The origins of modern research on Generative Artificial Intelligence (GenAI) can be traced back to breakthroughs in generative models within the framework of deep learning. Firstly, in their paper "Auto-Encoding Variational Bayes", Diederik P. Kingma and Max Welling proposed the Variational Autoencoder (VAE). Through the collaborative training of encoders and decoders, VAE can learn the probability distribution of data and generate new samples, laying the foundation for subsequent generative models (Kingma, D. P., & Welling, M., 2013). Secondly, Ian J. Goodfellow and others, in their paper "Generative Adversarial Nets", pioneeringly proposed the Generative Adversarial Network (GAN). This architecture has become one of the most influential paradigms in the field of generative artificial intelligence, widely applied to multimodal generation

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tasks such as images, text, and videos (Goodfellow, I. J., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y., 2014).

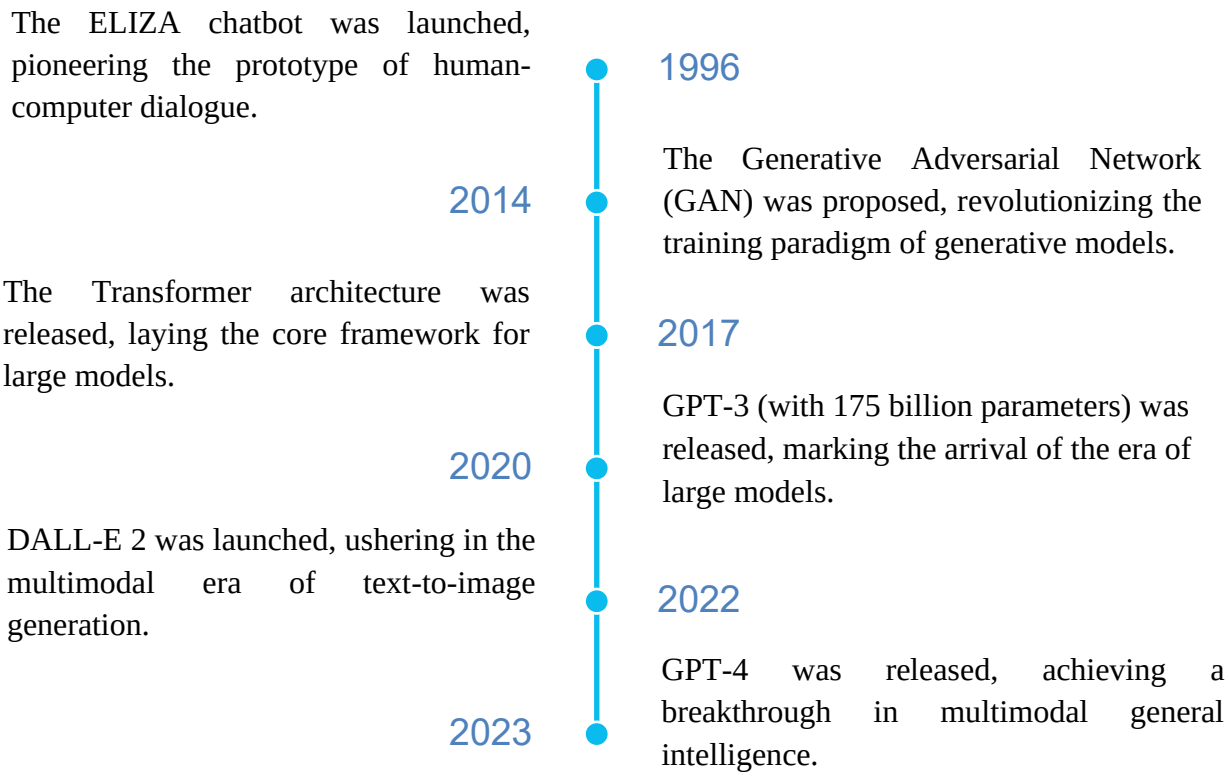

Figure 1. Timeline of Generative Artificial Intelligence Development

In recent years, the rapid development of GenAI has been profoundly transforming the operation models across various sectors of society. Amid the wave of digitalization, the tourism industry is confronted with challenges such as diversified consumer demands and intense competition. As an emerging technology, GenAI has brought transformative opportunities to the tourism industry. TripGenie, jointly launched by Trip.com and Microsoft, is a typical application of GenAI in the tourism field. Co-developed by Trip.com (under Ctrip) and Microsoft based on Azure OpenAI, the TripGenie intelligent chatbot has achieved service innovation featuring a closed loop of "natural language interaction - personalized itinerary generation - real-time booking". Its self-service resolution rate for flight and hotel services exceeds 70%, and the order conversion rate has doubled compared with the traditional model (Microsoft, 2024).

This case provides a typical sample for studying the adoption mechanism of GenAI in tourism enterprises and the service industry. It addresses the gap in existing GenAI application research, namely the "insufficient integration of technical characteristics and adoption theories", by deeply integrating the UTAUT framework with tourism scenarios and refining the dimensional connotations of GenAI adoption in the service industry. Additionally, it offers replicable experiences for tourism enterprises and the service industry in terms of GenAI technology

selection and implementation paths, particularly providing operational guidance in aspects such as "user demand matching", "reduction of technical thresholds", and "resource integration".

Methodology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. in 2003 in their paper "User Acceptance of Information Technology: Toward a Unified View". It aims to predict complex scenarios of future technology adoption and serves as a core paradigm guiding technology design, policy - making, and academic research. By integrating multiple theoretical models on technology adoption research, Venkatesh et al. formed the core determinant variables of UTAUT: performance expectancy, effort expectancy, social influence, and facilitating conditions. They believed that technology adoption behavior is driven by both rational decision - making paths and social influence paths, breaking through the limitation that early models only focused on individual cognition and revealing the deep logic of technology adoption (Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D., 2003).

In 2012, Venkatesh et al. optimized the Unified Theory of Acceptance and Use of Technology (UTAUT) model by integrating theories related to psychology and economics. Building on the original framework, they developed UTAUT2, which incorporates both instrumental rationality and emotional experience, expanding the theory's application to consumer scenarios. Specifically, by adding three core variables—hedonic motivation, price value, and habit—and refining the operational paths of moderating variables, UTAUT2 explains the complex motivations behind consumers' adoption of technology and enables precise adaptation to different user groups (Venkatesh, V., Thong, J. Y., & Xu, X., 2012).

In 2016, Venkatesh et al. conducted a comprehensive theoretical evaluation and critical reflection on the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extensions. They developed a multi-level theoretical integration framework: horizontally, it classifies extended variables from different fields into a unified framework through horizontal integration; meanwhile, it establishes a multi-level analytical model of "individual-organization-society" through vertical integration (Venkatesh, V., Thong, J. Y., & Xu, X., 2016).

In 2022, Venkatesh's paper *Adoption and Use of AI Tools: A Research Agenda Grounded in UTAUT*, published in *Annals of Operations Research*, constitutes a significant extension of the UTAUT theory in the field of artificial intelligence. Its core achievement lies in deconstructing the threefold uniqueness of AI tools: algorithmic black boxes and iteration speed at the technical level, trust paradox and algorithm anxiety at the user level, and ethical risks and institutional pressures at the organizational level. Additionally, it proposes a four-dimensional research agenda of "individual - technology - environment - intervention," covering variables such as technological anxiety, algorithmic trust, and institutional pressure, and verifies the dynamic moderating effects of technical experience and ethical sensitivity (Venkatesh, V., 2022).

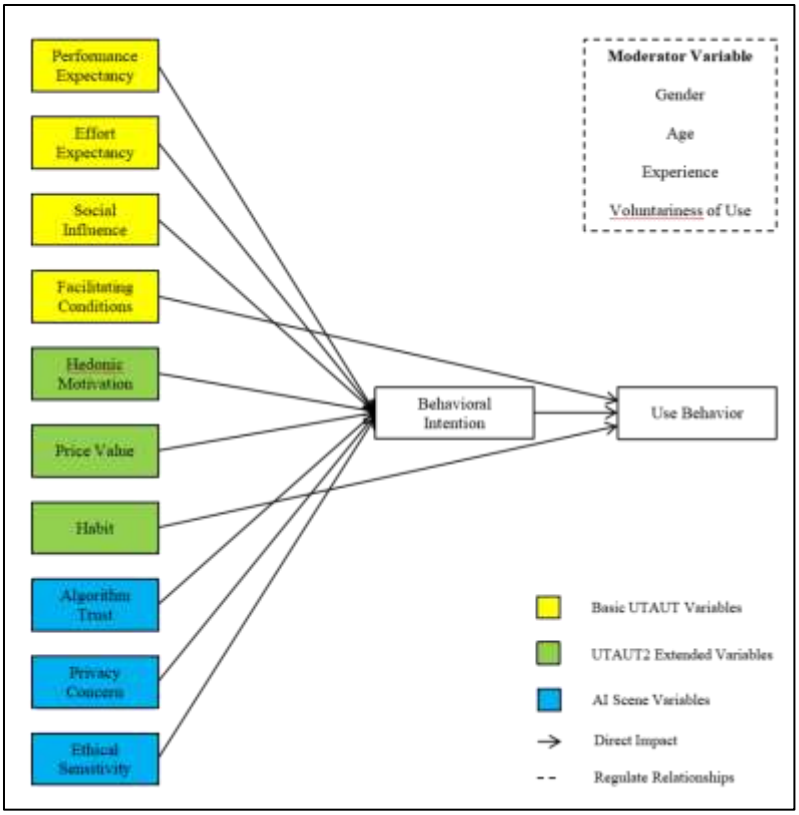

Figure 2. Types of UTAUT Extensions

To sum up, the development of the Unified Theory of Acceptance and Use of Technology has gone through an evolutionary process from fragmentation to integration and from static to dynamic. The development of this theory presents three major characteristics: first, integrity, which forms a unified framework by absorbing multidisciplinary theories; second, dynamics, which continuously expands variables and scenarios with technological changes; third, practicality, which is widely applied in fields such as medical care, education, and e-commerce to guide technology design and promotion strategies. The research on the Unified Theory of Acceptance and Use of Technology not only maintains the stability of the core framework but also, through variable innovation and methodological upgrading, has become the core paradigm in the field of technology adoption, continuously promoting the interactive development of theory and practice.

Case Background

Ctrip Group is a world-leading one-stop travel service provider, owning subsidiaries and brands including Trip.com, Ctrip Travel, Skyscanner, and Qunar. Upholding its mission of "Pursuing Perfect Journeys, Building a Better World", Ctrip Group is committed to comprehensively collecting and integrating travel information for travelers around the world, enabling users to easily book travel products and services and make choices that best suit their needs. Currently, Ctrip Group has built an advanced and mature transaction platform, which includes mobile applications, official websites, and 24/7 global customer service support. Meanwhile, through its diverse product portfolio and innovative marketing strategies, Ctrip Group helps its partners and suppliers

reach a rapidly growing global user base. In 2023, Trip.com launched Trip Genie, an AI chatbot that provides real-time travel tips, inspiration, and itinerary recommendations (Shanghai Institute of Culture and Tourism Industry, 2024). Trip Genie not only offers users personalized, convenient, and efficient itinerary planning services; it also leverages AI technology to roll out content products such as "Travel Hotspots" and "Word-of-Mouth Rankings, " as well as applying the AI Agent image in earnings call meetings (CSDN Blog, 2024). Trip.com is committed to integrating GenAI to provide exceptional intelligent travel experiences for international travelers across 39 countries worldwide.

As the tourism industry thrives increasingly, consumer demands have become more diversified. Shifting from traditional sightseeing tours to current diversified needs such as in-depth experiences and cultural exploration, consumers expect to customize travel plans based on their own interests, preferences, and requirements, and obtain more personalized travel experiences. This presents both opportunities and challenges for tourism service providers. For Ctrip, seizing opportunities, continuously innovating, and upgrading services to meet consumers' diversified needs and win their favor is the foundation for maintaining a sustainable competitive advantage. To address these challenges, Trip.com has decided to adopt Microsoft Azure OpenAI Services, deeply integrating the latest GenAI technology with its existing business scenario applications. Through continuous iteration, innovation, and optimization, the application systems across various business scenarios can better understand consumers' needs. Leveraging industry-leading large language models (LLMs) such as GPT-4 Turbo 0409, GPT-4o, and GPT-4 Turbo with Vision, Trip.com provides consumers with full travel lifecycle services. These services cover pre-travel destination exploration, itinerary planning, flight and hotel bookings, in-travel destination information Q&A, and high-quality, efficient after-sales services (Microsoft, 2024).

Case Analysis

There are numerous case studies on GenAI in the tourism field. Kumar and Malhotra adopted a mixed research method, conducting qualitative interviews with 44 tourists and collecting 445 quantitative questionnaires. They analyzed the negative impacts of three major stressors (hallucinatory outputs, poor information quality, and lack of empathy) in the application of GenAI on tourists' trust and electronic word-of-mouth, providing empirical evidence for the optimization of tourism AI services (Kumar, S., & Malhotra, D., 2025). Based on the Innovation Resistance Theory, Seyfi et al. conducted a comparative analysis of the acceptance barriers of GenAI tourism tools among tourists from South Korea and the United States. They identified cross-cultural differences at the functional level (usage value, risks) and psychological level (image perception, traditional preferences), offering a reference framework for the design of global tourism AI products (Seyfi, S., Kim, M. J., Lee, C. K., & Jo, Y., 2025). Tourism Northern Territory (Tourism NT) of Australia collaborated with Microsoft and Insight to develop the celebrity chatbot "Chat NT" based on the GPT-3.5 model of Azure OpenAI Service. By integrating tourism data with the celebrity's speech style, the chatbot successfully enhanced the effectiveness of tourism promotion during the off-season (Insight, 2024).

This case is based on the Unified Theory of Acceptance and Use of Technology (UTAUT). It explains users' intention to adopt technology and their usage behavior through four key variables

(performance expectancy, effort expectancy, social influence, and facilitating conditions). The connotation of UTAUT and its adaptability in this study are shown in Table 1:

Table 1. Core Variables of the Unified Theory of Acceptance and Use of Technology (UTAUT) and Their Adaptable Scenarios in This Study

Core Variables of UTAUT	**Core Connotation**	**Adaptable Scenarios in This Study**
Performance Expectancy	The degree to which users believe that technology can help them accomplish tasks, improve efficiency, or gain benefits	Can TripGenie create value for users (through personalized itineraries and multilingual services) and enterprises (by reducing costs, improving efficiency, and enhancing conversion rates)
Effort Expectancy	The degree to which users perceive the ease or difficulty of learning and using a technology	The interaction threshold of TripGenie (such as natural language operation and interface simplification) and the difficulty of enterprise technology integration (such as the connection between Azure OpenAI and Ctrip's data)
Social Influence	The degree to which users adopt technology under the influence of others (such as peers, social networks) or industry trends	The demonstration effect brought by Trip.com's industry status, and the driving effect of user word-of-mouth communication on potential users
Facilitating Conditions	External conditions that support technology adoption (such as technical support, resource investment, and policy compliance)	Microsoft's Azure computing power and model capabilities, Ctrip's travel data and business APIs, and the cooperation mechanism between the two parties

According to Microsoft's official data, performance expectancy is the core driving force for the adoption of TripGenie, and its value is reflected in a two-way manner between the "user side" and the "enterprise side". Effort expectancy determines the "ease of use" of technology adoption, and TripGenie lowers the threshold through "simplified user interaction" and "lightweight integration of enterprise technology". Social influence accelerates the "dissemination" of technology adoption, and TripGenie forms a diffusion effect through "industry demonstration" and "user word-of-mouth"; facilitating conditions are the "supporting conditions" for technology adoption, and TripGenie relies on the integration of resources from both parties and a compliance system to solve key obstacles to adoption.

Application Effects and Challenges

Integrating the GenAI provided by Azure OpenAI with the application of Trip.com's various business scenarios has enabled Trip.com to benefit significantly in both serving customers and driving the development of its own business. In terms of customer service, the AI chatbot system enhanced by Azure OpenAI can communicate with customers through natural language, better understand their needs, and quickly provide accurate responses. This allows customers to access global travel guide content more conveniently and efficiently, making it easier to create travel itineraries. The one-stop itinerary planning service provided by TripGenie for customers covers pre-travel destination exploration and itinerary planning, in-travel destination information Q&A and flight/hotel details, as well as efficient and timely after-sales service—greatly improving the convenience of customers' trips. Currently, the overall self-service rate of core flight and hotel businesses on Trip.com has exceeded 70% (Microsoft, 2024). In terms of Trip.com's own business development, the introduction of Azure OpenAI's GenAI has improved the efficiency of marketing content generation and can provide more targeted content and images. In terms of internal staff training, the knowledge base built using Azure OpenAI enables developers to significantly improve the efficiency of learning and understanding new knowledge and complete the upgrade and iteration of various business systems more quickly.

After more than 20 years of development, Trip.com has accumulated a large amount of high-quality travel routes and high-standard customer service data. Meanwhile, it also holds unique advantages in areas such as service information coverage and product resource coverage. The primary challenge facing Trip.com is how to integrate its existing product and data advantages into business products across different scenarios through GenAI to provide consumers with more targeted and personalized services. Second, Trip.com's customers come from many countries around the world, and their inquiries involve dozens of languages. Moreover, the travel scenario has extremely high requirements for information accuracy and service quality. Thus, the second difficulty for Trip.com is how to use GenAI to build a multilingual platform and achieve the goal of supporting multiple languages simultaneously with a single set of services. Third, the travel services provided by Trip.com usually involve multiple rounds of communication with customers, including both communication with human customer service representatives and with automated response chatbots. How to use GenAI to realize the integration of various information Q&A and service requests, intent recognition and clarification, optimization of conversation fluency, and connection with outbound call chatbots—these technical challenges are all highly demanding tasks for Trip.com (Microsoft, 2024).

Recommendation

It is recommended that Trip.com fully leverage its years of accumulated travel route and customer service data to prioritize the development of a tourism industry knowledge graph, thereby laying a solid data foundation for the subsequent upgrade of personalized services. Meanwhile, it could conduct associative annotation of various types of tourism information (such as scenic spots, hotels, transportation, and cuisine) to form a structured knowledge network, which further enhances the usability and relevance of tourism data. In terms of building personalized recommendation capabilities, Trip.com may wish to integrate users' historical browsing records, booking data, and

real-time search behavior, and apply personalized recommendation algorithms (including collaborative filtering and deep learning algorithms). By accurately capturing user preferences, this approach can improve the matching degree between recommended content and user needs, as well as enhance the user browsing experience. Furthermore, it is suggested that Trip.com develop a customized GenAI model based on its own business data and scenario characteristics. This model can automatically generate travel plans that meet users' specific needs (such as trip duration, budget, and interest preferences) by learning a large amount of high-quality travel route data. In this way, the platform's product resource advantages are fully integrated into personalized services, which not only improves the efficiency of users' decision-making but also helps strengthen the platform's core competitiveness.

It is recommended to take a multilingual-supported pre-trained model (e.g., Meta's NLLB-200 model) as the foundation. This model can cover mutual translation functions across more than 200 languages and provide core technical support for multilingual services. Meanwhile, in response to the high demand for information accuracy in tourism scenarios, Trip.com may consider using its accumulated multilingual customer inquiry data to fine-tune and optimize the model, further enhancing its adaptability in tourism-related scenarios. In addition, it is suggested to establish a quality monitoring system: Quality assessment of the multilingual services provided by GenAI can be conducted through methods such as manual random checks (e.g., regularly sampling translated content to verify accuracy) and customer feedback (e.g., setting up a service evaluation portal to collect opinions). Once issues like translation errors or inaccurate information are identified, timely corrections and optimizations are required to continuously improve the service quality of the multilingual platform and better meet the needs of global customers.

It is recommended to prioritize the construction of a unified integration platform for information and service needs, focusing on integrating various relevant data such as human customer service records, automated response chatbot conversation data, and users' historical order information. This platform will provide comprehensive data support for Generative AI. On this basis, Natural Language Processing (NLP) technology may be adopted to preprocess and classify the above-integrated data. This enables Generative AI to quickly retrieve users' historical information when they initiate new inquiries, fully understand their needs, and thereby provide more coherent and accurate services. During conversations, it is suggested to use a language generation model to produce natural and fluent responses. By learning from a large volume of high-quality conversation data, this model can generate adaptive responses based on personalized factors such as the user's inquiry style and emotional state, enhancing the intimacy and accuracy of communication. Meanwhile, it may be advisable to optimize the conversation logic between outbound call chatbots and users. For example, sort out communication script frameworks for common outbound scenarios (such as order confirmation and itinerary reminders) in advance to ensure the smoothness of outbound communication and avoid negative impacts on user experience due to logical discontinuities.

Conclusion

Based on the UTAUT, this study verifies the driving effect of the four variables—"Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions"—on the adoption

of GenAI technology in the tourism industry. The success of TripGenie, in essence, stems from the integration of Azure OpenAI's technical capabilities with Ctrip's tourism ecosystem. By revolutionizing travel planning and booking processes, it provides personalized and multilingual services, enhances user experience, drives business growth, and optimizes operational efficiency.

Future research can expand in two directions: first, exploring the adaptive differences of UTAUT variables across different tourism scenarios (e.g., hotels, scenic spots); second, combining multimodal technologies (e.g., AI-generated travel vlogs, VR-based virtual itinerary previews) to analyze the in-depth reconstruction of tourism service experiences by GenAI. For practical implications, tourism enterprises should take "value as the core, ease of use as the foundation, and resources as the support" to promote the upgrading of GenAI from "tool application" to "service innovation."

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