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Cost and Performance Analysis of Logistics on E-Commerce Platforms: A Management Accounting Approach to Industrial Operational Efficiency

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ABSTRACT
This study examines logistics cost structures and logistics performance on e-commerce platforms from a management accounting perspective to understand their implications for industrial operational efficiency. Using a qualitative literature-based research approach, the study systematically reviews recent peer-reviewed publications in the fields of e-commerce logistics, supply chain management, and management accounting, and synthesizes them through thematic analysis. The findings indicate that logistics costs in e-commerce environments are predominantly activity-driven, highly variable, and concentrated in warehousing, last-mile delivery, and reverse logistics, where service-level requirements strongly influence cost behavior. The analysis further reveals that logistics performance indicators—particularly delivery reliability, fulfillment accuracy, and return processing efficiency—play a critical role in converting cost management efforts into operational efficiency outcomes. Moreover, the study highlights that management accounting systems integrating activity-based costing and multidimensional performance measurement provide superior cost visibility and support strategic decision-making in complex logistics networks. Overall, the research contributes to the literature by conceptualizing industrial operational efficiency as the result of effective alignment between logistics cost management and performance measurement, rather than cost minimization alone, and offers insights relevant to both academic inquiry and managerial practice in digital commerce environments.

Keywords: E-Commerce Logistics, Logistics Cost Management, Logistics Performance, Management Accounting, Operational Efficiency.
JEL Code: M41, L81, L91

I. Introduction

The rapid advancement of digital technology has fundamentally transformed global business models, particularly in the domain of electronic commerce (e-commerce). E-commerce platforms have reshaped how goods and services are exchanged by enabling transactions that transcend geographical boundaries, reduce market entry barriers, and provide consumers with unprecedented levels of convenience

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and choice. As competition among e-commerce firms intensifies, operational efficiency has emerged as a critical determinant of sustainability and long-term competitiveness. Among the various operational functions within e-commerce businesses, logistics plays a central role due to its direct influence on cost structures, service quality, delivery speed, and customer satisfaction. Consequently, understanding the cost behavior and performance implications of logistics operations has become an essential concern for both practitioners and scholars, especially within the framework of management accounting and operational efficiency analysis.

Logistics in e-commerce encompasses a complex set of activities, including order processing, warehousing, inventory management, transportation, and last-mile delivery. Unlike traditional retail logistics, e-commerce logistics must handle high order volumes, demand variability, rapid delivery expectations, and frequent returns. These characteristics significantly increase operational complexity and cost sensitivity. Logistics costs often represent a substantial proportion of total operating expenses for e-commerce firms, in some cases exceeding marketing or platform development costs. As a result, inefficient logistics management can erode profit margins and undermine firm performance, even in high-revenue platforms. From a management accounting perspective, logistics costs are not merely expenses to be minimized, but strategic resources that require systematic measurement, analysis, and control to enhance operational efficiency and value creation.

In recent years, the growth of e-commerce has been accompanied by rising customer expectations regarding delivery speed, reliability, and transparency. Same-day or next-day delivery options, real-time order tracking, and flexible return policies have become industry standards rather than competitive advantages. While these service enhancements contribute to customer satisfaction and retention, they also impose additional cost burdens on logistics systems. This creates a managerial dilemma in which firms must balance cost efficiency with performance effectiveness. Management accounting provides analytical tools to address this challenge by linking cost information with operational performance indicators, thereby supporting informed decision-making. However, the extent to which logistics costs are efficiently managed and translated into operational performance outcomes remains an empirical question that warrants systematic investigation.

A significant phenomenon shaping contemporary e-commerce logistics is the increasing reliance on third-party logistics (3PL) providers and integrated logistics networks. Many e-commerce platforms outsource logistics activities to reduce capital investment and gain access to specialized expertise. While outsourcing can improve flexibility and scalability, it also introduces challenges related to cost transparency, performance monitoring, and coordination. Studies have shown that inadequate cost allocation and performance measurement systems can lead to suboptimal outsourcing decisions and reduced operational efficiency. Moreover, the expansion of cross-border e-commerce has further complicated logistics operations by introducing regulatory, infrastructural, and cost variability across regions. These developments highlight the growing importance of robust management accounting approaches to analyze logistics costs and performance in a holistic and systematic manner.

Empirical research on logistics and e-commerce performance has expanded considerably over the past decade. Previous studies have consistently demonstrated that logistics efficiency is positively associated with firm performance, customer satisfaction, and competitive advantage. For example, Christopher (2016) emphasized that logistics should be viewed as a strategic process that integrates cost management with service performance. Similarly, Gunasekaran, Subramanian, and Rahman (2017) found that effective logistics performance measurement systems contribute significantly to operational excellence in e-commerce supply chains. Their findings suggest that firms with advanced cost tracking and performance evaluation mechanisms are better positioned to respond to market volatility and customer demands.

From a management accounting perspective, several scholars have highlighted the role of cost management techniques in enhancing logistics efficiency. Kaplan and Atkinson (2014) argued that traditional costing systems often fail to capture the complexity of modern logistics operations, leading to distorted cost information and poor managerial decisions. They advocated for activity-based costing (ABC) and performance

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measurement systems that align cost drivers with operational activities. In the context of e-commerce, Hübner, Kuhn, and Wollenburg (2016) demonstrated that detailed cost analysis of warehousing and fulfillment processes can reveal significant inefficiencies and improvement opportunities. Their study underscored the importance of integrating accounting information with logistics process analysis to achieve operational efficiency. Further empirical evidence is provided by Wamba et al. (2020), who examined the impact of digital technologies on logistics performance in e-commerce firms. Their findings indicated that data-driven cost management and performance analytics significantly enhance operational efficiency by improving forecasting accuracy, inventory turnover, and delivery reliability. This suggests that management accounting systems must evolve alongside technological advancements to remain relevant and effective. Additionally, research by Lai, Zhao, and Wang (2019) showed that logistics cost efficiency has a direct effect on overall firm performance in e-commerce platforms, particularly in highly competitive markets. Their study reinforced the notion that logistics costs should be strategically managed rather than treated as unavoidable operational expenses.

Despite the growing body of literature, several gaps remain. First, many existing studies focus on specific logistics activities or technological interventions without providing a comprehensive analysis of logistics costs and performance within a unified management accounting framework. Second, prior research often adopts analytical or explanatory designs, while descriptive quantitative studies that systematically map cost structures and performance outcomes across e-commerce logistics operations are relatively limited. Third, there is a need for empirical evidence that explicitly links logistics cost behavior with operational efficiency indicators, such as order fulfillment rates, delivery lead times, and cost-to-serve metrics, particularly at the platform level. Addressing these gaps is essential to advance both theoretical understanding and managerial practice. The relevance of this research is further strengthened by the current economic environment, characterized by rising fuel prices, labor shortages, and increased pressure on supply chains. These factors have amplified logistics costs and exposed inefficiencies within e-commerce operations. In response, managers are increasingly seeking accounting-based insights to optimize logistics performance without compromising service quality. information is crucial for benchmarking, strategic planning, and continuous improvement initiatives.

Therefore, this study aims to conduct a cost and performance analysis of logistics operations on e-commerce platforms using a management accounting approach to assess industrial operational efficiency. By employing a quantitative descriptive research design, this study seeks to systematically describe logistics cost components, analyze performance indicators, and examine their alignment with operational efficiency objectives. The focus is not on testing causal relationships, but on providing an empirical overview that reflects actual operational conditions based on measurable data. This approach is particularly suitable for identifying patterns, trends, and disparities in logistics cost management and performance outcomes. The objectivity of this research lies in its reliance on quantitative data and standardized measurement indicators commonly used in management accounting and logistics performance evaluation. By utilizing numerical cost data, efficiency ratios, and performance metrics, the study minimizes subjective bias and enhances replicability. Furthermore, the descriptive nature of the analysis ensures that findings are presented as empirical observations rather than normative judgments, allowing stakeholders to interpret the results within their specific organizational contexts. This objectivity is essential for generating reliable insights that can inform managerial decision-making and future analytical or explanatory research.

II. Literature Review and Hypothesis Development

2.1. Logistics Cost Structures in E-Commerce and The Management Accounting Lens

E-commerce competition increasingly hinges on operational efficiency, and logistics is frequently the most cost-sensitive function because it connects digital demand with physical fulfillment under tight time and service constraints. Contemporary studies emphasize that e-commerce logistics costs are not a single

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category but a portfolio of interdependent cost pools—order processing, inbound handling, storage, picking and packing, line-haul transport, last-mile distribution, and returns—whose proportions shift with product mix, demand volatility, and service promises such as next-day delivery (Uzun & Deran, 2025; Zennaro et al., 2022). Cost behavior in e-commerce firms can differ from traditional retailers, including a distinctive mix of operating costs shaped by technology-enabled processes and scalable fulfillment networks, implying that cost analysis must be tailored to platform-based operations rather than borrowed directly from brick-and-mortar contexts (Argilés-Bosch et al., 2023). In this setting, management accounting becomes central because it provides the vocabulary and logic for tracing resource consumption to activities and linking those activities to performance outputs that matter for industrial operational efficiency.

A core management accounting issue is that traditional volume-based costing can obscure logistics cost drivers when overhead and indirect costs dominate, especially in warehouses and last-mile distribution where labor, equipment time, failed delivery attempts, and re-delivery loops are substantial. Research on e-fulfillment cost management shows that firms increasingly seek more granular visibility over cost-to-serve and process-level cost drivers, precisely because e-commerce strategies (e.g., ship-from-store, centralized fulfillment, dark stores, lockers) produce different cost patterns and trade-offs (Rodríguez-García et al., 2024). Operational analyses of delivery systems highlight that the most influential cost components may include time-related costs and re-delivery costs, suggesting that managerial attention should prioritize the "avoidable" costs embedded in process design (Alves et al., 2023). From a costing-method standpoint, activity-based logic is frequently presented as a better fit for logistics contexts, because it assigns resource costs to activities using cost drivers that reflect operational reality rather than broad averages (Tan, 2023; RSI International, 2024).

The e-commerce warehouse is a particularly important locus for management accounting analysis because small improvements in picking, packing, and batching can cascade into measurable cost and service impacts. Studies evaluating integrated picking and packing planning demonstrate that operational coordination in warehouses can materially affect efficiency outcomes, reinforcing the claim that cost is shaped by process architecture rather than only by scale (Zhong et al., 2022). Recent frameworks that structure fulfillment costs in online grocery and omnichannel contexts further show that warehousing and fulfillment cost breakdowns are sensitive to delivery model choices and service-level expectations, which is consistent with a management accounting perspective that treats cost as a function of activities and resource drivers (Rodríguez-García et al., 2023; Rodríguez-García et al., 2024). In e-commerce, these operational choices are often made at platform level and then propagated across networks, making descriptive quantitative profiling of cost composition a useful baseline for managerial benchmarking.

Finally, logistics cost analysis in e-commerce must recognize that sourcing decisions—whether to insource logistics or outsource to third-party logistics providers—reshape both cost transparency and controllability. Analytical work on logistics sourcing under competitive conditions suggests that outsourcing decisions can depend on strategic factors (including technology readiness and competitive intensity), and that "green" capabilities can become part of the logistics choice calculus (Gong et al., 2024). Complementary discussions of logistics cost management under IoT-enabled environments argue that digital connectivity can improve visibility and coordination, potentially reducing inefficiencies across information flow and execution (ResearchGate, 2025). Taken together, this literature supports a descriptive quantitative approach that maps cost structures and identifies where cost concentrations and cost volatility arise across key logistics activities, thereby creating an accounting-informed picture of operational efficiency conditions rather than relying on assumptions about "where the money goes" (Uzun & Deran, 2025; Argilés-Bosch et al., 2023).

2.2. Logistics Performance Measurement and Operational Efficiency in Platform-Based Fulfillment Networks

Cost analysis becomes more actionable when interpreted alongside logistics performance, because operational efficiency in industrial settings is fundamentally about converting inputs (resources and costs)

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into outputs (service and throughput) with minimal waste. E-commerce logistics performance is often operationalized through indicators such as order cycle time, on-time delivery, delivery accuracy, fulfillment rate, inventory turnover, and returns processing time, and recent reviews emphasize that e-commerce implementation requires careful alignment between influencing factors and key performance indicators across logistics areas (Zennaro et al., 2022). In the last-mile domain, empirical studies consistently show that delivery speed, delivery accuracy, and return handling quality matter for customer outcomes, implying that performance cannot be reduced to cost alone because service failures can create downstream costs through rework, refunds, and churn (Alam et al., 2025; Trung, n.d.). For platform operators, this means the performance system must capture both operational and customer-facing consequences of logistics execution.

A substantial stream of research promotes integrated performance measurement frameworks that balance financial and non-financial metrics, particularly in complex supply chains. While the balanced scorecard is a well-established concept, its continued relevance is reflected in recent syntheses and applications that discuss how multi-perspective measurement supports strategic alignment and operational control (Bhagwat & Sharma, 2007; Hoque, 2023). Supply chain performance measurement system research also emphasizes resilience and the need to evaluate performance systems under uncertainty, which is directly relevant to e-commerce where volatility (promotions, seasonal spikes, flash sales) can destabilize both cost and service metrics (Khourshed et al., 2024). From a management accounting viewpoint, these frameworks matter because they provide the structure for integrating logistics cost information with operational KPIs, enabling decision-makers to judge whether cost increases are "productive" (improving service and throughput) or "unproductive" (reflecting inefficiency and rework).

Performance and cost are especially entangled in last-mile delivery, widely recognized as both operationally complex and economically burdensome. Recent technical and review-oriented research shows a strong focus on optimizing last-mile delivery through network design, technology adoption, and operational policy choices, often explicitly modeling cost–service trade-offs (Shuaibu et al., 2025). Simulation and decision-support studies comparing traditional and "smart" last-mile technologies demonstrate that economic and environmental performance can be jointly assessed, reinforcing the need for performance dashboards that go beyond cost per delivery to include reliability, emissions, and capacity utilization (Gnoni et al., 2025). Emerging evidence on autonomous delivery systems suggests large potential cost reductions under certain density and configuration conditions, but these benefits are contingent on operational parameters—again underscoring that performance measurement must be context-sensitive rather than one-size-fits-all (Klar et al., 2025).

At platform scale, performance measurement also intersects with policy and urban constraints, because delivery externalities (congestion, emissions) and regulatory responses can indirectly affect operating costs and feasible service levels. Systematic literature and bibliometric analyses of last-mile distribution highlight the expanding research focus on urban impacts and sustainability constraints, reflecting that performance evaluation increasingly includes environmental dimensions alongside economic efficiency (Kumar et al., 2024; Viu-Roig & Alvarez-Palau, 2020). Practice-oriented reports similarly show that city logistics initiatives aim to reduce traffic and emissions while maintaining service standards, indicating that operational efficiency is being interpreted through a broader lens than purely internal cost minimization (World Economic Forum, 2024; World Economic Forum, 2025). For a quantitative descriptive study, these developments justify measuring logistics performance as a multidimensional construct—capturing time, quality, and throughput indicators—so that cost patterns can be interpreted against the service and sustainability outcomes that platforms are expected to deliver (Zennaro et al., 2022; Shuaibu et al., 2025).

2.3. Current Developments: Returns, Technology-Enabled Logistics, and Hypothesis Development for Cost–Performance Efficiency

Recent developments underscore that reverse logistics (returns) is not a peripheral activity but a central operational reality that can materially influence both cost and performance in e-commerce. Evidence

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suggests that returns processes are complex and expensive, with high return rates reported in recent market discussions, implying growing volumes of inspection, restocking, refurbishing, and disposal activities that must be managed as a structured logistics stream rather than an exception flow (Savills, 2025). Empirical work focusing on reverse logistics in e-commerce highlights the importance of understanding how customer behavior, return policies, and satisfaction dynamics relate to cost control, which aligns with management accounting's emphasis on identifying controllable costs and designing policies that reduce avoidable waste (Saravanan, 2026; Thibbotuwawa et al., 2023). Additionally, operational fraud and verification challenges have become increasingly salient; recent reporting shows firms deploying AI-based tools to detect return fraud and reduce loss, illustrating that performance measurement in reverse logistics now includes integrity and loss-prevention dimensions that feed back into cost-to-serve (Reuters, 2025).

Technology-enabled logistics is another major driver reshaping both cost structures and performance expectations. Research on last-mile delivery technologies documents the fragmentation of adoption contexts and the variety of technology pathways—lockers, crowdsourcing, routing optimization, automation, and data analytics—each with distinct cost and performance implications (Mogire et al., 2025; Shuaibu et al., 2025). Cost-oriented studies on parcel lockers, for example, show how alternative delivery infrastructures can reduce costs associated with failed delivery attempts and re-delivery loops, potentially improving profitability when utilization is sufficient (Alves et al., 2023; Kraisorn et al., 2025). At the same time, sustainability-focused analyses emphasize that "smart" last-mile solutions should be assessed jointly on economic and environmental outcomes, which strengthens the rationale for linking management accounting metrics (e.g., cost per order, cost per stop, cost per return) with operational KPIs (e.g., on-time rate, first-attempt success, return cycle time) in an integrated efficiency assessment (Gnoni et al., 2025; Ojha et al., 2025).

From a management accounting approach, the practical implication of these trends is that the unit of analysis often shifts from aggregate logistics spend to activity-level and customer-segment-level costing. E-fulfillment cost management work indicates that firms evolve their strategies partly by improving cost visibility and by aligning cost categories with operational decisions (Rodríguez-García et al., 2024). Broader discussions of cost management accounting techniques in logistics settings suggest that accounting practices can be linked to supply chain performance when measurement systems are deliberately designed to connect costs, activities, and outcomes (Nguyen et al., 2024). This body of evidence supports a research framing in which "industrial operational efficiency" is interpreted as the degree to which e-commerce logistics converts spending into reliable, fast, and accurate fulfillment under constraints, and therefore should be described through both cost decomposition and performance profiling, rather than through cost minimization alone (Argilés-Bosch et al., 2023; Zennaro et al., 2022).

Building on the literature above, hypothesis development can formalize the expected relationships among logistics cost management, logistics performance, and operational efficiency in e-commerce platforms, even if the immediate study employs a descriptive quantitative design to establish baselines. The evidence implies that better logistics cost management conceptualized as higher cost visibility, tighter control of major cost drivers (e.g., re-delivery, picking time, return handling), and more accurate activity-level tracing—should be associated with higher operational efficiency outcomes (Uzun & Deran, 2025; Rodríguez-García et al., 2024). It also suggests that logistics performance dimensions, especially last-mile reliability and reverse logistics effectiveness, may function as pathways through which cost management translates into efficiency, because service failures create rework costs and throughput losses (Alam et al., 2025; Savills, 2025). Accordingly, the following hypotheses are consistent with the research base:

H1 proposes that logistics cost management effectiveness is positively associated with industrial operational efficiency on e-commerce platforms (Argilés-Bosch et al., 2023; Tan, 2023).

H2 proposes that logistics performance (delivery speed, accuracy, and return handling efficiency) is positively associated with industrial operational efficiency (Alam et al., 2025; Shuaibu et al., 2025).

H3 proposes that logistics performance mediates the relationship between logistics cost management effectiveness and industrial operational efficiency, reflecting the mechanism by which cost visibility and control improve execution quality and throughput (Rodríguez-García et al., 2024; Gnoni et al., 2025).

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H4 proposes that technology enablement (e.g., lockers, automation, analytics) moderates the cost–performance relationship by strengthening the efficiency impact of cost management under digitally supported operations (Alves et al., 2023; Mogire et al., 2025).

These hypotheses translate recent empirical and conceptual insights into a coherent research model that can be tested in future explanatory work, while also guiding which variables should be described and benchmarked in the present accounting-oriented cost and performance profiling.

III. Research Method

This study adopts a qualitative research approach based on a systematic literature study to explore cost and performance analysis of logistics on e-commerce platforms from a management accounting perspective. A qualitative literature-based methodology is appropriate because the objective of the research is to develop an in-depth conceptual understanding of how logistics costs are structured, managed, and evaluated in relation to operational performance and industrial efficiency, rather than to test statistical relationships using numerical data. By synthesizing existing scholarly evidence, this approach enables the identification of dominant themes, theoretical perspectives, and analytical frameworks that have emerged in recent research, thereby providing a solid interpretative foundation for the study. The literature study was conducted through a structured and transparent review process to ensure rigor and credibility. Academic sources were identified primarily from reputable international databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar, which are widely recognized for indexing peer-reviewed journals in logistics, supply chain management, management accounting, and e-commerce. The search strategy employed a combination of keywords such as “e-commerce logistics,” “logistics cost management,” “logistics performance measurement,” “management accounting,” and “operational efficiency.” These keywords were used both individually and in combination to capture a broad yet relevant body of literature. To ensure the relevance and timeliness of the review, the search prioritized articles published within the last ten years, with particular emphasis on recent studies that reflect current developments in digital logistics and platform-based operations.

Following the identification stage, a screening process was applied to refine the corpus of literature. Articles were selected based on predefined inclusion criteria, namely relevance to e-commerce or digital logistics contexts, explicit discussion of logistics cost structures or performance indicators, and conceptual or empirical contributions related to management accounting or operational efficiency. Studies focusing solely on traditional retail logistics without reference to digital or platform-based environments were excluded. The full texts of selected articles were then reviewed in detail to assess their methodological quality, theoretical grounding, and relevance to the research objectives. Data analysis was conducted using a qualitative thematic analysis approach. Key concepts, definitions, and findings were extracted from each study and coded inductively to identify recurring themes and patterns. These themes included logistics cost components, costing approaches, performance measurement frameworks, last-mile delivery challenges, reverse logistics, and the role of digital technologies in enhancing efficiency. The coding process was iterative, allowing themes to be refined and reorganized as new insights emerged from the literature. Through this process, the study synthesized diverse perspectives into an integrated narrative that highlights how management accounting principles are applied to analyze and improve logistics performance in e-commerce settings.

To enhance the trustworthiness of the findings, methodological rigor was ensured through transparency and consistency in the review and analysis procedures. The use of multiple databases reduced the risk of publication bias, while cross-checking themes across different studies enhanced analytical validity. Reflexivity was maintained by critically comparing findings across sources and acknowledging variations in context, methodology, and theoretical orientation. Although this study does not involve primary data collection, the systematic and interpretative nature of the literature analysis provides a reliable basis for drawing meaningful conclusions. In summary, the qualitative literature-based research method employed in this study enables a comprehensive and nuanced understanding of logistics cost and performance analysis

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on e-commerce platforms. By synthesizing existing research through a management accounting lens, the study offers conceptual insights into industrial operational efficiency and establishes a foundation for future empirical investigations, including quantitative or mixed-method approaches that may test and extend the propositions identified in the literature.

IV. Results and Discussion

The results of this qualitative literature-based study provide a comprehensive understanding of how logistics cost structures and performance dimensions interact within e-commerce platforms to shape industrial operational efficiency. Drawing on recent and relevant studies in logistics management, supply chain analytics, and management accounting, the findings reveal that logistics efficiency in e-commerce is not solely determined by cost minimization but by the strategic alignment between cost visibility, performance measurement, and operational decision-making. This section discusses the synthesized results by examining major thematic findings emerging from the literature and situating them within a management accounting framework. The discussion also extends these insights toward sustainable and future-oriented research trajectories, particularly in the context of digital transformation and evolving platform-based business models.

4.1. Logistics Cost Structures and Cost Behavior in E-Commerce Platforms

The first major finding concerns the distinctive nature of logistics cost structures in e-commerce platforms compared to traditional retail or manufacturing systems. The literature consistently indicates that logistics costs in e-commerce are characterized by high variability, a significant proportion of indirect costs, and strong sensitivity to service-level commitments such as delivery speed and return flexibility (Argilés-Bosch et al., 2023; Uzun & Deran, 2025). Unlike conventional distribution systems, e-commerce logistics must accommodate fragmented demand, small order sizes, and geographically dispersed customers, resulting in complex cost behavior that challenges traditional accounting approaches.

Management accounting research highlights that logistics costs in e-commerce are predominantly driven by activities rather than volumes, especially in warehousing, order fulfillment, and last-mile delivery (Kaplan & Atkinson, 2014; Tan, 2023). Studies analyzing e-fulfillment operations show that picking, packing, and sorting activities account for a large share of logistics expenditure, and inefficiencies in these processes can significantly inflate cost-to-serve metrics (Rodríguez-García et al., 2024; Zhong et al., 2022). These findings underscore the limitations of traditional absorption costing, which tends to allocate overhead using broad averages that obscure the true consumption of resources across logistics activities.

The results further indicate that last-mile delivery represents the most cost-intensive and operationally uncertain component of e-commerce logistics. Empirical and review-based studies demonstrate that factors such as failed delivery attempts, customer absence, and route inefficiencies contribute disproportionately to cost escalation in last-mile operations (Alves et al., 2023; Shuaibu et al., 2025). From a management accounting perspective, these costs are often hidden within aggregated transportation expenses, limiting managerial awareness of avoidable cost drivers. The literature suggests that activity-based costing and cost-to-serve analysis offer more accurate representations of last-mile cost behavior, enabling managers to identify inefficiencies and evaluate alternative delivery models, such as parcel lockers or micro-fulfillment centers (Kraisorn et al., 2025; Gnoni et al., 2025).

Another important cost dimension identified in the literature is reverse logistics. Recent studies report increasing return rates in e-commerce, particularly in fashion and consumer electronics, which substantially increase logistics costs through inspection, repackaging, restocking, and disposal processes (Savills, 2025; Thibbotuwawa et al., 2023). These costs are often underrepresented in conventional logistics accounting systems, leading to distorted profitability assessments. Management accounting research emphasizes the need to treat reverse logistics as a core operational process rather than an exception, integrating its cost drivers into performance evaluation and pricing decisions (Saravanan, 2026; Nguyen et al.,

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2024). Collectively, these findings suggest that logistics cost structures in e-commerce are inherently complex and activity-intensive, requiring accounting systems that provide granular, process-level cost information. The literature supports the argument that improved cost visibility is a prerequisite for operational efficiency, but it also highlights that cost data alone is insufficient without being interpreted in conjunction with logistics performance outcomes.

4.2. Logistics Performance Measurement and Its Relationship to Operational Efficiency

The second major theme emerging from the literature concerns logistics performance measurement and its critical role in translating cost management into operational efficiency. The reviewed studies consistently emphasize that operational efficiency in e-commerce logistics is multidimensional, encompassing time-based, quality-based, and reliability-based performance indicators alongside financial measures (Zennaro et al., 2022; Alam et al., 2025). Key performance metrics identified across studies include order cycle time, on-time delivery rate, fulfillment accuracy, inventory turnover, and return processing time. From a management accounting standpoint, the results indicate that logistics performance measurement systems are most effective when they integrate financial and non-financial indicators within a coherent framework. Research drawing on balanced scorecard and supply chain performance models demonstrates that firms that align logistics KPIs with strategic objectives achieve superior efficiency outcomes compared to those relying on isolated financial metrics (Bhagwat & Sharma, 2007; Hoque, 2023). In e-commerce contexts, this integration is particularly important because service failures directly generate additional costs through rework, refunds, and customer churn, thereby linking performance shortfalls to financial consequences (Alam et al., 2025).

The literature also highlights the importance of performance measurement in managing last-mile delivery complexity. Studies on last-mile logistics consistently show that delivery reliability and first-attempt success rates are more critical determinants of efficiency than speed alone, as failed deliveries significantly increase operational costs (Shuaibu et al., 2025; Alves et al., 2023). Performance measurement systems that track these indicators enable managers to identify trade-offs between cost and service and to design delivery strategies that optimize overall efficiency rather than isolated metrics. Furthermore, performance measurement is increasingly influenced by sustainability considerations. Recent studies and policy-oriented reports suggest that logistics performance evaluation now extends beyond economic efficiency to include environmental and social dimensions, such as emissions, congestion, and labor conditions (Kumar et al., 2024; World Economic Forum, 2025). This expansion has implications for management accounting, as firms are required to incorporate non-financial performance data into decision-making processes. The literature suggests that integrating sustainability metrics with logistics performance indicators can enhance long-term operational efficiency by reducing regulatory risk and improving stakeholder acceptance (Gnoni et al., 2025; Viu-Roig & Alvarez-Palau, 2020). Overall, the findings indicate that logistics performance measurement acts as a mediating mechanism between cost management and operational efficiency. Effective performance systems enable firms to interpret cost information in operational terms, thereby supporting informed managerial decisions that balance efficiency and service quality.

4.3. Management Accounting as an Integrative Mechanism for Cost–Performance Alignment

The third major result relates to the integrative role of management accounting in aligning logistics costs and performance to achieve industrial operational efficiency. The literature consistently positions management accounting as a bridge between operational data and strategic decision-making, particularly in complex, technology-driven environments such as e-commerce platforms (Kaplan & Atkinson, 2014; Argilés-Bosch et al., 2023). Unlike financial accounting, which focuses on external reporting, management accounting emphasizes internal information use, making it particularly suitable for analyzing logistics operations. One key insight from the literature is that management accounting systems that incorporate activity-based logic and

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performance analytics are better equipped to support operational efficiency. Studies show that firms adopting activity-based costing, cost-to-serve analysis, and process-based performance dashboards gain deeper insights into resource consumption patterns and operational bottlenecks (Tan, 2023; Rodríguez-García et al., 2024). These systems allow managers to evaluate the economic consequences of operational decisions, such as changing delivery modes or return policies, within a structured analytical framework.

The literature also highlights the growing role of digital technologies in enhancing management accounting capabilities. Big data analytics, IoT, and AI-driven systems enable real-time tracking of logistics activities, improving both cost accuracy and performance monitoring (Wamba et al., 2020; Mogire et al., 2025). These technologies support dynamic cost allocation and predictive performance analysis, allowing firms to respond more effectively to demand fluctuations and operational disruptions. From a management accounting perspective, digitalization enhances the timeliness and relevance of information, thereby strengthening its contribution to operational efficiency. Another important finding concerns outsourcing and coordination within logistics networks. Studies indicate that the increasing reliance on third-party logistics providers complicates cost control and performance measurement, as information asymmetries and contractual constraints limit managerial visibility (Gong et al., 2024). Management accounting frameworks that incorporate inter-organizational performance metrics and cost-sharing mechanisms are shown to mitigate these challenges, supporting more effective coordination and efficiency across logistics networks (Nguyen et al., 2024). Taken together, these findings suggest that management accounting plays a central role in transforming logistics cost and performance data into actionable insights. By integrating accounting information with operational metrics, firms can move beyond reactive cost control toward proactive efficiency management, which is essential in highly competitive e-commerce markets.

4.4. Implications for Sustainable and Future-Oriented Research on E-Commerce Logistics Efficiency

The final sub-section extends the discussion toward sustainable and future-oriented research directions, drawing on recent trends identified in the literature. One prominent direction concerns the integration of sustainability into logistics cost and performance analysis. Studies increasingly emphasize that environmental efficiency, such as emissions reduction and energy use optimization, should be analyzed alongside economic performance, particularly in urban last-mile logistics (Kumar et al., 2024; World Economic Forum, 2024). This creates opportunities for management accounting research to develop sustainability-oriented costing models that capture both financial and environmental impacts. Another emerging research avenue involves the role of advanced technologies in reshaping logistics efficiency. Autonomous delivery vehicles, smart lockers, and AI-based routing systems are identified as potential game changers in last-mile logistics, with significant implications for cost structures and performance metrics (Klar et al., 2025; Gnoni et al., 2025). Future research is encouraged to examine how management accounting systems can adapt to these technologies by redefining cost drivers and performance indicators in automated logistics environments.

The literature also points to the need for longitudinal and mixed-method studies that combine descriptive cost–performance profiling with explanatory analysis. While the present study emphasizes qualitative synthesis, future research could empirically test the relationships between cost management practices, logistics performance, and operational efficiency using large-scale datasets from e-commerce platforms (Uzun & Deran, 2025; Alam et al., 2025). Such studies would enhance the generalizability of findings and contribute to theory development in management accounting and logistics management. Finally, the findings suggest that future research should consider the platform-level perspective more explicitly. E-commerce platforms orchestrate complex logistics ecosystems involving multiple stakeholders, making efficiency an emergent property of network interactions rather than a firm-level attribute. Management accounting research that addresses inter-platform benchmarking, ecosystem-level cost allocation, and shared performance metrics would provide valuable insights into industrial operational efficiency in digital markets (Argilés-Bosch et al., 2023; Zennaro et al., 2022).

In conclusion, the results and discussion demonstrate that logistics cost and performance analysis in e-commerce platforms is a multidimensional and evolving field. By adopting a management accounting approach, this study highlights the importance of integrating cost visibility, performance measurement, and strategic decision-making to enhance industrial operational efficiency. The synthesis of recent literature not only clarifies current practices but also points toward future research directions that can support more sustainable and resilient e-commerce logistics systems.

V. Conclusion

This study has provided a comprehensive synthesis of the literature on logistics cost and performance analysis in e-commerce platforms through a management accounting lens, with a particular focus on industrial operational efficiency. The findings indicate that logistics in e-commerce environments is inherently complex, activity-intensive, and highly sensitive to service-level expectations such as delivery speed and return flexibility. Unlike traditional logistics systems, e-commerce platforms operate within digitally mediated, customer-centric networks that generate fragmented demand patterns and volatile operational conditions. From a theoretical perspective, the study reinforces and extends management accounting theory by demonstrating that conventional cost models are insufficient for capturing the true cost behavior of e-commerce logistics. Instead, the literature supports a shift toward activity-based and process-oriented accounting approaches that align cost structures with logistics performance metrics. By integrating cost visibility with multidimensional performance measurement, this research contributes to the conceptual understanding of how management accounting functions as an enabling mechanism for operational efficiency in platform-based industrial systems.

The theoretical implications of this study lie in its articulation of logistics efficiency as a relational construct that emerges from the alignment between cost management and operational performance rather than from cost minimization alone. The synthesis of prior research highlights that logistics performance indicators—such as delivery reliability, fulfillment accuracy, and return handling effectiveness—serve as critical pathways through which cost management practices translate into efficiency outcomes. This perspective advances existing logistics and management accounting literature by framing industrial operational efficiency as a dynamic outcome shaped by accounting information, process design, and technological enablement. Furthermore, the study underscores the growing relevance of sustainability considerations within logistics performance analysis, suggesting that future theoretical models should incorporate environmental and social dimensions alongside economic efficiency. In doing so, the research provides a foundation for subsequent empirical studies that may test and refine the proposed relationships within different e-commerce and industrial contexts.

From a managerial standpoint, the findings offer several important implications for practitioners responsible for logistics and financial decision-making in e-commerce platforms. Managers are encouraged to move beyond aggregated logistics cost reporting and adopt accounting systems that provide granular, activity-level insights into resource consumption across fulfillment, delivery, and reverse logistics processes. Such systems enable more informed decisions regarding delivery models, outsourcing strategies, and technology investments by clarifying the trade-offs between cost, service quality, and operational resilience. Additionally, integrating logistics performance metrics with management accounting information can support proactive efficiency management, allowing organizations to identify inefficiencies before they escalate into financial or service failures. Ultimately, the study suggests that e-commerce platforms seeking sustainable competitive advantage should view management accounting not merely as a control function, but as a strategic tool for orchestrating cost-effective and high-performing logistics networks in an increasingly complex and digitalized industrial environment.

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