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Integrated Logistics Information for Supply Chain Management Optimization in the E-Commerce Industry

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ABSTRACT
This study aims to examine the role of integrated logistics information in optimizing supply chain management within the e-commerce industry. Adopting a qualitative research approach based on a systematic literature study, this research synthesizes prior theoretical and empirical studies to develop a comprehensive understanding of how logistics information integration supports efficiency, coordination, and responsiveness in e-commerce supply chains. The analysis draws on peer-reviewed journal articles and authoritative sources to identify recurring patterns, key dimensions, and emerging trends related to digital logistics integration. The findings indicate that integrated logistics information significantly enhances supply chain visibility, operational efficiency, service performance, and agility, while also supporting resilience and sustainability objectives. Furthermore, the study reveals that the effectiveness of integration depends on technological readiness, data quality, organizational alignment, and inter-organizational collaboration. The main contribution of this research lies in positioning integrated logistics information as a strategic capability that underpins supply chain optimization in dynamic e-commerce environments and provides a foundation for sustainable and resilient supply chain development.

Keywords: Integrated Logistics Information, Supply Chain Management, E-Commerce Logistics, Digital Integration, Supply Chain Optimization.

I. Introduction

The rapid expansion of the e-commerce industry over the past two decades has fundamentally transformed the structure and dynamics of global supply chains. Advances in digital technologies, shifting consumer behavior, and intensified global competition have driven firms to prioritize speed, accuracy, transparency, and cost efficiency in logistics operations (Gunasekaran, Subramanian, & Rahman, 2017). As a result, logistics and supply chain management have become critical determinants of organizational performance and customer satisfaction, particularly in digitally driven business models such as e-commerce (Hübner, Holzapfel, & Kuhn, 2016). Unlike traditional retail supply chains, e-commerce supply chains are characterized by high order frequency, small order sizes, volatile demand, and strong dependence on real-time information flows, thereby increasing the need for integrated logistics information systems to support coordination and optimization.

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Supply chain management is generally defined as the strategic coordination of business functions within and across organizations to improve the long-term performance of individual firms and the supply chain as a whole (Mentzer et al., 2001). Within this framework, information integration plays a central role by enabling the timely and accurate flow of data related to inventory, transportation, order fulfillment, and customer demand (Flynn, Huo, & Zhao, 2010). Prior studies consistently emphasize that integrated information systems enhance supply chain visibility, reduce uncertainty, and support operational efficiency (Schoenherr & Swink, 2012). In the e-commerce industry, where transactions occur digitally and customer expectations for fast delivery are exceptionally high, the integration of logistics information has become a strategic necessity rather than a supporting function.

More specifically, integrated logistics information refers to the seamless synchronization of logistics-related data across functional units and organizational boundaries within the supply chain. This integration is typically achieved through enterprise resource planning systems, warehouse management systems, transportation management systems, and digital platforms that facilitate data sharing among suppliers, logistics service providers, and e-commerce firms (Cheng, Chen, & Sun, 2021). Empirical evidence indicates that logistics information integration improves coordination, reduces information asymmetry, minimizes operational errors, and enhances real-time monitoring of logistics processes (Yu, Chavez, Jacobs, & Feng, 2018). By providing a unified and transparent view of supply chain activities, integrated logistics information enables firms to optimize inventory levels, improve delivery performance, and respond more effectively to demand variability. Despite its acknowledged importance, many e-commerce firms continue to experience difficulties in implementing fully integrated logistics information systems. Research suggests that fragmented information infrastructures, lack of system interoperability, limited technological capabilities, and poor data quality remain persistent challenges, particularly in developing economies (Kache & Seuring, 2017). These limitations often result in supply chain inefficiencies such as delayed deliveries, excess inventory, higher logistics costs, and reduced service quality (Wang, Gunasekaran, Ngai, & Papadopoulos, 2016). This phenomenon reflects a gap between the theoretical benefits of logistics information integration and its practical implementation within e-commerce supply chains.

The phenomenon of accelerated e-commerce growth has further intensified logistics complexity. The surge in online transactions, driven by digitalization and external disruptions such as the COVID-19 pandemic, has placed unprecedented pressure on logistics networks (Ivanov & Dolgui, 2020). E-commerce firms are required to manage increasing transaction volumes while maintaining delivery reliability and cost efficiency. In such an environment, inadequate logistics information integration exacerbates coordination failures and weakens supply chain performance. Conversely, firms that adopt integrated logistics information systems demonstrate greater supply chain agility, resilience, and responsiveness (Dubey et al., 2021). From a research perspective, the relevance of logistics information integration in supply chain management has been widely documented. Previous empirical studies confirm that information integration positively influences supply chain performance through enhanced information sharing, reduced lead times, improved collaboration, and better decision-making (Zhao, Huo, Selen, & Yeung, 2011). In e-commerce contexts, these outcomes are particularly critical due to the fast-paced and customer-oriented nature of online markets (Hübner et al., 2016). However, existing literature has predominantly focused on manufacturing or traditional retail sectors, leaving the unique characteristics of e-commerce supply chains relatively underexplored.

Moreover, much of the prior research employs explanatory or causal research designs to examine the relationship between information integration and supply chain performance. While such approaches offer valuable insights into cause-and-effect mechanisms, there remains a need for descriptive quantitative studies that systematically depict the current state of logistics information integration in e-commerce firms (Hair, Black, Babin, & Anderson, 2019). Descriptive quantitative research is essential for identifying patterns, levels, and variations in logistics information practices, thereby providing an empirical foundation for both theoretical development and managerial decision-making.Another gap in the literature concerns the multidimensional nature of logistics information integration. Scholars suggest that integration encompasses internal integration within firms, external integration with supply chain partners, and technological

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integration enabled by digital platforms (Flynn et al., 2010). However, empirical evidence describing how these dimensions are manifested in e-commerce logistics operations remains limited. A quantitative descriptive approach can therefore contribute to a clearer understanding of how integrated logistics information is implemented and how it supports supply chain optimization in practice.

The rapid advancement of digital technologies, including big data analytics, cloud computing, and the Internet of Things, has further reshaped logistics information systems. These technologies facilitate real-time data collection, analysis, and dissemination, enhancing supply chain transparency and predictive capabilities (Wang et al., 2016). Prior studies highlight that digital logistics information systems enable dynamic routing, automated inventory replenishment, and demand forecasting accuracy (Choi, Wallace, & Wang, 2018). Nevertheless, the extent to which e-commerce firms integrate these technologies into a coherent logistics information system varies significantly, underscoring the importance of empirical descriptive research. The practical relevance of this study is also evident from a managerial perspective. In highly competitive e-commerce markets, logistics performance represents a critical source of competitive advantage. Customers increasingly demand fast delivery, accurate order fulfillment, and real-time tracking information, all of which depend on integrated logistics information systems (Hübner et al., 2016). Understanding the current state of logistics information integration can therefore assist managers in identifying gaps and opportunities for supply chain optimization. The objectiveness of this study lies in its focus on providing an empirical, descriptive account of integrated logistics information in supply chain management within the e-commerce industry. Rather than testing causal relationships, this research aims to objectively describe the level, characteristics, and patterns of logistics information integration and its observable contribution to supply chain optimization. By adopting a quantitative descriptive approach, the study seeks to generate generalizable insights grounded in empirical data and aligned with prior research findings.

II. Literature Review and Hypothesis Development

2.1. Evolution of Logistics Information Integration in Supply Chain Management

The integration of logistics information within supply chain management has evolved considerably as firms strive to achieve operational excellence and competitive advantage. Early supply chain theories emphasized physical flows of goods, but contemporary research underscores the pivotal role of information flows as a core enabler of supply chain coordination (Mentzer et al., 2001). Logistics information integration refers to the cohesive alignment and seamless sharing of data across the supply chain, enabling visibility, synchronicity, and strategic decision-making (Flynn, Huo, & Zhao, 2010). As digital technologies matured, scholars began to frame logistics information as a dynamic asset capable of transforming supply chain performance, rather than a mere operational input (Zhao, Huo, Selen, & Yeung, 2011). Recent studies highlight that integrated logistics information improves responsiveness, reduces lead times, and enhances supply chain agility in response to demand variability (Cheng, Chen, & Sun, 2021). In e-commerce contexts, where consumer expectations for rapid delivery and real-time tracking are high, the strategic importance of logistics information integration is even more pronounced (Hübner, Holzapfel, & Kuhn, 2016). For instance, cloud-based logistics platforms facilitate near real-time data sharing, improving collaboration between e-commerce firms and third-party logistics providers (Kache & Seuring, 2017). The digital transformation trend has thus expanded both the scope and complexity of logistics information systems, pushing firms toward integrated models that transcend traditional enterprise boundaries.

However, integration is not homogenous across industries or regions. Developing economies often encounter technological and infrastructural constraints that hinder full integration, leading to fragmented information systems and suboptimal performance outcomes (Wang, Gunasekaran, Ngai, & Papadopoulos, 2016). These disparities underscore the need to understand how integration practices manifest in varied organizational and technological environments. The literature suggests that successful information

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integration requires not only technological investment but also organizational commitment to data sharing and cross-functional coordination (Schoenherr & Swink, 2012). Taken together, these developments establish information integration as central to contemporary supply chain strategies. However, while conceptual and case-based research is abundant, there remains a demand for quantitative descriptive studies that map the current state of logistics information practices, particularly in the rapidly evolving e-commerce sector. Understanding this evolution is crucial to formulating tailored strategies that align digital capabilities with supply chain objectives.

2.2. Mechanisms and Dimensions of Logistics Information Integration

Logistics information integration operates through multiple mechanisms that collectively enhance supply chain performance. Internally, integration aligns data and processes across functional areas such as procurement, warehousing, and distribution, reducing silos and enabling consistent decision frameworks (Flynn et al., 2010). Externally, integration facilitates information exchange between supply chain partners, including suppliers, carriers, and customers, thus extending visibility across the supply network (Yu, Chavez, Jacobs, & Feng, 2018). Technological integration, powered by digital platforms and analytics, further supports these processes by automating data capture, processing, and dissemination (Choi, Wallace, & Wang, 2018). Empirical research demonstrates that internal and external integration dimensions interact to influence outcomes such as operational flexibility and delivery accuracy. For example, firms that integrate internal systems but fail to connect with external partners often achieve limited improvements in responsiveness (Barratt & Oke, 2007). Conversely, comprehensive integration that spans both internal and external systems is associated with improved coordination, reduced distortions in information flow, and enhanced performance metrics (Zhao et al., 2011). These findings reinforce the view that integration is multidimensional and that isolated investments yield suboptimal benefits.

Technological enablers such as cloud computing, IoT sensors, and big data analytics are pivotal to realizing these mechanisms. Big data analytics, in particular, supports demand forecasting, route optimization, and predictive maintenance, providing actionable insights that improve logistics efficiency (Wang et al., 2016). Similarly, real-time tracking enabled by IoT enhances visibility into transportation and inventory movements, facilitating proactive issue resolution (Ivanov & Dolgui, 2020). Such technologies thus form the backbone of integrated logistics information systems. Despite these technological advancements, challenges persist. Data quality issues, interoperability barriers, and security concerns often complicate integration efforts (Cheng et al., 2021). These barriers suggest that technological adoption must be paired with governance mechanisms that ensure data integrity, standardization, and secure sharing practices across partners. This nuanced understanding of integration mechanisms lays the groundwork for examining how integrated logistics information supports optimization in e-commerce supply chains.

2.3. Impact of Integrated Logistics Information on Supply Chain Performance

A substantial body of literature has investigated the effects of logistics information integration on supply chain performance outcomes. Integrated information systems have been linked with shorter order fulfillment cycles, lower logistics costs, and enhanced customer satisfaction (Schoenherr & Swink, 2012). In e-commerce settings, where order volumes are high and customer expectations stringent, these performance outcomes are especially influential in maintaining competitive positioning (Hübner et al., 2016). For instance, logistics integration supports streamlined operations that reduce delivery delays and inventory inaccuracies, directly contributing to service reliability. Research further reveals that firms with higher levels of information integration exhibit greater supply chain flexibility and responsiveness to demand shocks (Dubey et al., 2021). Flexibility is crucial in e-commerce, where fluctuating demand patterns and peak sales events require rapid adjustment of logistics operations. Similarly, enhanced responsiveness through integrated information supports real-time decision making, enabling firms to reroute deliveries, adjust inventory allocations, and

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communicate updates promptly (Kache & Seuring, 2017). These capabilities collectively strengthen supply chain resilience, an increasingly critical attribute in volatile market environments.

Despite positive correlations, the magnitude of impact varies based on firm characteristics and external conditions. Firms with advanced IT capabilities and strategic alignment between supply chain and business goals tend to derive more pronounced benefits from integration (Gunasekaran, Subramanian, & Rahman, 2017). Conversely, firms with limited technological resources or misaligned organizational objectives often realize marginal improvements. This variability underscores the role of contextual factors in moderating the relationship between integration and performance outcomes. Although the relationship between integrated logistics information and performance is well documented, most studies employ causal or explanatory designs, leaving descriptive patterns underexplored. Quantitative descriptive research can illuminate how these relationships vary across different e-commerce contexts, offering granular insights into the distribution of integration practices and associated outcomes. Such evidence can inform tailored strategies that support optimization efforts at operational and strategic levels.

2.4. Current Trends and Research Gaps in E-Commerce Logistics Information

Recent technological advancements have accelerated the evolution of logistics information systems in the e-commerce industry. Cloud-based solutions, predictive analytics, and AI-driven optimization tools are increasingly adopted to support complex logistics processes (Choi et al., 2018). These innovations promise improvements in demand forecasting, automated inventory management, and dynamic routing, but their implementation levels vary widely across firms (Wang et al., 2016). Studies suggest that while leading e-commerce companies leverage advanced analytics for logistics optimization, smaller firms often struggle due to resource constraints (Kache & Seuring, 2017). This variation underscores the need for empirical evidence that describes integration practices across firm sizes and technological maturities. Additionally, research on how emerging technologies interact with organizational processes to produce performance improvements remains fragmented (Ivanov & Dolgui, 2020). Understanding these interactions is essential to identifying optimal pathways for technology deployment and integration in logistics systems.

Another gap pertains to the role of human and organizational factors in integration outcomes. Studies increasingly recognize that technology alone does not guarantee improved performance; effective integration also depends on organizational culture, cross-functional collaboration, and leadership commitment (Barratt & Oke, 2007). These socio-organizational dimensions warrant further descriptive investigation to complement technological analyses. These current trends and gaps point to the necessity of descriptive quantitative studies that map the state of integrated logistics information practices in the e-commerce sector. Such research can provide foundational insights that support more targeted investigations and practical interventions.

2.5. Hypothesis Development

Based on the literature reviewed, integrated logistics information is posited to be positively associated with supply chain optimization outcomes in e-commerce firms. Specifically, greater levels of logistics information integration are expected to correlate with improved operational efficiency, higher responsiveness to demand changes, and increased customer satisfaction. Therefore, the following hypothesis is proposed:

H1: There is a positive relationship between the level of integrated logistics information and supply chain management optimization in the e-commerce industry.

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III. Research Method

This study adopts a qualitative research approach based on a systematic literature study to examine the role of integrated logistics information in optimizing supply chain management within the e-commerce industry. A qualitative literature-based method is considered appropriate because the research aims to develop an in-depth conceptual understanding of existing theories, empirical findings, and emerging trends rather than to test hypotheses using numerical data. Through critical interpretation and synthesis of prior studies, this approach enables the identification of dominant themes, conceptual frameworks, and research gaps relevant to logistics information integration and supply chain optimization. The literature review process was conducted systematically to ensure rigor, transparency, and comprehensiveness. Academic publications were collected from reputable international databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar. The selection of literature focused on peer-reviewed journal articles, review papers, and seminal theoretical works published primarily within the last ten years to capture recent developments in digital logistics and e-commerce supply chains. However, foundational studies were also included to provide theoretical grounding. Keywords such as "integrated logistics information," "supply chain management," "e-commerce logistics," "information integration," and "supply chain optimization" were used in various combinations to retrieve relevant sources.

Inclusion criteria were established to ensure the relevance and quality of the selected studies. Articles were included if they explicitly discussed logistics information systems, information integration, or digital technologies in supply chain management, with particular relevance to e-commerce or digitally enabled supply chains. Studies focusing solely on technical system design without supply chain implications were excluded. After the initial screening based on titles and abstracts, full-text reviews were conducted to assess conceptual relevance, methodological soundness, and contribution to the research topic. Data analysis followed a qualitative content analysis approach. The selected literature was carefully read, coded, and categorized to identify recurring concepts, theoretical perspectives, and empirical insights related to logistics information integration. The coding process was iterative, allowing themes to emerge inductively from the literature while being informed by existing supply chain management theories. Key themes identified included dimensions of logistics information integration, enabling technologies, organizational and inter-organizational coordination mechanisms, and implications for supply chain performance and optimization. This thematic synthesis facilitated the construction of a coherent narrative that integrates diverse research findings into a unified analytical framework.

To enhance the credibility and trustworthiness of the study, triangulation was applied by comparing findings across multiple studies, contexts, and methodological approaches. Differences and similarities among prior research results were critically examined to avoid selective interpretation. In addition, reflexivity was maintained throughout the analysis process by continuously evaluating potential researcher bias and ensuring that interpretations were grounded in the reviewed literature rather than subjective assumptions. Overall, this qualitative literature-based research method provides a robust foundation for understanding how integrated logistics information contributes to supply chain management optimization in the e-commerce industry. By synthesizing and interpreting existing knowledge, the study generates theoretical insights that can inform future empirical research and support practitioners in designing more integrated and resilient logistics information systems.

IV. Result and Discussion

The synthesis of prior studies on integrated logistics information reveals a converging body of evidence that positions information integration as a critical enabler of supply chain management optimization in the e-commerce industry. The results of this qualitative literature-based analysis indicate that integrated logistics information consistently enhances visibility, coordination, responsiveness, and efficiency across complex and fast-moving e-commerce supply chains. At the same time, the literature highlights persistent structural, technological, and organizational challenges that limit the realization of these benefits. This section

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discusses the main results derived from the reviewed studies and interprets them in relation to supply chain optimization outcomes, technological enablers, organizational readiness, and the growing imperative for sustainable and resilient e-commerce logistics systems.

4.1. Integrated Logistics Information as a Foundation for Supply Chain Visibility and Coordination

A central result emerging from the literature is that integrated logistics information functions as the foundational infrastructure that enables end-to-end supply chain visibility in e-commerce environments. Numerous studies emphasize that the fragmentation of logistics data across procurement, warehousing, transportation, and last-mile delivery represents a major obstacle to effective coordination and decision-making (Mentzer et al., 2001; Flynn et al., 2010). In e-commerce, where order cycles are short and customer expectations are high, the absence of integrated information systems often results in delayed responses, inaccurate order tracking, and inefficient resource allocation. The reviewed studies consistently report that firms with higher levels of logistics information integration are better able to synchronize activities across internal functions and external partners, thereby reducing uncertainty and improving operational control (Zhao et al., 2011; Schoenherr & Swink, 2012).

The results further indicate that integrated logistics information enhances coordination by enabling real-time data sharing among supply chain actors. Studies focusing on omni-channel and e-commerce distribution systems show that integration between order management systems, warehouse management systems, and transportation management systems is essential for fulfilling diverse delivery promises, such as same-day or next-day delivery (Hübner et al., 2016). When logistics information is integrated, firms gain a unified view of inventory availability, order status, and transportation capacity, which supports more accurate and timely decision-making. This visibility is particularly important in e-commerce supply chains characterized by high order volumes, small shipment sizes, and volatile demand patterns.

In addition, the literature highlights the importance of external integration with logistics service providers and platform partners. Research shows that information integration across organizational boundaries improves coordination with third-party logistics providers, reduces handover delays, and enhances service reliability (Kache & Seuring, 2017; Cheng et al., 2021). However, the results also reveal that achieving external integration remains challenging, especially in developing economies where technological standards, data governance, and trust among partners are still evolving. These findings suggest that while integrated logistics information is widely recognized as a coordination enabler, its implementation is shaped by contextual and institutional factors. The discussion of these results suggests that supply chain optimization in e-commerce cannot be achieved without first establishing integrated logistics information as a visibility backbone. Integration enables firms to move from reactive problem-solving to proactive coordination, thereby laying the groundwork for further efficiency and performance improvements.

4.2. Optimization Outcomes: Efficiency, Service Performance, and Supply Chain Agility

The second major result concerns the optimization outcomes associated with integrated logistics information in e-commerce supply chains. Across the reviewed studies, integration is consistently linked to improvements in operational efficiency, service performance, and supply chain agility. From an efficiency perspective, integrated information systems reduce duplication of effort, minimize manual interventions, and support better utilization of logistics resources (Flynn et al., 2010; Wang et al., 2016). By enabling real-time visibility into inventory levels and order flows, firms can optimize stock allocation, reduce excess inventory, and lower logistics costs without compromising service quality. Service performance emerges as another key optimization outcome. The literature indicates that integrated logistics information improves order accuracy, on-time delivery, and customer satisfaction by supporting precise execution and rapid exception handling (Hübner et al., 2016; Zhao et al., 2011). In e-commerce, where customer experience is closely tied to delivery performance and transparency, integrated tracking and order status information plays a decisive role in maintaining trust and loyalty. Studies show that customers increasingly expect real-time updates and reliable delivery windows, which can only be achieved through seamless integration of logistics data across systems and partners.

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Agility and responsiveness represent a third dimension of optimization highlighted in the literature. Integrated logistics information enables firms to sense and respond quickly to demand fluctuations, capacity constraints, and operational disruptions (Ivanov & Dolgui, 2020; Dubey et al., 2021). By shortening information lead times and enabling faster decision cycles, integration supports dynamic adjustments in routing, inventory deployment, and fulfillment strategies. This agility is particularly valuable in e-commerce contexts characterized by seasonal peaks, promotional events, and sudden demand shocks.Despite these positive outcomes, the results also indicate that optimization effects are not uniform across firms. Studies suggest that the magnitude of benefits depends on factors such as technological maturity, organizational alignment, and managerial commitment (Gunasekaran et al., 2017; Kache & Seuring, 2017). Firms that invest in technology without aligning processes and decision rights often achieve limited improvements. This finding underscores that optimization through integrated logistics information is contingent upon complementary organizational capabilities and strategic alignment.

4.3. Technological Enablers and Organizational Barriers to Integration

The third set of results relates to the technological enablers and organizational barriers that shape the effectiveness of logistics information integration. The literature identifies digital technologies such as cloud computing, big data analytics, Internet of Things applications, and automation as key enablers of integration in e-commerce logistics (Wang et al., 2016; Choi et al., 2018). These technologies facilitate real-time data capture, processing, and dissemination, thereby enhancing visibility and supporting predictive and prescriptive decision-making. Integrated digital platforms allow firms to connect disparate logistics systems and coordinate activities across complex networks of sellers, warehouses, and carriers. However, the results also reveal significant barriers that hinder integration efforts. Data quality issues, lack of interoperability, and inconsistent data standards frequently limit the usefulness of integrated systems (Cheng et al., 2021; Schoenherr & Swink, 2012). Organizational barriers, including resistance to data sharing, insufficient skills, and weak governance structures, further complicate implementation. Studies emphasize that logistics information integration is a socio-technical process that requires changes in organizational culture, incentives, and collaboration practices, not merely technological upgrades (Barratt & Oke, 2007).

Another recurring barrier identified in the literature is the fragmentation of e-commerce ecosystems. Marketplaces, sellers, logistics providers, and technology vendors often operate heterogeneous systems with differing priorities and capabilities. While application programming interfaces and digital platforms offer technical solutions, effective integration also depends on shared standards, trust, and coordination mechanisms. These findings suggest that future optimization efforts must address both technical and relational dimensions of integration. From a discussion perspective, these results imply that technological investment alone is insufficient to achieve supply chain optimization. Instead, integrated logistics information must be supported by organizational readiness, governance frameworks, and collaborative relationships that enable data to be transformed into coordinated action.

4.4. Integrated Logistics Information for Sustainable and Resilient E-Commerce Supply Chains

The final major result extends the discussion toward sustainability and long-term resilience, reflecting emerging trends in the literature. Recent studies increasingly emphasize that integrated logistics information is essential not only for economic optimization but also for environmental and social sustainability in e-commerce supply chains (Baryannis et al., 2021; Sahoo et al., 2024). E-commerce logistics is associated with significant environmental impacts, including carbon emissions from last-mile delivery, packaging waste, and high return rates. Addressing these challenges requires accurate measurement and traceability of environmental data, which in turn depends on integrated information systems. The literature indicates that integrated logistics information can support sustainable optimization by enabling route planning that reduces emissions, consolidation of shipments, and more efficient reverse logistics processes (Patro et al., 2024; Zhang et al., 2024). Blockchain and traceability technologies are increasingly discussed as mechanisms for enhancing transparency and trust in sustainability data across supply chains. However, studies caution that

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such technologies must be integrated with existing logistics information systems to deliver meaningful sustainability outcomes.

Resilience also emerges as a critical dimension of sustainable supply chain optimization. Integrated logistics information enhances resilience by improving situational awareness, enabling early detection of disruptions, and supporting coordinated responses across supply chain partners (Ivanov & Dolgui, 2020; Dubey et al., 2021). In the context of climate change, regulatory pressures, and geopolitical uncertainty, resilience and sustainability are becoming intertwined objectives. Integrated information systems allow firms to balance cost, service, and environmental goals while adapting to external shocks. These results point to a future research agenda focused on sustainable and resilient e-commerce logistics. Scholars are encouraged to explore how integrated logistics information can support low-carbon optimization, circular supply chains, and inclusive digital ecosystems. Such studies would extend current knowledge by linking information integration with broader societal and environmental outcomes, thereby reinforcing the strategic importance of integrated logistics information in the evolving e-commerce landscape.

V. Conclusion

This study concludes that integrated logistics information constitutes a fundamental capability for supply chain management optimization in the e-commerce industry. Synthesizing prior theoretical and empirical literature, the findings demonstrate that logistics information integration enables superior supply chain visibility, coordination, and responsiveness, which are essential in managing the complexity, speed, and uncertainty inherent in e-commerce operations. From a theoretical perspective, this study reinforces and extends supply chain integration theory by positioning integrated logistics information not merely as a supporting technological resource, but as a strategic information-processing capability that underpins optimization outcomes. The results highlight that optimization emerges through the interaction of information integration with organizational alignment, digital infrastructure, and inter-organizational collaboration. This contributes to the literature by clarifying that the performance effects of integration are contingent, multi-dimensional, and context-dependent, particularly in digitally intensive environments such as e-commerce. Moreover, by linking integration to emerging themes of agility, resilience, and sustainability, this study broadens the conceptual scope of supply chain management research beyond efficiency-driven models toward more adaptive and future-oriented frameworks.

From a theoretical standpoint, the study also offers implications for ongoing research on digital transformation and supply chain sustainability. Integrated logistics information is shown to be a prerequisite for achieving not only economic optimization but also environmental and resilience-related objectives. The literature synthesis suggests that sustainability initiatives such as low-carbon logistics, efficient reverse flows, and transparent performance measurement require integrated, reliable, and timely logistics data across supply chain actors. This insight advances existing theory by highlighting information integration as a bridging construct between operational optimization and sustainable supply chain management. Furthermore, the study underscores the need for future research to move beyond isolated technology adoption perspectives and to examine integration maturity, governance mechanisms, and socio-technical dynamics as key explanatory factors. In doing so, this research provides a conceptual foundation for future qualitative and quantitative studies that seek to model the complex relationships between logistics information integration, digital capabilities, and long-term supply chain performance.

In terms of managerial implications, the findings suggest that managers in e-commerce firms should view integrated logistics information as a strategic investment rather than a purely operational tool. Effective supply chain optimization requires the alignment of internal systems, external partner interfaces, and decision-making processes to create a single, coherent information environment. Managers should prioritize data quality, interoperability, and cross-functional coordination to ensure that integrated information translates into actionable insights and operational improvements. Additionally, the results emphasize the importance of organizational readiness, including skills development, governance structures, and collaborative relationships with logistics partners, in realizing the full benefits of integration. From a strategic

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perspective, integrating logistics information also supports resilience and sustainability objectives by enabling proactive risk management, emission-aware planning, and efficient reverse logistics. Therefore, managers are encouraged to embed logistics information integration into broader digital transformation and sustainability strategies, ensuring that supply chain optimization efforts remain competitive, resilient, and aligned with evolving market and regulatory demands.

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