Analysis of Intelligent Technology Applications in Personalized Hotel Marketing

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Abstract. Intelligent technologies are profoundly transforming the marketing paradigm in the hotel industry, driving its shift from standardized services to personalized experiences. This study demonstrates through systematic analysis and case studies that technologies such as Artificial Intelligence (AI) recommendation algorithms have been widely applied across multiple stages—including user demand mining, customized marketing content, and scenario-based services. By constructing multidimensional user profiles, enabling precise product recommendations, and delivering intelligent interactive services, these technologies significantly enhance both user experience quality and hotel operational efficiency. However, the application of intelligent technologies still faces numerous challenges. At the data level, there are privacy compliance risks and data quality issues; at the technical implementation level, challenges include high deployment costs and technical compatibility difficulties; at the user level, issues such as varying experience perceptions and divergent group acceptance rates must be addressed. These challenges require hotels to prioritize balancing privacy protection, cost control, and human-cantered service while advancing intelligence. Future intelligent development in the hospitality industry should establish a dynamic matching mechanism between technology application and user needs. It must fully leverage smart technologies to elevate service standards while avoiding the pitfall of "technology supremacy," ultimately achieving the dual-win goal of maximizing personalized marketing.

1 Introduction

Digital technology applications permeate every industry. For instance, AI technology finds diverse applications in the tourism sector, spanning personalized services, sustainable tourism (such as wildlife conservation), crowd management, and hotel room management [1]. With the advancement of digital technology, personalized marketing powered by digital tools has become a crucial component of hotel operations. Scholars note that intelligent technologies—including smart hotel management systems, automated energy-saving systems, and personalized online platforms—enable the hospitality industry to transition from service automation to personalization, thereby enhancing operational efficiency and competitiveness [2]. Analyses of extensive hotel samples reveal both advantages and risks

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associated with intelligent technologies: while digital solutions reduce operational costs, enhance service personalization, and improve security, the high investment costs, diminished human interaction, and employment concerns they entail cannot be overlooked Specifically, Marriott and Hilton Hotels have progressively automated customer service, optimized revenue management, and personalized guest management to achieve tailored marketing. They also indicate future potential in automating routine tasks and strengthening sustainability [3,4].

Scholars in the field have adopted VR technology as their entry point, integrating computer graphics, AI, and other multidisciplinary technologies. Utilizing specialized equipment such as sensor helmets and data gloves, they enable users to perceive and manipulate virtual worlds in real time, delivering immersive experiences across multiple dimensions, including sight and sound. Customers can complete shopping and dining reservations within virtual scenarios, enhancing entertainment during their stay while expanding the hotel's revenue streams beyond room occupancy. This approach breaks through traditional marketing limitations. [5]. Maldivian resort hotels primarily leverage AI to enhance customer engagement and optimize marketing efficiency, while also pioneering innovations with blockchain and metaverse technologies. This approach not only elevates guest satisfaction but also reshapes the hotel's business potential [6]. Another study examined a five-star hotel in Aqaba, Jordan, using Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis to explore the relationship between technology adoption levels and innovation performance, highlighting the moderating role of smart hotel systems. Results indicate that intelligent systems align with leading technology adoption and innovation performance standards. Technology adoption positively influences intelligent systems, while intelligent systems positively impact innovation performance, with the former mediating this relationship. The study also identifies limitations such as employee resistance and data security concerns, recommending increased investment in intelligent systems and enhanced technical training [7]. Relevant research focuses on precision marketing in high-star hotels during the AI era, analyzing AI applications in user profiling and personalized recommendations. It highlights how AI can integrate multi-channel data to build accurate user profiles, enabling targeted service and marketing pushes to enhance customer satisfaction and repurchase rates. The study also explores challenges such as data privacy and technological costs, while outlining future trends like AI integration with Virtual Reality/Augmented Reality (VR/AR) and green marketing [8]. Scholars analyzed user reviews and questionnaire data from ten global smart robot hotels, finding that intelligent services garner significant attention. Robotic features like service capability, interactivity, and anthropomorphism positively influence guest perceptions, with gender acting as a moderator. Guest characteristics affect perceptions, which in turn positively influence behavioral intentions. These findings provide theoretical and practical insights for managing, marketing, and designing hotel smart robots [9]. Some studies indicate that while AI-driven market analysis optimizes pricing, chatbots enhance service responsiveness, and personalized marketing boosts customer loyalty, challenges like technical adaptation and employee skill gaps persist. Strategic planning and resource investment are needed to fully unlock AI marketing's potential [10]. This paper systematically reviews the current state of intelligent technology in hotel personalized marketing. Using Atour Hotels as a case study, it outlines their intelligent marketing pathway, offering reference points for industry development and innovation.

2 The path of smart technology in personalized marketing for hotels

2.1 User requirements exploration

With the deepening application of intelligent technologies, hotel marketing is undergoing a fundamental transformation. The core paradigm of hotel marketing is shifting from passively receiving information and batch-processing requests to proactively anticipating needs, delivering precisely tailored solutions, and providing immersive experiences throughout the entire journey. At the heart of this revolution lies technology, enabling hotels to truly begin understanding every guest.

The starting point of transformation lies in uncovering user needs. In the past, hotels' understanding of guests might have been limited to basic information and historical bookings. Today, big data technology consolidates scattered information into clear user profiles. This goes beyond knowing a guest's age and location to deeply understanding their consumption preferences and behavioral habits. For instance, systems can identify a guest who consistently requests non-smoking rooms on upper floors and orders afternoon tea service during every stay or notice another guest who frequently arrives in the early hours and makes high-frequency use of the fitness center. By integrating booking platforms, internal hotel consumption records, and even compliant third-party data, hotels can aggregate multi-dimensional guest information to build comprehensive, multidimensional user profile models. This enables them to anticipate potential needs—such as whether a family traveling with children requires an extra bed, or if a business traveler needs to reserve a meeting room.

Meanwhile, IoT technology elevates this predictive capability from static profiling to dynamic sensing [2]. Compared to functional appliances in traditional guest rooms, smart guest room devices have evolved from being mere tools to becoming demand-aware entities that proactively identify and adapt to user needs. Smart air conditioners log temperature adjustments to capture guests' preferred room temperatures, while smart TV viewing habits reveal their entertainment preferences. In public areas, compliantly deployed sensing systems analyze guests' dwell times and behavioral patterns in lobbies or restaurants, capturing unspoken implicit needs—such as a guest's preference for quiet corners or consistent mealtimes. Leveraging real-time data support, hotel operational decisions and service awareness are no longer confined to past experience or historical data. Instead, they can now encompass and respond to every immediate scenario demand and state change as it occurs.

Based on deep user insights, marketing content customization has become both precise and vivid. AI recommendation algorithms act as attentive personal assistants. During booking, they no longer suggest standard rooms but instead push family-friendly room packages for travellers with children, match executive suites with meeting room services for business guests, and even pre-emptively offer late check-out options for late-night arrivals. After check-in, in-room smart terminals become personalized advisors, sending fitness enthusiasts exclusive gym reservation slots and recommending daily signature dishes to food lovers.

2.2 User requirements exploration

Artificial intelligence recommendation algorithms utilize machine learning models to conduct in-depth mining and analysis of user data, constructing dynamically updated user preference models to achieve precise product and service matching. This mechanism plays a crucial role at different stages of the customer journey.

During the booking phase, the system generates customized recommendations based on multi-dimensional user profiles. For family travellers, the algorithm automatically identifies their needs and prioritizes family rooms equipped with children's facilities or themed family-friendly accommodations. For business travellers, it combines historical behavior data to recommend business packages that include access to the executive lounge and meeting room usage. Additionally, the algorithm adeptly captures users' latent needs. For instance, for guests arriving late at night, the system proactively offers late checkout options. For vacationers, it bundles recommendations for local attraction tickets and transportation services, effectively boosting average revenue per customer and enhancing the overall guest experience [4].

Upon check-in, recommended scenarios extend from online platforms to physical spaces. Through in-room smart terminals, hotels can implement scenario-based marketing. When the system identifies a guest as a fitness enthusiast, it automatically pushes exclusive time slot reservations for the hotel gym along with personalized training recommendations. When identifying a foodie, it displays the restaurant's daily specials and culinary experience activities in real time. This recommendation mechanism, based on real-time behavioral analysis, not only enhances the accuracy of service delivery but also creates significant cross-selling opportunities.

Simultaneously, the intelligent customer service system provides round-the-clock online support through digital channels such as WeChat and mobile apps. Unlike traditional touch-tone menus, modern conversational bots can comprehend complex queries expressed in natural language and deliver precise responses. More importantly, the system identifies key information during conversations to trigger relevant marketing recommendations. When customers mention celebrating anniversaries or birthdays, the system automatically suggests the hotel's themed decoration services and custom cake reservation options, transforming simple inquiries into sales opportunities.

3 Case study - Atour hotels

3.1 Intellectual Property (IP) theme positioning and data-driven demand discovery

Atour Hotels innovatively integrates IP cultural elements into its service system, achieving precise insights into user preferences through multi-dimensional data collection channels. Its mobile application serves as the primary data gateway, continuously gathering user preferences for IP-themed rooms—including, but not limited to, booking preferences for co-branded IP rooms like NetEase Cloud Music and purchasing behaviors for IP merchandise. After systematic analysis, this behavioral data forms a unique dual-dimensional user profiling model based on interests and consumption patterns. This profiling system encompasses not only basic demographic characteristics but, more importantly, records users' cultural preferences and consumption tendencies. For instance, the system can identify a specific user's level of preference for music-themed IPs or their willingness to consume specific cultural symbols. This deep understanding of users enables the hotel to transcend its traditional role as an accommodation service provider, transforming into a curator and provider of cultural experiences.

3.2 Implementation of personalized services in smart scenarios

In guest room settings, Atour Hotels achieves a seamless integration of personalized service and immersive experiences through smart devices. The AI speaker system automatically pushes curated playlists aligned with guests' musical preferences based on historical data, creating unique auditory journeys. Simultaneously, IP-themed in-room amenities—including curated books, decorative art pieces, and other physical elements—are precisely matched to guests' interest profiles. More innovatively, the system delivers timely promotions for IP-related merchandise, seamlessly bridging the gap between experience and purchase. This contextual marketing not only boosts conversion rates but, more importantly, deepens emotional connections and enriches the guest journey. By merging digital preference data with physical space elements, Atour crafts an exceptionally personalized lodging environment.

3.3 User lifecycle management and business model innovation

Atour Hotels' customer relationship management extends beyond the traditional accommodation cycle, establishing a long-term value extension mechanism. Based on IP-related consumption data and behavioral patterns collected during a guest's stay, the system delivers highly personalized marketing content after checkout. This includes room repurchase offers for the same IP-themed hotel or invitations to offline events featuring related IPs. This continuous engagement effectively transforms a single stay into a long-term cultural consumption relationship, boosting repurchase rates and brand loyalty. By integrating IP culture with customer relationship management, Atour Hotels has successfully built a differentiated competitive barrier, maintaining a unique market position within the fiercely competitive hospitality industry.

Atour Hotels' IP-themed operational model demonstrates significant market competitiveness. Data indicates that its IP-themed room types achieve approximately 40% higher booking rates than standard rooms, with average customer spending increasing by 80% [3]. These performance metrics fully validate the market acceptance and commercial value of personalized service models powered by big data.

4 Issues and challenges in the application of intelligent technologies for personalized marketing in hotels

4.1 Data layer

Privacy compliance risks have become the primary obstacle constraining technology adoption. To enhance personalized service levels, hotels often require collecting multi-source data, including behavioral data recorded by in-room smart devices and social data from third-party platforms. While this comprehensive data collection aids in building complete user profiles, it readily crosses privacy protection boundaries. For instance, collecting guest behavioral data via smart sensors within rooms may be perceived as an intrusion into private space. Integrating third-party social data poses challenges to the principle of informed consent. Such practices not only risk undermining user trust but also carry legal risks of violating regulations like China's Personal Information Protection Law and the EU's General Data Protection Regulation (GDPR) [5]. Striking a balance between data utilization and privacy protection has become a critical challenge hotel must confront.

Data quality issues also constrain the effectiveness of personalized marketing. Hotel data sources are fragmented, encompassing both booking data from online travel agencies and the hotel's own operational data. These datasets often suffer from inconsistent formats and standards, creating impenetrable “data silos.” Furthermore, implicit user preferences and subjective biases are difficult to quantify through traditional data collection methods, while inferences based on behavioral data may introduce bias. This fragmentation and incompleteness directly undermine the accuracy of user profiling, ultimately diminishing the effectiveness of personalized recommendations.

4.2 Technical aspects

The application costs of high-end smart devices and advanced algorithms constitute significant market barriers. The development and maintenance of smart room systems and artificial intelligence algorithms demand substantial capital investment, which small and medium-sized hotels with inherently limited profit margins often cannot afford. This may result in a “polarization” of smart technology within the hotel industry: large hotel groups can leverage technological advantages to enhance service quality, while smaller establishments are forced to remain at the basic informatization stage. This technological divide not only hampers the industry's overall development but also risks exacerbating imbalances in market competition.

The issue of technology-service compatibility also warrants attention. Some hotels blindly follow trends when introducing smart technologies, prioritizing technological sophistication over genuine user needs. For instance, overly complex interfaces on smart terminals create barriers for elderly users, while excessive reliance on automated services without adequate manual backup options actually degrades the user experience. This “technology for technology's sake” approach deviates from the core purpose of service industries, revealing a disconnect between technological solution design and user needs research.

4.3 User level

Personalized services carry the risk of perceived discomfort stemming from “over-precision.” When recommendation algorithms rely on overly detailed personal data, they may technically achieve greater precision but risk triggering psychological discomfort among users. For instance, recommending wellness services based on medical records or suggesting local social events based on call logs—while technically feasible—can easily make users feel monitored, leading to negative perceptions of the brand. This “uncanny valley effect” is particularly pronounced in personalized marketing: when technology seems to know users too well, it may inadvertently trigger psychological defense mechanisms.

There are significant differences in the acceptance of smart technologies among different user groups. Younger digital natives typically embrace intelligent services, while older users and some traditional business travellers prefer human-assisted options. This divergence stems not only from varying levels of technological proficiency but also reflects differing expectations for service experiences: some users prioritize technological efficiency, while others value interpersonal interaction and emotional warmth in service delivery. Hotels thus face a critical challenge: how to advance smart solutions while preserving the inclusive and human-centered nature of their services.

5 Conclusion

This paper explores the application of intelligent technologies in personalized hotel marketing, focusing on user demand discovery and customized marketing content. The innovative practices of Atour Hotels provide valuable insights for the digital transformation of the hospitality industry. Their success demonstrates that big data-driven user insights can effectively drive service innovation, while the integration of IP culture infuses standardized hotel services with unique emotional value and experiential depth. Looking ahead, as artificial intelligence technology advances further, this personalized service model holds promise for achieving more nuanced user understanding and more natural service interactions. However, it also faces challenges such as data privacy protection and balancing technology investment returns. While pursuing personalization, the hotel industry must establish robust data governance systems to ensure the secure and compliant use of user data. Furthermore, the sustained acquisition and operational capabilities regarding IP resources will be key factors in maintaining long-term competitiveness.

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