# The Role of Digital Media Supply Chain in Economic Perspective: A Comprehensive Study

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**Abstract.** In the realm of supply chains, an intricate web is woven by suppliers, partners, corporations, and distributors as they utilize, create, and disseminate information among themselves. This network precipitates a dynamic landscape filled with both challenges and prospects. At the heart of this evolution lies the Digital Supply Chain (DSC), distinguished by its intelligence, value-centric orientation, and proficiency in enabling organizations to forge new revenue streams and gain business value. DSC transcends the conventional division between digital and tangible goods and services, instead emphasizing the transformative management of supply chain activities through an array of cutting-edge technologies, including but not limited to drones, cloud-based services, and the Internet of Things (IoT). Contemporary scholarly works underscore the significance of DSC, with numerous industry experts delving into its practical applications. This paper conducts a rigorous examination of the current corpus of DSC research, scrutinizing it through scholarly and pragmatic lenses. It unfolds the critical constraints and future opportunities within DSC, synthesizes existing studies, and exposes areas lacking in information. The discourse elucidates the strengths, frailties, and boundaries of singular methodologies. Furthermore, the paper endeavors to chart a guideline for ongoing research and application, proffering a strategic blueprint to navigate the advancement within this field.

**Keywords:** Digital Supply Chain, Intelligence, Value-Centric, New Revenue Streams, Business Value.

## 1 Introduction

Digital technology is reshaping human interaction and engagement, revolutionizing information access and exchange through innovations like smartphones, self-driving cars, and smartwatches (Figure 1). These advancements are profoundly impacting industries, including supply chains and logistics, which traditionally operate in silos within organizational frameworks. Supply chains, consisting of geographically dispersed facilities,


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manage the movement of goods and services from suppliers to consumers. However, the rapid pace of technological progress challenges the effectiveness of these structures.

With 76% of the global population having internet access and significant engagement in social media and e-commerce, digitalization is transforming supply chain practices. Companies are increasingly utilizing big data analytics, with expectations that cloud storage will dominate data production. The future promises interconnected devices and wearable technology, enhancing supply chain operations.[1]

Organizations recognize the value of Digital Supply Chains (DSC) in maintaining competitive edge by optimizing production and delivery processes. Although DSC is in its early stages, it signals an accelerated transition and innovation for supply chains and logistics. Data centers are replacing physical warehouses, bits are replacing boxes, and bandwidth is taking over traditional delivery functions. Channel management now includes broadband services, online platforms, and direct customer interfacing.[2]

Technologies such as Augmented Reality (AR), Big Data (BD), Cloud Computing (CC), Omni-Channel (OC) Retail, and the Internet of Things (IoT) are integral to DSC. Current research highlights the criticality of DSC, exploring its multifaceted applications and benefits. This paper proposes a comprehensive framework, evaluating prior studies, and identifying gaps. It discusses digitalization's role in supply chains and logistics, examining related technologies and their challenges.[3]

To harness DSC fully, the development of a constructive framework is essential for realizing its benefits. This paper offers an approach to bridge the research gap, exploring digitalization's integration within supply chain dynamics. A literature review poses the question of embedding digitalization in supply chains, presenting a developmental model for systematically exploring DSC's advantages, managerial implications, and future research avenues.

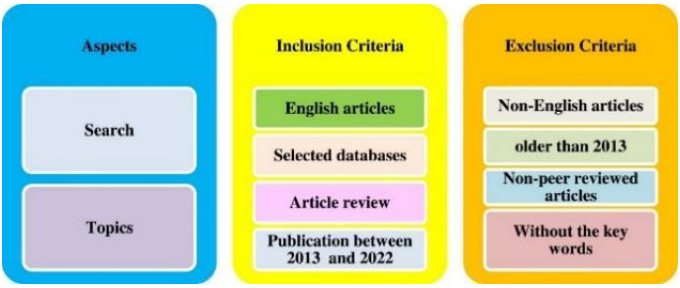


**Fig. 1.** Inclusion and exclusion criteria.

## 2 Benefits, Challenges and Research Gaps on DSC

Regardless of their size, businesses must cultivate digital organizational capabilities, as the competition in supply chains is rapidly becoming a global affair (Figure 2). For multinational corporations, the Digital Supply Chain (DSC) is a cornerstone for sustained growth and success. Notable examples such as Google, Amazon, and Apple have expanded their horizons well beyond their foundational services and have utilized their robust infrastructure in hardware, software, and expansive networks, leveraging the

data amassed from extensive user bases. Amazon, renowned as a colossal digital retailer, has forayed into myriad ventures including digital and software services, cloud computing (CC), mobile devices, e-readers, and a plethora of media and entertainment avenues. These ventures absorb considerable attention and labor from both academic scholars and industry professionals [4].

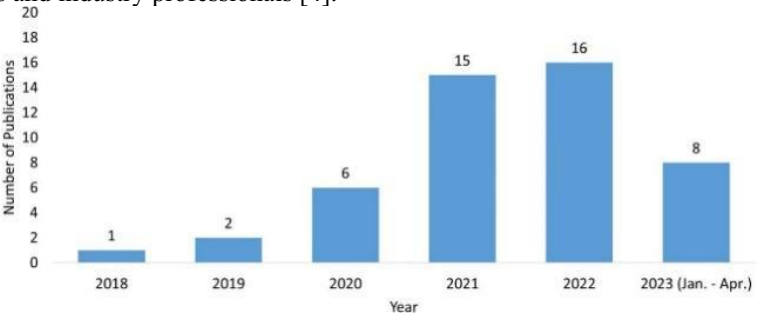


**Fig. 2.** Publications on DT in logistics and supply chain systems by year.

Despite these developments, there remains an ongoing quest to optimize supply chain configurations and strategies. Concepts such as lean supply, lean manufacturing, world-class manufacturing practices, and continuous enhancement philosophies like Kaizen stem from these endeavors. DSC offers a promising direction to refine supply chain frameworks and strategies.

This segment dives into the hurdles and merits of DSC implementation:

### 2.1 Struggles and Issues in DSC Deployment

Numerous complications can arise within a supply chain. Xu outlines the predominant difficulties in establishing DSC, which include consolidating diverse sets of data sources, verifying data precision, and creating a software foundation capable of manipulating this data to steer and carry out supply chain operations. Challenges stemming from the extensive nature of the chain and engagement with internal and external partners can lead to sluggishness and inaccuracy. Moreover, vast inventories might prove inadequate to meet demand, existing logistical structures could fall short, and quality control over products may become increasingly complex. Highlighted challenges in DSC development are:

Insufficient planning: The absence of an effective demand plan, guidelines, and implementation tools.

Collaboration deficiencies: Lack of cooperation with external partners and inadequate input from internal departments.

Erroneous demand projections: Overly optimistic and inaccurate demand, inventory, production, and other business forecasts.

Hesitance to share information: Reluctance among firms to exchange data.

The silver bullet fallacy: An unfounded belief that a standalone solution will address all issues.

Gaps in knowledge: A shortage of supply chain management education and expertise.

Agility and flexibility deficits: An absence of the needed nimbleness and adaptability in supply chain management.

Managing high volatility: Insufficient know-how to handle fluctuations within supply chain management.

Excessive reliance on suppliers: Overdependence on specific suppliers from certain global regions [5].

Integration issues: An inadequate perspective on the merger of digital with traditional supply chain management practices.

## 2.2 Determinants of DSC Effectiveness

The essence of DSC (Digital Supply Chain) is its ability to align customer needs with exceptional service, enhancing satisfaction through efficient product and service management. High DSC performance is measured by metrics like order fulfillment punctuality, delivery timelines, supplier reliability, cost efficiency, and delay reduction. Early adopters, like Monsanto in agriculture, lead this digital transformation, but broader adoption faces challenges such as workforce unawareness and skill gaps (Figure 3). Key factors for successful DSC integration include:

Real-Time Oversight: Secure, interactive monitoring across the supply chain.

Persistent Coordination: Improved stakeholder coordination [6].

Supplier Synchronization: Harmonizing interests for better performance and trust.

Process Integration: Combining digital and traditional practices for a holistic inventory view.

Information Access: Sharing sales predictions and production analytics.

Progressive Models: Adaptable frameworks for evolving customer needs [7].

Agile Last-Mile Strategy: Adapting business assets to changing market needs.

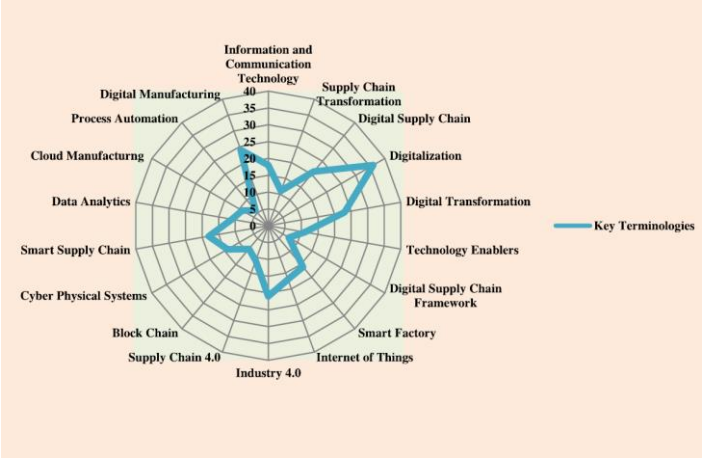


**Fig. 3.** Diagrammatic representation of key terminologies.

### 2.3 Scholarly Voids in DSC Research

This review conducted a methodical analysis of 105 relevant scholarly articles on DSC. It revealed a lack of in-depth research specific to DSC, with most studies focused on its enablers in supply chains. Despite an increase in DSC-related publications since 2010, most are confined to industrial accounts, highlighting the need for more academic engagement in DSC research (Figure 4). No leading-edge examinations were found, indicating a need for future research to develop frameworks for digital transformation in supply chains [8-10].

Several factors and gaps in the existing literature were identified:

Lack of Developmental Frameworks: There are insufficient frameworks guiding DSC implementation, deployment stages, and management protocol revisions.

Toolsets and Technology Solutions: There is a shortage of innovative tools addressing the specific challenges of supply chains within a DSC context, particularly concerning big data, sensor technology, and IoT.

Managerial and Technological Barriers: Numerous barriers exist that hinder DSC fulfillment, indicating the need for rigorous study to address these challenges and unlock benefits.

The review underscores the necessity for a robust DSC developmental framework, which will be proposed in subsequent sections based on the insights gathered.

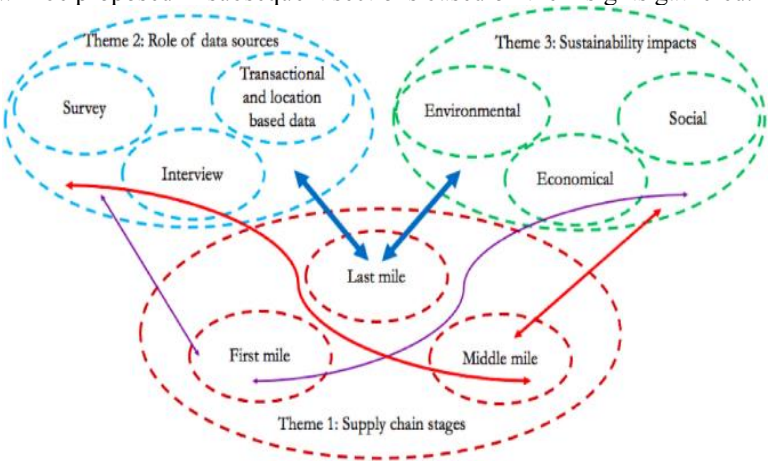


**Fig. 4.** Themes and sub-themes relationships.

## 3 Conclusion

This investigation centers on the digital transformation of supply chains, capturing the attention of industry experts and academic figures alike. The document is impeccably structured, presenting the content in a clear and systematic manner that accentuates the main proposition—a strategy for advancing a Digital Supply Chain (DSC). This study endeavors to clarify numerous questions such as the current academic and industrial

landscape of DSC, its prospective trajectories, and the methods of assimilating digitalization's significance within the spheres of supply chain and logistics. A comprehensive overview is undertaken to outline the leading-edge knowledge within the DSC domain, pinpointing research lacunae and synthesizing attributes from prior explorations. The analysis culminates in the construction of a DSC blueprint, predicated on the strengths, vulnerabilities, and constraints observed in the corpus of DSC research. This blueprint seeks to rectify the deficiencies identified in prior studies by presenting a well-conceived conceptual and theoretical structure. It endeavors to delineate the attributes, constituents, technological facilitators, impediments, and determinants instrumental in the evolution of a DSC. The insights tendered by the current exposition and the proposed blueprint are set to offer valuable perspectives to scholars and industry practitioners alike regarding the implementation of DSC. Looking to the future, this study incorporates three principal phases of DSC into a developmental blueprint. There is a clear need for subsequent inquiries to gauge the efficacy and impact of these developmental stages within the conventional supply chain model to ensure effective implementation and empirical validation.

## References

1. Akbari, M., Hopkins, J.L. (2022). Digital technologies as enablers of supply chain sustainability in an emerging economy. Operations Management Research.
2. Hahn, G.J. (2020). Industry 4.0: a supply chain innovation perspective. International Journal of Production Research.
3. Li, Y., Dai, J., Cui, L. (2020). The impact of digital technologies on economic and environmental performance in the context of industry 4.0: A moderated mediation model. International Journal of Production Economics.
4. Dolgui, A., Ivanov, D. (2022). 5G in digital supply chain and operations management: fostering flexibility, end-to-end connectivity and real-time visibility through internet-of-everything. International Journal of Production Research.
5. Yang, M., Fu, M., Zhang, Z. (2021). The adoption of digital technologies in supply chains: Drivers, process and impact. Technological Forecasting and Social Change.
6. Schniederjans, D.G., Curado, C., Khalajhedayati, M. (2020). Supply chain digitisation trends: An integration of knowledge management. International Journal of Production Economics.
7. Coyle, J.J., Novack, R.A., Gibson, B.J., Langley, C.J. (2021). Supply chain management: a logistics perspective.
8. Ivanov, D., Dolgui, A. (2021). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. Production Planning & Control.
9. Attaran, M. (2020). Digital technology enablers and their implications for supply chain management. Supply Chain Forum: An International Journal.
10. Núñez-Merino, M., Maqueira-Marín, J.M., Bruque-Cámara, S. (2020). Information and digital technologies of Industry 4.0 and Lean supply chain management: a systematic literature review. International Journal of Production Research.