

Supplier Management as a Driver of Efficiency and Competitiveness in E-commerce Logistics Supply Chains

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Abstract

With the rapid development of e-commerce, the efficient operation of e-commerce logistics supply chain has become the key to industry competition. This paper deeply explores the key role of supplier management in the e-commerce logistics supply chain. Through theoretical analysis and practical case study, it expounds the significance of supplier management in ensuring the stability of goods supply, reducing logistics costs, improving product quality, enhancing customer satisfaction and promoting the coordination of supply chain. At the same time, this paper analyzes the problems existing in supplier management in the current e-commerce logistics supply chain, and puts forward targeted optimization strategies, aiming to provide useful reference for e-commerce enterprises to improve the level of supply chain management and enhance the market competitiveness.

Keywords: Supplier Management; E-commerce Logistics; Supply Chain Optimization; Operational Efficiency; Customer Satisfaction; Case Study

1. Introduction

In the contemporary digital era, the rapid advancement of Internet technology has profoundly transformed the landscape of global commerce. Among the many changes brought by this technological surge, e-commerce has emerged as a dominant force, demonstrating explosive growth over the past decade (Brown & Davis, 2022; Teller et al., 2016). This transformation is not merely a gradual evolution of traditional business models but a deep and far-reaching shift that has penetrated almost every facet of the global economic ecosystem.

Statistics from eMarketer vividly illustrate the remarkable trajectory of global e-commerce retail sales. In 2015, total sales reached USD 1.66 trillion—a significant figure at the time, yet merely the starting point of a steep upward climb. By 2024, the figure is projected to reach USD 5.5 trillion, representing more than a threefold increase in less than ten years. Looking ahead, forecasts suggest that global e-commerce retail sales will surpass USD 10 trillion by 2030. This growth is not confined to a handful of developed markets; rather, it is a global phenomenon, with multiple countries and regions contributing to the overall upward trend. Figure 1 is an explicit indication that various nations—headed by China, the United States, and the United Kingdom—are spearheading the global continuous growth of the e-commerce retail industry.

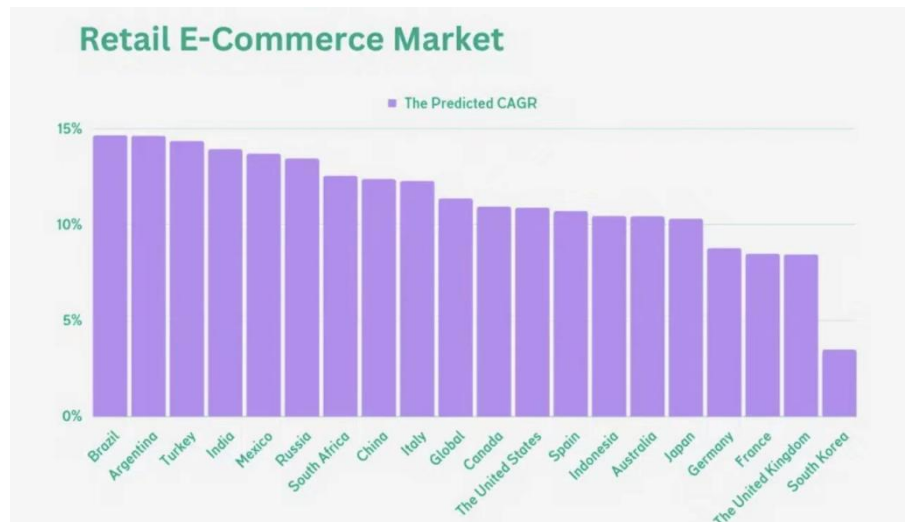


Figure 1. Retail e-commerce market growth by country

Within this global expansion, China stands out as a powerhouse in the e-commerce sector, solidifying its position as the largest e-commerce market in the world. In 2024, the value of China's e-commerce retail sales is expected to hit RMB 15.6 trillion. Even more telling is the proportion this represents—over 30% of the country's total retail sales of consumer goods—demonstrating that online commerce has become a dominant and indispensable part of China's domestic market. Across the country, from cosmopolitan hubs like Shanghai and Beijing to rapidly growing inland cities, consumers have embraced e-commerce wholeheartedly. The convenience of purchasing everything from daily necessities to high-end electronics with just a few taps on a smartphone, and having these items delivered within one to two days, has fundamentally reshaped consumption patterns.

Beneath the surface of this impressive growth lies a critical yet often overlooked factor: the logistics supply chain. As e-commerce has evolved, so too has the role of logistics. In the early years, competition among e-commerce enterprises revolved primarily around the variety of products offered and the prices at which they were sold (Williamson, 1985; Pfeffer et al., 1978). However, as markets have matured, competitive priorities have shifted dramatically. Today, the key battleground is the efficiency, speed, and reliability of the logistics supply chain. Consumers now expect not only attractive pricing but also fast, on-time delivery, accurate tracking information, and dependable after-sales service. A delay of even one or two days can result in customer dissatisfaction and the loss of future business. During major shopping festivals—such as

China's Singles' Day or the West's Black Friday—platforms that can guarantee smooth, timely order fulfillment gain a substantial competitive advantage.

At the very foundation of this critical logistics network are the suppliers. The quality of supplier management exerts a direct and profound influence on the overall performance of an e-commerce logistics supply chain. Well-managed suppliers ensure the timely availability of goods, maintain high product quality, and collaborate effectively with logistics partners (Smith & Johnson, 2023; Chopra & Meindl, 2020). They are also able to adapt quickly to fluctuations in demand—whether driven by sudden promotional events or shifts in consumer preferences (Yu et al., 2016; Dyer & Singh, 1998). Conversely, poorly managed suppliers can create bottlenecks in the supply chain, leading to stock shortages, delivery delays, and ultimately, a negative impact on the e-commerce enterprise's reputation and bottom line.

In summary, while the rapid rise of e-commerce driven by Internet technology is a remarkable achievement, the long-term success of e-commerce enterprises increasingly depends on their ability to manage and optimize their logistics supply chains, beginning with the effective management of suppliers. This recognition forms the basis for the present research, which aims to examine the role of supplier management in enhancing logistics performance, improving market competitiveness, and fostering sustainable industry development.

2. Objectives and Contributions

2.1. Research Objective

The primary objective of this study is to undertake a comprehensive and detailed investigation into the critical role of supplier management within e-commerce logistics supply chains. In this research, supplier management is conceptualized not as a routine operational task, but as the structural backbone that supports the efficiency, stability, and adaptability of the entire logistics network. The study explores how supplier performance directly and indirectly shapes multiple operational domains, including inventory management, warehousing efficiency, transportation planning, and last-mile delivery.

To achieve this objective, the study employs a multi-method research approach that integrates three complementary strategies. First, case studies are conducted to analyze both successful and unsuccessful supply chain practices, thereby providing comparative insights into the influence of supplier management. Second, in-depth interviews with managers of e-commerce enterprises are used to capture first-hand accounts of supplier–logistics interactions. Third, quantitative analysis is undertaken on key performance indicators—such as order fulfillment accuracy, on-time delivery rates, and defect ratios—that are directly linked to supplier operations. This comprehensive methodological design enables a nuanced understanding of how supplier efficiency, reliability, and adaptability collectively determine the resilience and performance of e-commerce logistics systems.

2.2. Research Contributions

From a theoretical perspective, this study extends the existing body of supply chain management literature by positioning supplier behavior at the center of analysis. It incorporates variables often overlooked in conventional models—such as suppliers' responsiveness to market fluctuations, capacity for innovation in product design or manufacturing processes, and adherence to rigorous quality control standards—into established theoretical frameworks. By integrating these elements, the research provides a more comprehensive and realistic representation of e-commerce logistics systems, particularly within markets characterized by volatility, short product life cycles, and rapid technological change. Furthermore, the study offers a refined lens through which to adapt traditional supply chain theories, which were largely developed in the context of brick-and-mortar retail or manufacturing, to the distinctive operational realities of digital commerce.

From a practical standpoint, the findings yield actionable insights for e-commerce enterprises seeking to enhance supply chain performance. Effective supplier management can deliver significant cost reductions, not only in procurement but also across related logistics operations. Careful supplier selection, favorable contract negotiation, and continuous performance monitoring can lower the cost of goods sold while streamlining warehousing, transportation, and delivery processes. Suppliers with advanced production capabilities or economies of scale can further enhance competitiveness by offering better pricing and consistent quality.

Beyond cost efficiency, robust supplier management contributes directly to improved customer satisfaction. The timely delivery of high-quality products reinforces consumer trust, encourages repeat purchases, and strengthens brand loyalty—factors that are essential in the highly competitive e-commerce landscape. By simultaneously reducing costs and enhancing service quality, sound supplier governance enables enterprises to offer more attractive prices, superior products, and faster delivery than their competitors, thereby improving their market position.

Importantly, the benefits extend beyond individual enterprises to the broader e-commerce industry. As more companies adopt sound supplier management practices, the overall efficiency, reliability, and sustainability of e-commerce logistics supply chains improve, fostering a healthier and more resilient e-commerce ecosystem that benefits suppliers, logistics providers, platforms, and consumers alike.

2.3. Theoretical Foundations of Supplier Management

The current research finds inspiration from some proven theoretical lenses from the field of supply chain management to decipher how supplier management amplifies the efficiency and competitiveness levels of e-commerce logistics supply chains.

Resource Dependence Theory (RDT) highlights how companies rely on outside partners for vital resources—raw materials, technology, and logistical capacity—and need to proactively manage those interdependencies to fend off uncertainty and stabilize. Within an e-commerce environment, where quick changes in markets and demand variability are the norm, efficient management of suppliers enables business ventures to gain stable inputs and remain adaptable. Through the formation of extended-term, trustee-based relationships, e-commerce business

ventures are able to minimize reliance on fluctuating outside circumstances and strengthen the supply chain.

Transaction Cost Theory (TCT) offers an alternative explanation framework. According to it, companies try to economize overall costs of transactions, comprising negotiation, monitoring, and enforcement, by using the best governance mechanisms. Supplier management is also central to the selection of proper contractual forms, performance indicators, and monitoring mechanisms to Balance efficiency and controls. In business to business logistics, with higher volumes of transactions and products' shorter lives, the use of TCT assists companies to decide when to internalised the business of logistics or contract it with dedicated suppliers, thus economizing the coordination cost and the risk associated with operations.

Lastly, the Relational View goes outside firm borders, suggesting that inter-organizational relations per se are sources of durable competitive advantage. Collaborative relations with suppliers, involving common information systems, co-improvement processes, and reciprocal investment, build up relational rents that are not easily matched through imitation. In e-commerce distribution, this collaboration facilitates quick filling of orders, co-innovation of packaging or transport, and end-user satisfaction, all reinforcing the enterprise's competitiveness.

Collectively, these conceptual models give a multi-dimensional view of the supplier management: RDT peers at resources leverage and dependency reduction; TCT spotlights efficiency and governance; and the Relational Viewpoints to value co-creation and sustainable competitiveness. These lenses, taken together, underpin the analysis model and case explanations that follow in subsequent sections here.

3. Overview of the E-commerce Logistics Supply Chain

3. 1. Methodology Overview

In order to preserve the methodological rigor, this dissertation takes a case-exemplification mixed-method design that combines qualitative and quantitative analysis. Two exemplary e-commerce companies Amazon and JD.com were invited to serve as case exemplars for summarizing both international and domestic industry features. Data were sourced from diversified sources, for example, annual reports (2015–2024), Statista and eMarketer data, and government or platform logistical bulletins. Major performance indices, for example, logistics-cost ratio, on-time-delivery ratio, and customer-satisfaction index, were pinpointed for confirming the framework of analysis.

Qualitative sources (business reports, policy papers, and professional interviews) were thematic-coded to recognize common patterns in supplier management. Quantitative signals were then employed to triangulate these results and plot performance trends. Such methodological configuration allows for a structured analysis of how the practice of managing the suppliers has an effect on efficiency, dependability, and competitiveness for e-commerce logistics supply chains.

3.2. Composition of the E-commerce Logistics Supply Chain

The e-commerce logistics supply chain is a complex and highly interconnected system comprising multiple stakeholders, including suppliers, e-commerce platforms, logistics enterprises, and consumers. Suppliers are responsible for providing goods, e-commerce platforms function as transaction hubs that integrate product information with consumer demand, logistics enterprises manage transportation, warehousing, and distribution activities, and consumers constitute the final demand link in the chain.

These stakeholders interact continuously, with each link influencing the others in both direct and indirect ways. As a result, inefficiencies in any single segment can generate cascading effects across the system. Ensuring effective coordination among all participants is therefore essential to maintaining operational performance and sustaining competitive advantage.

3.3. Characteristics of the E-commerce Logistics Supply Chain

3.3.1. High Degree of Informationization

Modern e-commerce logistics systems are characterized by a high level of digitalization, driven by the widespread adoption of Internet-based technologies. This technological infrastructure serves as the backbone of operations, enabling seamless, real-time data sharing across all stages of the supply chain.

The process begins as soon as an order is placed on an e-commerce platform. Advanced software systems transmit the order information instantly to all relevant actors. Warehouse management systems are immediately alerted to begin preparing goods for dispatch, and once goods leave storage, sensors and tracking devices capture the event and feed data back into the logistics information system.

During transportation, GPS and other tracking tools provide real-time updates on the location, speed, and estimated arrival time of shipments. Customers can access this information through platform interfaces, which enhances transparency and builds trust. Simultaneously, logistics managers use the data to preempt potential disruptions caused by traffic congestion, adverse weather, or equipment issues, adjusting delivery routes and communicating proactively with customers.

Real-time information flows also enhance coordination between supply chain links. Warehouses can adjust inventory levels based on incoming order patterns, while transportation providers can optimize routes and schedules to improve efficiency. Such integration reduces operational errors, minimizes delays, and increases productivity across the system.

3.3.2. Rapid Response Capability

In the fast-paced e-commerce environment, consumer expectations for quick delivery and high service quality have intensified, requiring supply chains to operate with unprecedented agility. The availability of same-day and next-day delivery has set new performance benchmarks, compelling firms to accelerate order processing to minutes—or even seconds—through highly automated verification, payment, and inventory allocation systems.

Once an order is confirmed, logistics providers must mobilize resources immediately. In densely populated urban areas, last-mile delivery often involves fleets of motorcycles, vans, or bicycles, while in certain markets, drones are being explored to shorten delivery times for lightweight goods.

Equally important is responsive customer service. When disruptions occur—such as delayed deliveries or damaged products—service teams must address the issues swiftly and transparently, ensuring that customers remain informed. This rapid problem resolution not only mitigates immediate dissatisfaction but also helps cultivate long-term customer loyalty.

3.3.3. Flexibility and Adaptability

The e-commerce market is inherently volatile, with demand patterns shifting rapidly due to seasonal fluctuations, emerging trends, social media influence, or unexpected macroeconomic changes. Short product life cycles further intensify the need for adaptability.

Flexibility in inventory management is crucial. When a product experiences sudden demand growth—perhaps triggered by viral marketing—companies must rapidly restock through expedited supplier deliveries or reallocation of inventory across warehouses. Conversely, when demand declines, swift liquidation strategies are required to prevent excessive holding costs.

Transport flexibility is equally vital. Natural disasters, regulatory changes, or infrastructure disruptions may necessitate immediate rerouting of shipments, whether by diverting vehicles to alternative routes or switching ports for maritime freight. Distribution models must also adapt to evolving customer preferences, shifting between home delivery, pick-up points, or parcel locker services. During peak shopping periods, companies may expand delivery teams, extend operational hours, and adopt alternative delivery methods to manage order surges effectively.

This ability to adapt to fluctuating market conditions and external disruptions ensures the continuous and efficient movement of goods from suppliers to consumers, safeguarding operational stability and customer satisfaction.

4. The Key Role of Supplier Management in the E-commerce Logistics Supply Chain

Supplier management occupies a central role in e-commerce logistics, exerting a direct influence on operational efficiency, cost control, product quality, and customer satisfaction. By ensuring the stability of goods supply, enhancing service quality, and enabling business expansion, effective supplier management significantly strengthens the competitiveness of e-commerce enterprises.

4.1. Ensuring the Stability of the Supply of Goods

4.1.1. Stable Supply of Goods

Reliable suppliers are essential for guaranteeing a continuous and stable flow of goods to e-commerce enterprises, particularly during high-demand shopping events such as China's "Double 11" and "618." During these peak periods, order volumes can surge exponentially. If suppliers fail to deliver sufficient quantities on time, companies risk stock shortages, resulting in missed sales

opportunities and reduced customer satisfaction. Therefore, proactive supplier coordination and early capacity planning are critical to preventing stock shortages and ensuring seamless order fulfillment during sales peaks.

For example, JD.com has cultivated long-term partnerships with numerous high-quality suppliers. Through proactive stockpiling and process optimization ahead of major sales events, JD ensured product availability during high-demand periods. As a result, the company recorded a 25% year-on-year sales increase during the 2024 “Double 11” festival.

4.1.2. Ability to Respond to Emergencies

Outstanding suppliers also demonstrate the capability to respond quickly to unforeseen disruptions such as natural disasters, raw material shortages, or sudden policy changes. Rapid adaptation and effective contingency measures can significantly reduce the negative impact on e-commerce operations. This agility is largely achieved through supplier development programs and the establishment of early-warning communication systems, which are core elements of effective supplier management. For instance, during the COVID-19 pandemic, certain suppliers adjusted production schedules and diversified sourcing channels to maintain supply continuity despite severe logistical challenges. Statistical data also indicate that improvements in supplier management can contribute to reducing logistics costs as a proportion of total sales. As shown in Table 1, between 2015 and 2024, the proportion of logistics costs in total sales steadily declined, reflecting enhanced supply chain efficiency and better coordination between suppliers and logistics service providers.

Table.1 The proportion of logistics cost in sales in 2015–2024

year	Logistics cost in sales proportion (%)
2015	14.5
2016	13.8
2017	13.2
2018	12.6
2019	12.0
2020	11.5
2021	11.2
2022	10.8
2023	10.5
2024	10.2

Source: Compiled from JD.com and Amazon Annual Reports (2015–2024), Statista, and eMarketer data.

Table 1 reveals a steadily declining ratio between the fraction of logistical costs to overall operating expenses, revealing an encouraging trend toward enhanced logistical operability for the e-commerce logistical supply chain. The declining trend is directly related to the uptake of sophisticated supplier administration procedures that have refined main phases of logistical operability. Specifically, businesses have intensified collaboration with suppliers through joint packaging design, joint warehouses, and transportation consolidation planning. Joint packaging design decreases the weight and size of shipments, consequently reducing handling and transportation costs. Joint warehouse planning allows the pre-positioning of inventory around major distribution centers, reducing conveyance time and storage redundancy. Correspondingly, transportation consolidation permits more than one supplier to synchronize distribution routes, maximizing truck usage and reducing dead-load mileage. Individually, these initiatives for managing suppliers have directly aided the continuous decrease in logistical cost ratio found in Table 1, while also facilitating increased delivery reliability, logistical flexibility, and logistical supply chain competitiveness.

4.2. Service Quality Improvement

4.2.1. On-Time Delivery Performance

In today's competitive e-commerce environment, the on-time delivery rate is a key performance indicator. Amazon offers a notable example: in 2015, its global on-time delivery rate was 92%, but by 2024, it had exceeded 98%. This improvement resulted from Amazon's collaborative planning with suppliers and the integration of real-time data systems that synchronize production and logistics schedules.

This improvement was achieved through closer and more efficient collaboration with suppliers, supported by real-time data sharing and enhanced communication channels. Suppliers receive immediate order notifications, enabling them to prepare production without delay. In earlier years, communication lags often resulted in production delays that disrupted delivery schedules. The updated systems allow suppliers to plan production more effectively, ensuring goods are ready for shipment on time.

Coordination extends to transportation and distribution stages. By sharing warehouse inventory data and regional demand forecasts, Amazon and its suppliers jointly determine optimal shipping routes, adjusting plans based on order urgency, customer location, and available transport capacity. This integrated approach has reduced transit times and increased delivery reliability, directly contributing to higher on-time delivery rates.

4.2.2. Customer Satisfaction

Supplier management also plays a crucial role in enhancing customer satisfaction. For example, Amazon has improved its customer satisfaction rate from 85% in 2015 to 93% in 2024 through strict supplier quality control and efficient collaboration mechanisms, accompanied by a significant increase in customer loyalty.

This improvement is closely linked to product quality control. Amazon enforces strict supplier selection criteria and continuously monitors performance to ensure that only products meeting

rigorous quality standards reach consumers. In the electronics category, for example, suppliers must guarantee defect-free products that meet all advertised specifications, as defective goods not only cause dissatisfaction but also damage brand reputation.

Efficient supplier collaboration further enhances the customer experience through accurate order tracking. Coordinated data sharing between suppliers and logistics providers enables customers to monitor the journey of their orders from warehouse to delivery point. This transparency reduces uncertainty and strengthens trust, increasing the likelihood of repeat purchases and positive word-of-mouth recommendations.

4.3. Continuous Growth of Business Scale

4.3.1. Stable Supplier Management as a Growth Driver

A well-managed supplier network provides a strong foundation for business expansion. Between 2015 and 2024, Amazon achieved a compound annual growth rate of over 15% in global sales. Such sustained growth can be attributed to the reliability and scalability achieved through strategic supplier partnerships, which ensured continuous product availability during market expansion. This growth encompassed not only the scaling of existing operations but also successful entry into new sectors, such as fresh e-commerce and cross-border trade—initiatives supported by robust supplier partnerships. This trend is further supported by quantitative evidence. As shown in Table 2, Amazon’s global sales experienced continuous growth from 2015 to 2024, with a compound annual growth rate exceeding 15%. This sustained upward trajectory demonstrates how effective supplier management can drive large-scale business expansion while enabling entry into new markets and product categories.

Table.2 Amazon Global Sales in 2015-2024 (in US \$100 million)

year	Global sales
2015	1070
2016	1360
2017	1780
2018	2330
2019	2800
2020	3860
2021	4698
2022	5140
2023	5960
2024	6800

4.3.2. Strategic Advantages Beyond Operations

Long-term, trust-based relationships with suppliers generate strategic benefits that extend well beyond improvements in operational efficiency. Such relationships often result in preferential pricing agreements, which can lower procurement costs and enhance overall profitability. They also provide priority access to scarce inventory during periods of supply shortage, ensuring that enterprises can maintain product availability even under challenging market conditions.

In addition, established partnerships create opportunities for collaborative product development, enabling companies to bring innovative, differentiated offerings to market more rapidly. These joint initiatives allow firms to align product specifications, quality standards, and production timelines more effectively, thereby responding swiftly to evolving consumer preferences and competitive pressures.

By leveraging these strategic advantages, enterprises can strengthen their positioning in both domestic and international markets. Over the long term, such supplier relationships contribute to building a more resilient and adaptable supply chain, which in turn supports sustainable competitive advantage and long-term business growth.

4.4. In-Depth Analysis of Current Supplier Management Issues

This section provides a more detailed analysis of the supplier-management issues revealed in this study—namely the lack of clear-cut supplier selection and evaluation mechanisms, weak supplier management (SRM), and lack of supply-chain risk management—by investigating root causes, firm-size heterogeneity, and typical manifestations in e-commerce logistics supply chain contexts. The analysis links each issue to observable operational symptoms and logistics KPIs for guided managerial intervention.

4.4.1. Weak Supplier management and Cross-Enterprise Data Silos

Poor supplier management (SRM) and disjointed data systems are two reinforcing barriers that severely diminish the operational flexibility and clarity of e-commerce logistics supply chains. Supplier relations in the majority of businesses remain subject to Short-term contract orientation with excessive cost-minimizing orientation and penalty provisions, with not much consideration for joint planning, feedback on performance, or mechanisms for continuous improvement. The transactional orientation deters open communication and trust, shifting the suppliers away from active disclosure of capacity constraints or fluctuation in the lead time.

Empirical evidence from the front-runners among China and Southeast Asia's leading e-commerce companies reveals that joint demand forecasting and collaborative replenishment planning practiced by these companies resulted in 15–20% higher rates for on-time deliveries than those with transactional supplier interaction maintenance. Nevertheless, the majority of the small and medium-sized e-commerce companies are not moving away from ad hoc communication using actual or instant messaging applications, which hinders traceability and slows down the resolution process for problems. Even among the large-scale platforms, adoption for Vendor Managed Inventory (VMI) and Electronic Data Interchange (EDI) is partial among the suppliers, rendering the upstream, or earlier, networks outside the collaborative fold.

At the technology level, cross-enterprise data silos exist due to variegated information standards, dissimilar ERP systems, and security worries about the data. The silos disconnect end-to-end visibility—from the placement of an order to the ultimate delivery—resulting in duplications of the data, mis-matched confirmations for orders, and Non-Uniform logistics tracking. Lack of unified exchange of the data also hinders appraisals of the performance of the suppliers in real time. For example, the failure to exchange shipping notices between the suppliers and the logistics providers often results in wrong inventory records and schedule clashes for warehouse operations.

In order to rise above these problems, businesses must beef up SRM through the building of jointly constructed governance mechanisms including joint scorecards, supplier councils, and virtual performance dashboards. Simultaneously, the taking up of API-approved data integration and common standards for logistical information will do away with duplications and synchronize. With relationship-based management and real-time connectivity for data, e-commerce companies are able to greatly increase the efficiency in coordination, the responsiveness of suppliers, and customer satisfaction.

4.4.2. Insufficient Risk Management and Short-Term Cooperation Mindset

Another deeply ingrained problem with e-commerce logistics supply chain is the lack of risk management system development, mostly due to a time-oriented cooperation mentality concerned with reducing costs at once. Such a mentality is responsible for the dominance of single-sourcing, insufficient planning for contingency, and the lack of systematic risk assessment for suppliers. For instance, when the COVID-19 epidemic broke out, numerous online retailers were struck with serious dislocation due to the fact that they were highly relying on a single or dual major supplier for must-have categories involving packaging supplies or electronic components. However, corporations that formulated multi-sourcing strategies or found dual-supplier models were successful in sustaining business continuity with minimal cost blowback.

In addition, the absence of formal risk identification instruments—like supplier risk matrices, financial health scores, or geopolitical exposure analysis—makes it impossible for businesses to expect the unexpected. According to industry surveys, fewer than 30% of Southeast Asian and Chinese e-commerce corporations formalize a supplier risk registry, and fewer than 20% undertake yearly stress tests for logistical capacity with peak demand. Limited risk knowledge consequently raises the damage multipliers for unexpected occurrences like natural catastrophes, shifts in government policies, or transport network breakdown.

Furthermore, short-term contract arrangements dissuade suppliers to invest in capacity flexibility or robustness-building initiatives, depriving the supply chain of long-term robustness. Without dual contingency planning or mutually agreed-upon recovery procedures, businesses end up with costly emergency logistics remedies—air freight, overnight transportation, or third-party fulfillment—to make up for disruptions. Such backward-looking remedies not only increase the expense associated with logistics but also compromise service consistency and customer confidence.

In response to these structural vulnerabilities, companies need to step down gradually from transactional procurement paradigms and move up to partnership-based models that focus on resilience, trust, and co-created value. Adoption of supplier diversification initiatives, tier-2 visibility maps, and joint business continuity planning (BCPs) can increase adaptability under the hood. In addition, the incorporation of risk management metrics—namely time-to-recover (TTR), time-to-survive (TTS), and supplier concentration index (HHI)—into the supplier appraisal systems would enable companies to track vulnerabilities in real time and shift sourcing strategies proactively. In the longer run, the transition from short-term cost thinking to the long-term thinking of resilience will be the determinant for the sustainable building up of competitive advantage within the field of e-commerce logistics supply chain.

5. Conclusion

Supplier management plays a pivotal role in the e-commerce logistics supply chain, exerting a direct influence on operational efficiency, cost control, product quality, and customer satisfaction. By ensuring a stable flow of goods, reducing logistics costs, improving product quality, enhancing customer experience, and fostering coordination among supply chain participants, effective supplier management provides essential support for the smooth and efficient functioning of e-commerce logistics systems.

Despite these benefits, several challenges remain in industry practice. Many e-commerce enterprises lack well-defined supplier selection and evaluation frameworks, exhibit weaknesses in supplier management, and maintain insufficient mechanisms for managing supply chain risks. These shortcomings can undermine the efficiency, reliability, and resilience of logistics networks, particularly in periods of volatile market demand or under the pressure of external disruptions.

To address these issues, enterprises should adopt scientific and transparent supplier selection criteria, develop comprehensive evaluation systems, and implement continuous performance monitoring. Strengthening supplier management through long-term partnerships and mutual trust can foster deeper collaboration and higher service quality. Moreover, reinforcing supply chain risk management—by diversifying sourcing channels, maintaining safety stocks, and preparing contingency plans—can mitigate the adverse effects of events such as natural disasters, raw material shortages, or regulatory changes.

Case evidence from industry leaders such as JD.com and Amazon demonstrates that systematic supplier management—encompassing quality control, real-time coordination, and risk mitigation—directly drives cost reduction, enhances delivery reliability, and sustains long-term business growth. As the e-commerce sector continues to expand and competition intensifies, supplier management will remain a decisive factor in enhancing an enterprise's core competitiveness. Theoretically, these results also confirm the explanatory capability of some age-old supply chain theories. In support of Resource Dependence Theory, the supplier management allows businesses to minimize uncertainty and achieve stability through the enhancement of controls over vital resources. In consonance with Transaction Cost Theory, standardized supplier governance reduces the costs of coordination and monitoring, hence increasing the efficiency of

operations. In addition, the Relational View explains that long-term co-opetition and reciprocal investments among businesses and suppliers generate distinct relational value that improves competitiveness. Through the amalgamation of these lenses, the study applies age-old supply chain theories to the digital commerce scenario and shows that the theories are equally relevant to the explanation of the upgrading of the performance of e-commerce logistical systems. Continuous optimization of supplier strategies, aligned with evolving market conditions and technological advancements, will be essential for achieving sustainable growth and long-term success in the digital economy.

Author Contributions:

Jiaming Shen led the study, including conceptualization, research design, methodology development, data collection, formal analysis, and original draft preparation. He also coordinated case study work, integrated theoretical and empirical findings, and finalized the interpretation of results. Tingyu Liu contributed to validation, provided resources, assisted in data visualization, supervised the research process, and managed project administration. Jaspal Singh Joginder Singh supported review and editing, and provided additional validation input. All authors have read and agreed to the published version of the manuscript.

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