

Analysis on How Digital Transformation Enhances Enterprise Supply Chain Resilience

Tianke Yang*

Hebei University of Economics and Business, Shijiazhuang 050061, Hebei, China

**Author to whom correspondence should be addressed.*

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Abstract: In recent years, with the advent of the digital era, digital transformation has become a mainstream social trend. As a powerful driving force, digital transformation is profoundly changing the operation mode and management method of enterprise supply chains. Enterprises should seize this opportunity to continuously enhance supply chain resilience. Enhancing enterprise supply chain resilience based on digital transformation can not only improve the supply chain's resistance and recovery capabilities, but also further enhance its innovation capability. This helps enterprises better respond to various unstable factors and provides protection for promoting the sustainable development of the supply chain. In this regard, this paper first expounds the multi-dimensional value of digital transformation in enhancing enterprise supply chain resilience, and then puts forward effective paths, aiming to provide certain reference for relevant researchers.

Keywords: Digital transformation; Enterprise; Supply chain; Resilience

Online publication: November 6, 2025

1. Multi-dimensional value of digital transformation in enhancing enterprise supply chain resilience

1.1. Facilitating the improvement of supply chain resistance capacity

In recent years, the social market environment has shown complex and volatile characteristics, and supply chains also face unstable factors such as trade frictions and natural disasters. Digital transformation can build a strong and powerful “shield” for them, further enhancing the resistance capacity of supply chains.

With the help of digital technologies, enterprises can monitor supply chains in real time and make dynamic adjustments to them. For example, enterprises use technologies such as artificial intelligence and the Internet of Things (IoT) to monitor supply chains in a multi-level and all-round manner, and grasp various data generated in warehousing, procurement, production and sales in a timely manner. When abnormal data is detected, enterprises will promptly formulate response plans, such as finding new suppliers, improving logistics and transportation routes, or readjusting production plans, thereby reducing the impact of unstable factors on the supply chain ^[1].

Digital transformation can enhance the effect of collaborative cooperation among cooperative enterprises in the supply chain. Through digital platforms, enterprises can establish in-depth cooperative relationships with distributors, manufacturers and suppliers, achieving collaborative innovation, resource complementarity and information sharing. At the same time, when resisting risks, all cooperative enterprises can communicate quickly, coordinate actions and jointly respond to various challenges faced, so as to continuously improve the stability of the supply chain ^[2].

1.2. Facilitating the improvement of supply chain recovery capacity

Enterprises' flexible use of digital means can significantly reduce transaction costs. In traditional supply chain transactions, not only the operation process is cumbersome, but also a large number of paper documents are generated. This will increase the risk of data errors, waste costs such as time and funds, and lead to a continuous rise in costs. With the steady advancement of the digital transformation process, enterprises will use automated order processing systems, online payments and electronic contracts in transactions. The transaction process will become more efficient and simple, and the investment in costs such as material and human resources will be reduced, thereby further reducing transaction costs ^[3].

At the same time, digital transformation can also enhance the coordination capacity of core enterprises. In the supply chain, core enterprises play an important role in overall planning and coordination. Through digital platforms, core enterprises can achieve closer connections and more efficient communication with upstream and downstream enterprises. Core enterprises can grasp the dynamic information of each node in the supply chain in real time, detect problems in a timely manner and coordinate all parties to solve them. When facing risks, core enterprises can rely on digital means to quickly organize forces from all parties, jointly formulate response strategies, and ensure the stable operation of the supply chain ^[4].

1.3. Facilitating the improvement of supply chain innovation capacity

In the context of the digital era, enterprises can use various digital technologies to conduct all-round data mining and analysis. By mining and analyzing massive data in the industrial chain, enterprises can accurately grasp the weak links of the supply chain, customer preferences and market demands. Based on these more valuable and practical data, they can carry out targeted innovation activities. At the same time, enterprises will also take the initiative to innovate the existing supply chain model, and actively jointly develop innovative projects with partners and suppliers to achieve complementary advantages and resource sharing, thereby promoting the sustainable development of the supply chain ^[5].

Meanwhile, enterprises can use digital platforms to obtain industry information and market dynamics in real time, and make targeted adjustments to supply chain strategies. In order to better respond to the complex and changeable market environment, enterprises can adjust logistics and distribution plans, production plans and product structures according to market changes, continuously improve their adaptability and flexibility, fully activate the innovation momentum of the industrial chain, and constantly enhance the influence of enterprises in the industry ^[6].

2. Multi-dimensional paths for digital transformation to enhance enterprise supply chain resilience

2.1. Deepening the operational reform of digital supply chains

In the warehousing link, enterprises should actively introduce advanced algorithms and automated equipment

to build an intelligent warehouse management system. This system enables efficient storage, rapid sorting, and accurate distribution of goods, thereby reducing human errors and labor costs. At the same time, building an intelligent transportation management system allows enterprises to monitor the driving position, status of vehicles, and conditions of goods in real time. They can adjust transportation routes based on actual situations to comprehensively improve transportation safety and efficiency^[7].

In the procurement link, enterprises should actively build digital platforms to ensure the standardization and transparency of procurement processes. Through these digital platforms, enterprises can achieve effective connection with suppliers and share procurement information in real time, making procurement decisions more timely and accurate. Meanwhile, enterprises can also use big data technology to evaluate and manage suppliers, screen out high-quality suppliers, establish stable and long-term cooperative relationships, and create a high-quality procurement environment.

In the production link, promoting the development of smart manufacturing is the key to deepening the operational reform of digital supply chains. Enterprises can introduce technologies such as industrial Internet and the IoT to realize interconnection and data sharing among production equipment. This allows real-time monitoring of various indicators in the production process, enabling timely identification and resolution of problems in production. By implementing smart manufacturing, enterprises can achieve flexible and customized production, quickly respond to changes in market demand, and improve production efficiency and product quality^[8].

In the sales link, to accurately understand and grasp market trends and enterprise demand, enterprises should flexibly use digital marketing platforms and tools. These tools help accurately identify target groups and develop exclusive marketing plans for them. Enterprises can also use social media and e-commerce platforms to communicate with customers in real time, provide better services to enhance customer satisfaction, and continuously increase the enterprise's market share and sales volume. Additionally, in-depth mining and analysis of sales data can provide strong support for formulating procurement decisions and production decisions^[9].

2.2. Strengthening monitoring and management of supply chain risk links

There is a close connection between various value links in the supply chain. Problems in a single value link may have a huge impact on the entire supply chain, and in severe cases, lead to the breakdown of the entire supply chain. Therefore, while improving the overall resilience of the enterprise supply chain, it is also necessary to strengthen the monitoring and management of each value link of the supply chain, extend the enterprise supply chain horizontally and vertically, and integrate more suppliers and distributors to ensure that enterprises in the supply chain can obtain corresponding resources in a timely manner^[10].

Enterprises should focus on the operation of the supply chain, proactively introduce technologies such as the IoT, big data, and artificial intelligence, and build an intelligent monitoring and automated early warning system to identify potential risks in the supply chain in a timely manner. For example, enterprises use the IoT technology to connect staff, circulating products, and production equipment in the supply chain, share and monitor operational data generated in the supply chain in real time, and issue timely warnings and formulate corresponding countermeasures when abnormal data is found. Enterprises rely on big data technology to identify abnormal data in a timely and accurate manner, such as sudden decreases or increases in supply volume and market sales volume, and promptly determine whether there are problems in the production and sales links^[11].

In addition, the supply chain risk monitoring and management system should be evaluated and optimized regularly. With changes in the market environment, the expansion of enterprise business, and the continuous

advancement of technology, the original monitoring systems and management methods may no longer be applicable. Therefore, enterprises should conduct a comprehensive review of the entire system regularly, checking whether the monitoring indicators are reasonable, whether the early warning mechanism is sensitive, and whether the response measures are effective. Based on the evaluation results, the system should be adjusted and improved in a timely manner to ensure that it can always monitor and manage supply chain risks accurately and effectively, providing a solid guarantee for enhancing the resilience of the enterprise supply chain.

2.3. “Chain Leader” enterprises proactively innovating supply chain technologies

In the supply chain, core enterprises occupy an important strategic position, and the digital transformation of core enterprises will have a relatively direct impact on the entire supply chain. Therefore, to enhance the resilience of the enterprise supply chain, it is necessary to improve the “chain leader system”, clarify the main responsibility for improving the resilience of the enterprise supply chain, confirm the “chain leader” status of the core enterprise in the supply chain, and rely on the core enterprise to drive the digital construction and intelligent upgrading of upstream and downstream enterprises, as well as guide the technological innovation and operation model innovation of the entire supply chain ^[12].

Core enterprises should use advanced digital technologies to collect, integrate, and analyze various data in the supply chain. This enables them to gain a deeper understanding of the problems and risks existing in each supply chain, accurately identify opportunities for further development, optimize supply chain development strategies, and thereby promote the sustainable development of upstream and downstream industrial chains. At the same time, core enterprises can also use intelligent algorithms and machine learning to predict risks such as inventory backlogs, optimal logistics and transportation routes, and market demand, thereby maximizing the accuracy of upstream and downstream supply chains.

To promote transparency in the entire supply chain process, core enterprises should fully rely on the advantages of blockchain technology and build a sound accountability mechanism. This not only makes each link in the supply chain more transparent but also enhances the trust between various industrial chains and enterprises. In addition, core enterprises can use digital twin technology to build supply chain models based on actual conditions, simulate and predict the future operation status of the supply chain, and regularly simulate and predict risks. This continuously strengthens the supply chain’s defense capabilities and effectively resists various unstable factors ^[13].

2.4. Cultivating an innovative ecosystem for digital supply chains

Enterprises should build an intelligent collaborative platform for supply chains, and set up modules such as R&D innovation, warehouse management, and production management in the collaborative platform. This breaks down data barriers between different business segments and enables cross-business and cross-system collaborative development. For example, enterprises can use integrated automation technology to develop an intelligent warehouse management system, which automatically updates and stores information on incoming and outgoing products, materials, and equipment.

The system can also proactively connect with other business segments, intelligently adjust production plans based on changes in warehouse inventory and throughput, and promptly feedback market trends and production plans to upstream enterprises. Upstream enterprises then adjust their equipment and material procurement plans and production schemes based on the feedback data, ensuring the rationality of product circulation and warehouse

reserves, thereby further enhancing the flexibility of the supply chain ^[14].

Enterprises should strengthen the development of digital talent teams. They should closely align with the development status and needs of the supply chain, focus on carrying out diversified talent training, and supply high-quality management talents, innovative talents, and R&D talents to the supply chain. At the same time, enterprises should improve the promotion channel mechanism for employees to create a favorable development and promotion environment within the enterprise.

In addition, efforts should be made to enhance employees' digital skills and thinking. Regular activities such as seminars and knowledge competitions themed on digital transformation should be held. These diverse activities fully stimulate employees' interest in learning, comprehensively improve their digital literacy, and cultivate them into digital talents truly needed by the enterprise's supply chain, injecting inexhaustible talent momentum into the sustainable development of the supply chain ^[15].

3. Conclusion

In summary, digital transformation has multi-dimensional value for enhancing the resilience of enterprise supply chains. It can improve the supply chain's resistance, recovery, and innovation capabilities, helping enterprises resist risks, reduce costs, and achieve innovative development in a complex and volatile market environment. To this end, enterprises can start with paths such as deepening the operational reform of digital supply chains, strengthening the monitoring and management of supply chain risk links, promoting supply chain technology innovation by "chain leader" enterprises, and cultivating an innovative ecosystem for digital supply chains. These paths provide specific practical directions for enterprises to enhance supply chain resilience. In the future, with the continuous advancement of science and technology and the constant changes in the market environment, digital transformation will become an inevitable path for enterprises to enhance supply chain resilience. Enterprises should fully recognize the importance and urgency of digital transformation, actively respond to challenges, seize opportunities, continuously explore and innovate the models and methods of digital transformation, and promote the digital transformation and resilience enhancement of their supply chains.

Disclosure statement

The authors declare no conflict of interest.

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