

Research on the Effects of Digital Supply Chain Transformation on the Operational Performance of Retail Enterprises

Xinran Gao^{*,†}

Faculty of Science, The Chinese University of Hong Kong, Hong Kong, 999077, China

*Corresponding author: 1155150517@link.cuhk.edu.hk.com

Abstract. In the face of the upgrading of consumption structure and the sudden change and development of the economy, China's retail industry has also shown an overall positive industry trend. This paper focuses on the major premise of digital transformation, discusses the status quo of retail enterprises, and analyzes the opportunity and necessity of the digital transformation of the supply chain driven by the development of digital technology and the "dual circulation" national policy. Through literature reading, many scholars have also realized the important role of digitization in improving supply chain capabilities. This paper first analyzes the current situation of Chinese retail enterprises and expounds on the significance of digitalization. Use the literature to study the role of digital technology on the development of retail enterprises and analyze the problems existing in the supply chain of retail enterprises under the background of digitalization. Research shows that transformation pain points can be improved through the intervention of consumer-centric supply chain value, digital infrastructure, trust mechanisms, omnichannel logistics platforms, and national policy support. As a result, this study holds that integrating digital technology may significantly boost retail businesses' performance as well as their fundamental competitiveness.

Keywords: Digital Transformation; Supply Chain; Operational Performance; Retail Enterprises.

1. Introduction

1.1 Research background

In recent years, China has continued to promote supply-side structural transformation and continuously optimize the structure of its economic organization. For six consecutive years, consumption has contributed more to GDP than investment. Consumption has become the main engine of China's economic growth.

The "troika" of consumption, investment, and foreign trade will further release the support and driving role of consumption reform on China's economic growth against a backdrop of accelerating the formation of a new development pattern with the domestic cycle as the main body and the domestic and international dual cycles promoting each other [1]. While the consumption structure continues to upgrade, traditional offline retail enterprises are in a developmental predicament. There have been phenomena such as slow growth in operating income and rising operating costs [2]. By the end of 2018, the growth rate of typical retail enterprises had dropped by 9.6%.

The current oversupply caused by the traditional supply chain continues to deepen, and the improvement of consumption levels and living standards has increased consumers' demands for the performance, quality, and individuality of products on the market. Additionally, retailers' and consumer groups' requirements are rapidly not being met by the traditional supply chain's way of operation. The development of emerging business formats, changes in demographic structure, consumption habits, and the new crown pneumonia epidemic have also impacted the traditional supply chain, making the digital transformation of the supply chain one of the trends in the development of the retail industry.

In 2020, the network economic index reached 1323.6, and the mobile Internet access traffic reached 165.6 billion GB. Fixed Internet broadband access users reached 480 million [3]. Consumers increasingly rely on online shopping, and the coverage of non-contact services has increased significantly. The restrictions imposed by time and geography in the traditional sense can also be

overcome by digital technology thanks to its constant development. It provides the advantage of timely access to information, which is important in driving the supply chain's digital transformation and improving the retail industry's operational performance. Digital technology provides strong technical support for enterprises to take consumers as the starting point, integrate online and offline multi-channel, optimize the organizational structure, and improve supply chain efficiency. Moreover, automate data flow, and optimize the uncertainty of business decision-making. In the era of the digital economy, the digital transformation of the supply chain will become the only way that must be passed for the entire retail industry to move towards high-quality development.

1.2 Literature review

Zhang used the method of robustness test to propose that digital transformation of the supply chain is the only way that must be passed in supply chain development. It also serves as a powerful motivator for advancing supply-side structural transformation and fostering new growth areas. By eliminating financial restrictions and overcoming the drawbacks of information asymmetry, the deep integration of supply chain and digital technology plays a critical role in enhancing enterprise risk-taking [4]. Han discusses the driving factors and operation mechanism of the digital transformation of the supply chain of manufacturing enterprises. He uses the DEMATEL and HOQ methods to propose a decision model and management scheme for digital transformation data management [5]. Zhu found that digital transformation has different degrees of positive impact on the performance of different types of enterprises and has a promotion effect on supply chain integration [6]. Pan found that the digital transformation and development of Chinese brick-and-mortar retail enterprises is a spiral process composed of internal and external digital changes in multiple links. The impact of digital transformation and development on the operational efficiency of the brick-and-mortar retail industry is diverse, but, overall has a significant positive impact [7-8]. Shen used the micro database to find that the Internet of enterprises has a universal promoting effect on the innovation ability of Chinese enterprises. In addition, the study used the deep integration of manufacturing enterprises, and the Internet is conducive to integrating innovation resources and reducing enterprise formation and learning costs.

1.3 Research gap

Most scholars mainly study the advantages and opportunities brought by digitalization. Moreover, these studies put forward relevant theories on managing the national economy and enterprises in the supply chain digital transformation field. In contrast, very few articles have examined the digital transformation of the retail industry's supply chains against the backdrop of China's emergence of new business models and the upgrading of consumption fueled by domestic demand. Relevant research on how supply chain digital transformation affects retail enterprise performance and its influencing factors is not abundant.

1.4 Research framework

First, the paper will analyze the development status of domestic retail enterprises in China. Secondly, the characteristics of China's retail industry will be discussed. Third, determine the precise definition of the digital supply chain and the components of digital image transformation. Last but not least, the paper will investigate how the operational performance of retail firms is impacted by the supply chain's digitization. At the same time, this paper obtains enlightenment and suggestions based on the research results.

2. Methods: Literature research method

Literature study is a tool for obtaining information by studying the relevant literature in line with a certain research objective or subject, in order to appreciate and grasp the issue under investigation [9]. This paper reviews and discusses relevant domestic and foreign literature from the aspects of the

retail industry, digitization, supply chain digitization, enterprise operation performance, etc. According to the research results of the literature, the influencing factors of retail enterprise operation performance and the promotion of supply chain digital transformation will be carried out. And offer a theoretical and conceptual framework of the effects of supply chain digital transformation on the operational effectiveness of retail organizations.

3. Results

3.1 Current situation of the impact of supply chain digital transformation on retail enterprises

With the transformation and upgrading of China's economy, China has steadily transitioned to the new normal stage of economic development [10]. Its development prospects are also simultaneously transitioning to high-quality, medium-to-high-speed growth. Economic growth is no longer limited to the scope of investment and foreign trade but drives high-quality economic growth by expanding domestic demand.

China's overall retail sales of consumer products have been rising significantly in recent years. The overall retail sales of consumer goods in China from January to October 2021 totaled 35.9 trillion yuan, an increase of 8.6 trillion yuan over the same period in 2020, thanks to the epidemic's ongoing progress in the resumption of work and output. In 2020, China's national daily necessities retail market will be about 6 trillion yuan, which is expected to reach about 8.4 trillion yuan by 2025. The development of the Internet economy has also maintained good momentum. Online retail sales of tangible items in China reached 9.76 trillion yuan in 2020, rising 1.24 trillion yuan from the previous year. [11].

The steady development of the national economy and Internet shopping has become one of the mainstream consumption patterns. Under these two preconditions, online and offline, parallel consumption patterns have undergone subversive innovations. "New retail" is gradually moving into the public eye. Compared with traditional retail, new retail advocates the full coordination of online supply chain business and offline supply chain activities through the introduction of digital technology. Real-time links are linked by activating data to drive the digital upgrade of supply chain links, such as the consumption side, supply side, products, and services, thereby promoting the innovation and development of retail models [12]. The proposal of the new retail concept drives retail enterprises to reconsider the overall layout of their supply chains and to carry out the digital transformation of supply chains in response to social development trends. Through new thinking and cognition, comprehensively optimize the supply chain management mode to achieve the purpose of seizing opportunities to improve corporate performance with the help of the new wave of the times.

3.2 Issues existing in the retail industry's supply chain against a backdrop of digitalization

The digital transformation of China's retail industry is accelerating. In moving forward, retail enterprises are also facing various difficulties. Most retail companies have established a supply chain system, including R&D, planning, procurement, production, and delivery. The overall structure is robust, but the supply chain often has high comprehensive costs and low efficiency. The digitization of supply chains highlights the importance of enhancing consumer engagement throughout the supply chain. However, the supply chain of retail enterprises has deficiencies in various links such as demand, procurement, and logistics. Although digitalization has expanded the previously squeezed development space, it has brought new problems. It is difficult to integrate online and offline, and enterprises can meet the needs of different consumer groups in all channels for products and services. Logistics transportation and response speed put forward higher requirements [13].

In terms of demand, the retail industry, as the end of the supply chain, cannot timely and accurately predict consumer demand. Consumer demand is highly variable and diversified, making it more difficult to predict demand accurately. The information asymmetry makes it impossible to connect with suppliers and meet consumer needs effectively. In terms of logistics and distribution, online and offline multi-channel operations have brought about the problem of scattered logistics orders, and the

warehousing link cannot yet cope with the scattered logistics. Information silos often appear between different links in the supply chain, and data collection and integration are the basis for online and offline Omni-channel retailing. This also means that in addition to requiring more capital investment. It also puts forward higher requirements for an effective trust mechanism between retail enterprises and other supply chain node enterprises. Otherwise, achieving effective collaborative management throughout the process will be difficult. In addition, the constantly escalating supply chain requires technical personnel. With a relatively complete technology platform and high-quality data sets, more professional and technical personnel are needed to provide technical support for retail enterprises to realize the digitalization of supply chain operations successfully.

4. Discussion

4.1 Strengthen the ability to sense needs

Due to their unique position as the only outlet in the supply chain, customers play a pivotal role in providing feedback and driving sales in the supply chain value creation process. [14]. With the increasingly prominent status of consumers, it is necessary to establish a consumer-centric supply chain. The specific performance is to realize the segmentation of the consumer value chain and collect consumer behavior data. Furthermore, make use of digital technologies such as big data analysis, cloud computing, the Internet of Things, and artificial intelligence technology to integrate, classify and analyze market demand data information. Taking the JIT idea as the starting point, emphasizing the application of the B2C model, using digital technology to configure the supply chain dynamically, and improving the agility and sensitivity of the entire chain to demand.

4.2 Reduce the risk of information silos

Digital information is the key production factor of the digital economy as a new economic form. The application of a generation of information technology has changed the channels of information transmission and the mode of value creation [15]. Match and coordinate through the digital capabilities of each supply chain link, combined with the company's development pain points and core business. Carry out data calculation and analysis of demand forecasting, production planning, and other aspects to achieve comprehensive early warning and monitoring of the overall supply chain. Use information technology to intelligently transform and upgrade the infrastructure of each supply chain link, form a digital infrastructure form, and realize the information connection and sharing of each node [16]. Change the phenomenon of information separation between upstream, downstream, and supply terminals.

4.3 Build a trust mechanism

As an advanced database mechanism, it allows transparent sharing of information in enterprise networks [17]. Hence, Block technology can ensure that information cannot be tampered with and has the characteristics of decentralization, traceability, transaction transparency, and smart contracts. , which meets the need to establish a trust mechanism between nodes in a retail enterprise supply chain. On the other hand, blockchain technology contributes to a greater degree of information sharing throughout the supply chain. This not only helps firms establish mutual trust, but also assists organizations minimize information islands and confidence imbalances. At the same time, the construction of a new supply chain platform that is mutually beneficial and win-win for all parties is formed, and the effective integration of various aspects of information, such as information flow, logistics, and capital flow, is realized.

4.4 Build an omnichannel logistics platform

The "new logistics," which is propelled by technological advancements and massive amounts of data, is an essential component of the modern supply chain system [18]. In addition to the blockchain

technology-based supply chain information platform to achieve the smooth logistics information flow. Determine the demand and product preferences in different cities and regions through information technology such as data mining and extensively collect feedback information from online and offline logistics data. To avoid inventory accumulation, make a reasonable inventory plan according to inventory changes and item flow speed [19]. Highlight intelligence applications in warehouse management, and realize the coordinated work of transportation and distribution with precise positioning and real-time supervision. Strengthen the connection and cooperation between online e-commerce and offline physical stores, and build a smart distribution system from the beginning to the end of the supply chain. Form the digital infrastructure construction between all links of logistics and distribution, complete the collaborative services between warehousing centers, logistics companies, and retail enterprises, and continuously upgrade and innovate the logistics model.

4.5 Alleviating the status quo of capital and technology constraints

Insufficient capital and limited technical capabilities restrict some retail companies' digital transformation of the supply chain. An enterprise's digital transformation does not disrupt the existing value proposition but delivers the core value proposition through progressive digital transformation [20]. First of all, according to the actual situation of the enterprise, carry out reasonable transformation and upgrading and fundamentally reduce the error rate and capital loss. Based on the fit between digital technology and the company's business model, the supply chain digitization is realized within an appropriate range. Secondly, take the outsourcing model as one of the ways to reduce costs in the digitalization of enterprise supply chain transformation. In addition to having many databases, data tools, and practical experience, the outsourcing team provides professional advice to small and medium-sized enterprises that lack transformation ideas and experience. It not only reduces the financial loss caused by the blind self-digitization of enterprises but also provides professional talents to make up for the shortcomings of the limited technical capabilities of enterprises. Thirdly, in recent years, the Chinese government has issued several policies to support and subsidize the digital transformation of enterprises. And actively explore policies that favor capital and talent needs in the enterprise transformation process. Li proposed to purchase the necessary support means for digital transformation through government purchase of services and provide them with free or preferential prices to enterprises with insufficient funds [21]. Shan believes that establishing special loans for the digital transformation of small and medium-sized enterprises will provide financial support for digital transformation [22]. Exploring opportunities to address high costs and insufficient technical capabilities in line with national policies is an important support for solving such problems.

5. Conclusion

5.1 Key findings

The rapid development of the national economy and the steady advancement of the digitization of the retail industry have made the digital upgrade of the supply chain an inevitable development trend. Studying the state of Chinese retail companies' digital development through the method of literature research. The paper addresses the challenges and difficulties in the supply chain's digital transformation, provides an overview of the variables influencing this transformation in the context of retail firms, and puts forward countermeasures accordingly.

First, the improvement of consumption level and the diversification of demand put forward higher requirements for demand forecasting. Combining supply chain value and agile supply chain, emphasizing the centrality of consumer power, and refining the idea of digital transformation of supply chain centered on consumers.

Second, the lack of circulation and asymmetry of information leads to the phenomenon of information islands. With the upgrading of information technology and the integration of the infrastructure of each node of the supply chain, the information island is broken, and the circulation and sharing of information and data are realized.

Third, the decentralization of orders makes logistics and transportation problems to be solved urgently. Research the construction idea of an information platform from the blockchain technology perspective.

Finally, the necessary conditions, such as basic software, cloud computing services, and data development platforms for data transformation, have higher requirements for enterprise capital and talent strength. Discuss the potential for cost reduction focusing on the business value proposition. Analyze the advantages of the outsourcing model when the upper limit of the technical capability of the enterprise is limited. Discuss the policy support of national policies for enterprises lacking talents and funds.

5.2 Research significance

Discusses the necessity of digital transformation of the supply chain under the background of continuous optimization of economic structure and studies the driving effect of digital technology on retail enterprises, which will help to promote new business forms and reverse social and economic development.

5.3 Limitations

The supply chain's overall digitalization is the only aspect of this article that is systematically analysed. The digital components of each link in the supply chain of the retail firm are not sufficiently covered in depth. Additionally, the article neglected to look at the upgrading of service functions and product innovation during the digitalization process. Further research on these aspects can be carried out in the future.

Due to the lack of primary data, the article did not build a data model from a data perspective to analyze whether the digitization of the supply chain has a positive effect on retail enterprises. The research object and scope need to be further specified, and the retail enterprises are not subdivided. Future research will analyze and verify the digital transformation of the supply chain of small and medium-sized enterprises and large retail enterprises.

References

- [1] China Macroeconomic Forum (Institute of Renmin University of China), Important History of China's Economic International and Domestic Dual Cycle Construction, 2022.12.15, 2022.8.26, <https://baijiahao.baidu.com/s?id=1686142739024540150&wfr=spider&for=pc>
- [2] Lei Jie, Research on the Transformation and Development of Traditional Retail Enterprises to New Retail Formats, 2021, pp. 11-15
- [3] Lu Haiqi (National Bureau of Statistics), Director of the Institute of Statistical Sciences of the National Bureau of Statistics Lu Haiqi Interpretation of the New Momentum Index of China's Economic Development in 2020, 2021.7.26, 2022.8.26, http://www.stats.gov.cn/xxgk/jd/sjjd2020/202107/t20210726_1819841.html
- [4] Zhang Shushan, Hu Huaguang, Sun Lei, Xia Minglu. Supply chain digitization and supply chain security and stability—a quasi-natural experiment [J]. China Soft Science, 2021(12):21-30+40.
- [5] Han Lu. Digital Transformation Mechanism and Decision Model of Manufacturing Enterprise Supply Chain [D]. Beijing Jiaotong University, 2021.
- [6] Zhu Heliang, Wang Chunjuan. Industrial digital transformation under the background of the “dual circulation” new development pattern strategy: theory and countermeasures [J]. Finance and Trade Economy, 2021,42(03):14-27.
- [7] Pan Yixin. Research on the Impact of Digital Transformation of Retail Enterprises on Operational Efficiency [D]. Zhongnan University of Economics and Law, 2020.
- [8] Shen Guobing, Yuan Zhengyu. The Impact of Enterprise Internetization on Chinese Enterprises' Innovation and Export [J]. Economic Research, 2020, 55(01): 33-48.

- [9] Baidu Entries (Baidu), Literature Analysis, 2022.8.26, <https://baike.baidu.com/item/%E6%96%87%E7%8C%AE%E5%88%86%E6%9E%90%E6%B3%95>
- [10] Wang Xiaoli. Research on the upgrading of small and medium-sized retail formats under the new consumption trend [J]. Business Economics Research, 2020(15):28-31
- [11] Huajing Intelligence Network, Analysis of the Current Situation of China's Retail Industry in 2020, Should Accelerate the Promotion of High-quality Development of the Retail Industry, 2022.2.24, 2022.8.26, <https://baijiahao.baidu.com/s?id=1725620363878812256&wfr=spider&for=pc>
- [12] Zuo Youqiong. Necessity and suggestions for the transformation of traditional retail industry to e-commerce [J]. China Business Review, 2022(05):22-24.
- [13] Miao Qing. Digital Research of New Retail Supply Chain [D]. Anhui University, 2019.
- [14] Dong Jianhua. Research on the value maximization of supply chain based on the integration of new production and consumption [D]. Shandong University, 2012.
- [15] Zhang Yuzhe. The development ideas and main tasks of the digital economy driving the industrial structure to the mid-to-high end [J]. Economics, 2018(09):85-91.DOI:10.16528/j.cnki.22-1054/f.201809085.
- [16] Wei Liurong. Thoughts on accelerating the construction of my country's digital infrastructure construction system [J]. Information and Communication Technology and Policy, 2020(09):63-66.
- [17] AWS, What is Blockchain Technology?, 2022.9.9, <https://aws.amazon.com/cn/what-is/blockchain/>
- [18] Zhao Shumei, Men Ruixue. "New Logistics" under the Background of "New Retail" [J]. China Circulation Economy, 2019, 33(03): 40-49. DOI: 10.14089/j.cnki.cn11-3664/f.2019.03.005.
- [19] Pan Changhong, Zhang Xinzeng. New logistics promoted by new retail [J]. Logistics Engineering and Management, 2019, 41(08): 1-4. [23] Economic Daily (Li Yongjian), What is the resistance to digital transformation of SMEs, 2022.6.18,2022,9.9,<https://baijiahao.baidu.com/s?id=1735917485074240739&wfr=spider&for=pc>
- [20] FURR N, SHIPILOV A. Digital doesn't have to be disruptive: the best results can come from adaptation rather than reinvention[J]. Harvard Business Review, 2019, 97(4): 94-103.
- [21] Economic Daily (Li Yongjian), What are the obstacles to the digital transformation of SMEs, 2022.6.18, 2022, 9.9, <https://baijiahao.baidu.com/s?id=1735917485074240739&wfr=spider&for=pc>
- [22] China Economic News (Shan Yanfei), Combination of policies to solve the financing problem of digital transformation of SMEs, 2022.8.8, 2022, 9.9, <https://www.163.com/dy/article/HE8C602N0512D71I.html>