



Logistics Service Quality as an Operational Bridge: A Systematic Literature Review of How Artificial Intelligence Usage and Supply Chain Strategies Drive Logistics Performance

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Abstract

As the global economy becomes increasingly unpredictable, Logistics Service Providers (LSPs) face growing pressure to integrate smart technologies with clear supply chain strategies to enhance resilience. However, the mechanism through which these elements create value remains insufficiently understood. This literature review examines the relationships between Artificial Intelligence Usage (AIU), Supply Chain Strategies (SCS), Logistics Service Quality (LSQ), and Logistics Performance (LP), and proposes a conceptual framework. Following PRISMA guidelines, peer-reviewed articles from Scopus, ScienceDirect, and Google Scholar published between 2019 and 2025 were reviewed, with 28 studies included in the final synthesis. The thematic synthesis reveals a value creation paradox: AIU and SCS serve as important upstream drivers, but they do not automatically improve LP unless translated into effective service execution through LSQ as the critical operational bridge. Theoretically, this study extends RBV and DCV by explaining how technological and strategic potentials are converted into logistics outcomes. Managerially, it emphasizes the need to balance technological infrastructure with human-centric service capabilities.

Keywords: Artificial Intelligence Usage, Supply Chain Strategies, Logistics Service Quality, Logistics Performance

Introduction

Given persistent global economic volatility, logistics companies increasingly adopt Industry 4.0 technologies to strengthen resilience and continuity. As conventional approaches struggle with recurring shocks, firms use digital capabilities to improve visibility, forecasting, and coordination (Ivanov et al., 2019; Queiroz et al., 2020; Gunasekaran et al., 2017). Thus, Logistics Service Providers (LSPs) must integrate intelligent technologies while meeting complex customer expectations.



Artificial Intelligence Usage (AIU) is a capability for decision-making, automation, and operational responsiveness. Its value depends on customers' Supply Chain Strategies (SCS), since cost leadership, agility, and responsiveness shape resource allocation and expected logistics value (Toorajipour et al., 2021; Qi et al., 2017; Wamba et al., 2020). Thus, AIU provides executional potential, whereas SCS provides strategic direction.

Despite substantial digital transformation investment, the mechanism converting upstream technological and strategic inputs into logistics outcomes remains underexplained. Prior studies emphasize direct links between digital technologies, supply chain capabilities, and performance, but give limited attention to service delivery, where customer value is realized (Gunasekaran et al., 2017; Toorajipour et al., 2021; Feng & Ye, 2021). This gap matters because technology and strategic alignment improve logistics performance only through effective service execution, including fulfillment quality and customer responsiveness (Mentzer et al., 2001; Huma et al., 2020; Gu et al., 2021).

To address this gap, this study positions Logistics Service Quality (LSQ) as the key operational bridge linking AIU and SCS to Logistics Performance (LP). LSQ explains how digital and strategic resources become value through “hard” dimensions—timeliness, accuracy, and fulfillment reliability—and “soft” dimensions—responsiveness, communication, and problem resolution (Mentzer et al., 2001; Huma et al., 2020). Accordingly, this review develops a framework clarifying LSQ's mediating role between upstream capabilities and downstream logistics performance outcomes (Snyder, 2019).

Objectives

1. To analyze the theoretical relationships among Artificial Intelligence Usage, Supply Chain Strategies, Logistics Service Quality, and Logistics Performance, with particular emphasis on the mediating role of LSQ in the logistics service provider context.
2. To develop a conceptual framework that explains how Logistics Service Quality functions as an operational bridge between upstream drivers and downstream performance outcomes.

Research Questions

RQ1: What theoretical relationships among Artificial Intelligence Usage (AIU), Supply Chain Strategies (SCS), Logistics Service Quality (LSQ), and Logistics Performance (LP) are identified in the literature on logistics service providers?

RQ2: How does Logistics Service Quality (LSQ) function as an operational bridge or mediating mechanism linking upstream drivers (AIU and SCS) to downstream Logistics Performance (LP)?



Concept theory framework

Integrating the Resource-Based View (RBV), Dynamic Capabilities View (DCV), and Logistics Service Quality (LSQ) framework explains how Artificial Intelligence Usage (AIU) (Singh et al., 2023) and Supply Chain Strategies (SCS) (Qi et al., 2017) create competitive advantage. RBV and DCV show how firms' sense, seize, and reconfigure resources under changing conditions (Xiao & Khan, 2024); as execution layer, LSQ converts inputs into customer value and superior logistics performance (Mentzer et al., 2001; Huma et al., 2020).

RBV views sustained competitive advantage as arising from valuable, difficult-to-replicate resources (Barney, 1991). AIU is the technological resource, whereas SCS provides strategic intent (Qi et al., 2017; Singh et al., 2023). DCV stresses that resources require integration, renewal, and reconfiguration to meet environmental changes (Teece et al., 1997). Together, AIU and SCS help Logistics Service Providers (LSPs) identify market shifts and respond with agility (Wamba et al., 2020).

LSQ translates upstream inputs into outcomes as the key operational bridge through which latent potentials in AIU and SCS become customer value and downstream Logistics Performance (Mentzer et al., 2001; Huma et al., 2020). AIU and SCS must be enacted through service execution; otherwise, investments may not generate LP outcomes—reliability, cost efficiency, and flexibility (Surucu & Sakar, 2018). The framework posits that AIU and SCS positively influence LSQ (Fosso Wamba et al., 2017; Qi et al., 2017; Singh et al., 2023; Toorajipour et al., 2021), which enhances LP (Huma et al., 2020; Lotfi & Saghiri, 2018; Mentzer et al., 2001; Surucu & Sakar, 2018; Xiao & Khan, 2024). This mechanism-based model supports validation, showing that competitive advantage under volatility depends on resources, strategy, and their execution pathway (Wamba et al., 2020).

Materials and Methods

This study employed a systematic literature review (SLR) to address the research questions and synthesize relationships among Artificial Intelligence Usage (AIU), Supply Chain Strategies (SCS), Logistics Service Quality (LSQ), and Logistics Performance (LP), emphasizing LSQ's mediating role. It analyzed these constructs and developed a framework positioning LSQ as an operational bridge between upstream drivers and downstream performance outcomes. It followed PRISMA 2020 principles for transparency and replicability (Page et al., 2021) and adopted concept-centric synthesis consistent with SLR design (Lamé, 2019; Snyder, 2019; Xiao & Watson, 2019).



Searches in Scopus, ScienceDirect, and Google Scholar were completed on 15 December 2024. Counts were retrospectively reconstructed from the documented search strategy and retained candidate studies. 123 records were identified; after removing 1 high-confidence overlap/duplicate, 122 underwent title and abstract screening. Then, 41 full-text articles were assessed for eligibility, resulting in 28 studies included in the final synthesis.

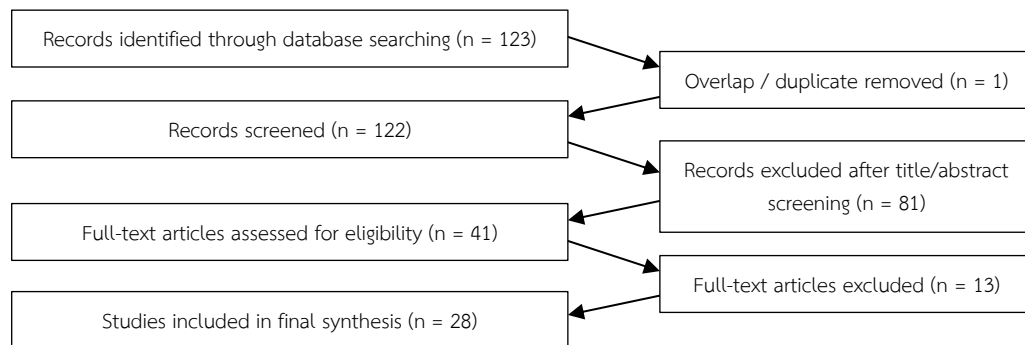


Figure 1: PRISMA flow diagram of the study selection process

Database-specific Boolean search strings combined AI keywords—“artificial intelligence,” “AI usage,” and “machine learning”—with logistics/LSP contexts, supply chain strategy, service quality, and performance outcomes. Scopus used TITLE-ABS-KEY fields, with comparable search in other databases. Included studies addressed AI usage/capabilities or supply chain strategy in logistics or LSP contexts and examined LSQ, service-quality constructs, and logistics performance. English-language, peer-reviewed journal articles published between 2019 and 2024 were retained; duplicates and non-peer-reviewed materials, including conference proceedings, theses, and editorials, were excluded.

Records were exported to a spreadsheet/reference manager for duplicate removal, title/abstract screening, and full-text review. Selection followed PRISMA guidelines with documented exclusion reasons. Data extraction covers year, context, region, method, unit of analysis, sample, constructs, modeled relationships, and key findings. Studies were synthesized through thematic content analysis around the value-creation process: AIU and SCS as upstream drivers, LSQ as the operational link, and LP as the outcome.

Study quality was appraised with an adapted business/management checklist covering design clarity, data adequacy, measurement rigor, analytical transparency, and construct relevance. The appraisal informed evidence interpretation rather than strict exclusion, consistent with systematic evidence synthesis and bias-aware review practice (Ahn & Kang, 2018; Lamé, 2019).



Results

Based on systematic extraction and thematic content analysis of the 28 included studies, the literature was synthesized into three themes supporting the proposed framework. For transparency, reconstructed counts were reported: 123 records identified, 1 overlap/duplicate removed, 122 screened, 41 full-text articles assessed, and 28 included in the final synthesis (see Figure 1). Evidence was mapped to each structural pathway, distinguishing representative studies (2019–2024) from foundational sources. Coding moved from descriptive codes to themes aligned with the value-creation mechanism (AIU and SCS → LSQ → LP). Table 1 summarizes the themes; Figure 2 shows how upstream drivers translate into Logistics Performance through LSQ-Hard and LSQ-Soft.

The 28 included studies comprise empirical and conceptual contributions across logistics, supply chain, and service-operation contexts. They were reviewed by context, region, method, unit of analysis, and sample information where applicable. Their heterogeneity supports concept-centric synthesis and contextual interpretation.

AIU and SCS as upstream drivers of LSQ.

Artificial Intelligence Usage (AIU) strengthens execution through forecasting, automation, and visibility, reducing errors, improving decision speed, and stabilizing processes (Baryannis et al., 2019; Ivanov et al., 2019; Toorajipour et al., 2021). These capabilities enhance hard LSQ where fulfillment accuracy, timeliness, and reliability are central (Feng & Ye, 2021; Gu et al., 2021). Supply Chain Strategies (SCS) shape LSP service requirements; agility and responsiveness strengthen soft LSQ through relational responsiveness, problem-solving, and service adaptation (Huma et al., 2020; Singh et al., 2023). Thus, hard and soft LSQ vary by operational intensity and customer-facing demands.

A recurrent mechanism shows that digital and AI-enabled capabilities do not automatically improve logistics outcomes unless translated into high-quality service execution, reflecting a “value creation paradox” when deployment is weak (Mikalef & Gupta, 2021; Wamba et al., 2020). LSQ acts as the mediating bridge converting upstream resources and strategic intent into tangible value. Hard LSQ uses AI-enabled precision for reliable fulfillment, whereas soft LSQ aligns service delivery with customer strategy through responsiveness, communication, and problem resolution (Feng & Ye, 2021; Gu et al., 2021; Huma et al., 2020; Singh et al., 2023; Xiao & Khan, 2024). Variations were interpreted as context-dependent rather than contradictory.

Downstream outcomes—LSQ as a direct driver of LP.

The theme confirms that LSQ is associated with improved Logistics Performance (LP), especially under disruption, where service execution channels upstream investments into outcomes (Ivanov, 2020; Queiroz et al., 2020). LSQ supports LP through reliability, cost efficiency, and flexibility, though strength varies with environmental volatility, service



complexity, and hard–soft LSQ balance. In stable environments, hard LSQ drives reliability and process consistency; under disruption and customer-facing pressures, soft LSQ supports recovery, flexibility, and relational continuity.

Table 1: Synthesized Relationships and Supporting Evidence

Structural pathway	Synthesized mechanism (key finding)	Supporting studies (k) (2019–2025)	Foundational sources (pre-2019)
1) Upstream drivers (AIU & SCS → LSQ)	AIU strengthens executional precision and supports hard LSQ, while SCS defines service priorities that elevate soft LSQ.	k=6: Baryannis et al. (2019); Ivanov et al. (2019); Toorajipour et al. (2021); Gu et al. (2021); Huma et al. (2020); Singh et al. (2023)	Qrunfleh & Tarafdar (2014); Fosso Wamba et al. (2017); Qi et al. (2017)
2) Mediating mechanism (Role of LSQ)	LSQ acts as the operational bridge converting upstream AIU/SCS into downstream value through the joint execution of hard and soft LSQ.	k=6: Mikalef & Gupta (2021); Wamba et al. (2020); Gu et al. (2021); Feng & Ye (2021); Singh et al. (2023); Xiao & Khan (2024)	Mentzer et al. (2001); Gunasekaran et al. (2017); Choi et al. (2018); Surucu & Sakar (2018)
3) Downstream outcomes (LSQ → LP)	Superior LSQ improves LP through reliability, cost efficiency, and flexibility, especially under disruption.	k=6: Chowdhury et al. (2019); Huma et al. (2020); Gu et al. (2021); Ivanov (2020); Gligor et al. (2019); Xiao & Khan (2024)	Mentzer et al. (2001); Ataseven & Nair (2017); Lotfi & Saghiri (2018)



Table 1 concisely links the three synthesized pathways with their mechanisms, recent evidence, and foundational sources.

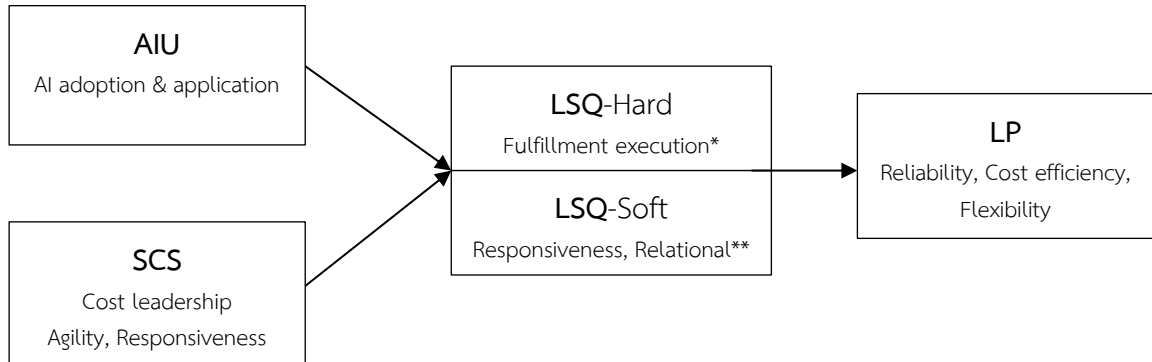


Figure 2: Conceptual Framework Linking AIU, SCS, LSQ, and Logistics Performance

* LSQ-Hard includes timeliness, accuracy, order-fulfillment reliability, and process consistency.

** LSQ-Soft includes responsiveness, communication quality, problem resolution, and service recovery/adaptation.

Conclusions and Discussion

Theoretical Implications. Integrating RBV, DCV, and LSQ, this study clarifies logistics value creation under volatility. It identifies a value creation paradox: AI investment and strategic alignment do not produce superior logistics outcomes unless enacted through service execution. AIU and SCS have latent upstream potential, while LSQ is the operational bridge translating them into Logistics Performance. This extends RBV and DCV by specifying the execution mechanism through which capabilities and strategies create value.

Managerial Implications. Logistics Service Providers (LSPs) should strengthen hard and soft service quality, not rely on technology alone. AI-enabled forecasting, automation, and visibility enhance hard LSQ through fulfillment accuracy, timeliness, and process consistency; responsiveness, communication quality, and problem-solving strengthen soft LSQ in customer-facing and disruption recovery contexts. AI is an enabler of service execution, not a stand-alone performance solution. Balancing technological infrastructure with human-centric service capabilities supports reliability, cost efficiency, and flexibility.

Limitations and Future Research. This synthesis lacks empirical validation with real-world data. Future research should survey Logistics Service Providers (LSPs) and analyze AIU, SCS, LSQ, and LP using Partial Least Squares Structural Equation Modeling (PLS-SEM), clarifying construct interaction in practice.



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