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Study on a New Path for Digital Collaboration of Supply Chain

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Abstract: In the context of the digital transformation of the global economy, the efficiency and response speed of supply chain management have become an important factor in the competitiveness of enterprises. However, in the process of promoting the digitalization of supply chain, enterprises are still facing multiple challenges, such as technical cooperation, data security and organizational structure adjustment. This paper analyzes the concept of digital supply chain and the similarities and differences between digital supply chain and smart supply chain. Finally, this paper puts forward the innovation path of supply chain digital collaboration based on consumer demand-driven from the aspects of strengthening the ability to resist risks, improving the data collaborative processing mechanism, and absorbing scientific and technological innovation.

1. Introduction

With the deep integration of global economy and the rapid development of digital technology, supply chain management is undergoing a major change from traditional mode to digital and intelligent mode. In this process, the demand of consumers is increasingly diversified and personalized, which drives enterprises to continuously improve the response speed and flexibility of the supply chain in order to better adapt to market changes. Especially with the support of "Internet +" and big data technology, supply chain digital collaboration has become an important way for major enterprises to reduce costs, increase efficiency and enhance market competitiveness [1]. However, in promoting this change, major enterprises are facing many challenges, such as technology and business integration, data security and organizational structure adjustment. Therefore, it is of great significance to explore how to effectively realize the digital transformation of supply chain under the guidance of consumer demand.

2. Concept of Digital Supply Chain

Digital supply chain refers to the use of digital, automation, visualization and intelligent technology to improve the efficiency, visibility and flexibility of the supply chain in the context of the global Internet and information technology. Digital supply chain is not only the physical flow of products, but also the flow of information, capital and services. Its goal is to make the supply chain management process more efficient and responsive to market demand, while reducing costs and

risks.

Digital supply chains rely on a high degree of integration and visualization of data. A large amount of data generated by various supply chain links need to be captured, integrated and analyzed so that manufacturing enterprises can better understand the operation of the whole supply chain. Through data visualization tools, managers can monitor supply chain activities in real time, track the location of products, components and raw materials, and understand market demand and inventory levels [2]. Digital supply chain uses automation and intelligent technology to reduce manual intervention and improve the efficiency of production and distribution. Automated robots, automated warehousing systems, self-driving vehicles and intelligent manufacturing equipment are all used in digital supply chains to varying degrees. In addition, artificial intelligence and machine learning technologies are also used to predict demand, optimize inventory management and risk management. Digital supply chain encourages collaboration among supply chain participants at all levels. Information sharing and collaboration among suppliers, manufacturers, carriers, and retailers will help ensure that products flow to market in the shortest possible time, reducing inventory waste and delays. Through advanced data analysis and decision support systems, digital supply chains can better understand supply chain bottlenecks, shortages and risks. These systems can provide real-time insights to help managers make more informed decisions in response to market changes and risks.

3. Challenges Facing the Digital Transformation of Supply Chain

3.1. How to Reconstruct the Organizational Structure?

Due to the differences in business, responsibilities and authority, each department within the enterprise has its own office system and workflow, and there is little communication between departments, forming an isolated island. The digital transformation of supply chain requires all departments in the organizational structure of enterprises to seamlessly link up and respond collaboratively, and requires all departments to upgrade their thinking mode and jointly establish a standardized organizational structure, which brings new challenges to the leadership and employees [3].

3.2. How to Coordinate Technology and Business?

Technically speaking, many enterprises do not know enough about the technology needed for the digital transformation of supply chain and still rely on traditional systems. The traditional system is not compatible with the enterprise development plan in the digital economy era, and its operability and interactivity are weak. Enterprises have to hire professional technicians to upgrade the traditional system, which requires huge time and economic costs.

3.3. How to Ensure Data Security and Accuracy?

As the supply chain data source is complex and the scale is huge, it is difficult to grasp, and human interference cannot be ignored, so it is difficult for enterprises to ensure the accuracy of the data. For large enterprises, the authority of supply chain data is high, and it is difficult for technicians to see the whole picture of the data, so it is difficult to analyze the data and optimize the business process from the overall perspective. At the same time, the digital transformation of supply chain depends on the Internet, and the risk of data leakage has increased dramatically.

4. Innovation Path of Digital Supply Chain

4.1. Strengthen Chain Anti-Risk Capacity

With the deepening of economic globalization, multilateral economic frictions are unavoidable. How to enhance the ability of digital supply chain to resist risks and recover, and improve the resilience of digital supply chain has become a key issue at the current stage. Based on the research of current scholars, this paper makes suggestions on improving supply chain security in China. On the one hand, the ability to resist risks is the inherent requirement of digital supply chain to enhance resilience. At the current stage, China's digital supply chain is in the process of developing from a single chain structure to a multi-network structure, focusing on accelerating the digital process, so the risk prevention ability is insufficient and vulnerable to external instability factors. Enhancing the anti-risk ability of digital supply chain is conducive to maintaining the smooth operation of supply chain and providing security for digital transformation.

According to the current development stage of China's digital supply chain, we must improve the supplier qualification evaluation and performance evaluation mechanism, and introduce suppliers into the threshold and standardization according to the degree of supplier digitalization [4]. According to the characteristics of different raw materials, match the warehousing, delivery and other links with the degree of digitalization, and confirm whether the supplier has the ability to meet the digital platform business such as data docking and data sharing, so as to ensure that the raw materials can be warehoused without obstacles in case of emergency and maintain the basic operation of the supply chain. In addition, while monitoring the technology and digitalization of suppliers, it is also necessary to conduct multi-level assessment of suppliers, such as R & D investment, digital transformation progress and supply cycle, and real-time dynamic reward and punishment mechanism, so as to promote suppliers to actively promote digital transformation and optimize supply channels.

Improving the rapid response ability of digital supply chain is also an important measure to strengthen the anti-risk and recovery ability of the chain. Through big data collection, consumer market preferences are analyzed, and products are optimized and upgraded. Reflective ability is also reflected in the speed of raw materials, manufacturing, distribution and final arrival at customers, which requires the digital supply chain in all aspects, including the speed of product development, the speed of market launch, and the ability to reorganize resources in the event of emergencies, which requires a higher degree of integration of digital technology and supply chain, in order to achieve the improvement of supply chain risk resistance.

4.2. Improve Data Collaborative Processing Mechanism

Deepen cross-border cooperation and data sharing in the supply chain. The strategic orientation of cross-border cooperation has a significant positive impact on the high adaptability of supply chain, and the electronic integration capability of supply chain can explain the impact of the strategic orientation of cross-border cooperation on the high adaptability of supply chain, and the application capability of big data promotes the strategic orientation of cross-border cooperation on the electronic integration capability of supply chain. At present, enterprises should pay attention to and cultivate cross-border awareness, and clarify the orientation advantages of cross-border cooperation strategy. Supply chain digital sharing and collaboration can enhance the efficiency of resource utilization, improve the sustainable operation performance of supply chain, and help the digital innovation of supply chain. Specifically, the construction of data sharing cloud platform will transform the original vertical data information channel into flat data information channel, open up the horizontal and vertical data exchange channels, so that data sharing is no longer the upstream to

downstream sharing within the enterprise, but the data sharing between different supply chains of different industrial chains on the same platform, in the face of market uncertainty. Avoid the wrong formulation of enterprise strategy due to the untimely disclosure of upstream or downstream information.

Strengthen data security and privacy protection of sharing platform. First, establishing a strong data governance framework is critical. Enterprises should develop detailed data classification, access rights and use policies to clarify what data can be shared and what data should be kept private. This framework not only helps to standardize the data processing process, reduce the risk of mis-operation and leakage, but also provides a stable legal and ethical basis for data sharing. Secondly, using end-to-end data encryption technology is an effective means to protect data security. In the process of data transmission and storage, high-standard encryption algorithms should be used to ensure that even if the data is intercepted during transmission, it cannot be interpreted and used by unauthorized parties [5]. In addition, enterprises should implement multi-factor authentication (MFA) mechanisms. This measure requires users to provide two or more authentication factors, such as passwords, biometrics or mobile phone authentication codes, when accessing sensitive data or systems, in order to increase the level of access control and effectively prevent identity theft and unauthorized access. At the same time, regular safety training and awareness raising activities are essential for employees to improve their safety awareness and skills. Employees are the first line of defense for data security, and their vigilance and correct operation are essential to prevent internal data leakage. Finally, enterprises should establish a sound data breach response plan. Even after all preventive measure have been taken, the risk of a data breach remains. Having a clear response plan can help businesses respond quickly in the event of a spill, minimize losses and restore normal operations.

4.3. Absorb Technological Innovation Achievements

Absorb scientific and technological innovation achievements and strengthen digital collaboration. To expand scientific and technological innovation, we should consolidate the application of basic technology and break through the bottleneck in the frontier of technology. We need to consolidate the application of basic digital technology, such as the Internet, data interaction platform, automatic warehousing and tallying of materials, so as to further enhance the synergy of basic technology and expand the application scope of basic fields.

We need to focus on cutting-edge technologies, such as 5G, artificial intelligence and digital twins. Secondly, we should actively absorb and transform high-end innovative technological achievements to promote the overall upgrading of the digital supply chain. Enterprises should establish special R & D teams, pay close attention to the progress of cutting-edge technologies, and cooperate with universities and scientific research institutions to quickly apply innovative technologies to supply chain management practices. At the same time, we should encourage cross-industry technology exchanges, promote the efficient transformation of technological achievements in all aspects of the supply chain, and enhance the level of intelligence and automation of the supply chain, so as to enhance the market competitiveness of enterprises and the overall resilience of the supply chain. Finally, we need to achieve universal benefits of science and technology, guide small and medium-sized enterprises to carry out scientific and technological innovation, digital transformation, make up for the shortcomings of existing technology, accelerate the construction of digital infrastructure in the industrial chain and supply chain, promote the optimal allocation of industrial resources and the connection of multiple elements, promote the digital transformation of enterprises by scientific and technological innovation, reduce the threshold of digital transformation of enterprises, and improve the efficiency of digital information collaborative processing in the

supply chain of Chinese enterprises.

Use intelligent decision-making system to improve the level of digital governance. While deepening the development of digitalization, we should grasp the application of digital technology and digital tools, improve the level of digital governance, and adopt targeted digital tools to deal with the characteristics of digitalization. For example, forecasting tools can help enterprises collect large internal and external data, calculate and forecast enterprise production through specific algorithms, and flexibly adjust production strategies while grasping market trends. For example, the four key parts of the supply chain intelligent cognitive decision-making system are data ingestion, information visibility, decision support and intelligent execution, which ensure that the intelligent cognitive decision-making system can receive a large amount of data and assist users in decision-making, anomaly detection, scenario modeling, machine learning, etc. Integrate supply chain data sources, act as supply chain decision-making experts, and build an intelligent tactical decision-making platform. By improving the level of digital governance, we can effectively prevent data overflow and slow data processing, bring technical support to the digital transformation of enterprise supply chain, and establish a "fast processing plant" for data information.

5. Conclusion

With the rapid development of global economy and the popularization of digital technology, supply chain management is gradually transforming from traditional mode to digital and intelligent mode. Although there are many challenges in this process, such as technical cooperation, data security and organizational structure adjustment, through active response, enterprises are expected to achieve efficient operation and innovative development of the supply chain. In the future, it is necessary to further strengthen the collaborative innovation of all links in the supply chain, constantly improve the ability to resist risks and the level of data sharing, so as to adapt to market changes and improve the market competitiveness of enterprises.

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