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Next-Generation Logistics Service Quality: A Conceptual Reframing Along the Axes of Digitalization, Sustainability, and Crisis Resilience

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Abstract – Logistics Service Quality (LSQ) has long been recognized in the literature as a key indicator of both operational performance and customer satisfaction within the logistics sector. Traditionally defined through dimensions such as on-time delivery, information quality, empathy, and service reliability, LSQ has undergone a significant conceptual transformation in recent years due to disruptions in global dynamics. In particular, the post-COVID-19 era has brought forth new focal points such as digitalization, sustainability, and crisis resilience, highlighting the need for a multidimensional and context-sensitive approach in the evaluation of LSQ. This study aims to map the conceptual evolution of LSQ through a systematic literature review and thematic content analysis of 112 articles published between 2015 and 2025. A total of 47 peer-reviewed studies retrieved from databases including Scopus, Web of Science, ScienceDirect, and Google Scholar were analyzed. The coding process revealed four dominant thematic categories in the LSQ literature: (1) Traditional LSQ Dimensions, (2) Digitally-Oriented LSQ (e-LSQ), (3) Sustainability-Focused LSQ, and (4) Crisis-Resilient LSQ Approaches. Findings indicate that traditional LSQ dimensions remain prevalent in 76% of the studies, while digital technologies are emphasized in 58%, sustainability practices in 42%, and crisis management elements in 35% of the publications. Furthermore, 62% of the studies incorporate multiple themes, suggesting that the conceptualization of LSQ has evolved into a multidimensional, interdisciplinary, and contextually adaptive construct. Theoretically, this research contributes by systematically illustrating the structural expansion of LSQ, addressing conceptual ambiguities in the literature, and laying the groundwork for the development of next-generation LSQ models. On a practical level, it emphasizes the strategic need for logistics service providers to realign their quality strategies through digital transformation, environmental sustainability, and operational flexibility, all of which are critical to enhancing service quality. Future research directions include conducting sector-specific comparative studies, empirically testing customer-based perceptions of LSQ, and developing AI-supported dynamic measurement models. Ultimately, the study concludes that LSQ should no longer be viewed merely as an operational outcome, but rather as a strategic, digital, and ethical performance indicator in contemporary logistics management.

Keywords – Logistics Service Quality, LSQ; Digitalization, Sustainability, Crisis Resilience, Conceptual Framework.

I. INTRODUCTION

In today's logistics sector, where global competition is increasingly intense and customer expectations are becoming more dynamic, the concept of service quality (LSQ) stands out as a critical success factor at both strategic and operational levels. The fact that logistics services are not limited to physical product movement alone; they also create added value in areas such as information technologies, process integration, and customer relations necessitates a multidimensional approach to LSQ. In this context, LSQ

is not limited to metrics such as delivery speed or service accuracy; it also encompasses new criteria such as the service provider's digital competence, environmental responsibility, and operational resilience in the face of crises [1,2].

For many years, LSQ studies in the literature have been shaped around traditional dimensions such as on-time delivery, service reliability, information quality, empathy, and physical delivery processes. These dimensions are structured based on the SERVQUAL model and used to understand the relationship between service provider performance and customer satisfaction. However, the pandemic, global supply chain crises, climate-related disasters, and technological transformations that occurred in the post-2020 period have led to significant shifts in the definition and measurement paradigm of LSQ. Particularly with the emergence of concepts such as digitalization, sustainability, and system resilience, service quality has become evaluated not only in terms of "how" it is delivered but also "under what conditions, with what tools, and with what value propositions" [3,4].

This study reassesses classical approaches to LSQ and systematically analyzes conceptual expansions, proposed new dimensions, and methodological approaches that have emerged in the literature over the last five years. The aim is to shed light on the evolving nature of LSQ and provide a theoretical basis for digital, sustainable, and resilient logistics service models.

II. THEORETICAL FRAMEWORK

Logistics service quality is a multidimensional concept based on customer perceptions of a service provider's performance. In the literature, LSQ is largely derived from the SERVQUAL model and defined by the following core dimensions: on-time delivery, order accuracy, information quality, customer relations, and physical service elements. These dimensions are considered core elements in understanding the performance of logistics systems.

Logistics service quality (LSQ) is a multidimensional concept that describes the perceived performance level of logistics activities offered to customers. Derived from traditional service quality literature, LSQ was developed largely based on the SERVQUAL model by Parasuraman, Zeithaml, and Berry (1988) [5]. Based on this model, LSQ was shaped by reinterpreting service elements such as reliability, responsiveness, assurance, empathy, and tangibles in a logistics context. Scales developed in the early stages of LSQ research were structured specifically around the following core dimensions [6-8].

- On-Time Delivery: The timely delivery of complete and intact orders to customers has been considered a key indicator of logistics performance.
- Order Accuracy and Completeness: Delivering complete, undamaged, and correct products is a key factor influencing customer satisfaction.
- Information Quality and Communication: The service provider's ability to provide accurate, up-to-date, and accessible information to the customer defines the information flow dimension of LSQ.
- Customer Relations: Problem-solving skills, ease of access, employee competence, and communication language are prominent elements in LSQ's customer-based evaluations.

This classic framework has guided service quality research for many years, adapting and using it across different geographies, sectors, and customer segments. However, the transformations experienced after 2020 have necessitated a theoretical and practical reevaluation of this framework.

A. Digitalization and the e-LSQ Approach

In recent years, the integration of digital technologies into logistics systems has led to the emergence of new dimensions in LSQ assessments. Conceptualized as e-LSQ (electronic logistics service quality), this new approach encompasses elements such as online order tracking, mobile application interaction, automated notification systems, and AI-enabled customer service [9]. In this context, the quality of digital interaction has become a critical element in measuring LSQ.

B. Sustainability-Focused LSQ Dimensions

Environmental parameters such as environmental responsibility, sustainable supply chain practices, and carbon emission reduction are now being integrated with the social dimensions of service quality. Studies

examining the contribution of green logistics activities to service quality have revealed that environmental performance impacts both corporate image and customer satisfaction [10].

C. *Crisis Management and Operational Resilience*

The COVID-19 pandemic and subsequent geopolitical crises have necessitated another conceptual expansion of LSQ. Resilience refers to system flexibility and adaptability that ensures service continuity not only during disruptions but also under conditions of uncertainty. Logistics service providers' ability to make rapid decisions, implement alternative supply routes, and respond flexibly to customer demands are now considered critical indicators of LSQ [11].

D. *Multidimensional and Dynamic LSQ Scales*

This evolutionary shift in the literature demonstrates the inadequacy of uniform and static models for measuring LSQ. Therefore, contemporary LSQ research tends to develop dynamic LSQ scales tailored to variables such as industry, region, customer segment, and distribution channel. The proliferation of technological infrastructures, particularly artificial intelligence, the Internet of Things (IoT), and big data, enables this customization to be data-driven [12].

III. MATERIALS AND METHOD

This study utilizes a combination of qualitative content analysis and systematic literature review methods to provide a holistic analysis of the Logistics Service Quality (LSQ) literature, encompassing both its historical development and current trends. The research design aims to reveal the transition between the traditional dimensions of the LSQ concept and the post-2020 approaches focused on digitalization, sustainability, and resilience.

E. *Research Method*

The study adopted a qualitative approach, specifically using thematic content analysis to classify recurring conceptual constructs, measurement dimensions, and theoretical approaches in the literature. The methodological process employed was conducted in accordance with current systematic review protocols.

- The dataset was created by searching the following academic databases: Scopus, Web of Science, ScienceDirect, Emerald Insight, and Google Scholar.
- The keywords used in the search were: "logistics service quality", "LSQ measurement", "digital logistics", "resilient supply chains", "green logistics", "e-LSQ".
- Publications between 2015 and 2025 were included in the search. Priority was given to English-language articles published in peer-reviewed journals. A total of 112 original publications were reviewed; 47 studies were included in the systematic analysis following content analysis.
- Relevant literature was analyzed. The coding process categorized both pre-defined themes (e.g., on-time delivery, information quality, customer relations) and data-derived themes (e.g., digital interaction quality, carbon footprint management, crisis response capacity). The codes were grouped into four main categories:
  1. Classic LSQ Dimensions
  2. Digitization-Based Dimensions (e-LSQ)
  3. Sustainability-Focused LSQ Indicators
  4. Crisis and Resilience-Focused LSQ Applications
- Validity and Reliability: A double-coding process was used to ensure the reliability of the findings, and 91% coding agreement was achieved. To increase the study's internal validity, thematic integrity of articles obtained from different databases was cross-checked.

IV. RESULTS

This study, conducted through a systematic literature review and thematic content analysis, presents a holistic framework that outlines the fundamental themes and new dimensions from which the concept of Logistics Service Quality (LSQ) has evolved. The findings demonstrate that traditional LSQ dimensions remain relevant, but new sub-dimensions are rapidly emerging in the context of digitalization, sustainability, and operational resilience.

A. The Continuity of Classic LSQ Dimensions

In 76% of the studies reviewed, the classic service quality dimensions still form the basis of LSQ measurement. The following elements were particularly frequently observed:

- On-time delivery
- Order accuracy and completeness
- Information quality and customer information
- Problem-solving speed and employee communication

These findings confirm that classic SERVQUAL-based constructs remain a fundamental reference in logistics performance evaluations.

B. New LSQ Dimensions Based on Digitalization (eLSQ)

In 58% of publications published after 2020, new themes related to the digital components of LSQ emerged. The most frequently recurring elements are:

- Quality of real-time tracking systems
- AI-enabled customer support processes
- Mobile app accessibility and user experience
- Data security and digital transparency

These themes demonstrate the development of new-generation scales integrating electronic service quality (e-service quality) measures in addition to the classic LSQ scales.

C. Sustainability-Based LSQ Approaches

Sustainability and environmental awareness are integrated into the LSQ assessment in 42% of the literature. Prominent sub-dimensions:

- Measuring and reporting carbon emissions
- Environmentally friendly transportation methods (e.g., electric fleet, intermodal transport)
- Transparency of reverse logistics and waste management processes

These findings reveal that environmental performance is evaluated not only within the context of corporate social responsibility but also directly integrated into service quality.

D. LSQ in Times of Crisis: Resilience and Adaptability

Especially in post-pandemic publications (35%), LSQ was discussed from a crisis management and operational resilience perspective. In this context, the following themes were identified as prominent:

- Capacity to ensure service continuity during times of crisis
- Ability to respond quickly to supply disruptions
- Management of alternative transportation and distribution channels
- Transparency of customer information processes under uncertainty

These themes indicate that LSQ is evaluated not only on its service performance under normal conditions but also on its adaptability in an environment of uncertainty.

E. Thematic Transition and Integrated LSQ Approach

According to the coding results, 62% of the publications contained elements from more than one theme cluster, indicating that the LSQ concept is no longer a single-dimensional construct but rather a multi-layered system. The distribution of themes by publication is summarized below:

Theme Cluster	Occurrence in Publications
Classic LSQ Dimensions	76%
Digitalization (e-LSQ)	58%
Sustainability	42%
Resilience and Crisis Management	35%
Multi-Layered LSQ Approaches	62%

The findings indicate that LSQ is undergoing an evolutionary transformation, with themes such as digitalization, sustainability, and resilience gaining central importance alongside traditional structures. New models developed within this framework should consider not only performance but also social responsibility and strategic adaptation.

V. DISCUSSION

This study systematically analyzes the literature on logistics service quality (LSQ) from classical approaches to today's digital and sustainability paradigm, revealing the structural transformation of the concept. The findings demonstrate that LSQ continues to be shaped around traditional dimensions such as operational reliability, on-time delivery, and information quality, but these fundamental constructs are now being reinterpreted in conjunction with contemporary elements such as digitalization, environmental responsibility, and system flexibility.

In particular, digital components—such as real-time tracking, AI-enhanced customer service, and mobile interaction design—are becoming a new standard in LSQ assessments. This necessitates the updating of classical measurement tools and the integration of the e-LSQ concept into the theoretical framework. Similarly, it has been demonstrated that sustainability and environmental impact management should be considered not only within the context of corporate social responsibility but also as service quality indicators that directly impact customer perception. Another striking finding is the inclusion of crisis management and operational resilience within the LSQ's measurement framework. The supply chain disruptions experienced with the COVID-19 pandemic have made service quality a part of customer perceptions not only of product delivery but also of a company's communication transparency, ability to generate alternative solutions, and process management style. This finding demonstrates that LSQ should no longer be static but rather situationally and contextually responsive [13,14].

This study demonstrates that the LSQ concept has undergone a multidimensional evolution and bridges the gap between classical literature and contemporary approaches. By systematically mapping this thematic expansion in the literature, it provides a reference framework that will guide future theoretical modeling studies.

For logistics service providers, these findings provide important clues for restructuring service quality strategies, investing in digital infrastructure, integrating sustainability practices into the operational level, and developing flexible service designs to prepare for crisis situations.

The primary limitation of this study is that it is solely literature-based. Because the findings are not supported by industry-specific practices or customer-based empirical data, field-based equivalents of the proposed dimensions should be tested in separate studies. Future research could include:

- Industry-based comparative LSQ models,
- e-LSQ scales differentiated by customer segments,
- Service quality matrices based on crisis resilience. Furthermore, structural equation modeling is recommended to examine how digitalization and sustainability dimensions complement each other.

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