

# SWOT Analysis to Explore the Development of Smart Retail Vending Machines in the Countryside

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## ABSTRACT

With the rapid development of rural economy and the improvement of residents' living standards, smart retail vending machines have shown great potential in the rural market. As an emerging retail model, rural smart retail vending machine combines modern information technology and intelligent hardware, aiming to improve the retail service level in rural areas. In this paper, the strengths, weaknesses, opportunities and threats of rural smart retail vending machines are systematically explored using SWOT analysis to assess their development prospects and challenges in the rural market. Smart retail vending machines can provide round-the-clock services and enhance the convenience of access to goods and shopping experience in rural areas. Meanwhile, the vending machines are able to achieve accurate inventory management and personalized product recommendation through intelligent management and data analysis, thus improving operational efficiency. Rural smart retail vending machines have significant development potential, but in the process of promotion, it is necessary to pay attention to the investment cost, technical maintenance, and market acceptance in order to realize its wide application and long-term development in rural areas.

## KEYWORDS

SWOT Analysis Method; Smart Retail; Vending Machine; Rural Development.

## 1. ANALYSIS OF THE ADVANTAGES OF RURAL SMART RETAIL VENDING MACHINES

### 1.1. Enhance Shopping Convenience

Smart retail vending machines provide great shopping convenience for tourists and local residents, greatly enhancing the retail experience in rural areas. For tourists, they usually want to be able to find convenient shopping spots to buy local specialties at any time during their visit, and smart retail vending machines fulfill this need, and their widespread deployment means that tourists no longer need to specifically look for stores or wait for specific opening hours. For local residents, smart retail vending machines offer the same convenience. In rural areas, where traditional retail outlets may be far away and have limited hours of operation, the 24-hour service feature of smart vending machines breaks down these constraints. Residents can purchase the goods they need through the vending machine at any time, whether early in the morning or at night, and this flexible shopping method saves a lot of time and energy and improves the quality of life.

The introduction of intelligent systems not only improves the shopping experience, but also significantly increases the operational efficiency of the vending machines. Traditional merchandise management and inventory control usually rely on manual operations, which are prone to errors and delays. Smart vending machines, on the other hand, realize automated inventory monitoring and

replenishment management through advanced management systems. The system is able to track the sales of each item in real time, predict demand trends through data analysis, and adjust inventory levels in a timely manner. [1] This intelligent management reduces the need for manual operations, lowers operating costs, and ensures the timely supply of goods, thereby further enhancing consumer satisfaction.

## **1.2. Personalized Recommendation and Experience**

Using advanced big data analytics, smart retail vending machines are able to accurately capture each consumer's preferences and habits by collecting and analyzing consumer purchase data. This process includes monitoring information such as the frequency of consumer purchases, the types of goods chosen, and the time of purchase. After these data are comprehensively analyzed, the vending machine system is able to identify the consumer's personalized needs and thus recommend snacks that meet their tastes and needs. In addition, big data analysis can help vending machine operators understand market trends and changes in consumer demand, and optimize the commodity supply chain and inventory management. For example, when the system discovers a surge in demand for a certain type of goods, it can adjust the replenishment strategy in a timely manner to ensure an adequate supply of popular goods. This intelligent operation not only improves consumer satisfaction, but also enhances the vending machine's operational efficiency and market competitiveness. With the help of big data technology, the smart retail vending machine provides accurate personalized recommendations, redefines the shopping experience, and greatly enhances consumer satisfaction and loyalty.

## **1.3. Enhance Cultural Experience and Dissemination**

By combining rural local snacks with smart retail vending machines, the project not only provides consumers with shopping convenience, but also enhances their experience and knowledge of rural culture. The elaborate design and decoration of the vending machines enhances the cultural experience, and each vending machine incorporates elements characteristic of the rural area, such as traditional handicrafts, patterns of local scenery or decorations of local customs. This visual appeal not only makes the vending machine a sight to behold, but also triggers consumers' interest and curiosity in the local culture. The specialty snacks sold in the vending machine have their unique historical background and cultural connotations. By setting up a large multimedia screen or QR code on the vending machine, consumers can scan to get a detailed story about each product, including its historical origin, production process and traditional customs. [2] This display of information allows consumers to learn the stories behind the snacks while enjoying the food, enhancing their understanding and recognition of rural culture and feeling the charm of the countryside.

## **1.4. Promote Rural Economic Development**

Through the intelligent management system of smart vending machines, local producers can more accurately understand market demand and optimize the production and supply chain, thus improving production efficiency and economic benefits, promoting the sale of countryside snacks, and also injecting vitality into local economic development. By introducing smart retail vending machines to sell local specialty snacks, this not only provides villagers with jobs and an additional source of income, but also increases business activities and economic flows in the village. These vending machines make it easy for tourists to purchase food with local specialties at any time, thus enhancing the attractiveness of the village and the tourist experience. [3] At the same time, with the increase in tourists, local stores, restaurants, and accommodations are positively impacted, creating a virtuous cycle. This comprehensive economic growth contributes to the overall prosperity of the village and can inspire other villages to explore similar economic development models.

## **1.5. Enhance Brand Image and Market Competitiveness**

Through smart retail vending machines, rural local snacks can be innovated in packaging and display to enhance brand image. The appearance design of the vending machine can be combined with local cultural elements to present a unique visual style, thus enhancing brand recognition. In addition, the digital screen on the vending machine can display the brand story, production process and product features, further enhancing consumers' identification and trust in the brand. This modernized display not only makes the product more attractive, but also helps shape a more professional and trustworthy brand image. The intelligent system of the vending machine enables diverse marketing tactics, such as regular special promotions, membership offers and limited edition products. These innovative marketing strategies not only increase consumers' desire to buy, but also help enhance the brand's market influence.

In the fierce market competition, Country Local Snacks needs to keep innovating to stay competitive. Smart retail vending machines, as an emerging sales channel, provide a distinctive market positioning for these local snacks. Compared with traditional retailing methods, vending machines are able to provide round-the-clock service, reduce operating costs and expand sales coverage. This flexible and efficient approach to retailing has enabled Countryside Local Snacks to better meet the immediate needs of consumers and thus stand out in a competitive market.

## **2. RURAL SMART RETAIL VENDING MACHINE DISADVANTAGE ANALYSIS**

### **2.1. Technology Dependence and Stability Problems**

The efficient operation of smart retail vending machines cannot be separated from the support of advanced information technology and Internet of Things (IoT) technology. The core of these technologies is to ensure real-time data transmission, processing and analysis to optimize inventory management, user experience and transaction process. However, in the event of technical glitches or network problems, vending machines may face issues such as failure to recognize payment information, delayed inventory updates, or system crashes, directly affecting the consumer shopping experience. The stability of the system not only relies on the reliability of the technology, but also requires regular maintenance and updates. These maintenance activities may involve software upgrades, hardware inspections, or system debugging, and while they can help improve system security and functionality, the vending machines may temporarily stop service during the maintenance process, which can cause some disruption to the continuity of operations. Therefore, while pursuing high efficiency and intelligence, the smart retail system also needs to be finely managed in terms of technical support and operation and maintenance management to ensure its long-term stable operation.

### **2.2. Limitations of Product Categories and Updates**

Due to the limited space of the smart retail vending machine, the variety of commodities displayed and sold is inevitably subject to certain restrictions. The internal volume of a vending machine is usually insufficient to accommodate a large number of commodities, which may result in certain popular local snacks not being available on the shelves in a timely manner. Particularly during periods of high demand, such as holidays or local festivals, popular snacks may not be replenished in a timely manner, affecting consumers' choice and satisfaction. Certain seasonal items, such as seasonal festival foods or seasonal snacks for a particular season, may not be available in the vending machine for a long period of time. The space constraints of vending machines mean that merchants need to select and plan merchandise precisely to maximize consumer satisfaction. Updating and replacing merchandise in a vending machine not only takes time, but also requires a certain amount of cost

investment. Each product change involves logistics, inventory management, and shelf adjustments, which not only require additional costs, but may also cause the vending machine to temporarily stop functioning, affecting the consumer's shopping experience. Therefore, merchants need to find a balance between the frequency and cost of product updates to keep vending machines operating efficiently and products attractive. Meanwhile, optimizing inventory management and forecasting demand are also important measures to improve the operational efficiency of smart retail vending machines.

### **2.3. Price Sensitivity and Acceptance**

Although smart retail vending machines offer a convenient way to shop, their prices are usually slightly higher than those of traditional retail channels, which is mainly attributed to their higher technical and operational costs. The operation of smart retail vending machines involves advanced technological infrastructure, including automated control systems, payment processing systems, real-time inventory management and IoT devices, which are more expensive to invest in and maintain. The operating costs of smart retail vending machines also include regular merchandise replenishment, equipment maintenance, and trouble-shooting. These operational costs are usually passed on to consumers, making the merchandise in the vending machine more expensive. For consumers who are more price-sensitive, they tend to prefer traditional retail channels for local snacks. While smart retail vending machines provide a convenient and innovative shopping experience, they may attract consumers who are more focused on convenience than price due to their high prices. Therefore, smart retail vending machines need to find ways to reduce operating costs and optimize pricing strategies while providing a convenient shopping experience in order to appeal to a broader group of consumers.

### **2.4. User Education and Acceptance Issues**

Using smart retail vending machines may be challenging for some consumers who are older or unfamiliar with smart devices. These consumers may need to invest additional time and effort to learn how to operate the vending machine, including familiarizing themselves with the touch screen, navigating the menu, and the payment process. For those who are accustomed to traditional shopping methods, facing a new technological interface may be unfamiliar or confusing, which may lead to frustration or uneasiness during use. In addition, certain consumers may have trust issues or security concerns about using smart devices for shopping. To overcome these challenges, smart retail vending machines need to take steps to enhance the user experience, including providing clear operating instructions, simplifying the user interface, and increasing technical support services. For consumers who are unfamiliar with smart devices, providing training or help services can effectively reduce barriers to their use. At the same time, enhancing payment security and data protection measures, and clearly demonstrating to consumers the system's commitment to security and privacy protection can also help boost their trust and encourage more people to try and accept this emerging shopping method.

## **3. RURAL SMART RETAIL VENDING OPPORTUNITY ANALYSIS**

### **3.1. Booming Tourism Industry**

With its unique culture and local characteristics, the countryside will attract a large number of tourists. With the booming of tourism, the demand of tourists for local snacks in the countryside is increasing. This trend creates a broad market space for smart retail vending machines. By deploying smart retail vending machines at major tourist attractions and high-traffic areas, they can provide a convenient and fast shopping experience and meet the demand of tourists for instant purchase of local snacks. Operators of the vending machines can work with local snack producers and suppliers to ensure the freshness and quality of the products, and adjust the variety and quantity of goods according to tourists' needs. Through data analysis and feedback mechanisms, product configurations and service

experiences are continuously optimized to better meet tourists' needs. The application of smart retail vending machines in the countryside can not only enhance the shopping experience of tourists, but also promote the development of the local economy and achieve a win-win situation for all parties.

### **3.2. Trend of Intellectualization and Digital Transformation**

With the progress of science and technology and the advancement of intelligent and digital transformation, smart retail has become a key trend in the development of the retail industry. This trend has driven a comprehensive change in the retail industry, focusing on the use of data analytics, artificial intelligence and automation technologies to improve operational efficiency and consumer experience. By introducing smart retail vending machines, it has injected modernization momentum into the village retail industry. For traditional villages, this is not only the introduction of technology, but also a new opportunity for economic development. Smart retail vending machines will promote the upgrading of local business models, attract more tourists and consumers, and increase the activity of the village economy. This model will also create new employment opportunities in areas such as vending machine maintenance and data management, providing more career options for local residents. By effectively integrating technology and commerce, smart retail vending machines will improve the efficiency and service level of the retail industry, inject new momentum into rural economic development, and promote the overall progress of the regional economy.

### **3.3. Optimization and Enhancement of User Experience**

Under the perspective of user experience, the introduction of smart retail vending machines significantly optimizes the shopping experience of consumers, providing more convenient and personalized services. Traditional retail methods often rely on manual services, which may not be able to meet the specific needs of each customer or provide instant recommendations. Smart retail vending machines, however, achieve multiple optimizations in the shopping process through advanced technology, enhancing overall user satisfaction and loyalty.

Smart Retail Vending Machines employ an intelligent interactive interface that makes the shopping process easier and more efficient. The vending machine is equipped with an advanced recommendation system, which is capable of providing personalized product recommendations based on the user's shopping history, preferences, and real-time behavioral data through big data analytics and artificial intelligence technology. Vending machines are equipped with virtual assistants or intelligent customer service, which can answer user inquiries, provide product information, and guide the purchasing process, greatly enhancing consumer engagement through intelligent interaction. Smart retail vending machines usually have real-time data feedback functions, which can instantly collect users' shopping behaviors and feedback information to help operators understand changes in consumer demand, identify popular products and optimize product allocation. Through continuous analysis and adjustment, the vending machine can better meet consumers' expectations and needs, thus enhancing users' shopping satisfaction.

## **4. RURAL SMART RETAIL VENDING MACHINE THREAT ANALYSIS**

### **4.1. Intensification of Market Competition**

With the rapid development of smart retail, enterprises and merchants have introduced advanced technologies to improve operational efficiency and customer experience. This trend will undoubtedly intensify market competition and pose a certain threat to the development of rural smart retail vending machines. In order to stand out in this fiercely competitive environment, the team operating the Village Smart Retail Vending system must continue to promote technological innovation, improve service quality, and keep up with market trends. Only through continuous improvement of smart

technologies, such as artificial intelligence, big data analytics, and the Internet of Things, combined with local characteristics and consumer needs, can they effectively attract and retain customers and establish a unique market advantage. In addition, the team needs to pay attention to user feedback, optimize products and services, and provide personalized experiences to meet the challenges posed by competition.

#### **4.2. Challenges of Technological Upgrading**

Smart retail vending machines rely on advanced technologies and equipment that often evolve and are updated over time. In order to remain competitive and advanced, the team must remain highly sensitive to industry dynamics and technology trends. For example, emerging artificial intelligence algorithms, improved sensor technologies, more efficient payment systems, and smarter recommendation engines are all key technologies that may impact vending machine performance. The team needs to regularly evaluate the potential applications of these new technologies and integrate them into existing systems to enhance user experience and operational efficiency. In addition, it should establish a close working relationship with technology vendors to ensure timely access to support and services as equipment is updated and technology is upgraded. Through these measures, the team will not only be able to cope with the challenges posed by technological changes, but also utilize innovative technologies to maintain market leadership, provide better services, and attract and retain more consumers.

#### **4.3. Changes and Uncertainty in Consumer Demand**

Consumer needs and preferences are dynamic and influenced by a variety of factors, including market trends, seasonal changes, economic environment, technological advances, and socio-cultural changes. It is critical for Village Smart Retail Vending to accurately capture these changes. Teams that fail to keep up with changes in consumer demand, or that fail to adapt and optimize what and how vending machines offer services in a timely manner, will face many challenges. Consumer needs can change rapidly due to changing fashions, and if the vending machine fails to offer products that meet these needs, consumers may turn to other retail channels that fulfill their needs, leading to churn. [4] Innovations in technology and functionality also have an impact on consumer expectations. Modern consumers are increasingly demanding convenience and personalization. If smart retail vending machines fail to offer advanced features such as touchless payments, personalized recommendations, or smart interactions, they will likely be left behind by competitors and lose market share.

To meet these challenges, the team needs to establish an effective market research and consumer feedback mechanism. Regularly collecting and analyzing consumer feedback, purchase data and market trends can help the team keep abreast of changing consumer needs. Based on these data, the team can flexibly adjust the vending machine's product offerings, service features and marketing strategies. In addition, the introduction of advanced data analytics tools and artificial intelligence technology can predict future consumer trends and prepare for them in advance to ensure that the vending machines will always be able to provide services that meet consumer expectations.

#### **4.4. Risks of Policies and Regulations**

Changes in policies and regulations can have a significant impact on the operation of smart retail vending machines. For example, food safety regulations may require vending machines to sell food with clear ingredient labeling, maintain proper storage conditions, and even conduct regular sanitation inspections. Consumer protection regulations may increase requirements for refund policies, user privacy protection and transparency, all of which may impose higher standards on vending machine operational processes and system design. A dedicated compliance team is needed to track and interpret regulations in real time to ensure that vending machines are up-to-date with the latest legal requirements in all aspects of their operation. This includes regular updating and maintenance of

equipment to ensure that it meets security and privacy standards, as well as appropriate training for staff to increase legal awareness and compliance.

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