

Enterprise Digital Transformation and Supply Chain Resilience ——Based on the Perspective of Search Matching

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ABSTRACT

Digital transformation is gradually becoming a new engine driving the transformation and upgrading of supply chains. How to utilize digital transformation to enhance supply chain resilience is a pressing practical issue that requires immediate research, yet no literature has provided direct empirical evidence on this matter. The research findings indicate that digital transformation of enterprises can significantly promote the improvement of supply chain resilience. From the perspective of transmission mechanisms, digital transformation of enterprises enhances supply chain resilience through two channels: reducing search and matching costs and improving search efficiency. For enterprises with high environmental uncertainty, low internal control levels, those located in the downstream of the industrial chain, and those in regions with low marketization levels, the boosting effect of digital transformation on supply chain resilience is more pronounced. "Chain leader" enterprises and supply chain policies play a certain positive incentive role in the process of digital transformation enhancing supply chain resilience. This article not only provides a new analytical perspective for systematically understanding the relationship between enterprise digital transformation and supply chain resilience, but also offers policy implications for building digital supply chains and ensuring the smooth circulation of the national economy.

KEYWORDS

Digital transformation; Supply chain resilience; Matching cost; Matching efficiency

1 Literature Review

Supply chain resilience is the ability of a system to recover to its original state or to move to a new, more desirable state after a disruption (Christopher and Peck, 2004; Ponomarov and Holcomb, 2009). Supply chain resilience emphasizes the recovery response in the face of accidents. It is possible to recover to a more favorable and stable state than before the accident, so as to gain a sustained competitive advantage (Chen Jian et al., 2021). Supply chain resilience is divided into four different stages. Including supply chain preparation for disruption, rapid response to chain disruption, recovery, reconstruction and growth (Spieske and Birkel, 2021). These studies show that supply chain resilience mainly focuses on the ability of relevant entities in the supply chain to cope with potential risks or uncertain events. Based on the perspective of supply chain, this paper studies the supply chain after being interrupted by adverse shocks. Whether the digital transformation of enterprises promotes the improvement of supply chain resilience.

The main ways to integrate the development of digital economy and real economy can be understood from the micro, meso and macro levels. This paper studies the enterprise digital transformation at the micro level. Digital technology is easy to change or replace traditional business rules, if enterprises can not adapt to these changes. It is likely to be replaced by enterprises using these technologies, so it is necessary for enterprises to carry out digital transformation. Change the way of using digital technology, develop new digital business models, and create and utilize more value (Verhoef et al., 2021). According to the previous literature, digital transformation promotes enterprises to optimize their operation system and improve their operation efficiency. It is helpful to realize the transformation of enterprise operation and management mode; Digital transformation can promote enterprise division of labor by reducing enterprise costs, thereby improving enterprise production efficiency or total factor productivity; Digitalization and related technologies can promote the liquidity level of corporate stocks; And during the crisis, the higher the degree of digitalization of enterprises, the higher the stock returns, and the more resilient enterprises. However, these studies focus on the internal impact of digital transformation, ignoring the external spillover effects on the supply chain.

On the one hand, shocks at the enterprise level are transmitted through the information flow of the supply chain, and information diffusion is an important channel to drive the transmission of shocks. When the supply chain information is improved, the spillover effect becomes more obvious (Xunxiao Wang et al., 2023). Corporate financial distress will spread along the supply chain or ripple to other levels of the supply chain (Hertzel et al., 2008); Customer innovation will have a positive impact on supplier innovation through knowledge spillover effect (Isaksson et al., 2016); Downstream customer information can be transmitted to upstream suppliers along the supply chain; The easing of financing constraints brought about by enterprises holding shares in financial institutions can spill over to the upstream major suppliers; The effect of downstream tax reduction policy can spill over along the supply chain and promote the digital transformation of midstream enterprises. These studies have affirmed the spillover effect between the upstream and downstream of the supply chain from multiple perspectives. However, it has not yet paid attention to the spillover effect brought by the

digital transformation of midstream enterprises.

On the other hand, digital technology promotes the interconnection of information islands and the transmission of data on commercial networks. Strengthen cooperation, promote knowledge diffusion and optimize factor allocation. It is found that the digital transformation of customer enterprises can spread to the upstream of the supply chain and drive the digital transformation of upstream supplier enterprises; Li Qingyuan and others found that the information spillover effect of digital transformation of customer enterprises can alleviate the "bullwhip effect" in the supply chain. And help supplier enterprises to better cope with external environmental risks and uncertainties; Yang Jinyu and others found that the digital transformation of partners and customer enterprises has important driving and contagion effects. It can influence supplier innovation through backward effect and resource effect. It can be seen that many literatures show that there are spillover effects in the vertical relationship of supply chain. The effect of enterprise digital transformation can spread to upstream suppliers along the supply chain. However, there are few literatures on the relationship between digital transformation and supply chain resilience. On the one hand, there is a vertical correlation effect between the upstream and downstream of the supply chain, and the digital transformation of customer enterprises has a backward spillover effect along the supply chain. By optimizing the matching of supply and demand, stabilizing the relationship between supply and demand, and improving the innovation ability of suppliers, the resilience of supply chain will be enhanced. Four phases of supply chain resilience can be effectively improved: preparation, response, recovery, and growth (Spieske and Birkel, 2021).

On the other hand, digital information technology helps to share and collect information in the supply chain and provide information to decision makers in a timely and rapid manner. It is conducive to responding quickly to environmental changes and improving operational capacity. Enhance the ability of the supply chain to withstand short-term or long-term changes and disruptions (Pervaiz Akhtar et al., 2024), which can help enterprises predict possible risks in advance and take countermeasures in advance. It can also promote information sharing in the supply chain. Reduce the risk of untimely information transmission and data sharing in the supply chain (Weili Yin et al., 2022), affect supply chain memory (Alvarenga et al., 2023), strengthen information sharing, and help core enterprises perceive market changes. Enable core firms and their suppliers to cope with and recover from disruptions (Minhao Gu et al., 2021), thereby enhancing supply chain resilience. Based on the background of supply chain disruption caused by exogenous adverse shocks in 2020, this paper combines the information spillover effect of supply chain. This paper studies whether the digital transformation of enterprises can reduce the cost of search and matching, improve the efficiency of search and enhance the stickiness of supply relationship. To help enterprises find suitable suppliers, thereby enhancing the resilience of the supply chain.

2 Research Hypothesis

2.1 Reduce the cost of searching and matching

Digital transformation will reduce the cost of searching for matching suppliers after the supply chain is interrupted by adverse shocks in 2020. On the one hand, due to the existence of information search cost, when the supply chain is interrupted, information asymmetry will lead to high costs when enterprises search for new supplier information and confirm information. The cost of matching between the two parties increases. The division of labor and cooperation between digital platform and network reduces the cost of information transmission, communication and sharing. An industrial, regional, and even global interactive network of innovation will be formed, and with the advancement of the digital transformation of enterprises. The willingness and ability of enterprises to search and integrate external frontier information are also enhanced, and enterprises are based on data mining and analysis. The information transmitted to upstream suppliers is also more accurate. With the application of digital technology, the search cost of enterprises and the matching cost and trust cost between enterprises and suppliers are greatly reduced. On the other hand, the cost of information verification is related to the ability to overcome information asymmetry (Avi and Catherine, 2019). Improving the quality of enterprise information disclosure can improve the information asymmetry among enterprises in the supply chain and effectively reduce the search cost of enterprises. Enterprises acquire and analyze information and data within enterprises, suppliers and stakeholders through digital technology. It can depict the complete information portrait of suppliers more comprehensively and reduce the verification cost of supplier enterprise information. Relieve the information asymmetry among enterprises on the supply chain. Therefore, digital transformation can help enterprises to obtain more potential supplier information at a lower cost. This enables enterprises in a broader space to choose a comprehensive range of better reputation, reliable product quality and more satisfied with their own life. Suppliers required for production. Based on the above analysis, this paper proposes.

Hypothesis 1: The digital transformation of enterprises can significantly reduce the cost of searching for matching suppliers, thereby improving supply chain resilience.

2.2 Improving search efficiency

When the external environment of the supply chain changes and the risk rises, The efficiency of enterprise resource search determines whether it can find a suitable new supply relationship in time and quickly. In order to cope with the impact of the interruption or breakdown of the original supply relationship. With the rapid penetration and rise of digital technology in various fields of social economy, The mode of enterprises seeking and utilizing business resources has also undergone profound changes. Digital technology promotes the circulation and dissemination of business information among micro-subjects. It shortens the trade distance between enterprises and partially alleviates the friction of information transmission, thus having an important impact on the efficiency of business resource search. In the era of digital economy, the traditional vertical linear supply chain has evolved into a virtual and dynamic network supply chain. Data penetration promotes the interconnection of information islands, and the same member of the supply chain assumes different roles to improve inefficient links.

Because of the close transactions between the upstream and downstream enterprises in the supply chain, The influence exerted on a certain link in the supply chain will be transmitted and amplified through the supply chain channel. And then evolve into a global impact (Hertz et al., 2008), and the important external information and knowledge experience resources provided by enterprise digital transformation are diffused along the supply chain. Promote the digital transformation of upstream suppliers and better promote the application of digital technology docking with enterprises. Effectively establishing a smooth system for the generation and flow of data elements among supply chain enterprises will help to improve the efficiency of information search. Digital technology plays an important role in supply chain collaboration among business partners, enabling more efficient sharing and exchange of information. Thereby minimizing supply chain disruptions (Pervaiz Akhtar et al., 2024). Enterprises can more flexibly and efficiently use digital technologies such as artificial intelligence, big data and cloud computing to search and match business resources. Search for quality and appropriate supply relationships faster after a supply chain disruption. Based on the above analysis, this paper proposes.

Hypothesis 2: The digital transformation of enterprises can significantly improve the efficiency of searching for suppliers, thereby improving the resilience of the supply chain.

3 Discussion

Based on the realistic background of the exogenous impact in 2020 and the rapid development of China's digital economy, From the perspective of supply chain information spillover, this paper investigates the impact of enterprise digital transformation on supply chain resilience and its transmission mechanism. The main conclusions are as follows. Generally speaking, the digital transformation of enterprises has significantly improved the resilience of supply chain, and has passed the robustness test. This conclusion is still valid. This shows that there is a spillover effect of enterprise digital transformation in the vertical relationship of supply chain.

4 Conclusions and policy recommendations

According to the results of the study, this paper puts forward the following policy recommendations. Firstly, we should accelerate the development of digital economy, promote the deep integration of digital technology and real enterprises, and effectively promote the digital transformation of enterprises. The government should further strengthen the support for the digital transformation of enterprises. Enterprises are encouraged to make systematic use of the new generation of digital technology in terms of products, operations and supply chains. And then improve the ability of enterprises to cope with exogenous adverse shocks. Secondly, we should make full use of the spillover effect of digital transformation among supply chain enterprises to promote the deep integration of supply chain and digital technology. Improve supply chain resilience and security. In this paper, Digital transformation is conducive to enterprises to search for more alternative suppliers that meet production requirements with lower cost and higher efficiency. Help enterprises to resist the risk of upstream and downstream chain breakage caused by exogenous adverse shocks, so as to ensure the resilience, security and stability of the supply chain. Therefore, we should fully promote the deep embedding of digital technology in the supply chain and strengthen the information transmission of supply chain node enterprises. Break the "digital island" and reduce the risk of supply chain disruption. Thirdly, according to the vertical relationship structure of supply chain, we should implement policies according to enterprises to improve the accuracy of digital transformation policies. The effect of digital transformation is different among enterprises, on the one hand, because of the different degree of connection between enterprises in the supply chain. Enterprises occupy different positions in different supply chains, and the cooperative relationship changes over time. On the other hand, it comes from the heterogeneity of enterprises in the supply chain.

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