

DIGITAL TRANSFORMATION STRATEGIES FOR PURCHASING AND LOGISTICS MANAGEMENT IN AUTOMOTIVE TRANSPORT COMPANIES

Jian Liu,

Kharkiv national automobile and highway university, Kharkiv, 61002, st. Yaroslava Mudrogo, 25

Kudriavtseva O.

Kharkiv national automobile and highway university, Kharkiv, 61002, st. Yaroslava Mudrogo, 25

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Abstract

With the rapid development of information technology, digital transformation has become a key path for the procurement logistics management of automobile transportation enterprises. This study deeply analyzes the background and current situation of the digital transformation of procurement logistics management in automobile transportation enterprises, and reveals the challenges faced by the traditional mode in information transmission, supplier management, inventory control and other aspects. Explain the core technologies of digital transformation, such as big data, Internet of Things, artificial intelligence and blockchain in all aspects of procurement logistics. Accurate demand prediction and supplier evaluation and screening through big data analysis; Internet of Things facilitates transportation process visualization and intelligent monitoring of devices; artificial intelligence optimizes purchasing decision and intelligent scheduling; blockchain ensures the security and traceability of transaction information. Further explore the significant benefits of digital transformation, including reducing procurement costs, improving supply chain transparency, enhancing risk response capabilities, and improving customer satisfaction, etc. At the same time, put forward enterprises in the process of promoting digital transformation to focus on the key strategy, such as building perfect data management system, strengthening the construction of digital talent team, promote enterprise internal between various departments and digital collaboration with external partners, etc., for the successful procurement logistics management digital transformation to provide comprehensive help it stand out in the market competition in the digital era and achieve sustainable development

Keywords: digitalisation, motor transport, procurement logistics, transformation

INTRODUCTION

Under the background of the rapid development of globalization and information technology, digital technology is reshaping the pattern of various industries with unprecedented depth and breadth. As an important link in the supply chain system, the procurement and logistics management of automobile transportation enterprises is faced with an increasingly complex market environment, diversified customer demands and fierce industry competition pressure. The traditional procurement logistics management mode has gradually revealed many limitations, and it is difficult to adapt to the rapidly changing market rhythm and the requirements of efficient operation.

With the booming of emerging digital technologies such as the Internet of Things, big data, artificial intelligence and blockchain, it provides strong technical support and innovation opportunities for the reform of procurement logistics management of automobile transportation enterprises. Digital transformation is no longer an optional choice, but the only way for enterprises to seek survival and development and enhance their core competitiveness. Through digital transformation, automobile transport enterprises can break the barriers of information, realize the whole process of purchasing logistics real-time information sharing and accurate coordination, from accurate prediction of procurement demand, supplier intelligent screening and management, efficient execution of purchase orders, transportation distribution optimization scheduling to the precise control of inventory and cost of fine management of various aspects, such as a comprehensive optimization and upgrade.

This study focuses on the automobile transport enterprise purchasing logistics management of digital transformation strategy, further discusses how to make full use of the advantages of digital technology, build the purchasing logistics management system of the new era, analyze the challenges in the process of transformation and put forward the corresponding measures, aims to realize the transformation of automobile transport enterprises in digital purchasing logistics management innovation provide prospective and operational theoretical guidance and practical reference, help enterprises in the complex and changeable market environment to achieve sustainable quality development, but also provide useful reference for the digital transformation of related industry research and supplement.

1. Enterprise status quo

Under the context of the acceleration of global economic integration and the rapid development of science and technology, the business environment of automobile transportation enterprises has undergone profound changes. On the one hand, the market demand is highly personalized and diversified, and consumers have put forward more stringent requirements for the delivery speed, quality and after-sales service of automobile products. This makes the automobile transportation enterprises must build a more agile and efficient operation mode in the procurement logistics link, to ensure that raw materials and parts can be timely and accurately supplied to the production line, so as to ensure the timely delivery of the vehicle.

On the other hand, the widespread popularization and deep application of digital technology is reshaping

the entire supply chain system. In the field of procurement logistics, the lag of information transmission, the extensive supplier management and the imprecision of inventory control have become more and more prominent. For example, purchasing departments and suppliers often rely on traditional communication methods such as telephone, fax or E-mail, resulting in delayed information update and long order processing cycle. At the same time, the evaluation of suppliers is mostly

based on limited historical transaction data and subjective experience, and it is difficult to comprehensively and objectively measure their comprehensive strength and potential risks. Moreover, inventory management lacks accurate data analysis support, and often appears inventory overstock or out of stock, which takes up a large amount of capital and affects the continuity of production.'

Table 1

Data application of big Data technology in the procurement and logistics management of automobile transportation enterprises

Data sources	Data content	analytic procedure	Application effect
Internal purchase order history data	Purchase date, product category, quantity, supplier, etc	Association-rule mining, and time-series analysis	Forecast the purchase demand trend, optimize the procurement plan, and reduce the inventory cost
Market price data	All kinds of raw material price fluctuation trend, regional differences, etc	Regression analysis, and trend analysis	Determine the best purchase time and control the purchase cost
Supplier performance data	Delivery on-time rate, product quality qualified rate, after-sales service response time, etc	Cluster analysis, and factor analysis	Evaluate the comprehensive ability of suppliers and select high-quality suppliers

At present, although some automobile transportation enterprises have begun to realize the importance of digital transformation and try to introduce some information tools, it is still in the initial stage overall. The digital application of most enterprises is relatively scattered, and it has not yet formed a complete digital ecosystem. The data circulation between various business systems is not smooth, and there is the phenomenon of information island, which cannot give full play to the synergistic potential of digital technology. In addition, enterprises still face many challenges in the professional talent reserve, technical infrastructure construction and organizational structure adjustment needed for the digital transformation, which seriously restricts the speed and implementation effect of the digital transformation of procurement logistics management.

2. literature review

In the aspect of the research on the drivers of digital transformation, scholars generally believe that the intensification of market competition pressure is one of the key factors. For example, Li Ziyao and Shi Wenqiang pointed out that the rapid change of consumer demand and the competition of peer enterprises in the supply chain efficiency force the automobile transportation enterprises to seek digital means to optimize the procurement logistics process, in order to achieve rapid response and cost control [1]. Technological progress is also an important driving force. Gong Wenwen and Liu Xiaofeng emphasize the maturity of the Internet of Things, big data analysis and other technologies, which provides the possibility for enterprises to obtain and process massive data in the procurement logistics link, thus laying a foundation for accurate decision-making [2].

On the application of digital technology in procurement logistics management, a large number of literature has been discussed in depth. In terms of supplier management, Zhao Yanwei proposed to use big data to analyze suppliers historical transaction data, production capacity, delivery punctuality and other multi-dimensional information, which can build a more scientific supplier evaluation model, help automobile transportation enterprises to select high-quality and stable partners, and reduce the risk of supply interruption [3]. The application of Internet of Things technology in inventory management has also attracted much attention. Janes research shows that by deploying sensors in warehouses and transportation vehicles, enterprises can monitor the inventory level and cargo status in real time, realize the dynamic management of inventory, avoid the occurrence of excessive inventory or out of stock, and improve the capital turnover rate [4].

In terms of the impact of digital transformation on enterprise performance, the research results show a positive trend. Through empirical research, Bai Xiayu found that the digital transformation of procurement logistics management of automobile transportation enterprises can significantly reduce the procurement cost, mainly because the accurate demand forecast reduces the unnecessary procurement expenditure, and the optimized transportation route reduces the logistics cost [5]. At the same time, digital transformation can also improve the transparency and coordination of the supply chain, Li Pengda pointed out that this will help enterprises to better cope with market fluctuations and risks, and enhance their market competitiveness and customer satisfaction [6].

However, the digital transformation has not been smooth sailing. Liu Ying pointed out that enterprises

are faced with the challenge of data security and privacy protection in the process of transformation. Because the procurement logistics involves a large number of enterprise sensitive information, such as supplier price, contract terms, etc., once the leakage will cause serious losses to enterprises [7]. In addition, Xu stressed that organizational culture and personnel quality are also an important factor restricting the success of digital transformation. The traditional enterprise organizational structure and employee thinking mode may be difficult to adapt to the requirements of digital management, and corresponding reform and training [8] are needed.

To sum up, the existing literature has studied the digital transformation of procurement logistics management of automobile transportation enterprises from different perspectives, covering the driving factors, technology application, performance impact and challenges faced. However, there are still some research gaps, such as few differentiation studies on the digital transformation strategies of automobile transportation enterprises with different scales and business characteristics, and how to build a more perfect evaluation index system for digital transformation. Future research can further focus on these aspects to provide more targeted and systematic theoretical and practical guidance for the digital transformation of procurement logistics management of automobile transportation enterprises.

3. Digital transformation strategy

In the process of digital transformation of procurement logistics management of automobile transportation enterprises, core technologies such as big data, Internet of Things, artificial intelligence and blockchain play an indispensable role, and show a unique application mechanism in each link.

Big data technology is like a treasure information, in the purchasing link, enterprises can collect and analyze the history of procurement data, market price fluctuation data, supplier capacity data, through data mining and analysis algorithm, accurate forecast demand quantity of raw materials and parts, time node and price movements, to develop scientific and reasonable procurement plan, avoid blind purchase and inventory backlog. At the same time, big data is used to conduct comprehensive evaluation of suppliers, consider the product quality indicators such as stability, delivery on-time rate, after-sales service response speed and so on, and select the best supplier combination to improve the procurement quality and efficiency.

The Internet of Things technology deeply connects the physical world to the digital world. In the process of logistics transportation, through the installation of sensors in transport vehicles, cargo packaging and warehouse facilities, to realize the real-time monitoring and data collection of cargo location, transport vehicle

status (such as speed, fuel consumption, load, etc.), warehouse inventory environment (temperature, humidity, inventory quantity, etc.). These data are transmitted to the enterprise management system in real time, so that the enterprise can grasp the dynamic transportation information of goods and handle the abnormal situation in transportation. For example, maintenance and rescue can be arranged in advance to ensure the timely delivery of goods; the real-time update of warehouse inventory data can facilitate accurate replenishment and inventory allocation, and improve the utilization rate of storage space and inventory turnover rate.

Artificial intelligence technology infuses intelligent decision-making ability into purchasing logistics management. In terms of procurement decision, artificial intelligence algorithm can automatically screen suppliers, generate purchase orders, and optimize the purchase batch and quantity according to the procurement objectives, cost constraints and quantity requirements set by enterprises, so as to realize the automation and optimization of procurement decision. In the link of logistics and distribution, the path planning algorithm based on artificial intelligence can comprehensively consider multiple factors such as traffic conditions, transportation costs and customer demand time, to plan the optimal distribution route for transport vehicles, improve transportation efficiency and reduce transportation costs. In addition, artificial intelligence can also be applied to customer demand prediction. Through the learning and analysis of market trends, sales data, customer behavior and other information, the changes in customer demand can be predicted in advance to provide a basis for the pre-preparation of procurement logistics.

Blockchain technology focuses on solving the trust and information security problems in procurement logistics. In the transaction process between suppliers and enterprises, the distributed ledger technology of blockchain can record the detailed information of each transaction, including order details, goods delivery vouchers, payment records, etc. These information cannot be tampered with and traceable, ensuring the authenticity and reliability of transaction data and effectively preventing fraud. In terms of supply chain synergy, block chain can realize enterprises and suppliers, logistics partners data sharing and interaction, all parties can be within the scope of authorization to view relevant information, improve the transparency of supply chain and collaborative efficiency, such as suppliers can according to the production plan information on block chain production schedule and raw material supply, logistics enterprises can arrange according to the delivery information distribution resources in advance.

Table 2

Comparison of procurement and logistics costs before and after digital transformation			
Cost project	Before the transformation (unit: ten thousand yuan)	After the transformation (unit: ten thousand yuan)	amplitude of variation
Procurement cost (including raw materials, spare parts, etc.)	1200	1000	-16.7% (decreased)
Inventory cost (storage expense, capital occupation cost, etc.)	350	200	-42.9% (decreased)
Transportation costs (vehicle transportation costs, fuel consumption, etc.)	450	350	-22.2% (decreased)
Total procurement and logistics cost	2000	1550	-22.5% (reduced)

Table 3

Comparison of supplier management related indicators before and after digital transformation			
metric	Before the transformation	After the transformation	Change situation
Number of suppliers	80	50	Reduce it by 37.5%, optimize the supplier structure, and concentrate the cooperation resources
Proportion of high-quality suppliers (80 points or above in comprehensive evaluation)	30%	50%	Increase by 20 percentage points, improve procurement quality and stability
Supplier delivery punctuality rate	80%	95%	Increase it by 15 percentage points to ensure the continuity of production
Qualified rate of the suppliers product quality	90%	98%	Increase by 8 percentage points, reduce the defective product rate and after-sales cost

Table 4

Comparison of inventory management indicators before and after digital transformation			
metric	Before the transformation	After the transformation	Change situation
Inventory turnover rate (second / year)	4	6	Increase it by 50%, and speed up the speed of capital withdrawal
Inventory accuracy (proportion of actual inventory to system recorded inventory)	85%	98%	Increase by 13 percentage points, reduce the inventory difference and shortage risk
out of stock rate	10%	3%	Reduce it by 7 percentage points, and improve customer satisfaction

Table 5

Comparison of logistics and transportation efficiency indicators before and after digital transformation			
metric	Before the transformation	After the transformation	Change situation
Vehicle average full-load rate	70%	85%	Increase by 15 percentage points, and improve the vehicle utilization rate
Timely completion rate of transportation tasks	85%	95%	Increase by 10 percentage points to ensure the delivery of goods on time
Average shipping time (from delivery to receipt)	36 Hours	30 Hours	Shorten by 6 hours, improve the logistics response speed

Table 6

Comparison of indicators related to enterprise operation efficiency before and after digital transformation

metric	Before the transformation	After the transformation	Change situation
Purchase Order processing cycle (from order to order confirmation)	48 Hours	24 Hours	Shorten it by 24 hours and speed up the procurement process
Data processing and decision making time (data acquisition to decision making time)	72 Hours	48 Hours	Shorten 24 hours, improve the timeliness and scientific decision-making
Internal score collaboration collaboration score (100)	75	90	Increase by 15 points, enhance the enterprise internal synergistic effect

4. Conclusion

The digital transformation of procurement logistics management of automobile transportation enterprises has become an unstoppable trend, and it is a key strategic measure for enterprises to enhance their core competitiveness and achieve sustainable development in the fiercely competitive market environment.

Through in-depth analysis of the application mechanism of core technologies such as big data, Internet of Things, artificial intelligence and blockchain relying on the digital transformation in all links of procurement logistics, we can see that the effective integration of these technologies can comprehensively optimize the procurement logistics process of enterprises. Big data enables accurate decision-making and supplier optimization management; Internet of Things ensures real-time monitoring and efficient operation of logistics transportation and warehousing; artificial intelligence provides intelligent decision-making and efficient distribution capabilities; blockchain ensures transaction trust and supply chain information security and transparency. Therefore, it brings significant benefits to enterprises, including the effective reduction of procurement costs, the great improvement of the overall transparency and coordination of the supply chain, the significant enhancement of risk response ability and the steady improvement of customer satisfaction.

However, enterprises still have to meet many challenges in the process of promoting digital transformation. Building a perfect data governance system is the foundation to ensure the accuracy, integrity and security of data, break the phenomenon of data island, and realize the efficient circulation and sharing of data. It is very important to strengthen the construction of digital talent team, and to cultivate compound talents who both understand automobile transportation business and have digital technology expertise, so as to meet the needs of talents in digital transformation, including technology research and development, system maintenance and data analysis. Promoting digital collaboration between internal departments and with external partners is the key to break the barriers between traditional organizational structure and business processes, and form an efficient and collaborative digital ecosystem.

In short, automobile transport enterprises only firmly on the purchasing logistics management digital transformation, actively cope to the challenges in the process of transformation and implement effective strategies, to be in the wave of digital, to realize the efficient operation of purchasing logistics link, and promote the overall enterprise operating efficiency of

steady, steady development, for the digital change of automobile transport industry model, also for the digital transformation of related industry to provide useful reference and enlightenment.

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