

Optimization and Innovation of Supply Chain Models in the Context of Cross-Border E-Commerce

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Abstract:

In today's context of economic globalization, cross-border e-commerce has become the core of international trade, and the efficient operation of the supply chain is key to the core competitiveness of cross-border e-commerce platforms. Supply chain optimization involves various processes within the supply chain. The main purpose of optimizing the supply chain is to help enterprises reduce costs and improve efficiency. This paper takes Shopee, a leading e-commerce platform in Southeast Asia and Latin America, as the research subject, systematically analyzing the operating status of its six core supply chain links. It focuses on innovative optimization practices in four key areas: logistics and warehousing, sales platforms, payment and funds, and customer service, and conducts targeted comparative analysis with TEMU in these four areas, clarifying the strengths and weaknesses of both supply chain models. Finally, combining current industry development trends, provide summarizing suggestions for the optimization and innovation of cross-border e-commerce supply chains, and offer some references for the high-quality development of the industry.

Keywords: Cross-border e-commerce, Supply chain model, Shopee, Optimization and innovation, Comparative analysis

1. Introduction

1.1 Research Background

As a relatively novel model, cross-border e-commerce is a concept that was proposed only after entering the 21st century. The concept of cross-border e-commerce was first introduced by Valarezo (2018).

Cross-border e-commerce is a form of foreign trade with relatively small transaction volumes. Traditional foreign trade involves large-scale transactions between companies, and once goods reach foreign countries, they are sold in offline physical stores. Therefore, cross-border e-commerce is closer to the concept of retail[1]. Blatherwick et al. (2013) believe that compared to physical stores, cross-border

e-commerce delivers ordered products to customers in a shorter time. The fast delivery greatly enhances shoppers' satisfaction and creates greater value for them [2]. So, in recent years, the cross-border e-commerce industry has experienced explosive growth, with increasing market competition, replacing many traditional e-commerce methods. This transformation allows enterprises to respond more flexibly to consumer demands, thereby enabling rapid adjustment of business strategies and ensuring their ability to adapt to the constantly changing market environment[3]. Emerging markets such as Southeast Asia and Latin America, with their large populations and growth potential, have become battlegrounds for cross-border e-commerce platforms. The concept of the supply chain was first defined by Zhang et al. (2017) as: a supply chain is a network consisting of facilities and distribution channels that acquire raw materials, transform them into finished and semi-finished products, and deliver the products to customers. Although the complexity of supply chains varies across industries and enterprises, supply chains are commonly present in both service and manufacturing companies [4]. As a key link connecting product production, distribution, and consumption, the efficiency and flexibility of the supply chain directly impact the platform's user experience, operating costs, and market share. Against this backdrop, traditional supply chain models can no longer meet the complex demands of cross-border trade. Optimizing and innovating the operational modes of various supply chain links has now become the core path for cross-border e-commerce platforms to break through development bottlenecks and build competitive advantages.

1.2 Research Subjects and Framework

This article focuses on the leading e-commerce platform Shopee in Southeast Asia and Latin America as the main research subject. By examining the operational practices across various links in its supply chain, it identifies innovative optimization measures in logistics and warehousing, sales platforms, payment and funds, as well as customer service. At the same time, TEMU is selected as a comparison object, with key areas such as procurement, logistics and warehousing, and sales platforms analyzed comparatively to clarify the strengths and weaknesses of both parties. Finally, based on the research conclusions, the article proposes summarized recommendations for optimizing and innovating supply chain models in the context of cross-border e-commerce. The research framework is structured around "status analysis—innovative measures—comparative study—recommendations and outlook" to ensure the completeness and relevance of the research logic.

2. Overview of the Shopee Platform

Shopee is a leading e-commerce platform in Southeast Asia and Latin America, belonging to the Singaporean internet company Sea Group (formerly Garena), established in 2015. Its operations cover more than ten markets, including Singapore, Malaysia, the Philippines, Thailand, Vietnam, and Brazil. It also has cross-border business offices in Shenzhen, Shanghai, and Hong Kong, providing Chinese cross-border sellers with one-stop cross-border solutions, offering support in traffic, logistics, incubation, language, payment, and ERP.

Since entering the Chinese market in 2016 and establishing its headquarters in Shenzhen, Shopee has maintained steady growth and fully launched its cross-border business in China. In the first quarter of 2019, GMV grew by 81.8% year-on-year, total orders increased by 82.7% year-on-year, and app downloads exceeded 200 million. In 2021, GAAP revenue reached \$5.1 billion, up 136.4% year-on-year, total orders were 6.1 billion, up 116.5% year-on-year, and GMV was \$62.5 billion, up 76.8% year-on-year. In 2022, total orders reached 7.6 billion, up 23.7% year-on-year. In 2023, total orders rose to 8.2 billion, with growth in the fourth quarter reaching 46%. In 2024, total orders further increased to 10.9 billion. Shopee has ranked first in downloads among Southeast Asian shopping apps for consecutive years, demonstrating its strong market competitiveness and growth potential.

3. Core Links of the Cross-Border E-Commerce Supply Chain

The cross-border e-commerce supply chain is a complex collaborative system, covering the entire process from product procurement to customer service. Under the topic of optimizing cross-border e-commerce supply chains, everyone has their own perspective, and many people have shared their different ideas. Suchanek et al. (2012) found through modeling studies that supply chains largely depend on the state of e-commerce, and different e-commerce systems place different demands on supply chains, requiring optimal supply chain approaches [5]. Wei et al. (2019) studied a new model that integrates maritime logistics with inland logistics into a seamless logistics transportation chain, providing suggestions for improving the functional logic of cross-border logistics [6]. Giuffrida et al. (2017) identified a series of potential future development areas through studying the role of e-commerce in logistics, including distribution network design, dedicated transportation network construction, and the concept of multimodal transportation [7]. But in summary, the optimization of the supply chain mainly includes six core areas:

3.1 Procurement

As the starting point and foundation of the supply chain, it is responsible for obtaining all raw materials, components, equipment, and services needed for production. Its efficiency, cost, quality, and service level directly affect the overall performance of the supply chain and the competitiveness of the enterprise.

3.2 Production and Quality Control

This is an essential key link in the supply chain. They collaborate and influence each other, collectively affecting the efficiency, quality, and competitiveness of the supply chain.

3.3 Logistics and Warehousing

This link is not only the physical carrier of the supply chain, but also the foundation for the coordinated operation of information flow and capital flow. Together, they form the 'infrastructure' of the supply chain, directly affecting its efficiency, cost, flexibility, and customer satisfaction. Without efficient and reliable logistics and warehousing support, the strategic planning of the supply chain will be difficult to implement, and the company's competitiveness will be severely limited.

3.4 Sales and Platform Links

The sales link is the initiator of demand and the value realizer in the supply chain, while the platform link is the core hub for resource integration, data-driven operations, and ecosystem building. The two are interdependent and mutually reinforcing, together forming an important component of the supply chain.

3.5 Payment and Capital Flow

This runs through the entire supply chain, serving not only as the culmination of value realization but also as the starting point for resource allocation, information transmission, and risk management. It plays an irreplaceable role in the efficient operation and sustainable development of the supply chain.

3.6 Customer Service

It is not only a direct reflection of meeting customer needs within the supply chain but also a key factor in driving supply chain optimization and enhancing corporate competitiveness.

4. Optimization and Innovative Practices of Shopee's Supply Chain Model

4.1 Logistics and Warehousing: Layout the

warehousing network to improve delivery efficiency

4.1.1 Settling in Local Warehouses: Shopee's local warehouses are distributed across two major regions: China and Southeast Asia. In mainland China, there are multiple official warehouses in cities such as Dongguan, Yiwu, Quanzhou, Nanning, and Jinan; in Taiwan, local warehouses are mainly concentrated in Taipei, New Taipei, and Taoyuan. In Southeast Asia, official overseas warehouses have been established in Malaysia, the Philippines, Thailand, and Singapore. Local warehouses speed up logistics, with an average delivery time of only 3-7 days, which is 50%-80% faster than traditional cross-border shipping, and in some regions, products can even be delivered the next day, meeting buyers' high demand for quick delivery. They also reduce overall costs, as warehouse resources can be shared, lowering storage costs by 40% compared to self-built warehouses, and enabling quick handling of returns and exchanges through local warehouses, reducing post-sale logistics losses.

4.1.2 New Logistics Hubs: Shopee recently announced the addition of three new logistics hubs in the state of Rio de Janeiro, located in Itaboraí, São Gonçalo, and Magé, further improving the local 'central warehouse and agent point' logistics network and helping the Rio de Janeiro metropolitan area achieve same-day or next-day delivery for orders. This greatly enhances delivery efficiency. The new hubs, equipped with smart sorting and cross-docking technologies, have shortened delivery times for certain categories from the previous 5-7 days to 2-3 days. For electronics, a '3-hour express delivery' trial has even been launched, effectively addressing local delivery delays. It also expands the range of products that sellers can operate, transporting liquid cosmetics and other aerospace-restricted items to this hub for storage and sales, unlocking over 2,000 previously restricted product categories, breaking the limitations of cross-border transportation on goods, and increasing profit margins.

4.2 Sales and Platform Segment: Focus on Live Streaming Marketing and Optimize Transaction Conversion

Shopee has launched its e-commerce live streaming feature, Shopee Live, as a key marketing tool supported by the platform. It is characterized by its low entry barriers and ease of use. For sellers, it offers exclusive live discounts, flash sales, and follower gifts, helping to shorten the conversion cycle. On the Taiwan site, the return rate for some categories in livestreams is less than 3%, while also achieving efficient follower growth and increased fan engagement. For buyers, the livestreams provide exclusive coupons, limited-time discounts, and other benefits. Hosts showcase product details in real-time and answer

questions, aligning with the live shopping preferences of 64% of Southeast Asian consumers, combining cost-effectiveness with entertainment.

4.3 Payment and Fund Processes: Localized payment solutions to ensure the flow of funds

4.3.1 Launching the e-wallet ShopeePay: Launched in Indonesia in 2018, it now covers 8 markets including Singapore and Malaysia. It supports local bank card binding, offline cash top-ups, and can be used for online shopping on the platform, offline QR code payments, bill payments, and other scenarios. It has an offline user coverage rate of over 70% in Southeast Asia, with a payment success rate of 98%.

4.3.2 Expand diverse local payment channels: Malaysia supports cash payments at convenience stores like 7-11 and local online bank transfers via Maybank2u; the Philippines connects with major banks such as BDO and BPI for top-ups; Indonesia integrates local e-wallets like DANA and OVO, with most sites supporting locally issued Visa and Mastercard credit card payments.

4.3.3 Optimize local payment methods: By 2025, some sites will lower the fees for localized payment methods. The fee for receiving payments through local bank accounts at the Malaysia site will be only 1.8%-2.5%, significantly lower than international credit card fees. The funds will be credited within 1-3 business days, effectively avoiding losses from exchange rate fluctuations.

4.4 Customer Service Stage: Build a Membership System to Enhance User Loyalty

4.4.1 Platform-wide Members: This includes the Shopee Rewards program for sites like Malaysia and Singapore (divided into Classic, Silver, Gold, and Platinum tiers, with a 6-month cycle, requiring corresponding order volume and spending to upgrade, offering benefits such as coupons, cashback, and priority customer service), as well as the ShopeeVIP subscription in Indonesia and Malaysia (with monthly fees in Indonesia at IDR 14,900 and two other tiers, and MYR 6.99 in Malaysia, providing members with free shipping, exclusive discounts, and more).

4.4.2 Store Brand Membership: Set up independently by Shopee Mall or selected sellers. Buyers can join the basic level for free and upgrade based on their spending in the store. Members can receive exclusive gifts, coupons, and more. Both membership levels and points are valid for 12 months. This system helps buyers reduce shopping costs while assisting sellers in retaining loyal customers, increasing repeat purchase rates and average order value, and enhancing the platform's market competitiveness.

5. Comparative Analysis of Shopee and

TEMU Supply Chain Models

5.1 Procurement Stage

Shopee uses a fully managed system, and the mandatory stocking rules increase the risk for sellers, making it easy to cause inventory buildup issues. In contrast, TEMU relies on data analysis and AI technology to accurately understand consumer preferences and shopping behaviors, providing merchants with support for production scale decisions, effectively avoiding excess inventory, reducing backlog costs, and at the same time enabling a rapid response to market demand.

5.2 Logistics and Warehousing Segment

Shopee's fully-managed model limits sellers' operational and decision-making autonomy, as the quantity of stock must wait for platform notifications. TEMU, on the other hand, offers a semi-managed model, returning logistics and after-sales autonomy to sellers. This makes it easier to attract 'local-to-local' sellers with local shipping capabilities, enhancing supply chain flexibility.

5.3 Sales an Platform Segment

Shopee focuses on Shopee Live live-stream marketing as its core promotion method, with over 3.4 million related posts as of 2024; TEMU, on the other hand, concentrates on advertising on high-traffic platforms, promoting deeply discounted products on platforms like Facebook and TikTok, while also expanding its user base through the app's "invite friends to place orders" viral feature. TEMU has 427 million related posts, giving it an advantage in exposure.

5.4 Payment and Funding Process

Shopee has built a localized payment system centered on ShopeePay, covering a variety of local payment channels and optimizing collection fees. While TEMU has not explicitly mentioned a dedicated payment tool, it most likely connects to the mainstream payment channels in its target markets, leveraging its global presence. The core difference between the two in this aspect lies in the extent to which they have established a closed-loop payment ecosystem.

5.5 Customer Service Stage

Shopee achieves refined user management through a tiered membership system, strengthening user loyalty; TEMU has not yet disclosed detailed innovations in customer service, but it is assumed that, relying on an efficient supply chain, it has certain competitive advantages in areas such as after-sales response speed and returns/exchanges process. Both companies show different approaches in their

user retention strategies.

6. Summary Recommendations for Innovation in Cross-Border E-Commerce Supply Chain Optimization

6.1 Building a Diverse Collaborative Logistics System

Integrate multiple transportation channels such as commercial express, dedicated logistics, and sea freight, and flexibly match logistics solutions according to product characteristics (such as volume and fragility) and order time requirements; optimize first-leg transportation loading rates, select high-quality local delivery providers for last-mile delivery, maintaining a certain degree of logistics autonomy; offer multiple options such as standard delivery and expedited delivery, provide real-time logistics tracking, and enhance logistics transparency and user control.

6.2 Promote Digital and Intelligent Transformation

Introduce management systems such as ERP and WMS to achieve comprehensive integration and sharing of data across procurement, inventory, logistics, and sales; leverage big data analytics to accurately predict market demand, providing scientific guidance for product selection and restocking; actively apply AI intelligent scheduling, IoT-based warehouse monitoring, and other technologies to reduce human errors and improve supply chain operational efficiency.

6.3 Optimize Warehouse Layout and Management Efficiency

Establish core overseas warehouses in major markets such as Southeast Asia and Latin America, and set up front warehouses in potential markets to form a multi-level storage network; paired with an intelligent inventory management system to achieve real-time inventory visibility; enable multi-warehouse inventory sharing channels and intelligently assign the shipping warehouse based on the order delivery address. Domestic warehouses are preferably located near ports or airports to improve the efficiency of first-leg transportation connections.

6.4 Strengthen Brand Promotion and Traffic Acquisition

Drawing on TEMU's experience in traffic operations, run targeted ads on major global social platforms and short video platforms to increase platform awareness; combine the successful practices of Shopee Live to continuously

enrich promotion methods such as live stream marketing and content seeding, reducing customer acquisition costs; encourage users to share and spread through referral discounts and exclusive benefits, achieving simultaneous growth in user base and brand influence.

7. Outlook

With the continuous expansion of the cross-border e-commerce market and the rapid iteration of technology, optimizing and innovating the supply chain model will become the core focus of platform competition. In the future, cross-border e-commerce supply chains need to further strengthen digitalization, intelligence, and localization capabilities, addressing industry pain points such as logistics efficiency, inventory management, and payment adaptation through technological empowerment and model innovation. As a leading regional platform, Shopee needs to maintain its local operational advantages while learning from the advanced experiences of peers, continuously optimizing the efficiency of each link in the supply chain, strengthening government-business cooperation, actively responding to challenges posed by changes in the international trade environment, and providing more valuable practical examples for the sustainable development of the cross-border e-commerce industry.

8. Conclusion

This article takes Shopee, a leading cross-border e-commerce platform in Southeast Asia and Latin America, as the research subject, systematically analyzing the current operations of its six core supply chain links and the optimization and innovation practices in logistics, warehousing, and sales platforms. By making a targeted comparison with TEMU, it clarifies the strengths and weaknesses of both supply chain models, and, combined with industry development trends, proposes summarized recommendations for optimizing and innovating cross-border e-commerce supply chains, providing a reference for high-quality industry development.

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