DIGITAL TRANSFORMATION OF THE SUPPLY CHAIN, ENVIRONMENTAL UNCERTAINTY AND SUPPLY CHAIN DYNAMIC CAPABILITY TO INFLUENCE THE COMPETITIVE ADVANTAGES OF ENTERPRISES IN MANUFACTURING INDUSTRY IN CHINA

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ABSTRACT

Based on the previous research results, this dissertation takes the supply chain digital transformation of manufacturing enterprises as the starting point, and focuses on the impact and path of the supply chain digital transformation on the competitive advantage of manufacturing enterprises in an uncertain environment, Striving to answer: Firstly, why should manufacturing enterprises carry out supply chain digital transformation? How does the supply chain digital transformation affect the competitive advantage? Secondly, what role do supply chain dynamic capabilities play in the process of supply chain digital transformation? Thirdly, how does environmental uncertainty affect the relationship between supply chain digital transformation, supply chain dynamic capabilities, and competitive advantage?

Keywords: Digital transformation of the supply chain, Environmental uncertainty, Supply chain dynamic capability, Competitive advantages of enterprises, Manufacturing industry

INTRODUCTION

Background of the study

Amidst the backdrop of digitization, conventional industrial companies have adopted and established a new trend called digital transformation. From 17.98 trillion yuan in 2012 to 27.6 trillion yuan in 2020, China's manufacturing industry's added value grew, and its share of the global manufacturing sector expanded by over 8%. The State Council's most recent "14th Five Year Plan" for the growth of the digital economy makes it abundantly evident that by 2025, China's digital economy would go through a phase of complete expansion, with the added value of its core businesses contributing 10% of the country's GDP. Currently, there is a national push to advance industrial digitalization and digital industrialization. In certain parts of China, the percentage of critical linkages in industrial businesses larger than the designated size is predicted to reach 65% by 2025. Even Nevertheless, there are still important problems with business digital transformation that cannot be disregarded. For instance, despite their enormous size and solid basis, conventional manufacturing companies nevertheless struggle with issues including an unjust industrial structure, a shortage of skilled labor, and a lackluster capacity for independent innovation. An important area of research in supply chain management has always been how to increase an organization's competitive edge. Investigating ways to improve manufacturing companies' competitive edge in the context of digital transformation is very useful study.

Within the macroeconomic context, China's manufacturing sector is among the most significant, serving as the foundation of the national economy and contributing significantly to

its development. In order to better adapt to the expansion and transformation of the new pattern of the global economy, China led the way in introducing the "Made in China 2025" plan as early as 2015. The plan calls for China to join the ranks of manufacturing powers by 2025, move up to the middle level by 2035, and take the top spot by 2050. At that point, China's conventional manufacturing companies began to gradually modernize and transition to digital platforms. The article "On deepening a new generation of information technology and manufacturing integration development guidance" made clear that current manufacturing enterprises face new challenges as well as great opportunities in order to steer large and small manufacturing enterprises toward the road of independent innovation, to integrate a new generation of information technology and manufacturing, and to leave the path of manufacturing enterprises with Chinese characteristics. In China's 14th Five-Year Plan and the Outline of 2035 Vision Goals, the digital transformation of manufacturing businesses is highlighted as a crucial tool to increase their efficiency and quality. This is advantageous for strengthening the base, ensuring the safety and security of supply chains and industry, and successfully controlling major risks and outside shocks.

1.1 Statement of the Problem

While supply chain digital transformation research and discussion need to be improved, current research on the topic of digital transformation is still in its infancy and focuses primarily on the digital transformation of businesses themselves, including the use of digital technology in product development, manufacturing, improving customer experience, and other areas. Nowadays, digital technology is used in many aspects of business production and daily life. Research has been heavily funded by both industry and academia, and digital transformation is pervasive. For example, we only need a mobile phone to complete the payment activities, autonomous driving technology is applied to cars, using robots to transport materials in factories, etc. However, they are just simple applications of digital technology, and the application scenarios are too single and independent, without universal significance. Because an improved supply network will encourage cost reduction and a shorter production cycle, supply chain management is a crucial procedure for manufacturing organizations. However, the traditional supply chain lacks some of the attributes needed for current and future businesses because it is composed of a series of basically discrete, isolated steps, and the digital supply chain is believed to break down these barriers and transform the supply chain into an integrated system that operates perfectly. There are still a lot of untapped opportunities for businesses looking to digitally change their supply chains, even though numerous industrial organizations have acknowledged and attested to the enormous potential of integrating digital technology in their supply chains. The ultimate goal of each strategic adjustment made by an organization is to increase its competitive advantage and performance. However, there is currently insufficient evidence to support the concept of digital supply chain transformation.

However, little research has been done on how the digital transformation of the supply chain will affect an enterprise's competitive advantage or how the dynamic ability of the supply chain will affect an enterprise's competitive advantage in the context of the digital economy. On the other hand, the factors that have been fully explored in the existing research have improved the competitive advantage of manufacturing enterprises. Many academics have used qualitative or quantitative approaches to get rich study results about the key influencing aspects to improve the competitive advantage of manufacturing companies throughout the research state. However, the topic of how to gain a sustainable competitive advantage in manufacturing companies has been offered due to the in-depth research on manufacturing enterprises and the expansion of research frontiers; therefore, more research is required to fully explore this area. As the fourth wave of the industrial revolution approaches, manufacturing companies are looking for supply chain digital transformation. However, blind transformation will only yield

half the results; instead, supply chain dynamic ability, environmental uncertainty, and the relationship between an organization's competitive advantage and its mechanism of action must all be considered. Based on these factors, supply chain digital transformation will yield twice the results with half the effort.

1.2 Research Objectives

(1) To explore the relationship between digital transformation of supply chain and competitive advantage of enterprises;

(2) To construct a role of supply chain dynamic capacity between digital transformation of the supply chain and competitive advantage of enterprises;

(3) To explain the model containing environmental uncertainty, digital transformation of supply chain, supply chain dynamic capacity and competitive advantage of enterprises.

Literature review

Theoretical basis

1.2.1 Supply chain management theory

The scope of supply chain management has expanded to include supply chain management globally, surpassing the boundaries of a single nation or region due to the swift advancement of economic globalization. Traditional supply chain management faces challenges in the highly competitive and dynamic global market, including high fragmentation and delayed information transmission. These issues impede smooth collaboration between upstream and downstream enterprises and hinder the supply chain's ability to adapt swiftly and effectively to market changes. The global dispersion of many businesses' supply chain network nodes adds to the complexity of the supply chain network and raises the bar for supply chain management. Furthermore, the increasing use of new generation information technology, market environment volatility, and economic globalization have all raised new demands for supply chain management. According to Jangga et al. (2015), businesses must adopt new technology and create new goods in order to respond to the needs of a changing market in complicated and chaotic business settings. As a result, information technology application can support the development of corporate supply chain management capabilities. The notion of a data-driven supply chain was introduced by Yu et al. (2018) and incorporates big data technologies into several aspects of supply chain management. According to research by Li et al. (2017), businesses may increase supply chain visualization, procurement intelligence, and logistics efficiency by implementing IOT technology. Based on the theory of supply chain management, this study examines how manufacturing firms' competitive advantages are affected by the digital transformation of their supply chains, fusing traditional supply chain management with digital transformation.

1.2.2 Resource-based theory

Conventional resource-based theory focuses more on the acquisition of diverse resources by businesses as a means of gaining and retaining competitive advantages. The resource-based theory from a static perspective, however, can no longer keep up with the state of research and practice due to the rapid changes in the external environment and the advancement of science. In order to describe how to assist businesses in developing new products and management procedures by rearranging and integrating current resources in order to pursue growth in a volatile market environment, Teece and Pisano (1997) developed the dynamic theory of capabilities.

1.2.3 Dynamic ability theory

Enterprise competitiveness and performance are positively impacted by dynamic capabilities. According to Anand et al. (2009), dynamic capabilities enable businesses to adapt strategically and operationally, enhancing their operational capabilities and enabling them to remain or become more competitive even in a dynamic environment. According to Zahra and George (2002), dynamic capabilities let businesses adapt their resource base to changing client demands and shifts in rival strategy. According to Barreto (2010), dynamic capabilities assist businesses in methodically resolving issues, empowering them to innovate, adjust their resource base, and make prompt, market-driven decisions. According to Weerawardena (2007), dynamic ability can be used to develop cutting-edge knowledge-intensive products, opening doors for faster market entry. However, in the face of frequent technological change, dynamic ability is more valuable because it gives businesses more opportunities to use it to their advantage and better offset the cost of developing them. In order to investigate the role of dynamic supply chain capability in the digital transformation of the supply chain and the relationship between the competitive advantage of firms, this research blends the theory of dynamic capability with supply chain management.

1.2.4 Contingency management theory

The principles found in management practice are not effective in any situation. According to this phenomenon, Lawrence and Lorsch put forward contingency management theory in the late 1960s after conducting a lot of investigations and studies. This theory explains that the management theory should be closely combined with the practical environment, and the same management theory may produce completely different results in different practical environments. In addition, there is no invariable external environment. With the development of economic globalization, environmental uncertainty has a more significant impact on enterprises. At the same time, enterprises are not completely an independent system, which needs to be closely combined with the external environment. Therefore, the management of the enterprise should be adjusted according to the change of the external environment.

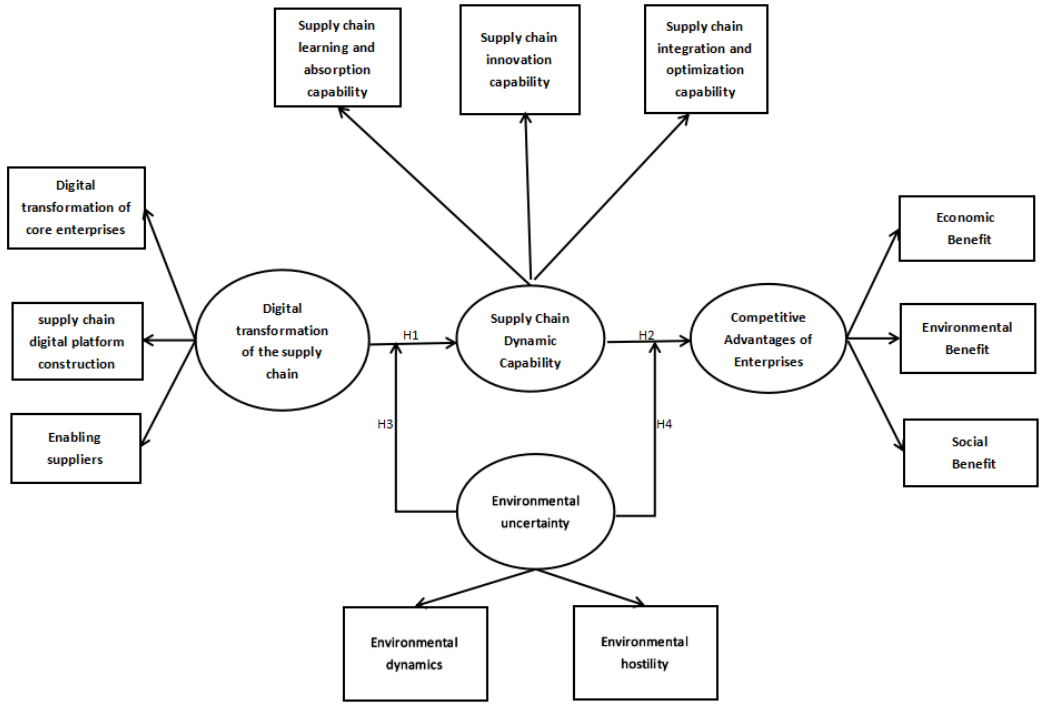
1.2.5 Competitive advantage theory

The famous five-force analysis architecture was initially developed by American economist Porter (1985) in his book Competitive Strategy, which also introduced the concept of competitive advantage. The threat of new entrants, the bargaining power of buyers (customers), the threat of substitution (or services), the bargaining power of suppliers, and the confrontation situation of existing competitors are, in his opinion, the five factors affecting the state of industrial competition. The industry's competitiveness and profit potential can be evaluated by analyzing these five factors. The shift from focusing on the external environment to considering the evolution of internal resources, as well as the shift from confrontation and rivalry to cooperation and competition, provide the development context for theoretical research on the competitive advantage of firms. In recent years, these two evolution paths are constantly integrated, resulting in the competition way between enterprises to obtain resources in the network environment.

1.3 Model building and research hypotheses

This research examines the mechanism of the digital transformation of supply chain of manufacturing enterprises on the competitive advantage of enterprises, as illustrated in Figure 1. It also integrates environmental uncertainty, supply chain dynamic capability, and competitive concerns of enterprises into the same theoretical framework. The relationship between the variables examined in this thesis was examined and assumed based on the literature review, and a theoretical model framework was created.

Figure 1: Conceptual Framework



The following hypotheses are proposed according to the model:

H1: Digital transformation of supply chain of manufacturing enterprises has a impact on supply chain dynamic ability.

H2: Supply chain dynamic ability has a impact on competitive advantage of enterprises.

H3: Environmental uncertainty regulates the relationship between digital transformation of supply chain and supply chain dynamic ability.

H4: Environmental uncertainty regulates the relationship between supply chain dynamic ability and competitive advantage of enterprises.

Research design

Define Variables

Digital transformation of supply chain is dominated by the core enterprises at the end of the supply chain, information and data driven supply chain management change, form a customer-centered supply chain management mode (Calatayud et al, 2019).

Supply chain dynamic ability is the advanced ability of enterprises to cooperate with the upstream and downstream of supply chain, integrate, reconfigure and optimize supply chain resources, and it is the advanced ability of enterprises to match and even create market changes (Gupta.2020).

All the organizations is in a specific environment, which includes the market structure, economic policy, political conflict, social environment and other factors outside the organization (Yang Jingzhao and Zang Min., 2022).

Competitive advantage of enterprises is the comprehensive quality of enterprises to surpass the competitors by rationally allocating resources in the competitive market, and effectively exporting them to the market, so as to win more development opportunities (Porter, 1986).

1.4 Scope of Variables

The variables in the research are:

(1) Dependent variable: Competitive advantage of enterprises

(2) Independent variable: Digital transformation of supply chain

(3) Mediating variables: Supply chain dynamic ability

(4) Adjusting variables: Environmental uncertainty.

1.5 Scope of population

Northeastern China was chosen for questionnaire surveys in this study. The primary causes are as follows: manufacturing businesses in northeast China are mature, the region has a perfect supply chain for manufacturing, and northeast China has China's historic old industrial base. The plan of rejuvenating the ancient industrial base in northeast China has been implemented more thoroughly in recent years, and as a result, manufacturing businesses in the region have received new life. have presented cutting-edge digital technologies and approaches for management, looking for digitalization-related company change. The manufacturing-related industrial chain in this region is mature, and the manufacturing enterprises begin to seek the road of digital transformation, which provides favorable research conditions for this research. The total number of subjects in the research was 589 companies.

1.6 The significance of the research

(1) Created a conceptual model of the manufacturing supply chain's digital transformation and broadened the definition of the phrase "digital transformation of supply chain."

(2) Identified the path of value realization for both the supply chain's advanced mechanism of dynamic ability and its digital transformation. Developed connections between various theories. Examined the empirical relationship between the supply chain's digital transformation and manufacturing companies' competitive advantage.

(3) Three factors make up the supply chain's dynamic ability: supply chain integration and optimization ability, supply chain learning and absorption ability, and supply chain innovation ability. Next, a three-dimensional framework for the digital supply chain's dynamic ability is built using the supply chain's digital transformation scenario as well as the traits of manufacturing companies.

(4) A new perspective on supply chain transformation research is provided by a further analysis of the power of this transformation, which also uncovered the process's unpredictable environment, the supply network's capacity for change, the control of competitive advantage, and the ability of the supply chain to act as a middleman.

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