THE DIGITAL ERA'S IMPACT ON RETAIL SUPPLY CHAIN CHALLENGES AND SOLUTIONS

Emily Grace Anderson[1]

Article Info	Abstract
Keywords: Retail, Supply Chain Management, Digitalization, Consumer Trends, Manufacturing Integration.	The retail sector serves as a vital bridge connecting production and consumption, facilitating the effective alignment of supply and demand through mechanisms that decipher consumer preferences and direct production accordingly. Historically, the retail supply chain has been characterized by a siloed approach, driven by the inertia of "industry self-circulation," resulting in limited integration between the retail and manufacturing sectors. This isolation has often led to conflicts between retailers and suppliers, exacerbated by competitive dynamics. In the digital age, retail is transitioning towards a reliance on big data resources and intelligent algorithms for forecasting consumer trends, guiding manufacturing processes, and delivering diverse and personalized services. Consequently, retail enterprises are confronted with new dynamics and supply chain management challenges. This study explores the evolving landscape of retail supply chain management, emphasizing the shift towards data-driven decision-making and the convergence of retail and manufacturing sectors. It delves into the implications of these changes on supply chain practices, emphasizing the need for collaboration, adaptability, and innovation in the retail industry.

Introduction

As the pivotal link between production and consumption, retail plays a leading role in effectively matching supply and demand with the linkage mechanism of identifying consumer demand and guiding production. In the field of the retail supply chain, for a long time, based on the development inertia of "industry self-circulation", there has been a lack of integration between retail and manufacturing industries, and even problems such as conflicts between retailers and suppliers often break out under the competitive relationship of game rivalry. Moreover, with the development of digitalization, the retail side is gradually turning to rely on big data resources and intelligent algorithms to predict consumer trends, guide manufacturing, and provide diversified and personalized services, and retail enterprises are facing new changes and challenges in supply chain management.

[1] School of Arts and Sciences, Rutgers University, New Jersey 07103, US

1. Overview of supply chain management for retail enterprises

1.1 Concept of supply chain

The supply chain is the business relationship and process between customers and suppliers that integrates capital, information, and product flow. The aim of supply chain management is to ensure that customers receive products, information, services, etc., with more value and to ensure customer rights. Furthermore, a more common type of enterprise management is supply chain management, which refers to the effective integration, organization, and design of multiple information in the actual production and operation process of an enterprise, and makes it cover the entire production and operation network structure of the enterprise, such as service, production, and supply, to ensure that it plays its best role. The essence of supply chain management enterprise supply chain management aims to integrate and coordinate internal and external resources to meet customers' needs and maximize efficiency (As shown in figure 1).[1]
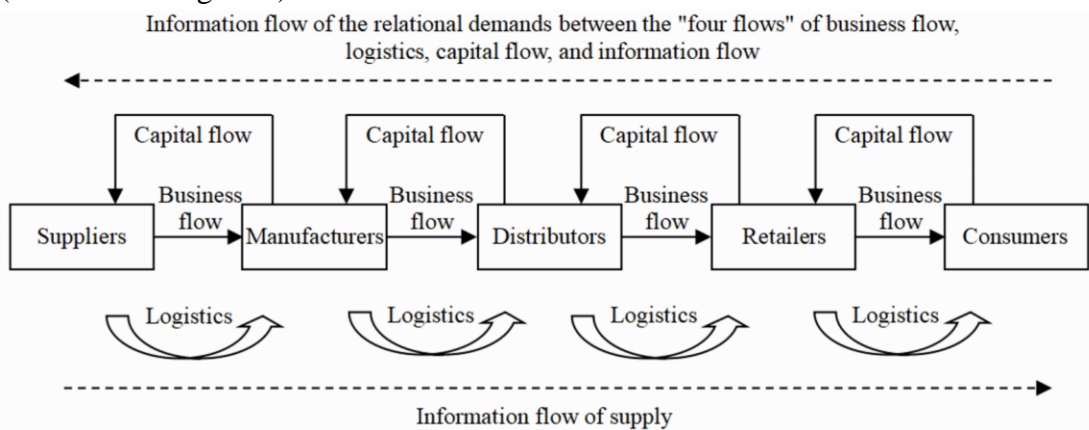

Figure 1. Information flow of the relational demands between the "four flows" of business flow, logistics, capital flow, and information flow[2]

1.2 Characteristics of the supply chain

Supply chain management has four major characteristics, namely, dynamic, strategic, complementary, integrated, etc. (As shown in figure 2)
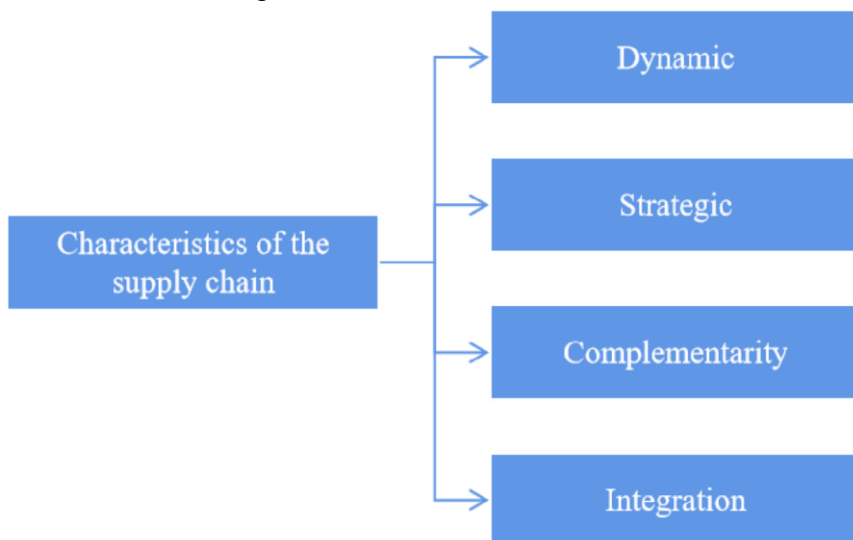

Figure 2. Four major characteristics of the supply chain

Dynamic refers to the actual operation process of the enterprise, whose supply chain is gradually changing with the change of market environment, and the corresponding capital flow, information flow, product flow, etc., also exist dynamic changes.

Strategic refers to enterprises having long-term strategic goals and a holistic vision, in which there is cooperation and competition among individual enterprises, with a mutually promoting effect, and their comprehensive capabilities are gradually enhanced in the competition.

Complementarity refers to the mutual collaboration of enterprises, taking advantage of the strengths of others to compensate for their own deficiencies and sharing resources and information to achieve common development and mutual benefit[3].

Integration refers to further integration and optimization of existing resources to minimize the cost of an enterprise's supply chain, to ensure a higher and faster level of service, and to win in the competition between chains.

2. Challenges of supply chain management for retail enterprises in the digital era

2.1 Traditional retail supply chain lacks a holistic view of digital transformation

Currently, most enterprises are still in the "primary" stage of digital transformation, which is subject to the limitations of the business sector's understanding of digital technology applications. Moreover, most enterprises think that digital transformation is to carry a big data platform on the business operation system, and digitalization is simply similar to moving offline parts to online, which can easily lead to "technicalism". However, the technology application is often disconnected from the business requirements and breaks away from the business operation needs, and does not really achieve the effect of promoting retail efficiency, which eventually makes it difficult for the technology application to effectively support and promote business optimization.

From the perspective of data services, there is no data connectivity among production, circulation, and consumption, and the data collection, data analysis, and use conducted by each link is limited to its own field. Moreover, the traditional retail industry only focuses on the financial statements of front-end stores, which makes each link of data collection, customer information, customer classification, and data processing in a segmented state, seemingly with more data. However, since the overall data processing is inefficient and imprecise, it cannot fundamentally solve the inherent problems of the traditional retail industry. In addition, the online and offline data are each formed into a system, and various mobile e-commerce, membership, and other systems and manual data are independent of each other, which causes all kinds of data to be unable to be integrated, and it makes it difficult for enterprises to conduct a comprehensive and accurate analysis of user data

2.2 Lack of a digital supply chain system driven by market demand

Some brick-and-mortar retailers have established a relatively sound supply chain system, including planning, research and development, procurement, production, delivery, service, etc. However, they lack the capability of a demand-driven digital supply chain system based on the whole chain, including forecasting, procurement, inventory, transportation and distribution, and have the problem of high supply chain costs and low efficiency. Moreover, in terms of demand forecasting, since consumer data collection is incomplete and data mining is not deep enough, it is not accurate in forecasting consumer demand; in terms of procurement, the digital supply chain system requires production enterprises to produce on demand and retail enterprises to purchase on demand, but at present, there is a delay in docking at each node of the supply chain, which causes failure to make quick responses to consumer demand.[4]

To the inadequate supply chain management capability of applying digital technology, the various data precipitated in the process of digital retail transformation is not really valued and fully utilized; the feedback from the production and sales side is relatively slow. Furthermore, manufacturing enterprises lack the guidance of retail data, which easily leads to the problem of large inventory accumulation due to untimely feedback from terminal sales.

2.3   **Supply chain system collaboration is not efficient**

Each node of the supply chain will be interconnected through digitalization, and the seamless connection of data will enable each node to make timely adjustments and feedback based on data, which enables the whole supply chain system to have a clearer understanding of consumer demand and also enables each link of the supply chain to operate more efficiently, precisely and individually around consumer demand. Currently, most retail enterprises still focus on the digital construction of the consumer side, while the upstream of the value chain, the transformation of more difficult fields, is still the "short board" of digitalization, such as some supermarkets have established a cover online and offline warehousing and logistics system, but still in a discrete state, its offline stores and integrated e-commerce business is still using two sets of completely separated warehouse arrangement system, lack of sharing and coordination mechanism between the two systems. The traditional ERP, CRM, MIS, POS, and other systems can no longer meet the needs of enterprise refinement management and intelligent operation and urgently need a strong technical middle platform, middle business platform, data middle platform, etc., to integrate and coordinate, and these middle platform systems are what traditional small and medium-sized retail enterprises lack at present. Moreover, only when enterprises have a strong "central nerve" of the middle platform they can digitize their business system and organizational system and support the front platform system to respond to market changes quickly.

Customer portraits, front warehouse, home service, community live broadcast, etc., are all data output from the middle platform to the front platform to achieve accurate business management and profit improvement.

3.   **Change strategies for supply chain management of retail enterprises**

3.1   **To sound supply chain management system**

The ultimate goal of the digital construction of retail enterprises is to establish a digital business system. Furthermore, digital transformation is not simply the use of technology or the digitization of any one link but involves the whole overall operation, which requires concept innovation, model innovation, and even more people's thinking innovation. Put digital transformation in the overall picture of development strategy to think and create end-to-end, whole-scene, and whole-chain interaction with systematic thinking. The head retail enterprise must consider the whole picture and system planning from the strategic level and carry out a comprehensive digital reconstruction of its own organizational structure and operating system. Only by building a comprehensive and systematic digital strategy in terms of consumer guidance, organizational transformation, technology service upgrade, product quality improvement, channel supply chain optimization, etc., and deeply integrating digital technology with management and retail business, as well as reconstructing the business system and value chain, can they comprehensively improve their core competitiveness. Concurrently, the head retail enterprises cooperate with small and medium-sized enterprises to build digital middle platform systems or integrate small and medium-sized enterprises into their own middle platform systems to achieve accurate business management and profit improvement. (As shown in figure 3)
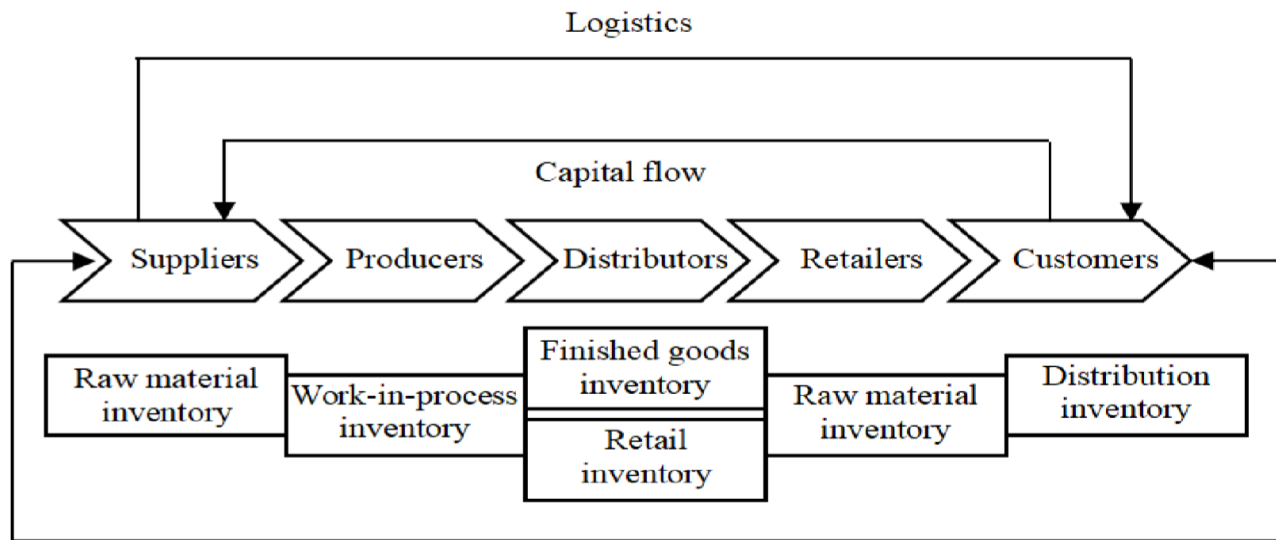
Figure 3. System structure of the supply chain[5]

3.2   Establishing digital infrastructure and aggregating full-link data resources

Along with the enrichment of business scenarios, the current digital technology is extending from the front end of the value chain in retail to the whole value chain. Moreover, these changes reflect the holistic linkage of the system, emphasizing the driving role of data in the system, which ultimately allows enterprises to mobilize all resources to achieve better operational effects.

Data is a pivotal factor of production, with zero marginal cost and no difference in replication, and is a strategic resource for enterprises to create competitive advantages. Establishing the digital infrastructure to aggregate all kinds of big data from the supply side and operation side to the consumer side is a pivotal link to open up the integration and development of retail and manufacturing industries. Consumer demand information matches intelligent algorithms, retail enterprises achieve precise operation and accumulate more valuable data, consumer data is shared in real-time in retail and manufacturing, and manufacturing enterprises can transfer consumer data to the production process in real-time and be analyzed and predicted by the intelligent manufacturing system, and then transfer the data to each production process, including production, procurement, supply, logistics and other links to achieve collaborative innovation in different processes. Moreover, the establishment of digital infrastructure aggregates data resources of the whole chain, and big data is used in production, management, organization, circulation and service, transforming traditional processes and procedures with the advantages of information technology, saving a lot of costs for organizational operation and industrial chain synergy, providing better services and reducing transaction costs. The digital infrastructure gives big data connotation to the integration of retail and manufacturing, which not only enhances the operational efficiency of enterprises but also allows them to improve their operational decision-making ability and provides support for the development of manufacturing and retail integration based on big data. (As shown in figure 4)
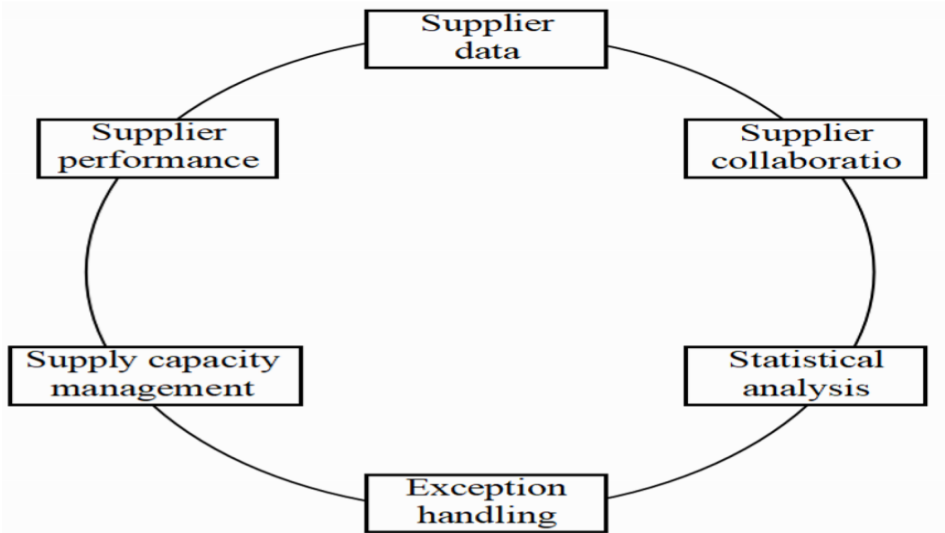
Figure 4. Full-link data resources[6]

3.3 Establishing an agile C2M model for retail enterprise supply chain management

Under the background of complex and changing consumer demand, shortening product life cycle, and fiercer market competition, the traditional production model with mass production as the core has increased the risk of delayed mismatch of commodity supply and demand, causing a certain degree of overcapacity and disconnection between production and marketing. The manufacturing industry needs to change its production concept and move towards the C2M (Customer-to-Manufacturer) model of "customizable, diversified, small-scale, and cycle-controlled", which is the key to transforming agile production methods for traditional manufacturing enterprises. The realization of the C2M model requires manufacturing enterprises to flexibly adjust production according to changes in market demand, driving the enterprises to create a more flexible and refined production line while also promoting innovation and change in enterprise management concepts and management mechanisms and strengthening endogenous growth momentum. Furthermore, by organizing production around end-user demand, the entire production process, design, research and development, raw material supply, and other functions will be synchronized through digital technology, applying digital production processes for cost control, accelerating the overall operation by reducing inventory pressure, and achieving a rapid response to retail.

4. Conclusion

In conclusion, under the background of the traditional retail industry has entered a period of weakness; the retail industry urgently needs accelerated change to explore new value growth points. The production link needs to improve market recognition, the distribution link needs to reduce costs, and the consumption link needs to strengthen the integration of online and offline experiences, which implies a change in all operational links of the traditional retail industry. The digitalization process, as a new technology-driven, is an innovative combination of products, services, and channels, prompting a closer linkage of each industry, from data-dependent scale customization at the production end to accurate crowd profiling at the consumption end, strongly supporting the operational decisions of retail enterprises. For this reason, enterprises must strengthen the overall control of the supply chain to make better use of internal resources and establish long-term partnerships with suppliers to meet the ever-changing market environment, thus better promoting the development of product marketing. Moreover, the sustainable development of the enterprise is supported by continuous improvement of product quality,

perfecting inventory management, implementing effective cost control, establishing an advanced logistics network and service system, and implementing effective supply chain management.

References

Lu Sen. Analysis of supply chain reconfiguration mechanism under the new community retail model[J]. Business Economics Research, 2023(08):11-14.

Fu Lei, Gu Xianming. A study on the coordination strategy of logistics supply chain at the retail end based on chain and chain competition[J]. Journal of Engineering Mathematics, 2023, 40(02): 190- 206.

Sun Yadong. New retail channel integration, supply chain sensitivity and residents' consumption intention[J]. Business Economics Research, 2023(05):30-33.

Ding Yue. Analysis of retail supply chain management in the context of new retail [J]. Modern Business, 2023(03):7-10. DOI:10.14097/j.cnki.5392/2023.03.014.

Xu Chunqiu, Liu Fengzhi. Research on the integration strategy of low carbon supply chain under "new retail"[J]. Price Theory and Practice, 2021(09):151-154+203. DOI:10.19851/j.cnki.CN11- 1010/F.2021.09.337.

Zhou Xuan. New retail promotes digital transformation of enterprise supply chain [J]. China Logistics and Purchasing, 2021(24):74. DOI:10.16079/j.cnki.issn1671-6663.2021.24.041.