

Research on the Development Pathways and Transformation Strategies of Wenzhou's Cross-Border E-Commerce O2O: A Localized Innovation Perspective

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ABSTRACT

This paper focuses on the development status and optimization paths of the cross-border e-commerce O2O model in Wenzhou. Against the backdrop of the global digital wave and domestic policy dividends, Wenzhou, leveraging its strong private economy foundation, vibrant industrial clusters, and strong government support, has actively deployed cross-border e-commerce O2O and achieved significant results. However, challenges such as logistics and payment risks, operational bottlenecks in experience stores, and intensified regional competition persist. Based on field research and SWOT analysis, this paper proposes systematic optimization strategies, ultimately aiming to build a new collaborative ecosystem involving "government, enterprises, and research" to explore a sustainable development path for cross-border e-commerce O2O with Wenzhou characteristics.

KEYWORDS

Cross-border E-commerce; O2O Model; Development Strategy; Regional Economy

1. INTRODUCTION

In recent years, the global economy has entered a new stage dominated by digitalization and intelligence. The rapid development of cutting-edge technologies such as the Internet, mobile communication, the Internet of Things (IoT), big data, and blockchain is profoundly changing traditional production, circulation, and consumption patterns. Against this backdrop, cross-border e-commerce, as a key force driving changes in international trade methods, has garnered widespread attention globally. Developed countries like Europe, the US, Japan, and South Korea are actively exploring the use of Internet platforms for cross-border retail and wholesale. In China, a series of government policy documents (such as the establishment of Cross-border E-commerce Comprehensive Pilot Zones, simplified import-export procedures, tax incentives, etc.) have further stimulated the vitality of enterprises and the market. Statistics show that China's total import and export volume of cross-border e-commerce has continued to grow in recent years, with its proportion in overall foreign trade constantly increasing. Simultaneously, the rise of the Online-to-Offline (O2O) model has enabled traditional retail enterprises to rely not only on offline stores but also on online platforms for product display, sales, and delivery, forming a new retail ecosystem integrating channels and processes [1].

Wenzhou City, Zhejiang Province, China, has long been renowned for its business spirit of "dare to be the first" and "pragmatic innovation," serving as the birthplace and an important representative of China's private economy. Wenzhou possesses a deep manufacturing foundation, with significant competitive advantages in traditional industries such as footwear, eyewear, and auto/motorcycle parts.

Additionally, according to Wenzhou Customs data report, Wenzhou's abundant regional resources, active private capital, and unique business culture provide a solid foundation for the development of cross-border e-commerce [2]. In recent years, the Wenzhou government has continuously introduced supportive policies. By establishing cross-border e-commerce industrial parks, comprehensive bonded zones, overseas warehouses, and other measures, it has provided enterprises with a comprehensive support system encompassing logistics, warehousing, and finance, enabling Wenzhou to rise rapidly in the cross-border e-commerce field. Supported by increasing cross-border e-commerce import and export data, the number of enterprises, and the expansion of market scale, Wenzhou is gradually transitioning from traditional manufacturing to high-end services and international trade [2].

The O2O model (Online to Offline) involves guiding consumers through online platforms to offline experiences, shopping, or service enjoyment, and then using offline feedback to drive online sales growth. Liu et al. proposed that despite variations in domestic O2O implementations, all fundamentally integrate three operational capacities: warehousing functionality, general trade import retail channels, and cross-border product display platforms [3]. This model not only breaks the time and space constraints of traditional retail channels but also leverages big data and information technology for precise analysis of consumer behavior. Li et al. studied the choice of foreign investment mode of enterprises when they build cross-border O2O channels, and establishes an appropriate evaluation system of investment for cross-border O2O channel construction [4]. In Wenzhou, with consumption upgrading and growing demand for international quality products, more and more enterprises are adopting the O2O model to innovate marketing methods and enhance service quality. However, in the field of cross-border e-commerce in China, the primary models are still B2C (Business To Customer) and C2C (Customer To Customer). That is, the model involves commodity transactions between enterprises and ordinary consumers in different countries or regions, or between individual sellers and buyers, facilitated by Internet-based cross-border e-commerce platforms. Since most cross-border e-commerce platforms cannot provide consumers with real product experiences, few merchants attempt the cross-border e-commerce import O2O model, resulting in a relatively small overall development scale and a short development history.

2. MAIN TYPES OF DOMESTIC CROSS-BORDER E-COMMERCE O2O LAYOUTS IN CHINA

2.1. Port Hub Model: Airport "Buy & Pick Up" Mode

The "Cross-border Purchase" Experience Center at Shanghai Hongqiao Airport leverages the international airport port scenario to innovate a "online order + departure pick-up" closed-loop service. Consumers can purchase duty-free goods (covering cosmetics, luxury goods, digital products, etc.) via the "Cross-border Purchase" APP up to 72 hours in advance; the system automatically links flight information. Upon departure, consumers complete identity verification and receive their goods within 10 seconds using facial recognition technology in the airport's dedicated pick-up area. Data from 2024 shows that the center's peak daily orders exceeded 5,000, with an average pick-up time of only 90 seconds. Its core value lies in deeply integrating with the cross-border travel scenario, enhancing the consumer experience with "zero waiting," providing a replicable model for coastal cities like Zhoushan and Qingdao. On travel platforms like Ctrip, consumers can conveniently book duty-free goods while reserving flights and hotels. Leveraging the platform's rich tourism resources, such services have expanded to airports in Hong Kong, Taiwan, South Korea, Japan, and other locations, aiming to provide more comprehensive and convenient services and enhance the consumer shopping experience.

2.2. Bonded Integration Model: "Front Store, Back Warehouse" Mode in Comprehensive Bonded Zones

The Hangzhou Xiasha Intime West Selection Cross-border Experience Complex project pioneered a three-dimensional structure of "bonded display + online transaction + integrated warehousing and distribution." Within a 12,000m² space, it is divided into three functional areas. The immersive experience zone showcases over 3,000 overseas products using technologies like AR virtual makeup mirrors and 3D holographic product projection. In the digital transaction zone, consumers scan product QR codes directly linked to the customs system; after online payment, goods are rapidly cleared from the bonded warehouse. In the intelligent distribution center, integrated AGV robot sorting systems achieve delivery within 3 hours in downtown Hangzhou and next-day delivery in the Yangtze River Delta region. This model has been replicated in bonded zones in Tianjin, Ningbo, Fuzhou, and other places with good performance, with plans for further expansion.

2.3. Customized Cross-border Services through Domestic-Foreign Cooperation

Providing customized services through cross-border cooperation is another common type of cross-border O2O layout. Consumers use the Internet to customize personalized cross-border travel packages, purchase overseas concert tickets, etc., and then enjoy and experience the services offline at the destination. Additionally, many consumers enroll in overseas educational courses or skills training online and then participate in learning and exchanges at designated offline locations. In the future, this type of customized cross-border service will delve deeper into user behavior and preferences for more precise marketing and service optimization.

These cases demonstrate the innovation and diversity of China's current cross-border e-commerce O2O layouts, providing references and insights for Wenzhou's exploration of cross-border O2O.

3. RESEARCH ON THE DEVELOPMENT OF WENZHOU'S CROSS-BORDER E-COMMERCE O2O

Based on extensive data collection and field research, Wenzhou's cross-border e-commerce O2O model has formed an omnichannel operational system centered on online platforms, offline experiences, smart logistics, and supply chain integration in recent years. In terms of business format layout, Wenzhou has established the province's most comprehensive cross-border e-commerce ecosystem in Zhejiang, validating the advantages of the overseas warehouse model in reducing logistics costs and optimizing consumer experience. At the policy level, the in-depth implementation of the "Wenzhou Three-Year Action Plan for High-Quality Development of Cross-border E-commerce" has driven the import-export volume of cross-border e-commerce to grow more than 20 times in three years, accounting for 10% of foreign trade exports. It has also fostered innovative models like the "Overseas Chinese Warehouse Alliance," linking over 70 overseas warehouses invested and built by Wenzhou enterprises abroad, providing a fulcrum for local products going global. On the consumer side, bonded zone experience stores enhance interactive experiences through technologies like AR makeup trials and product traceability. Combined with localized marketing strategies like "Intangible Cultural Heritage Co-branding" and "Cultural Blind Boxes," consumer trust and repurchase rates have significantly increased, successfully transforming "manufacturing advantages" into "service advantages." This marks Wenzhou's cross-border e-commerce transition from scale expansion to quality leap.

3.1. Empirical Observation of International Brand Entry and Local Response

Sam's Club, as an internationally renowned retail brand, fully demonstrates the innovative advantages of the new retail format in its Wenzhou market layout. Notably, before officially opening its offline

physical store, Sam's Club first launched various online delivery services such as "Speed Delivery" and "Nationwide Delivery." Unlike traditional independent delivery platforms, "Speed Delivery" is Sam's integrated service combining online ordering, warehouse management, and logistics scheduling, providing consumers with fast and precise delivery of cross-border goods. Relying on intelligent warehousing systems, real-time order monitoring, and dynamic route planning technology, "Speed Delivery" completes order picking and delivery tasks within an extremely short time after consumers place orders, significantly shortening waiting times and ensuring the freshness and quality of goods during transportation [5].

As an important part of the omnichannel strategy, "Speed Delivery," relies on Sam's Club's comprehensive supply chain system and advanced information technology, quickly integrates online orders with offline warehousing and logistics systems, providing consumers with convenient delivery experiences for cross-border quality products [6]. This initiative not only greatly enhanced the brand's penetration rate in the initial market phase but also optimized product structure and service processes through online data collection and precision marketing.

Simultaneously, during its operations, Sam's Club actively integrated Wenzhou's local characteristics, exploring a cross-border e-commerce O2O industrial model with Wenzhou flair. By cooperating with local enterprises and institutions, it launched exclusive products and promotional activities with local identifiers, further enhancing brand affinity and consumer trust. Overall, this omnichannel strategy not only promoted the innovative development of Wenzhou's cross-border e-commerce but also provided a successful example for the construction of the regional O2O retail ecosystem.

3.2. Implications of Metro Supermarket's Entry for Regional Retail Peaks

Based on field research and data analysis of Wenzhou's retail market, this study reveals that Metro's market entry following Sam's Club has generated significant industrial upgrading effects. Its mature membership system and global supply chain capabilities will reshape regional commercial competition dynamics, compelling local enterprises to pursue differentiated development through product quality enhancement and service standardization.

Emulating Sam's Club's O2O integration strategy ("Express Delivery"), Metro has similarly established an omnichannel service system featuring "presale + instant delivery," accelerating Wenzhou's transition from traditional shelf-based retail to digital instant retail.

Notably, logistics resource sharing, technical standard alignment, and data interoperability between Wenzhou and neighboring cities are fostering a smart retail ecosystem across Southern Zhejiang. This integration not only elevates regional operational efficiency but also provides replicable paradigms for supply chain integration in building Wenzhou into an international consumption hub. These transformations demonstrate how global retail giants reconfigure regional commercial ecosystems, offering critical benchmarks for local enterprises' upgrading strategies.

3.3. Achievements in Technological Innovation, Data-Driven Approaches, and Supply Chain Integration

Supported by empirical research on technology application and supply chain management among Wenzhou enterprises, this study summarizes the following achievements:

The application of technologies such as block-chain, RFID, IoT, and big data in cross-border e-commerce enables real-time monitoring of product information, logistics distribution, and after-sales service, greatly improving the security and efficiency of cross-border transactions.

Enterprises utilize data platforms for precise analysis of consumer demand to formulate personalized marketing strategies, significantly improving order conversion rates and customer satisfaction. With government support and regional policies, Wenzhou enterprises continuously optimize supply chain

structures, strengthen upstream-downstream cooperation, achieve resource sharing and risk sharing, laying a solid foundation for the sustainable development of the cross-border e-commerce O2O model.

3.4. SWOT Comprehensive Evaluation and Future Development Prospects Prediction

In light of a comprehensive analysis of various data and case studies of Wenzhou's cross-border e-commerce O2O model, a SWOT model is shown in the table below:

Table 1. SWOT analysis of Wenzhou's cross-border e-commerce O2O

Strengths	Weaknesses
<p>1. Robust Business Heritage & Private Sector Vitality: As the birthplace of China's private economy, Wenzhou possesses competitive industrial clusters (footwear, eyewear, etc.).</p> <p>2. Systematic Policy Empowerment: Implementation of the Three-Year Action Plan for High-Quality Cross-Border E-commerce Development, featuring overseas warehouse subsidies, tax incentives, and bonded zone clearance reforms enhancing efficiency.</p> <p>3. Localized Innovation Practices: AR virtual try-ons and cultural IP co-branding (e.g., intangible heritage collaborations) strengthening consumer trust.</p>	<p>1. Logistics & Payment Constraints: Elevated international shipping costs, insufficient overseas warehouses, and cross-border payment risks dampen consumer confidence.</p> <p>2. O2O Experience Store Challenges: Low operational survival rates and inadequate online-offline integration.</p> <p>3. Technical Talent Shortage: Insufficient professionals in block-chain and data analytics.</p>
Opportunities	Threats
<p>1. Growing Demand for Premium Imports: Expanding consumer preference for high-quality international goods.</p> <p>2. Demonstration Effect of Global Brands: Successful market entries by Sam's Club and Metro validating omnichannel models.</p> <p>3. Policy & Technological Dividends: Government support policies and smart logistics innovations creating growth momentum.</p>	<p>1. Regional Resource Competition: Industrial siphon effects from neighboring cities (Hangzhou, Ningbo).</p> <p>2. Global Supply Chain Volatility: Geopolitical uncertainties complicating customs clearance.</p> <p>3. Homogenization Challenges: Widespread replication of "front-store-back-warehouse" models eroding competitive differentiation.</p>

Under multi-party collaboration between government, enterprises, and technology, Wenzhou's cross-border e-commerce O2O model will usher in large-scale transformation, upgrading, and regional economic collaborative development, possessing significant market potential and development prospects.

4. EXPLORATION AND SUGGESTIONS FOR THE FEASIBILITY OF WENZHOU'S CROSS-BORDER O2O

4.1. Policy Level: Improve Support Systems and Regional Collaboration Mechanisms

Optimize Policy Support: It is recommended that the government continue to increase policy support for cross-border e-commerce and the O2O model, introducing special funds, tax incentives, and credit support policies targeting these new platforms. Simultaneously, establish a cross-departmental coordination mechanism to ensure the effective implementation of various support policies.

Build Regional Collaboration Platforms: Promote the collaborative development of cross-border e-commerce between Wenzhou and surrounding cities (such as Hangzhou, Ningbo, Yiwu). Form regional supply chain alliances through resource sharing, information exchange, and joint procurement to enhance overall market competitiveness.

Establish Standardized Regulatory Systems: Develop unified standards and regulatory norms for aspects involved in cross-border e-commerce, such as product quality, logistics distribution, and data security, to ensure healthy market development and prevent systemic risks.

4.2. Technical Level: Promote Smart Logistics and Product Traceability Systems

Vigorously Promote Information Technologies: Actively introduce cutting-edge technologies such as blockchain, RFID, IoT, big data, and artificial intelligence into Wenzhou's cross-border e-commerce O2O model to achieve full-process transparency and intelligent management of the supply chain. Establish a cross-border product traceability system to ensure consumers can query product information in real-time, enhancing consumer confidence.

Build Smart Logistics Networks: Leverage full-link services like SaaS management systems, intelligent sorting, and automated delivery systems to accelerate the transformation of logistics infrastructure, creating an efficient "last mile" delivery channel. Integrate online and offline logistics resources to achieve full-process tracking and dynamic scheduling, improving delivery efficiency and service quality.

Data Platform Construction and Sharing Mechanism: Establish a cross-border e-commerce data platform to enable data exchange and sharing among enterprises, logistics companies, government, and research institutions. Utilize data mining and analysis to timely adjust market strategies and operational plans, improving market responsiveness.

4.3. Operational Level: Optimize Omnichannel Marketing and Experience Store Operations

Strengthen Omnichannel Integration: Encourage enterprises to deeply integrate online platforms, physical stores, and social media to build an omnichannel sales network. Learn from the successful experience of warehouse membership supermarkets to enhance user experience through membership marketing and precision promotions.

Improve Experience Store Operation and Management: Strengthen training on site selection, decoration, display, and service management for O2O experience stores to enhance their attractiveness and user stickiness. Utilize methods like online appointments and offline interactions to increase consumer engagement and brand loyalty. Actively carry out new marketing methods such as cross-border cooperation, community marketing, and live-streaming sales to build a brand image and market competitive advantage with Wenzhou characteristics.

4.4. Talent and R&D Level: Strengthen University-Enterprise Cooperation and Professional Talent Cultivation

Construct a Talent Cultivation System: It is recommended that the government collaborate with universities and vocational colleges to establish majors in cross-border e-commerce and O2O operations, offering targeted training courses to address talent shortages in new technologies and models. Encourage enterprises to set up practical training bases and provide internship opportunities to achieve the organic integration of theory and practice.

Promote Industry-University-Research Cooperation: Encourage joint technology R&D and project pilots by research institutions, enterprises, and the government. Apply the latest blockchain, big data,

and AI technologies to the entire cross-border e-commerce process to form a batch of exemplary R&D achievements.

5. CONCLUSION

Focused on comprehensive field investigation and representative case studies of Wenzhou's cross-border e-commerce O2O model, this study has drawn the following conclusive findings:

(1) Wenzhou possesses unique advantages in cross-border e-commerce and the O2O model due to its deep private economy foundation, mature business culture, and government policy support. However, it simultaneously faces challenges such as logistics distribution, technical security, talent reserves, and competition from surrounding regions.

(2) Through technological innovation, data-driven approaches, and supply chain integration, Wenzhou's cross-border e-commerce O2O model has achieved significant results in improving product traceability, logistics efficiency, and user satisfaction, providing important momentum for regional economic transformation.

(3) SWOT analysis shows that while enjoying policy, brand, and technological advantages, Wenzhou's cross-border e-commerce O2O model must also face threats such as external competition, supply chain instability, and consumer trust issues. Future development should be based on collaborative innovation and internal-external linkage.

(4) To address existing problems, government, enterprises, and research institutions should jointly build a multi-level, multi-dimensional collaborative development system. Through measures like policy optimization, smart logistics, omnichannel operations, and talent cultivation, they should promote the continuous upgrading and international development of Wenzhou's cross-border e-commerce O2O model.

In the future, relying on multi-party collaboration, technological innovation, and policy guarantees, Wenzhou is expected to seize opportunities in global cross-border e-commerce competition, creating a new retail model with Wenzhou characteristics and international competitiveness.

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