

Research on AI-Enabling Strategies for OTA Platforms

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Abstract. This study examines the effectiveness of the application of artificial intelligence (AI) technologies in online travel agent (OTA) platforms and the limitations they face, focusing on analyzing their impact on platform operational efficiency and user experience. Through the SWOT analysis framework and user satisfaction assessment methodology, the study provides an in-depth analysis of the application of key technologies such as AI recommendation systems, intelligent customer service, dynamic pricing, and backend automated operation, as well as user experience. The analysis finds that AI technology performs significantly in enhancing personalized services, optimizing resource allocation and improving market responsiveness, but it also exposes problems such as data privacy, algorithmic bias and lack of user trust. The study discusses the strengths, weaknesses, opportunities and threats of AI technology from the perspective of actual cases and theories, and puts forward improvement suggestions for OTA platforms, including optimizing the transparency and diversity of recommender systems, enhancing the fairness and user-friendliness of dynamic pricing, improving the ability of intelligent customer service to handle complex issues, and promoting the application of the technology on small and medium-sized platforms through industry collaboration and policy support. In addition, the study highlights the potential of AI in sustainable tourism, suggesting that technological innovation and strategy optimization can be used to promote the long-term development of the tourism industry and user satisfaction. This study provides important theoretical references and practical guidance for the in-depth application of AI technology in OTA platforms.

Keywords: Artificial Intelligence, Online Travel Agent, OTA, Satisfaction, SWOT Analysis.

1. Introduction

The rapid development of Artificial Intelligence (AI) technology is reshaping business models globally, bringing disruptive changes to several industries. Among them, the online travel agency (OTA) industry, with its highly digitalized nature, has become one of the typical fields of AI application. In recent years, breakthroughs in AI technology in data analysis, natural language processing (NLP) and machine learning have enabled OTAs to deeply explore user needs and provide more personalized and efficient services. The application of these technologies has significantly improved the platform's operational efficiency and user experience, while helping companies gain a greater advantage in the competitive market [1].

Users' expectations of online travel services have gradually increased, and the demand for personalization has become stronger. AI technology has become an important driving force for innovation and competition in the OTA industry. Existing studies show that AI provides new opportunities for platforms' revenue growth and market expansion while improving service quality [2]. However, the practical application effect of AI technology is still deficient in terms of user satisfaction improvement. On the one hand, the design of recommendation algorithms may fail to accurately meet users' needs due to data bias, thus degrading user experience [2]. On the other hand, the transparency issue of dynamic pricing raises questions about the fairness of prices, which to some extent weakens users' trust in the platform [3]. In addition, the introduction of customer service automation improves efficiency but lacks emotional support when dealing with complex issues, and this "emotionless service" may trigger user dissatisfaction [2]. Research on these issues can provide important references for the future development of the OTA industry.

Based on the above background, this study will systematically summarize the main applications of AI technology in the OTA industry and its impact on user satisfaction. By integrating existing

literature and case studies, the study will explore the performance and effectiveness of AI in intelligent recommendation, dynamic pricing, and customer service automation, while sorting out its shortcomings. Further, the study will adopt the SWOT analysis framework to reveal the strengths, weaknesses, opportunities and threats of AI technology from a macro perspective, and based on this, propose strategic recommendations for the future development direction, which will provide a reference for sustainable innovation in the OTA industry.

2. Major Applications of Artificial Intelligence in OTA

2.1. Intelligent Recommender System

Intelligent recommendation systems have become a core tool for OTA platforms to optimize the user experience. These systems generate customized recommendations based on a user's past queries, booking history, and behavioral preferences. g. Using collaborative filtering algorithms, companies can efficiently recommend accommodation options that are highly matched to a user's interests, a strategy that directly contributes to higher order conversion rates and increased user stickiness to the platform [1][2]. Expedia's semantic search feature significantly enhances the user experience by speeding up the user's ability to locate ideal hotels and flights, effectively compressing the decision cycle [4].

In practical application scenarios, the effectiveness of recommender systems is extremely prominent. Studies have shown that with the help of recommender systems, the average user's stay time and click rate have increased significantly by more than 25%, while the order fulfillment rate of OTA platforms has also been significantly improved [3][4].

2.2. Intelligent Customer Service and Chatbots

Intelligent customer service has significantly optimized the overall user experience of OTA platforms by virtue of its instant response and efficient service. Booking.com's BookingAssistant automates processes such as order management, date adjustment and refund application, successfully reducing the workload of human customer service by 30% [1]. Ctrip's intelligent customer service system realizes full-time operation, dramatically enhances user experience, and effectively improves service response efficiency [2].

According to user feedback, intelligent customer service significantly shortens user waiting time and maintains efficient service quality even during peak traffic periods, thus helping the platform to attract and retain customers and significantly increasing user trust in the service [3][4].

2.3. Dynamic Pricing and Revenue Management

Dynamic pricing is a key revenue-enhancing strategy for online travel agent (OTA) platforms, which flexibly adjusts prices based on immediate market movements and customer behavioral patterns. Hopper has seen significant growth in its air ticket sales through an AI-powered price prediction system that advises users on the best time to buy [1][5]. Meanwhile, Amadeus' dynamic pricing mechanism utilizes instantaneous market assessments to continuously adjust prices, ensuring that the platform maintains its competitiveness regardless of travel peaks and troughs [4].

The application of these systems has been effective, mainly in terms of widespread user acceptance of their price fairness and significant growth in platform revenues. On platforms with a high degree of price transparency, user trust and repeat purchases increase significantly [3][5].

2.4. User Profiling and Precision Marketing

With the help of AI technology to generate user profiles, OTA platforms have implemented precision marketing strategies to push personalized offers and advertising content to users. For example, with the help of in-depth analysis of users' browsing history and consumption patterns, the company is able to accurately customize offers for various user groups. This strategy has significantly

increased the attractiveness and efficiency of advertisements, as evidenced by a significant increase in click-through and conversion rates [1][2]. In addition, Expedia provides personalized offers for returning users, which significantly increases the frequency of repeat bookings [4]. This precision marketing strategy directly contributes to the steady growth of the platform's revenue.

2.5. Operational Efficiency and Automation

The use of AI technology has significantly improved the operational efficiency of OTA platforms. For example, Expedia has optimized its back-office order management and inventory update processes with robotic process automation (RPA) technology, which significantly reduces human errors and greatly improves the speed of transaction processing [4]. Sabre's airline distribution system uses AI technology to achieve dynamic seat allocation and itinerary planning, which significantly enhances the users' booking experience process [3].

With the power of automated systems, OTA platforms have significantly reduced their operational costs while improving the efficiency of resource utilization, thus enhancing their competitiveness in the market [1].

3. SWOT Analysis: Artificial Intelligence in OTAs

3.1. Strengths

AI technology has significantly optimized the user experience and operational efficiency of online travel service platforms, and become one of their core competitive advantages. AI-driven recommendation system enables accurate and personalized product suggestions by analyzing user interaction footprints. AI-powered recommendation systems, which analyze user interaction footprints to make accurate and personalized product recommendations, play an important role in increasing user stickiness and order conversion rates, e.g., Booking.com's personalized accommodation recommendations have significantly increased customer satisfaction and platform profitability [1]. In addition, tiket.com has significantly improved the conversion efficiency of its marketing campaigns with its AI-enabled dynamic offer strategy [6].

In terms of operational efficiency optimization, Robotic Process Automation (RPA) technology has become a key tool for many OTA platforms to strengthen their back-office management, and Expedia has optimized and upgraded its order processing and inventory updating processes with RPA technology, which significantly reduces the probability of manual errors and improves the overall response efficiency and stability of the system. The overall response efficiency and stability of the system has been greatly improved [7].

3.2. Weaknesses

Despite the wide application of AI technology in the field of online travel services (OTAs), however, the consideration of its inherent limitations is indispensable. The application of AI technology requires huge financial support, which covers a number of dimensions, such as the construction of the system, the analysis of the data and technical support. The high cost significantly restricts the flexibility of small and medium-sized online travel agent (OTA) companies in terms of technological innovation [5].

Second, the extreme dependence of AI technology on data quality poses a central challenge. OTA platforms may suffer from fragmented, incomplete, or inaccurate data, which can undermine the accuracy of recommendation mechanisms and dynamic pricing models [7]. At the same time, user acceptance of AI services is also lacking. Although AI can effectively deal with programmed tasks, most users still prefer human customer service for complex needs or emotionally charged questions [6].

3.3. Opportunities

The rapid progress of artificial intelligence technology has opened up a vast development prospect for online travel service platforms. The continuous optimization of personalized recommendations aims to provide each user with more vivid and precise travel solutions and services. For example, with the help of user profile analysis and instant data processing technology, OTA platforms are able to accurately customize travel solutions to meet user preferences, significantly improving booking conversion efficiency [6].

AI brings great opportunities for OTA platforms to develop international markets. The rapid development of real-time language translation and localization technology has significantly enhanced the service effectiveness of platforms in multilingual environments. For example, Booking.com's AI-powered multilingual customer service has enabled the company to significantly improve its competitiveness in the global market [8]. Furthermore, AI technologies are increasingly playing a key role in the field of sustainable tourism. Online travel agent (OTA) platforms utilize data analytics capabilities to guide users to travel during off-peak hours, which not only effectively improves resource utilization, but also significantly enhances the user's travel experience [9].

3.4. Threats

In the external environment, the application of AI on OTA platform is facing multiple challenges and risks. In the highly competitive market environment, large OTAs have successfully dominated the market and gained a large market share by leveraging their advanced technological strength and abundant resources. In sharp contrast, small and medium-sized enterprises are facing great challenges and pressures in the research and development and practical application of artificial intelligence [1].

Increased legal scrutiny also breeds potential risks. In the face of tightening data privacy protection regulations, OTA platforms face more stringent challenges and demands for algorithmic transparency and data usage compliance. Lapses in user data management or algorithmic fairness can lead to a loss of trust and the threat of legal liability [9].

The stability of the technical system is also a hidden risk point. In high-traffic scenarios, the performance of AI systems may be challenged, leading to delays or even crashes, which can adversely affect the user experience as well as the platform's reputation. The rapid evolution of AI technology not only significantly increases the cost of technology upgrades for organizations, but also enhances the uncertainty of technology strategy development [6].

4. User satisfaction analysis

Artificial intelligence technology is profoundly changing the service mode of online travel platforms. Through intelligent recommendation system, the platform is able to accurately capture user preferences and push personalized travel products, intelligent customer service and chatbots provide around-the-clock consulting services to quickly answer users' questions, dynamic pricing strategy ensures that the price is reasonable and transparent, and improves the users' willingness to book, and AI technology optimizes the platform's operational efficiency to provide a smooth user experience from the backend to the front-end. AI technology optimizes the operational efficiency of the platform and provides a smooth user experience from the backend to the front-end, improving service quality and user satisfaction in all aspects.

4.1. Recommendation System

4.1.1 User acceptance

Users' evaluation of the recommendation system of OTA platforms mainly depends on two core factors: the accuracy of the recommended content and the diversity of choices. Taking Booking.com and Ctrip as an example, the recommendation function of these two leading platforms has gained generally favorable comments from users, and is especially outstanding in helping users make travel decisions quickly [2]. However, as users' knowledge of the recommendation mechanism deepens,

some hidden concerns gradually emerge. Some users begin to pay attention to the possible bias behind the algorithmic recommendation and the influence of commercial factors on the recommendation results, questioning whether the platform is really recommending based on user needs [10]. This reflects that there is still room for OTA platforms to improve the transparency of the recommendation system and user trust.

4.1.2 Interactive experience

Intelligent recommendation systems play a unique role in improving users' travel planning experience, and studies have shown that through the interactive recommendation function, users are able to explore more novel destination options, which not only enriches the travel planning possibilities, but also makes the whole planning process more vivid, interesting and efficient [11]. However, this technological advantage also faces challenges in practical applications, as Yang et al. [10] point out that users often have questions about the logic of recommendation results when using recommendation systems. The “black box” nature of the recommendation process affects the user experience, suggesting that improving algorithmic transparency will be an important direction to optimize user satisfaction.

4.2. Intelligent Customer Service and Chatbots

4.2.1 User acceptance

Its ability to efficiently handle standardized problems in the application of intelligent customer service on OTA platforms has gained wide acceptance among users, and Chiang's study found that intelligent customer service systems have obvious advantages in terms of response speed and 24-hour service accessibility, which significantly improves the user's service experience [12].

However, the application of AI customer service also has obvious ability boundaries, according to the research of Nurul et al. [2], when users encounter complex problems that require in-depth understanding or emotional resonance, they are often disappointed with the service effect of intelligent customer service, and they prefer to transfer to manual service, which reflects the inadequacy of AI customer service in dealing with non-standardized service scenarios, and also points out the direction of future service optimization.

4.2.2 Interactive experience

Intelligent customer service shows significant advantages in language interaction and can provide users with a smooth and natural dialog experience, taking Booking.com's “Booking Assistant” as an example, and its excellent multilingual processing ability allows users from different countries to obtain convenient service support [13]. However, technical stability is still a key factor affecting user experience. Taehye et al. [14] showed that technical failures such as delayed system response or provision of incorrect information can lead to a sharp drop in user satisfaction, a finding that emphasizes the importance of intelligent customer service systems in maintaining stability in terms of service quality and suggests that platforms need to make continuous investments in technical infrastructure.

4.2.3 Technical trust

Some users expressed concerns about privacy protection and data security of AI customer service, especially when sensitive information is handled. The lack of trust may limit users' willingness to use intelligent customer service [10].

4.3. Dynamic Pricing

Artificial intelligence-driven dynamic pricing techniques are changing users' booking behavior, and studies have shown that users' booking satisfaction significantly increases when they are provided with accurate price prediction services through platforms such as Hopper, reflecting the positive role of intelligent pricing in enhancing users' decision-making confidence [14]. However, dynamic pricing also brings new challenges. Tomislav et al.'s [13] study found that frequent price changes may trigger

users to question the pricing mechanism, and users tend to distrust the platform when they are unable to understand the reasons for price fluctuations, suggesting that OTA platforms need to make efforts to improve the transparency and explainability of price adjustments in providing flexible pricing.

The personalized service users experience in dynamic pricing scenarios enhances their willingness to buy, but too frequent price changes may trigger negative emotions [6].

4.4. Operational Efficiency and Automation

The efficiency gains of automated back-office operations are directly reflected in the user experience, such as faster order processing and refunds. This technology dramatically reduces service wait times and increases user satisfaction [15].

Users' trust in automated systems depends mainly on their reliability. User satisfaction is higher when the system is running smoothly, while it decreases significantly if the system crashes or is delayed during peak traffic [7].

5. Future developments and recommendations

5.1. Technology Trends

Artificial Intelligence is revolutionizing the service model of OTA platforms and bringing a qualitative leap in user experience. In particular, the combined application of generative AI and AR technology is creating a new paradigm for travel services. Studies have shown that intelligent customer service systems based on generative AI can more accurately understand and handle the complex needs of users, and significantly improve the quality of service [12], and the introduction of AR technology has made it possible to have a virtual travel experience, which allows users to gain a deeper understanding of the destination environment virtually prior to the booking. destination environment, effectively reducing the experience gap caused by information asymmetry [11]. In terms of pricing strategy intelligent market analysis and user behavior prediction are reshaping the competitive advantage of OTA platforms, through the integration of real-time market data and user preference analysis, platforms are able to achieve more accurate and transparent dynamic pricing, and enhance user trust [15], this data-based intelligent pricing not only optimizes the platform's operational efficiency, but also brings users a more valuable booking experience.

AI technology shows unique advantages in promoting sustainable tourism development, Tussyadiah and Miller's study points out that through real-time monitoring and data analysis of tourist destinations by AI technology[13], the OTA platform can better balance the relationship between tourism development and environmental protection, and this intelligent resource allocation not only helps to protect tourism resources, but also guides users to carry out this intelligent resource allocation, and promotes the development of the entire industry in a sustainable direction. These technological innovations are redefining the service boundaries of OTA platforms, creating a richer and smarter travel experience for users. In the future, as technology continues to advance, OTA platforms will play a greater role in enhancing service efficiency, optimizing user experience and promoting sustainable development.

5.2. Platform Strategy

In order to further enhance user satisfaction and service capabilities, OTA platforms need to optimize their existing functions and service models in multiple ways. The recommendation system needs to be more personalized and transparent. The "reason for recommendation" function should be added to the recommendation page to show users the basis of the recommended content (e.g., users' browsing history or historical preferences), so as to enhance users' trust in the system [10]. Meanwhile, by optimizing the algorithmic model, it avoids homogenization of recommended content and better meets the diverse needs of users [11].

The performance of intelligent customer service needs to be further optimized to cope with complex questions and emotional interaction scenarios. Platforms can improve the accuracy and

flexibility of intelligent customer service in multi-round conversations by introducing emotion recognition technology, so that users can feel more humanized service [13]. In addition, designing features for quick switching to human customer service can reduce user dissatisfaction due to repetitive descriptions of problems, thus improving problem resolution efficiency and satisfaction [14].

Improvements in dynamic pricing are also crucial. By providing a description of the specific reasons for price fluctuations (e.g., adjusting the price due to a decrease in inventory or an increase in market demand), platforms can improve users' understanding and acceptance of dynamic pricing [15]. In addition, the introduction of a price locking feature, which provides users with the option to keep the current price for a certain period of time, can significantly alleviate users' anxiety due to frequent price changes [9].

Finally, the platform's back-end automated operation capability needs to be further improved. By optimizing system performance through distributed architecture, platforms can reduce the risk of system crashes during peak traffic [7]. The ability to update the progress of order and refund processing in real time can also significantly improve user experience and increase service transparency [15].

5.3. Industry Collaboration and Policy Promotion

The development of OTA platforms cannot be separated from industry collaboration and policy support. The issues of data privacy and algorithm transparency are the main obstacles to users' trust in AI. Industry organizations should work with the government to develop unified standards for AI technology applications, such as clarifying norms for data collection, storage and use to ensure the security of user data [9]. At the same time, the development of algorithmic transparency should be promoted so that users can understand the logic of platform recommendation and pricing and reduce distrust [10].

Small and medium-sized OTA platforms face greater resource constraints in technology application, and the government and large OTA companies can jointly provide technology sharing and financial support programs. For example, by setting up a special fund for AI technology, providing tax breaks, or developing shared AI toolkits, they can help SMEs lower their technological thresholds. This initiative would not only improve the overall technology level of the industry, but also maintain the diversity and dynamism of the market [5].

Promoting the development of sustainable tourism technologies is also an important task for the industry. By monitoring the ecological conditions and resource usage of tourist destinations through AI technology, OTA platforms can recommend more environmentally friendly travel options to users, such as off-peak travel or diversion to undeveloped destinations. This approach not only reduces the pressure on popular tourist destinations, but also provides users with a more unique travel experience while building the platform's green brand image [15].

6. Conclusion

The rise of artificial intelligence technology has brought great changes to the development of OTA platforms. By summarizing the application of AI technology in online travel platforms as well as SWOT analysis and user satisfaction exploration, this study comprehensively reveals the practical effects of AI technology on OTA platforms and the challenges they face. It can be seen that key technologies such as AI recommendation systems, intelligent customer service, dynamic pricing and automated back-office operations have played an important role in optimizing user experience, improving operational efficiency and promoting industry innovation. However, the application of these technologies has also exposed some limitations, such as data privacy issues, lack of user trust and lack of transparency in dynamic pricing.

Based on SWOT analysis and user satisfaction exploration, this study proposes recommendations for the improvement and development of AI applied to OTA platforms. At the technical level, the

recommendation system should improve transparency and personalization, intelligent customer service needs to optimize complex problems solving ability, and dynamic pricing needs to focus on price fairness and user anxiety relief. From the strategic level, platforms can promote continuous innovation in technology, optimize user experience and focus on policy collaboration. This not only helps to address existing weaknesses and enhance the ability to face potential threats, but also seizes the opportunity of technological development and sustainable tourism. At an industry level, a focus on policy facilitation and collaborative innovation is critical to the sustainability of small and medium-sized OTA platforms.

Through technological innovation and strategy optimization, the potential of AI in OTA platforms will be further unleashed to provide higher quality services to users and create more value for the industry. Future research can further explore the application of AI technology in niche markets and emerging technology areas, providing more theoretical support for the development of OTA platforms.

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