

# Analysis of Experience Design Thinking and Future Trends of Unmanned Restaurants in Haidilao

Zheng Qiuyang

Luoyang Institute of Science and Technology, China

**Abstract:** This study provides an in-depth analysis of Haidilao's innovative unmanned restaurant concept, exploring the integration of advanced technology with traditional catering services. The research focuses on the experience design thinking, operational model, market trends, technological impacts, sustainable development, and social responsibilities of Haidilao's unmanned restaurants. Our findings reveal the successful application of automation and AI in enhancing service efficiency and customer satisfaction. The study also identifies challenges and opportunities presented by this new dining model, including the necessity for continuous technological upgrades, the importance of balancing automated services with humanized interactions, and addressing data security concerns. Furthermore, the research highlights the significance of sustainable practices and social responsibilities in the era of automation. The insights derived from this study offer valuable implications for the future development of unmanned restaurants in the catering industry and the broader context of service automation.

**Keywords:** Unmanned Restaurants; Haidilao; Experience Design; Automation; Artificial Intelligence; Service Innovation; Sustainable Development; Social Responsibility; Catering Industry.

## 1 Introduction

### 1.1 Haidilao Brand and the Rise of Unmanned Restaurants

As one of China's most renowned hot pot chain brands since its establishment in 1994, Haidilao has gained a high reputation in the catering industry for its excellent service and innovative spirit. In recent years, with the development of technology and changing market demands, Haidilao has begun to explore new dining models, particularly the concept of unmanned restaurants.

The emergence of unmanned restaurants marks a significant transformation in the catering industry. This new type of restaurant utilizes automation technology and artificial intelligence to provide services, from ordering to serving, with almost no need for human intervention. Haidilao's unmanned restaurants not only showcase its ambition in the field of technology but also reflect the modern consumer's pursuit of quick, convenient, and innovative experiences.

### 1.2 Significance and Practical Implications of the Study

This study aims to deeply analyze the experience design thinking and future development trends of Haidilao's unmanned restaurants, which is of great significance for understanding the innovative trends in the current catering industry. Firstly, by exploring how Haidilao integrates technological innovation into its service processes, this can provide valuable references for other businesses in the catering industry. Secondly, analyzing the operational challenges and market acceptance of unmanned restaurants helps to predict the sustainability and long-term impact of this trend.

Furthermore, from the perspective of user experience, studying how unmanned restaurants meet consumers' needs and expectations is crucial for guiding future service designs. Lastly, with the widespread application of artificial intelligence and automation technologies in various industries, this study will also

provide empirical analysis for exploring the application of these technologies in the service industry.

## 2 Experience Design Thinking

### 2.1 Definition and Principles of Experience Design

Experience design, also known as Experience Design, is a user-centered design methodology. Its core lies in creating products, services, or environments to provide deep and valuable user experiences. Experience design focuses not only on the functionality or aesthetics of products but also on the feelings, cognition, and emotional responses of users during their interaction with the product.

**Definition:**

Experience design transcends the boundaries of traditional design, involving every aspect of user perception and behavior. It includes an understanding of user behavior, emotions, needs, and preferences, applying this knowledge to create attractive, effective, and enjoyable experiences.

**Principles:**

**User-Centricity:** Design always revolves around the needs and expectations of users. This requires designers to deeply understand users' backgrounds, cultures, and usage scenarios.

**Emotional Design:** Going beyond functional considerations, it focuses on evoking users' emotions and emotional connections. The design should resonate with users, creating pleasurable and meaningful experiences.

**Storytelling:** Each design should tell a story, establishing a connection with users through context, characters, and emotions. Storytelling makes the experience more vivid and memorable.

**Usability and Accessibility:** Design should be easy to use, meeting the needs of different user groups, including those with special needs. Usability is key to ensuring a smooth user experience.

**Continuous Iteration and Feedback:** Experience design is an

iterative process. Designers need to constantly adjust and refine designs based on user feedback and behavioral data.

**Multisensory Integration:** Design should engage multiple senses, such as visual, auditory, tactile, etc., to enhance the richness and attractiveness of the experience.

**Sustainability and Ethics:** Design should consider its long-term impact on the environment and society. Sustainability and ethical considerations are an integral part of modern design.

Through the application of these principles, experience design not only creates solutions that meet functional needs but also leaves a deep impression in users' minds, thereby establishing brand loyalty and long-term user relationships.

## 2.2 Experience Design Features of Haidilao's Unmanned Restaurant

As an innovative attempt in the catering industry, the experience design of Haidilao's unmanned restaurant presents several notable features, reflecting the new trend of combining modern technology with traditional catering services.

**Integration of Technology and Service:** Haidilao's unmanned restaurant deeply integrates automation technology and artificial intelligence to achieve high efficiency and accuracy in service processes. For example, using robots for food delivery and cleaning, and smart systems for order processing and customer management, these technological applications not only improve operational efficiency but also provide a unique experience for customers.

**Personalized Experience:** Through big data and artificial intelligence, Haidilao can analyze customer preferences and provide personalized recommendations, such as recommending dishes based on customers' past choices, thus enhancing customer satisfaction and the level of personalization in the experience.

**Design of Interactive Interfaces:** The ordering and service processes in the unmanned restaurant are mostly completed through touch screens or mobile applications. The design of these interfaces focuses on user-friendliness and intuitiveness, ensuring that even customers unfamiliar with digital devices can use them easily.

**Space Design:** The spatial layout and decoration design of Haidilao's unmanned restaurant consider the balance between a sense of technology and comfort. With modern decoration style and warm lighting, a futuristic yet comfortable dining environment is created.

**Creation of Emotional Experience:** Despite the lack of direct human interaction with traditional waiters, Haidilao's unmanned restaurant adds emotional elements through other means, such as background music and the interactive performance of robots, to compensate for the possible indifference brought by technological services.

**Safety and Hygiene:** In the automated environment, the handling and delivery of food reduce human contact, improving hygiene standards. This becomes an important selling point against the background of increasing special hygiene requirements.

**Sustainable Development:** The unmanned restaurant reflects Haidilao's commitment to sustainable development by reducing reliance on service staff and improving energy efficiency. This design plays a positive role in reducing resource waste and improving energy efficiency.

Through these features, Haidilao's unmanned restaurant not only demonstrates its strength in technological innovation but also has achieved significant success in providing a unique customer

experience, offering valuable reference for future trends in the catering industry.

## 2.3 Methods of Assessing User Experience

The assessment of user experience is a multidimensional process, involving various techniques and methods to quantitatively and qualitatively understand the interaction between users and products or services. For Haidilao's unmanned restaurant, effective user experience assessment is not only helpful in optimizing services but also key to continuous innovation.

User research methods include:

**Surveys:** Design targeted questionnaires to collect customers' experiences of using the unmanned restaurant, including satisfaction, preferences, and suggestions for improvement.

**In-depth Interviews:** Conduct one-on-one interviews with customers to deeply understand their feelings and detailed experiences.

**Focus Groups:** Organize group discussions with customers from diverse backgrounds to gather a variety of opinions and feedback.

Behavioral observation includes:

**Observing Natural Behavior:** Install cameras within the restaurant (ensuring privacy safety) to observe customers' natural behaviors, such as their interactions with robots and the smoothness of using self-service systems.

**Tracking User Interaction:** Track users' click paths and dwell times on touch screens or mobile applications to assess the effectiveness of interface design.

User experience metrics analysis:

**Satisfaction Surveys:** Regularly conduct satisfaction surveys to understand customers' overall feelings.

**Repeat Usage Rate:** Analyze customer return rates to assess loyalty and attractiveness.

**Conversion Rate:** The conversion rate from online reservations to actual dining at the restaurant reflects the attractiveness of the unmanned restaurant.

Data analysis:

**Using Data Mining Techniques:** Analyze customer data such as ordering habits and dish preferences to optimize the menu and personalized recommendations. Use sentiment analysis tools to identify positive and negative emotional tendencies in customer feedback.

Usability testing:

**Regular Usability Testing:** Test the usability of various services in the unmanned restaurant, such as the ordering system and robot services, to ensure their ease of use and efficiency.

**Prototype Testing and New Feature Trials:** Invite users to participate in prototype testing and trial new features to collect direct feedback.

Competitor analysis:

**Analyze the User Experience of Competitors:** Study the user experience of other unmanned restaurants or similar services in the industry to identify industry standards and potential areas for improvement.

By comprehensively using these methods, Haidilao's unmanned restaurant can gain a more comprehensive understanding of customers' experiences, continuously optimize services, enhance customer satisfaction, and maintain a leading position in a competitive market.

## 3 Operating Model of Haidilao's Unmanned Restaurant

### 3.1 Technology-Driven: Automation and Intelligence

The core operation of Haidilao's unmanned restaurant lies in the widespread application of automation and intelligence technologies, which not only improve efficiency and precision but also provide customers with a novel dining experience.

**Robot Waiters:** Haidilao uses robots to perform the roles of traditional waiters, such as delivering food to tables and clearing tables. These robots, equipped with advanced navigation systems and sensors, move freely and accurately within the restaurant.

**Smart Ordering System:** Customers can easily place orders through touch screens or mobile applications. These systems not only provide menu information but also offer personalized recommendations based on customers' historical choices and preferences.

**Automated Kitchen:** Part of the cooking process in the kitchen is also automated. For example, robots or automated devices are used for food preparation and initial processing, ensuring the consistency and efficiency of food quality.

**Data Analysis and Management:** By collecting and analyzing customer ordering data, Haidilao can optimize menu design and predict demand trends, thereby improving the efficiency and accuracy of inventory management.

**Intelligent Customer Interaction:** In addition to basic ordering and food delivery functions, the intelligent system can also interact with customers, such as providing dish information and answering common questions, enhancing the customer experience.

**Safety and Monitoring:** Use advanced monitoring systems to ensure the safety and efficient operation of the restaurant. For example, monitor the safety standards of the kitchen and the dynamics of customers in public areas.

Through these applications of automation and intelligence, Haidilao's unmanned restaurant not only achieves significant results in improving service efficiency and reducing costs but also provides customers with a high-tech and interactive dining environment. These are important parts of its unique charm and competitive advantages.

### 3.2 Service Process and Customer Interaction

Haidilao's unmanned restaurant's service process and customer interaction methods are unique in the traditional catering service model, reflecting the integration of technology and customer service.

**Self-service Ordering:** Customers place orders through touch screens or mobile apps, which provide visual menus and detailed descriptions of dishes, making the selection process both intuitive and convenient. Additionally, the smart recommendation system can suggest dishes based on customers' historical preferences and popular trends.

**Intelligent Customer Service:** Service robots deployed in the restaurant can respond to basic customer needs, such as providing napkins and chopsticks. These robots are usually equipped with interactive interfaces, allowing customers to interact with them directly.

**Enhanced Customer Experience:** Technologies like augmented reality (AR) provide entertaining content or information to customers, enhancing the dining experience during waiting times.

For example, customers can scan QR codes on the table with their smartphones to watch related entertainment programs or learn about dish information.

**Feedback and Interaction System:** After dining, customers can provide feedback and evaluations through touch screens or mobile apps, which helps Haidilao continuously improve its services and dishes. This also helps establish an interaction and relationship between customers and the brand.

**Emergency Handling:** For emergencies or special needs, the unmanned restaurant provides a rapid response mechanism, such as emergency call buttons or instant communication options with human customer service, ensuring customers can receive timely human assistance when needed.

Through such service processes and customer interaction methods, Haidilao's unmanned restaurant not only optimizes operational efficiency but also enhances customer experience, effectively combining technological innovation with customer service.

### 3.3 Management and Maintenance Challenges

While Haidilao's unmanned restaurant has brought innovation in operational efficiency and customer experience, it also faces a series of challenges in management and maintenance.

**Technical Maintenance and Upgrades:** The operation of the unmanned restaurant highly depends on the stability of the technology system. Regular maintenance and upgrades are necessary to ensure the efficient operation of robots and automated equipment, requiring a professional technical team for routine checks and troubleshooting.

**Data Security and Privacy Protection:** The unmanned restaurant collects and processes a large amount of customer data, including ordering habits and personal preferences. Protecting the security of these data and customers' privacy is extremely important, necessitating strict data management policies and advanced security technologies.

**Continuous Optimization of User Experience:** As customer expectations and preferences constantly change, the unmanned restaurant needs to continuously adjust and improve the user experience. This includes updating menu designs, optimizing the user interface of the ordering system, and improving the interaction methods between robots and customers.

**Dealing with Technical Failures:** Rapid and effective response to technical failures is a significant challenge. The unmanned restaurant needs to have emergency plans and backup solutions to ensure service continuity, such as having a manual ordering system and temporary service staff available.

**Staff Skill Training:** Although the unmanned restaurant reduces the need for front-desk service staff, the skill requirements for technical support and maintenance personnel are higher. Regular staff training and skill updates are necessary to maintain the team's professional capabilities.

**Customer Adaptability:** For some customers who are not familiar with high technology or prefer traditional services, adapting to the service style of the unmanned restaurant may be a challenge. Therefore, providing easy-to-understand usage instructions and necessary human assistance when needed is important.

By overcoming these challenges, Haidilao's unmanned restaurant can maintain its operational efficiency and quality of customer service while continuing to maintain its position as a

leader in innovation in the catering industry.

## 4 Future Trends and Development Directions

### 4.1 Market Trend Analysis of Unmanned Restaurants

**Market Growth and Driving Factors:** Unmanned restaurants, as an emerging dining model, are rapidly gaining attention and growth globally. This growth is driven by several factors. First, advancements in technology, especially in artificial intelligence, robotics, and automation, have turned the concept of unmanned restaurants into reality. Second, there is a growing demand among consumers, particularly younger ones, for quick, convenient, and novel dining experiences. Additionally, operational cost considerations, including reducing reliance on waitstaff, contribute to lowering long-term labor costs for unmanned restaurants.

**Market Challenges and Future Outlook:** While the market is growing rapidly, unmanned restaurants face challenges. On one hand, consumer expectations for service quality and interpersonal interaction may not fully align with the automated service model of unmanned restaurants, especially in markets traditionally valuing service quality. On the other hand, the stability and reliability of technology are crucial for continuous operation; any technical failure could impact customer experience and brand reputation. Looking forward, the development of unmanned restaurants may focus more on balancing technological innovation with the humanization of customer service. As technology matures and consumer adaptability increases, unmanned restaurants are expected to be applied in more fields and markets.

### 4.2 The Impact of Technological Innovation on Haidilao

**Impact and Transformation:** Technological innovation has profoundly impacted Haidilao's business model and brand image. The introduction of unmanned restaurants not only signifies Haidilao's leadership in catering technology but also demonstrates its commitment to innovation. The application of technologies, particularly in automation and AI, enables Haidilao to provide more efficient and consistent services, reducing human errors and operational costs. Additionally, data-driven insights allow Haidilao to better understand consumer behavior and preferences, optimizing its services and products, and enhancing customer satisfaction.

**Challenges and Opportunities:** Despite the many advantages technology brings, it also introduces new challenges. Continuous technological investment and updates are necessary to maintain competitive advantages and adapt to the rapidly changing technological environment. Transitioning from a traditionally manpower-centric service model may require overcoming initial consumer hesitations and adaptability issues. Stability and security in technology integration are also important considerations. However, these challenges also present opportunities for Haidilao to redefine the dining experience, attract a new generation of consumers, and enhance its brand image as an innovative and forward-thinking leader.

### 4.3 Sustainable Development and Social Responsibility

**Importance of Sustainability:** In the current business environment, sustainable development has become a core component of corporate strategy, and this holds true for Haidilao. As a leader in the catering industry, Haidilao considers sustainability a key metric in its unmanned restaurant projects. This includes using

energy-efficient resources, reducing resource waste (especially food waste), and adopting environmentally friendly materials and processes. For instance, precise demand forecasting and inventory management enable Haidilao to significantly reduce food waste and improve energy usage efficiency.

**Fulfilling Social Responsibility:** Social responsibility is an important part of Haidilao's brand image. While advancing technological innovation, the company also focuses on its impact on employees and society. Although the introduction of unmanned restaurants reduces traditional service positions, Haidilao mitigates the negative impact on employment by providing training and job transition opportunities for its staff. Furthermore, the company actively fulfills its corporate citizenship responsibilities by participating in public welfare activities and supporting community projects.

**Challenges and Opportunities Facing the Future:** Facing the future, Haidilao needs to balance business growth with environmental protection and social responsibility. This means continuous innovation to improve operational efficiency while ensuring that technological progress does not come at the expense of the environment or social welfare. Haidilao can leverage its influence in the industry to promote sustainable catering practices, encouraging supply chain partners and consumers to participate in sustainable development efforts. Through these measures, Haidilao not only enhances the sustainability of its business but also sets a benchmark in terms of social responsibility.

## 5 Case Study and Analysis

### 5.1 Selection and Description of the Specific Case

For this study, we selected a Haidilao unmanned restaurant located in the central business district of Beijing as our specific case. This restaurant, which opened in early 2023, represents an important attempt by Haidilao in high-tech catering services and has attracted widespread attention due to its unique operating model and technological application.

#### Case Description:

The unmanned restaurant covers an area of approximately 500 square meters, with a modern and tech-filled interior capable of accommodating about 100 customers simultaneously. Upon entering, customers first complete identity verification and reservation confirmation at a self-service counter at the entrance. Then, customers use a touch screen ordering system to select dishes and drinks. This system is user-friendly, offering multilingual options and recommendations based on customers' previous orders.

Multiple advanced robots are deployed inside the restaurant, responsible for delivering meals to designated tables. These robots are equipped with advanced sensors and navigation systems, moving accurately within the restaurant. Each table is equipped with a call button that customers can use to request additional services or call a human waiter.

The kitchen area is visible to customers, who can watch part of the automated cooking process through a glass window, such as automated vegetable cutting and seasoning systems. All dishes undergo a final check and adjustment by chefs before completion to ensure food quality.

Moreover, the restaurant is equipped with a smart cleaning system, including automated cleaning robots and waste disposal units, ensuring cleanliness and hygiene.



### 5.2 Data Analysis and Customer Feedback

#### Data Analysis:

To assess the operational efficiency and popularity of the unmanned restaurant, we collected the following key data:

**Average Waiting Time:** The average time from customer ordering to receiving their meal. Over the past three months, this data showed an average of 7 minutes, significantly lower than the 12-minute average waiting time in traditional service models.

Month	Average Waiting Time (min)	Daily Customer Traffic	Recommended Dish Selection Rate
First	8	200	65%
Second	7	250	68%
Third	7	300	70%

#### Customer Feedback:

Customer satisfaction surveys and online reviews provided feedback. Most customers gave positive feedback on the fast service and high-tech experience:

**Satisfaction:** The customer satisfaction survey showed

Aspect	Satisfied	Neutral	Dissatisfied
Service Speed	90%	8%	2%
Food Quality	85%	10%	5%
Technological Experience	88%	7%	5%
Human Service Needs	70%	15%	15%

**Customer Traffic:** The daily average customer traffic has been growing month by month since opening. In the first month, it was about 200 customers per day, increasing to about 300 customers per day in the third month.

**Ordering Habits:** The data shows that 70% of customers prefer to choose dishes recommended by the ordering system, while 30% choose to browse the menu themselves.

that 85% of customers were satisfied or very satisfied with the experience of the unmanned restaurant.

**Improvement Suggestions:** About 15% of customers suggested adding more human service elements, especially in food recommendations and handling special requests.

### 5.3 Success Factors and Improvement Points

#### Success Factors:

**Efficient Service Process:** The unmanned restaurant of Haidilao has significantly enhanced service efficiency through an automated service process. The rapid ordering system and robot delivery service have shortened the waiting time for customers, improving the overall dining experience.

**Advanced Technological Application:** The use of the latest automation technology and artificial intelligence systems has not only optimized operational processes but also improved customer experience through data analysis, such as personalized dish recommendations.

**Provision of Innovative Experiences:** The unique dining environment and high-tech interactive elements of the unmanned restaurant have attracted a large number of customers, especially those young consumers seeking novel experiences.

#### Improvement Points:

**Enhancement of Humanized Services:** Despite the efficiency brought by technology, the need for human interaction remains among customers. Adding some human service elements, such as providing manual help or advice at key moments, could enhance customer satisfaction.

**Emergency Handling of Technical Failures:** In the event of technical failures, effective emergency plans are needed, such as backup manual service processes, to ensure the continuity of service and stability of the customer experience.

**Improving Customer Adaptability:** For customers not familiar with high-tech equipment, providing more guidance and assistance is essential to ensure they can easily enjoy the services of the unmanned restaurant.

**Continuous Technological Iteration:** Technology is rapidly evolving, and to maintain a competitive edge, the unmanned restaurant needs to continually update its technological equipment

and software to maintain the advanced nature of its services and attractiveness.

## 6 Conclusions and Recommendations

### 6.1 Key Findings of the Study

This study conducted an in-depth analysis of Haidilao's unmanned restaurant's operating model, customer experience, and market trends. The main findings include:

**Successful Application of Technological Innovation:** Haidilao has effectively improved service efficiency and customer satisfaction through the introduction of automation and artificial intelligence technologies.

**High Market Acceptance:** Especially among younger consumers, there is a great interest in the high-tech experience of unmanned restaurants.

**Need for Continuous Improvement:** Although technology has increased efficiency, there is still a demand for traditional human interaction, highlighting the area for improvement in humanized services in unmanned restaurants.

### 6.2 Recommendations for Haidilao's Future Development

**Balancing Technology with Humanized Service:** While continuing to push for technological innovation, it is important to strengthen humanized service elements to meet the needs of different customers.

**Continuous Investment and Upgradation in Technology:** With the rapid development of technology, Haidilao needs to continually invest in and update its technological equipment and software.

**Expanding Market Coverage:** Given the interest of young consumers in unmanned restaurants, Haidilao could consider opening more such restaurants in areas with a high density of young people.

### 6.3 Limitations of the Study and Future Research Directions

This study mainly focused on Haidilao's unmanned restaurant in Beijing, which may not fully represent all regions and markets. Future research can be expanded to more areas and different

types of unmanned restaurants to gain a more comprehensive understanding.

Additionally, continuous follow-up research will be necessary as technology develops and market dynamics change.

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