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SUMY NATIONAL AGRARIAN UNIVERSITY

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Public management and administration department

QUALIFICATION WORK

education degree - Master

on: **«Business processes management system on transnational company-Supply Chain Digital Management Based on Lenovo Group»**

Completed: student of
specialty 073 Management
EP «Administrative management»

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Sumy - 2025

SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty Economics and Management
Department Public management and administration

Education degree *«Master»*
Field of Study *073 «Management» (EP «Administrative Management»)*

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«_____» _____ 2025

TASK

on qualification work for student

Xiao Yaxi

1. Theme of Qualification work: **Business processes management system on transnational company- Supply Chain Digital Management Based on Lenovo Group**

Superviser _*Assistant Kateryna Dudnyk*_____

approved by the university from _____

2. Deadline for student completed project (work) *March, 8 2025*

3. Background to the project (work):
methodical manuals, monographs, textbooks on the subject of research, scientific publications, economic and financial statements for the period of 2019-2024

4. Contents of settlement and explanatory notes (the list of issues to develop):

The concept of supply chain business, the related ideas of supply chain digital transformation, taking Lenovo Group as an example to analyze the current state of corporate supply chains, and conducting the analysis from both financial and non-financial perspectives to draw research conclusions.

5. Date of assignment: **December, 15 2024**

CALENDAR PLAN

№	Title the stages of the degree project (work)	Date of performance project stages	Note
1	Definition and approval of the thesis, preparation of the plan - schedule of work	*December, 2023*	Done
2	Selection and analysis of literary sources, the preparation of the first theoretical chapter	*December, 2023*	Done
3	Preparation and presentation of draft of the first chapter of the thesis	*February 2024*	Done
4	Collection and processing of factual material, synthesis analysis of application issues in the enterprise	*March 2024*	Done
5	Making the theoretical part of the thesis, summarizing the analytical part	*April 2024*	Done
6	Design options improve the research problem	*May 2024*	Done
7	Completion of the project part of the thesis, design chapters	*May 2024*	Done
8	Previous work and its defense review	*December, 01-02 2024*	Done
9	Checking the authenticity of the thesis	*February, 20-28 2025*	Done
10	Deadline for student completed the thesis	*March, 01 2025*	Done
11	Defense of the thesis	*March, 09 2025*	Done

Student _____ (signature) ***Xiao Yaxi***

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Authentication performed _____ (signature) ***Nadiia Baranik***

Checking the authenticity conducted. Thesis allowed to defense _____ (signature) ***Svitlana Lukash***

ABSTRACT

Xiao Yaxi. Business processes management system on transnational company-Supply Chain Digital Management Based on Lenovo Group

Master's thesis in the specialty 073 «Management», EP «Administrative Management» SNAU, Sumy-2025 - Manuscript.

In the context of the continuous upgrading and iteration of digital technology, the new generation of Internet digital technologies such as big data, digital twins, and the Internet of Things have penetrated into all areas of society. The sudden emergence of the new crown epidemic has greatly affected the normal operation of enterprises, but also prompted enterprises in the increasingly competitive market environment to realize the importance of the supply chain, press the supply chain digital transformation of the "acceleration key". Therefore, how to find new opportunities in this change, gain greater competitive advantage, and accelerate the digital transformation of the supply chain has become the strategic focus of many enterprises.

This paper chooses to combine the case of Lenovo Group's supply chain digital transformation to explore two aspects: the 1 is the path through which the enterprise carries out the supply chain digital transformation, and the 2 is how the enterprise supply chain digital transformation affects the performance of the enterprise, which complements the existing research and has certain theoretical significance. Lenovo Group is the world's leading integrated service provider of software and hardware integration. As the brand leader of electronic information manufacturing industry, Lenovo Group plays an important role in the industrial chain, and has made brilliant achievements in the digital transformation of supply chain. This paper combines Lenovo Group to study the digital transformation of supply chain, aiming to provide reference for the digital transformation of China's manufacturing supply chain enterprises, which has certain typical and practical significance.

Keywords: Digital technology; Big data; Digital twins; Competitive advantage; Lenovo Group; Enterprise performance; Manufacturing industry

АНОТАЦІЯ

Сяо Ясі. Система управління бізнес-процесами транснаціональної компанії Леново Груп, Китай

Магістерська робота зі спеціальності 073 «Менеджмент», ОП «Адміністративний менеджмент», СНАУ, Суми-2025 р. – Рукопис.

В умовах постійного вдосконалення цифрових технологій спостерігається тенденція проникнення їх у всі сфери суспільства. Раптова поява пандемії значно вплинула роботу підприємств, але також спонукала їх в умовах зростаючої конкуренції на ринку усвідомити важливість зосередження на тому, як знайти нові можливості в цих змінах, отримати більшу конкурентну перевагу та прискорити цифрову трансформацію ланцюга поставок, що стало стратегічним напрямком діяльності багатьох підприємств.

У даній роботі на прикладі цифрової трансформації ланцюга поставок Lenovo Group розглядаються два аспекти: 1) шлях, яким підприємство здійснює цифрову трансформацію ланцюга поставок, і 2) те, як цифрова трансформація ланцюга поставок впливає на результати діяльності підприємства, що доповнює існуючі дослідження і має певне теоретичне значення. Lenovo Group - провідний світовий постачальник інтегрованих послуг з інтеграції програмного та апаратного забезпечення. Як бренд-лідер у галузі виробництва електронної інформації, Lenovo Group відіграє важливу роль у промисловому ланцюгу та досягла блискучих успіхів у цифровій трансформації ланцюга поставок. Ця робота зосереджена на вивченні цифрової трансформації ланцюга поставок, з метою надання посилання на цифрову трансформацію китайських підприємств виробничого ланцюга поставок, що має певне типове та практичне значення.

Ключові слова: Цифрові технології; Цифрові двійники; Конкурентні переваги; Lenovo Group; Ефективність підприємства; Переробна промисловість

CONTENT

INTRODUCTION

Relevance of the topic. The rapid development and continuous upgrading of digital technology have significantly transformed modern industries. Emerging digital technologies such as big data, digital twins, and the Internet of Things (IoT) have become integral to various sectors of society. Industrial digitalization and digital industrialization have paved the way for the Fourth Industrial Revolution. The outbreak of the COVID-19 pandemic has profoundly disrupted business operations while simultaneously accelerating the need for enterprises to enhance supply chain resilience and efficiency through digital transformation. In an increasingly competitive market environment, the digitalization of supply chains has become a strategic priority for enterprises seeking to gain a competitive advantage and ensure long-term sustainability.

China has been actively promoting supply chain digital transformation as part of its broader economic and technological advancement strategy. As enterprises strive to enhance their competitiveness, the integration of digital technologies into supply chain management has become a focal point. Despite the growing interest in this subject, existing research has yet to establish a unified understanding of the relationship between supply chain digital transformation and enterprise performance. Particularly, there is a lack of in-depth exploration of the impact of digital transformation within individual enterprises, highlighting the need for further case-specific studies.

This study focuses on the supply chain digital transformation of Lenovo Group, a global leader in hardware and software integration. Lenovo Group, as a prominent player in the electronic information manufacturing industry, plays a crucial role in the industrial chain and has made remarkable progress in digitalizing its supply chain. This paper aims to analyze the digital transformation journey of Lenovo Group, investigating both the pathways of transformation and its impact on enterprise

performance. By examining Lenovo's case, the study seeks to contribute to existing research and provide valuable insights for the digital transformation of China's manufacturing supply chain enterprises.

Research objectives and methodology. This paper systematically explores the supply chain digital transformation of Lenovo Group through comprehensive case analysis.

The study aims to:

1. Investigate the pathways through which Lenovo Group has undertaken its supply chain digital transformation.
2. Assess the impact of supply chain digital transformation on Lenovo's enterprise performance.

To achieve **these objectives, the study** employs a multi-method approach:

- **Literature review**: A systematic review of existing research on supply chain digital transformation and enterprise performance, incorporating theories such as value chain theory, synergy effect theory, and supply chain management theory.
- **Case study analysis**: An in-depth examination of Lenovo Group's supply chain digital transformation, including policy influences, industry trends, and internal motivations.
- **Comparative analysis**: A comparison of financial and non-financial performance indicators to evaluate the effects of Lenovo's digital transformation efforts.

Key findings and significance. The research identifies Lenovo Group's digital transformation strategy as a three-stage process:

1. **Enhancing internal digital capabilities** – Improving data processing and decision-making efficiency.

2. **Expanding intelligent decision-making** – Leveraging advanced data analytics to optimize supply chain processes.
3. **Building a collaborative supply chain ecosystem** – Strengthening internal and external business links for seamless operations.

Scientific and practical significance. By analyzing Lenovo Group's transformation, this research provides practical insights for other enterprises aiming to embark on supply chain digital transformation. The findings emphasize the importance of technological readiness, data-sharing ecosystems, and strategic planning in achieving successful digital transformation.

This study contributes to both theoretical and practical discussions on supply chain digitalization, offering valuable recommendations for enterprises, policymakers, and researchers. Ultimately, the research highlights the critical role of digital transformation in driving enterprise competitiveness and long-term sustainability in the modern industrial landscape.

CHAPTER 1

A THEORETICAL OVERVIEW OF THE DIGITAL TRANSFORMATION OF THE SUPPLY CHAIN

With the gradual penetration of new-generation digital technologies such as blockchain, artificial intelligence, and digital twins into people's daily lives, the digital economy is booming on a global scale, and digital technology has become a key element in the reshuffle of the market. Countries have become more aware of the disruptive role of digital technology in various industries and are actively developing strategic deployments. In 2015, China proposed the China Manufacturing 2025 Strategy, which mentioned the need to actively develop new digital economic forms, deepen the digital transformation of enterprises and the construction of digital supply chains. In the "14th 5" plan released by the state in 2021, the digital transformation of the manufacturing industry and the digital upgrading of the industrial chain are listed as key projects, and it is clearly proposed to promote enterprises to build agile, efficient, safe and stable digital supply chain and supply chain network. The above policies indicate that the future development trend of the manufacturing industry is to continue to develop in the direction of intelligent and digital supply chain, and industrialization is also 4.0 supply chain 4.0. Therefore, in order to achieve "curve overtaking", we must seize the opportunity of industrial chain digitization. Supply chain digitization not only realizes the supply chain visualization and sustainable development, but also promotes the enterprise digital transformation process, but also accelerates China's modern supply chain The construction of a manufacturing power and the promotion of a virtuous circle of the national economy are of great significance.

The "black swan" event of the new crown epidemic in 2020 has had a certain impact on the development of global manufacturing, but from another 1 point of view, it has also accelerated the process of intelligent manufacturing. In the era of digital economy, the deep integration of the new generation of information technology and

supply chain also drives the competition in the manufacturing industry to evolve into the competition between supply chain and supply chain. With the increasing demand for the fineness of product supply, the complexity of product production is also increasing, especially for electronic product manufacturers, the impact is more significant, the product life cycle is accelerated to shorten, and customers' requirements for product quality, personalized customization and performance are constantly improving, which also promotes the demand of various subjects in the supply chain to build a more stable and efficient supply chain. The digital transformation of the supply chain is the key to the global forefront of manufacturing.

Compared with the traditional supply chain, the data-based supply chain has many advantages such as interconnection, intelligence, flexibility, and speed. Through the collection, aggregation and analysis of large amounts of data, there are obvious differences from the traditional supply chain in terms of demand forecasting accuracy, data interoperability and sharing, production flexibility and resilience, transportation management, driving process and the structure of the entire supply chain. However, the transition from traditional supply chain to digital supply chain is more complex, and the key nodes of the transition must be grasped, which is of great significance to the digital transformation of China's manufacturing industry.

However, there are many obstacles in the process of digital transformation of the supply chain of manufacturing enterprises with many production processes, high precision requirements and complex management content. Although many enterprises have realized the benefits of digital supply chain to enterprises, according to the survey of research institutions, only a small number of enterprises can successfully combine the concept of "digital economy" with "supply chain". Some enterprises are in the process of transformation, because the transformation planning is out of the actual needs of enterprises,Transformation management efficiency is not high, resulting in the transformation process of many practices are ended in failure. More and more enterprises and research scholars at home and abroad begin to pay attention to the digital transformation of supply chain, and the digital supply chain has become an important part of the current supply chain management research.

As a global PC industry giant, Lenovo continues to expand its business scope based on the PC business, and has achieved brilliant results in the digital transformation of the supply chain. It has been listed in the Gartner supply chain list for 8 consecutive years and has become the top of the Asian supply chain list. Therefore, the digital transformation of its supply chain is typical. As the benchmark of domestic supply chain digital transformation enterprises, this paper studies the process and path of supply chain digital transformation of Lenovo Group, and studies the mechanism of supply chain digital transformation on enterprise performance combined with Lenovo Group. It provides theoretical support for the practice of manufacturing enterprises that need to carry out supply chain digital transformation in China, which has certain practical significance.

Therefore, this paper studies the supply chain digital transformation of Lenovo Group, explores the path of supply chain digital transformation, analyzes the influence mechanism of transformation on enterprise performance, and provides theoretical basis for manufacturing enterprises to implement supply chain digital transformation.

The research significance of this paper is divided into theoretical significance and practical significance, through the combination of literature research, case study and comparative analysis method, the motivation and path of the digital transformation of Lenovo Group's supply chain are collated, the mechanism of its impact on enterprise performance is summarized, and the conclusions and enlightenment are summarized.

(1) Theoretical significance

The digital transformation of supply chain is a new research hotspot in recent years, and the case studies related to the digital transformation of supply chain and enterprise performance in the academic circles need to be supplemented, and this paper expands the theoretical research on the digital transformation of supply chain and enterprise performance to a certain extent, and provides the support of practical cases. This paper analyzes the influence mechanism of supply chain digital

transformation on enterprise performance through the theoretical framework, and complements the existing research.

(2) Practical significance

This paper can provide a reference for other manufacturing enterprises, including leading enterprises and small and medium-sized enterprises, to choose the path of supply chain digital transformation. Lenovo Group is an important part of the entire industrial chain, and ranks first in the global supply chain list. As a typical representative of the digital transformation of China's manufacturing supply chain, taking Lenovo Group as a case study can provide reference for the digital transformation of China's traditional manufacturing enterprises. Therefore, this paper takes the influence path and mechanism of Lenovo Group on enterprise performance through supply chain digital transformation as the research object, which has certain reference significance for enterprises to implement transformation practice.

(3) The meaning of digital transformation

The academic community has not yet reached a consensus on the connotation of digital transformation. In recent years, with the study of many scholars do not and in-depth analysis, scholars have further deepened their understanding of the subject. For the connotation of digital transformation, the academic circles have discussed from the aspects of technology use and transformation field.

First, research from a technical point of view. Frank(2019) also pointed out that the implementation of digital transformation requires the integration of enterprise business models and new technologies, and then gradually guide social and technological innovation. Vial(2019) defines digital transformation as the process of using a combination of computing, communication and connectivity technologies to cause changes in an organization's strategy, organizational structure, processes and culture. Wang Ziyang et al. (2020) believe that digital transformation is the process of applying new digital technologies in the business process in order to achieve data-driven business decisions, with a focus on digital technologies.

Second, research from the perspective of the transformation field. Hess et al. (2016) proposed that through the application of digital technology, enterprises can

comprehensively promote the change of business process and strategy, and then promote the transformation and upgrading of business model. He Fan (He 2019) believes that digital transformation is the integration of enterprise production and operation with digital technology. Gregory(2019) believes that digital transformation refers to the process of enterprises using digital technology to promote enterprise processes, business models, organizational structures and production models. Yizhou Chu et al. (2019) believe that digital transformation refers to the whole process of enterprise organization and business process under the application of information technology, to achieve a complete change in the way enterprises operate. Jiang Jian (2021) believes that digitization is to use digital means to change their own business methods, so that they can meet or complete their own changes to a certain extent, so as to upgrade the business model. Mohamad(2021) study concluded that the field of digital transformation includes the business model and operation process of the enterprise. He Yumei (2021) defines that digital transformation is based on the circulation and sharing of data resources, and has achieved change and development in the production process, application scenario, organizational structure and business model of the enterprise. Yu Wei (2022) proposed that digital transformation is a 1 iterative organizational process based on business process supported by enterprise data, which promotes enterprises to develop new business models under digital conditions, and changes the organizational structure, business processes and other aspects of enterprises through digital technology to form stronger core competitiveness. To sum up, this paper defines digital transformation as the process of integrating a new generation of Internet technology into the daily operation, business process, organizational structure and other aspects of the enterprise, carrying out subversive transformation and change, and improving enterprise performance.

(4) The connotation of supply chain digital transformation.

Supply chain digital transformation is a relatively new concept. For the first time, Berman(2012) predicted in his research that digitalization will become the trend of supply chain development. And then more and more scholars are aware of the development of digital unstoppable impact on all aspects of life and work.

Karimi(2015) defines supply chain digitization as digitally driving existing supply chain structures to generate new value. Patrick(2017) and other scholars see the digital supply chain as a way to integrate procurement, smart warehousing, smart B2C logistics, digital marketing and customer relationship management and other process data integration of the ecosystem. Khanfar et al. (2021) propose that digital management of digital business processes, organizations, and corporate assets is a 1 more collaborative, flexible, open, and flexible operating model. Chinmay(2020) proposed that the digital supply chain is more flexible and efficient in the enterprise's marketing and operation planning, strategic procurement decisions, production process and warehouse management, etc. Wei Ying et al. (2021) proposed that the digitalization of the supply chain refers to the effective integration of various high-quality resources in the industrial chain by means of digitalization, so as to form a complete, brand-new and, Efficient supply chain operations. Zhang Renzhi (2022) believes that supply chain digitization refers to the use of a variety of new- generation digital technologies to connect the information between the various subjects in the entire supply chain, so as to be able to adapt to changing market needs and achieve more Agile and more efficient operations, while reducing operating costs.

According to the relevant literature, the research on the motivation of supply chain digital transformation can be divided into two angles: external driving force and internal demand.

With the gradual development of a new generation of Internet digital technologies such as digital twins, Internet of Things, 5G technology, intelligent AI, simulation and simulation, and the comprehensive application of more and more fields, it has brought new opportunities for the digital transformation of China's supply chain. Wu Shugui (Wu 2020) believes that the digital transformation of the supply chain is through the comprehensive integration of the entire enterprise, through the comprehensive integration of its internal structure to optimize, improve its technical approach, so that its entire supply chain in all parts are Able to effectively operate and continuously upgrade, thereby improving the company's core capabilities. Olsen and Tomlin

(2020) pointed out that the new generation of Internet technology, represented by the Internet of Things, blockchain and artificial intelligence, has promoted the arrival of the era of industrial 4.0 and realized the real-time connection between entities and data, making enterprises need to make choices and trade-offs in multiple dimensions such as production cost, flexibility, speed of response and product quality. Facing the increasingly complex market environment, the competition between enterprises has gradually evolved into the competition between supply chains, and major enterprises are improving their operational efficiency through digital transformation.

(5) From the perspective of internal demand

Sun Shusheng (2016) proposed that in the traditional supply chain, information can not flow quickly, can not provide timely and effective information, and the use of Internet of things technology, information service platform and other information sharing means, can speed up the flow of information, so as to achieve effective collaboration between all members of the supply chain. Cheng Dong (2017) believes that the use of big data can improve the operational efficiency of the supply chain, improve risk management capabilities, and stimulate the innovation and development potential of enterprises. Srinivasan(2018) believes that managers can use innovative technology to enable enterprises to gain competitive advantage in the fierce market competition. Chen Jian (Chen 2020) pointed out that customer requirements are gradually developing in the direction of diversification, functionality and integration, and it is difficult for a single enterprise to meet all the needs of customers. Leading companies in various industries are using mobile Internet, cloud computing and other technologies to associate different products and services that seemed unrelated in the past, and build an ecosystem that adapts to diverse consumer needs. Qu Weifeng (2021) found that the degree of internationalization of the supply chain, supplier concentration and customer concentration and other factors on the supply chain complexity has a significant effect, and as the complexity of the enterprise supply chain increases, the enterprise supply chain of the digital demand also increases.

(6) The direct impact of supply chain digital transformation on enterprise performance.

The digital transformation of enterprise supply chains can improve operational efficiency and, in turn, enterprise performance. Inayat et al. (2018)

It is believed that the integration of digital technology into supply chain management and the use of big data Internet technology in each node of the supply chain can promote the rapid response of the supply chain, speed up the flow of information, and share data more timely, thus improving enterprise performance. Li et al. (2018) found that by using IoT technology, companies can improve procurement accuracy, material flow visualization, product distribution efficiency and customer service experience. Jiang Wenrui (R. 2021) Research found that digital transformation improves the overall efficiency of enterprises by improving the organizational structure of circulation organizations, the efficiency of data circulation, and the operational efficiency of organizations. Chen Zhiyuan (2021) found that with the digital transformation of the supply chain, the traditional supply chain structure has changed, from a single chain structure to a mesh structure, and makes the data in the entire supply chain realize intelligent online management. Through the circulation of data in the whole process of supply, production and sales, we can achieve more effective resource allocation, better adapt to the needs of the market, and then improve the operational efficiency of the entire supply chain. Zhao Chen Yu (such as 2021) research shows that the digital supply chain can improve the ability of independent innovation, optimize the organization structure and improve the quality of resource allocation at the same time, to ensure the performance of enterprises at the same time, but also to a certain extent to achieve the effect of "double promotion.

The digital transformation of the enterprise supply chain can reduce operating costs and improve business performance. Schrauf(2016) proposed that digital transformation can enhance the response speed of the supply chain, enhance the visualization of the supply chain, help to improve the mode of operation, enable enterprises to adapt to the changing market needs, and constantly iterate on services and products, so as to improve the production and processing quality of enterprises

and reduce inventory costs. The research of Zhang Shushan and other (2021) scholars show that the digitization of the supply chain can improve the information asymmetry between each node of the supply chain. Through the use of digital technology, the real-time data of staff, product flow, capital flow, etc. can be accurately recorded and shared, which is conducive to the timely assessment of their own business risk situation, thus reducing the financing costs of enterprises, thus improving the financing efficiency of enterprises. Li Qi et al. (2021) proposed that digital transformation is conducive to improving the supply- chain integration, through digital analysis technology, enterprises can collect and identify customer diversification needs, respond in a timely manner, and be able to identify the value chain in the value creation link, and optimize it.

(7) The indirect impact of supply chain digital transformation on firm performance

On the one hand, the indirect impact of supply chain digital transformation on enterprise performance is reflected in the impact on the industrial chain enterprises. Xu Heng et al. (2020) have shown that the use of digital technology in business operations can affect companies in the same industry and bring additional technology spillover effects. Yang Zhiqiang et al. (2020) believe that the improvement of the information disclosure level of downstream enterprises can greatly reduce the degree of information asymmetry in the supply chain, and the efficient circulation of information helps upstream enterprises to reduce the cost of information search, thus alleviating the "bullwhip effect". Li Qingyuan et al. (2022) found that the digital transformation of downstream enterprises in the supply chain can alleviate the "bullwhip effect" of the supply chain through data exchange and sharing, which has a significant positive information spillover effect on upstream supplier enterprises, affecting their decision-making behavior, prompting supplier enterprises to optimize supply structure and alleviate overcapacity. Nie Xingkai et al. (2022) concluded that after the digital transformation, the credit status, default record and transaction price of the cooperative enterprises can be further confirmed, and improve the transparency of the information environment.

On the other hand, the indirect impact of supply chain digital transformation on enterprise performance is reflected in the impact on the enterprise. Lei Hui et al. (2021) believe that the digital supply chain of enterprises can optimize the business environment in which enterprises operate, thus strengthening its positive impact on enterprise performance. Zhang Shushan et al. (2021) have shown that the digitalization of the supply chain can prompt management to learn scientific and technological ideas in a timely manner, enhance the grasp of opportunities in crisis, improve the company's risk tolerance, and thus improve the company's business performance.

CHAPTER 2

PATH ANALYSIS OF Lenovo GROUP'S SUPPLY CHAIN DIGITAL TRANSFORMATION

2.1 Company Profile

2.1.1 Introduction of Lenovo Group

Lenovo Group was established in 1984. It is a large-scale international enterprise in 1 engaged in the design, research, production and sales of its own-brand computers and server-related businesses. It has been deeply engaged in the field of electronic information manufacturing for many years and is the world's leading software and hardware Integrated service provider. was listed in Hong Kong in 1994 and has since grown. Lenovo Group's current main products and services mainly include personal computers and tablets, smart products, mobile phones and servers. For many years, Lenovo Group's personal computer market share has ranked the world leader and is also the world's largest PC manufacturer and seller. As of November 31, 2023, the market value of Lenovo Group reached about HK $116.309 billion.

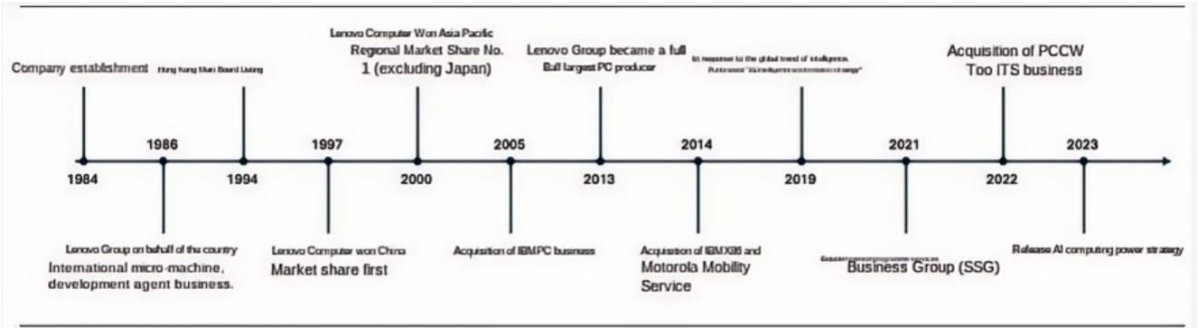

Figure 3.1 - Lenovo Group's Development History

Source: Lenovo official website, Hua'an Securities Research Institute.

From the perspective of changes in business models, the company's development process can be divided into four stages as shown in Figure 3.1, namely,

the start-up period (1984-1993), the personal computer brand period (1994-2003), the globalization period (2004-2013) and the diversification period (2014-present).

During the entrepreneurial period (1984-1993), Lenovo started as an agent and distribution for multinational brands in China. During the period of personal computer brand (1994-2003), Lenovo was listed on the Hong Kong Stock Exchange in 1994 to develop its own brand personal computer business. In 1997, it became the leading PC brand in China, ranking first in the domestic market for the first time. During the globalization period (2004-2013), Lenovo acquired IBM's global personal computer business in 2004, taking this opportunity to expand overseas markets. During the diversification period (2014-present), Lenovo made a large number of acquisitions in 2014, successfully expanding the company's business from PC to smart phones, servers and other diversified business areas. Lenovo first acquired the IBM x86 server business for US $2.3 billion in August 2014, making Lenovo the third largest supplier in the world. After completing the acquisition of Motorola's mobile smartphone business, Lenovo Group will become the third smartphone manufacturer in the world. In May 2018, Lenovo officially established a new Intelligent Device Business Group (IDG). In 2019, the 3S strategy of intelligent transformation will be proposed to become a new IT all-factor service provider that enables the intelligent transformation of the industry. In 2021, Lenovo established the Solution Services Business Group (SSG), which is currently divided into the Intelligent Device Business Group (IDG), the Infrastructure Solution Business Group (ISG) and the Solution Services Business Group (SSG) as shown in Figure 3.2 below.

Lenovo Group has 35 self-owned factories and third-party cooperative factories. Lenovo's upstream is mainly 2000 parts supplier partners such as electronic components, parts, CPU, and chips. From the perspective of sales model, Lenovo Group adopts a combination of direct sales and distribution, with 2.8 million downstream distributors and channel providers as well as end consumers all over the world. From the perspective of production mode, Lenovo Group adopts a mixed manufacturing mode, which is a combination of its own factories and foundry production. It supplies high-quality goods and services to the end users of the

enterprise, and 1 a flexible and effective supply chain operation. Mode, improve operating efficiency, reduce production costs, and flexibly deploy advantageous resources from various regions, the country and even the world, coordinate sales, production, logistics, and after-sales service to achieve efficient and efficient operation, and coordinate and collaborate between various systems to better allocate resources.

Lenovo's supply chain partners are all over the world, which enables Lenovo to realize the allocation of global resources and achieve global procurement, global manufacturing and global logistics, which also constitutes Lenovo's "global resources, local delivery" core capability. Lenovo can respond to customer needs in a timely manner than other competitors, increase Lenovo's core competitiveness and seize growth opportunities.

2.2 Lenovo Group Supply Chain Digital Transformation Motivation

The factors driving Lenovo Group's digital transformation of supply chain mainly come from two levels. 1 is the external economic environment factors. With the development of digital economy and the continuous development of science and technology, the competition of industry is becoming increasingly fierce, and the service transformation of manufacturing enterprises has become an inevitable trend, and the strategy of digital transformation can improve the efficiency of service transformation of manufacturing enterprises. The government provides corresponding policy support to guide enterprises to develop in the direction of digitalization and networking. The above external factors not only bring great opportunities to Lenovo, but also bring great challenges. The changing external environment drives Lenovo to find new development methods to cope with external changes and promote its digital innovation. 2 is a change in internal demand. Faced with the need for service upgrading of manufacturing enterprises and the limitations of Lenovo's existing business model, Lenovo Group needs to use its rich data resources on the basis of

existing big data to push it out of the development dilemma and improve its core competitiveness.

2.2.1 Follow the trend of digital development

With the development of digital technology, many enterprises are aware of the huge dividends contained in data resources, combining digital technology with enterprise operation management to carry out digital transformation, and the digital transformation of supply chain is an important part of the digital transformation of enterprises. Lenovo Group has stepped into the ranks of changers in line with the development trend of digital supply chain. This is mainly due to the following two aspects.

1 is the policy orientation of the country; under the new form of profound changes in the world economic structure, the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China clearly stated that it is necessary to open up production, distribution, circulation, consumption and other links, and promote the market and market factors through supply-side reforms. Effective combination and optimal distribution. The manufacturing industry is an important pillar of China's economic development. The Party Central Committee clearly stated that it should focus on the real economy, focus on manufacturing power, quality power, network power, and digital China, promote the advanced industrial foundation and modernization of the industrial chain, and improve the national economy. Quality and core competitiveness. 2021 in the "14th 5" plan will be manufacturing digital transformation action and industrial chain digital upgrade action as one of the key contents of future development, which particularly emphasizes the need to promote enterprises to build a flexible, efficient, safe and stable digital supply chain system. The above policies have pointed out the direction for the development of China's supply chain, which is to continue to develop towards an intelligent and networked digital supply chain.

The 2 is the development of digital technology, as shown in Figure 3.2, with digital technologies such as blockchain, data twins, artificial intelligence, 5G and the

Internet of Things, which are the core technologies for the digital transformation of the entire supply chain and an important technical support for the digital transformation of the entire supply chain. More specifically, the block chain improves the credibility of data by making data more transparent and reliable. Artificial intelligence technology can improve management decision-making accuracy and efficiency; 5G technology can transmit and transmit a large amount of information more efficiently, ensuring real-time data timely updates; The Internet of Things is changing the way people and things contact;

The digital twin builds a digital mapping of the real world to simulate various scenarios to assist managers to analyze and predict, improve the quality of decision-making, and so on. The continuous development of digital technology has given birth to a new form of business model, which makes the boundaries of the industry more and more blurred. In order to keep up with the pace of the development of the times, enterprises must carry out business changes and deal with the market changes caused by the scientific and technological revolution.

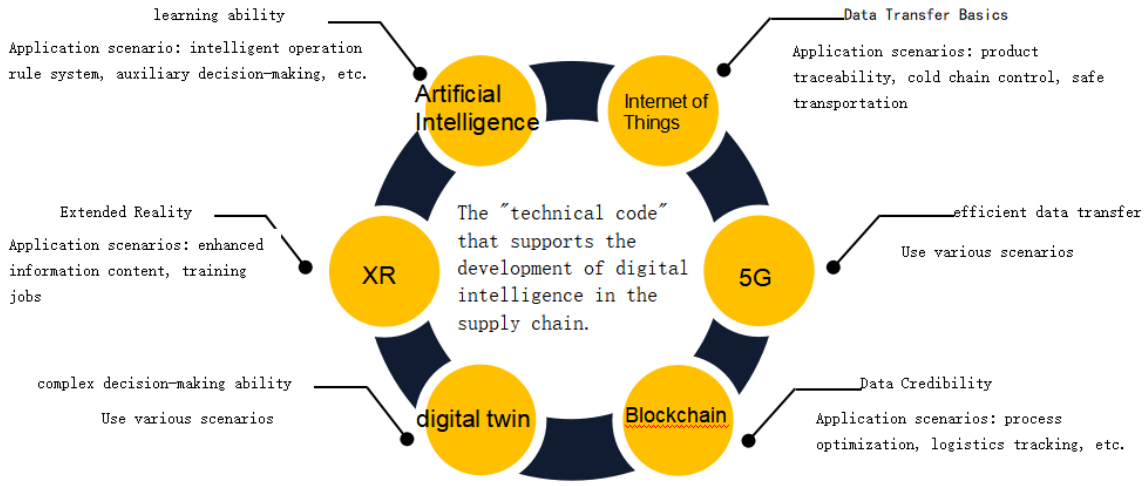

Figure 3.2 - Technical support for digital transformation of supply chain

3.2.2 Requirements for the transformation of traditional manufacturing business models to service-oriented manufacturing business models

Since 2020, China has officially entered a new stage of high-quality development from a stage of rapid development, along with economic transformation

and industrial upgrading, promoting collaboration and integration between industries, and the boundaries between manufacturing and service industries are accelerating. To promote the transformation of manufacturing industry to service, on the one hand, it can promote enterprises to change from simple production of products to higher-level business of providing system solutions, master core technology and enhance the core competitiveness of enterprises. In the long run, it can alleviate the problems of low-end overcapacity and insufficient high-end capacity in China's manufacturing industry to a certain extent. At the same time, it can also promote the upgrading of the industry and realize the improvement of product quality and efficiency.

Service-oriented manufacturing is a new industrial form of integrated development of manufacturing and service, and it is an important direction for China to realize the upgrading of manufacturing industry. The core of service-oriented manufacturing is that manufacturing companies have gradually shifted from "manufacturing-centric" to "customer-centric and delivery-centric"; from simply providing products to providing products and product-related services, adhering to "product services" "Business philosophy. Under the service-oriented manufacturing mode, the service-oriented transformation of manufacturing enterprises emphasizes the integration and collaborative operation of the upstream manufacturing link and the downstream service link of the supply chain to meet the personalized product and service needs of customers, thus extending to the whole value chain. The ultimate goal of the supply chain is always to meet the needs of customers. The digital transformation of the supply chain has become a powerful driving force for the integrated development of Lenovo Group's service industry and manufacturing industry. On this basis, the construction of customer-centered supply chain system, customer-oriented product, organizational structure and service model design. Based on the relevant data of customers, a digital supply chain center is constructed by using intelligent methods to support the cooperation of various departments of the company, so as to accurately predict the needs of customers and bring more valuable services to customers.

2.2.3 Enterprises can not make full use of their own data resources

With the development of the times, data has become an important resource for enterprise development. After 40 years of development, Lenovo Group has grown into a global company operating in more than 180 markets, with more than 1000 business systems, So these business systems tend to produce different types of data. In Lenovo's nearly 40 years of operation, the system has accumulated a huge amount of data, consisting of PB-level massive data sets, and is still growing at a 30% annual growth rate, so Lenovo's demand for data governance is extremely urgent, enterprises need to release these data of great value.

At the same time, Lenovo Group found that its own manufacturing advantages are obvious, but the level of informatization and automation is uneven. The practice of Lianbao factory (self-owned manufacturing) makes the group see that its own manufacturing has outstanding advantages in key technologies, capabilities and operations, and deeply recognizes the value of its own manufacturing to the supply chain. However, at that time, each of Lenovo Group's own factories carried out digital transformation from its own perspective. The informatization and automation of its own manufacturing are uneven. The data between each business department is independent and the data standards are different. Therefore, it is difficult to summarize and analyze the data of each factory. From the perspective of Lenovo Group as a whole, the digital transformation of the supply chain is conducive to centralized analysis of the information of each production distribution and improve its own production standardization level, and then improve the quality and efficiency of product production.

2.2.4 Traditional supply chain management cannot meet changes in customer needs

With the increasing complexity of business scenarios and the changing business environment, enterprise supply chain management is facing unprecedented challenges. Traditional supply chain management lacks timeliness and comprehensiveness in terms of demand forecasting, scheduling, and risk identification. Once unforeseen unfavorable factors occur, it may lead to supply

breaks and sales declines. The risk will also spread to the supply chain partners, causing the entire supply chain ecosystem to be affected or even collapse.

Lenovo Group has a variety of different product lines. With the increase of people's functional demand for electronic products and the increase of personalized demand, it also means that the production of electronic products tends to be more kinds and less batches. If there is no clear customer demand information, enterprises will not be able to accurately and quickly grasp the market, affecting the accuracy of demand forecasting. Traditional demand forecasting mainly relies on the past experience of management, but with the expansion of the market scale and the continuous development of the market, the original demand forecasting method is often lower than the actual situation, can not meet the business needs of enterprises. This requires companies to accurately and completely grasp the entire supply chain, and analyze it intelligently, so as to make rational decisions and make rapid responses and adjustments.

Customer experience and operational efficiency put forward higher requirements for supply chain planning management and procurement management. From the customer's point of view, customers need a unified service process. For example, for B- side customers, Lenovo Group hopes to integrate limited resources to meet customer needs to the maximum. However, customers hope that each interaction can have a consistent service experience, while C- side customers also hope that the delivery process is unified and transparent. From the perspective of company management, Lenovo Group hopes to take advantage of centralized procurement, but due to the inconsistency of the system, it needs to spend a lot of manpower to collect data from different systems, which affects operational efficiency.

Supply difficulties during the epidemic exacerbated the need for digital transformation of the supply chain, and although the outbreak of the new coronavirus in 2020 is itself a public health crisis, the impact continues to expand due to other problems caused by its impact, such as a sharp drop in consumer demand, stagnant labor force, and partial disruption of the supply chain due to material shortages. Wuhan, the center of the epidemic, is also an important transportation hub in the

country, which has also had a huge impact on the supply chain operation order of the manufacturing industry. Fluctuations in market demand, insufficient upstream supply, and hindered logistics capabilities have made many manufacturing companies Having to adjust the inventory strategy from "zero inventory" to "more materials" as far as possible, Lenovo Group's supply chain has also been greatly affected. This strategy adjustment can prevent raw materials from being cut off and lead to prolonged production and delivery cycles, thus affecting the service level of enterprises. However, at the same time, more materials are prepared, which correspondingly aggravates the risk that the inventory material backlog becomes a "sluggish material. The increasingly severe economic situation makes many enterprises pay attention to the construction of their own supply chain architecture, and more and more enterprises realize the important value of supply chain digital transformation.

2.2.5 Steady Increase in Market Share

Market share, also known as "market share", refers to the sales volume of a 1 product or the proportion of sales to similar products in the market, reflecting the position of the enterprise in the market. This paper selects Lenovo's global PC market shipment data from 2011 to 2023 for analysis. As can be seen from Figure 3.4, Lenovo Group's market share was 12.1 in 2011 and 36.8 in 2023, showing an overall upward trend. After 2017, Lenovo's PC product shipments ranked first in the market, and its market share with HP and Dell increased year by year. The reason can be attributed to two aspects. On the one hand, Lenovo Group has improved the production efficiency and logistics efficiency of products through intelligent decision-making, and reduced the operating costs of products. At the same time, to ensure the quality of products, optimize the quality of service, and thus improve product sales. On the other hand, Lenovo Group uses digital technology to build an Internet collaboration platform for all parties in the supply chain, improve the efficiency of business services, and help it undertake more business volume, indicating that its supply chain digital transformation has been effective.

At the same time, Lenovo Group's global server sales market share is also increasing year by year. As can be seen from Figure 3.5, Lenovo Group has a market share of about 6.5 per cent in the global server market in 2022, second only to Dell, HPE and Inspur, and is rapidly squeezing into the top three. The reason for this is that the epidemic has accelerated digital and intelligent transformation and strong demand for infrastructure, which in turn has contributed to the growth of traditional servers, storage, networking, new types of edge computing, and cloud computing.

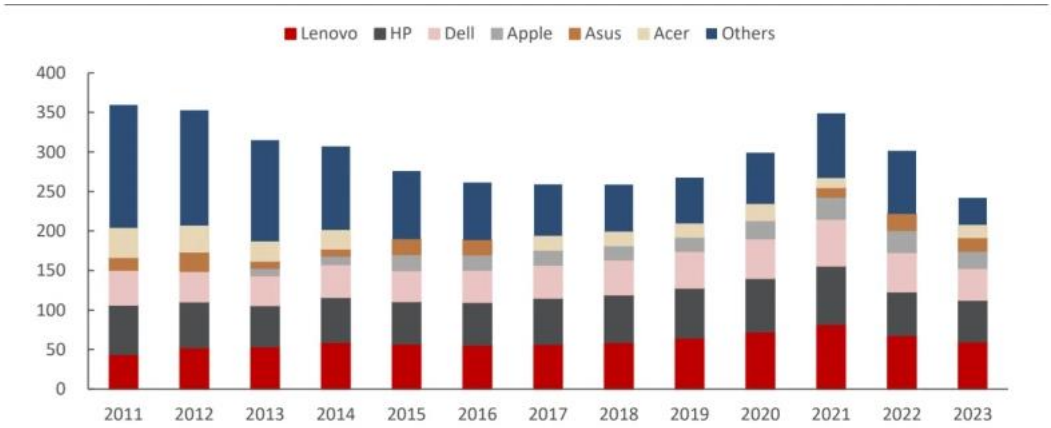

Figure 3.3 - Changes in Global PC Market Share from 20111to 2023

Data source: IDC

Lenovo Group's full-stack intelligent trinity layout helps small and medium-sized enterprises to carry out digital transformation, providing trinity services of intelligent equipment, intelligent infrastructure and intelligent solutions. IDG business provides necessary mixed office and production terminals for enterprises, such as PC, office screen, intelligent gateway, industrial control computer, etc. ISG is the door to open the door of enterprise customers brick-enterprise digital transformation order, server, storage, network, edge and other equipment is usually the most basic products, other solutions services, software products are based on the above hardware. SSG includes hardware support services (providing maintenance, data rescue and other services for Lenovo equipment and ICT equipment of more than 100 brands), intelligent operation and maintenance services (such as ServiceForce platforms) and solution services (solutions for various industries). SSG business to Lenovo infrastructure, smart devices in the pure hardware direction of the competition traction to higher gross margin services, software areas. The three major business groups cover

all the capabilities of "end-edge-cloud-network-intelligence" and have a clear division of labor. IDG business, ISG business and SSG business also played a synergy between the three businesses, played a "1+1>2" effect, expanding business revenue.

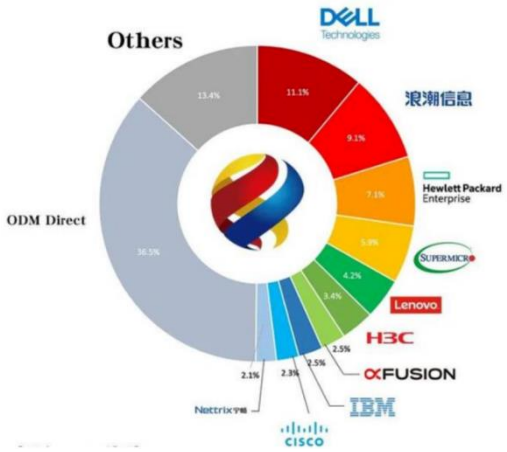

Figure 3.3 - Distribution of Global Server Shipment Amount in 2023

Data source: IDC

2.2.6 Brand influence gradually increased

For enterprises, they need to pay attention not only to economic benefits, but also to social benefits and brand influence. From the perspective of brand influence, Lenovo Group's global supply chain construction, R & D layout, and service network cover 145 contracted countries along the "Belt and Road", with a total output value of more than US $3 billion. According to public data, in 2023, Lenovo Group ranked eighth in the Top 25 Gartner the world's leading supply chain list, ranking first in Asia.

In September 2022, Ipsos released the "2021 Chinese Brand Global Trust Index", and Lenovo Group ranked first with a 146 trust index. It is understood that the list released by Ipsos is mainly aimed at ranking Chinese brands that are more influential in overseas markets. The data is based on a survey of 11000 overseas respondents in 15 markets and an in-depth analysis of indicators such as cognition, trust, purchase intention and brand competitiveness.

Since the establishment of the "Brand Value List of Listed Companies in China" in 2017, Lenovo has topped the list of overseas brands for the 5 consecutive year. In 2023, the value of overseas brands exceeded 200 billion yuan, doubling the scale of 100 billion yuan in 2020 by 17. By 2024, its overseas brand value will rise further.

The above achievements show to a certain extent that Lenovo Group has provided consumers with high-quality products and services by building the core competitiveness of the entire industry chain covering R & D, production, products, markets, and supply chains, and further enhanced its social influence.

2.2.7 Innovation ability is improved

Innovation is the power source of the sustainable development of enterprises, and improving the innovation ability helps enterprises to cope with the changing environment,

Enhance core competitiveness. Since Lenovo Group proposed its digital transformation strategy, its investment in R & D personnel has increased year by year. The number of R & D personnel increased from 8950 in 2019 to 10600 in 2022, an increase of 18.4 percent. This 1 trend of continuous growth shows that Lenovo Group's investment and development in the field of innovation is increasingly strengthened, which will further enhance the technical strength and market competitiveness of enterprises.

At the same time, the company continues to increase investment in research and development. According to the Figure 3.4, the R & D investment in 2020 is 12.3 billion yuan, and by 2023 it has increased to 18 billion yuan. In 2023, R & D expenses accounted for 3.6 percent of operating income, indicating that Lenovo continued to increase its investment in R & D. This 1 trend of continuous growth fully demonstrates the importance that enterprises attach to technological innovation.

In addition, through the comprehensive management and application of R & D results in the past 20 years, Lenovo Group has accumulated more than 30000 patents and patent applications worldwide. According to data from the website of the National Patent Office, the number of valid patents of Lenovo Group is on the rise from 2020 to 2023. Despite a slight decline in the number of patents due to the impact of the 2020 epidemic, Lenovo quickly adjusted and showed the industry's resilience to recover quickly the following year. Lenovo Group has invested a lot of resources in the field of 5G and has applied for 638 patents related to 5G. As a catalyst to promote

digital reform, 5G technology can not only realize the digital connection of more terminal devices, realize the seamless combination of network and cloud, reduce the technical cost and improve the flexibility of the network. Lenovo in the 5G interconnection can not only improve the enterprise before and after the end of the computing efficiency, to provide a large number of access nodes and low latency channel, but also for operators and enterprises to provide a full range of 5G construction solutions.

Year	R & D investment (RMB billion)	Year-on-year growth rate	Percentage of revenue
2020	123	11%	2.9%
2021	143	16%	3.1%
2022	160	12%	3.0%
2023	180	12.5%	3.6%

Figure 3.4 - Lenovo Group's R&D investment from 2020 to 2023

Data source: Lenovo Annual Report

In summary, Lenovo Group for the introduction of research and development personnel, research and development investment increased, enough to reflect its company.

The emphasis on R & D has prompted it to achieve better results in the field of R & D innovation, and its R & D innovation capabilities have been greatly improved, indicating that the digital transformation of the supply chain has improved Lenovo's R & D innovation capabilities to a certain extent.

Year	Total number of valid patents (pieces)	Year-on-year growth rate	Number of AI patents (pieces)
2020	5200	--	650
2021	6400	23%	820
2022	7800	22%	1050
2023	9500	22%	1200

Figure 3.5 - Lenovo's number of valid patents from 2016 to 2022

Data source: National Patent Office official website

2.3 Impact effect analysis based on financial indicators.

In the process of supply chain digital transformation, Lenovo Group has experienced a long exploration and efforts. With the sweeping wave of digitalization, Lenovo Group first proposed a digital transformation strategy in 2014, taking an important step from digital integration to multi-service integration, and has made some achievements in this 1 process. In the face of the decline in demand in the electronic information manufacturing industry and the rising cost of electronic components, Lenovo Group still maintained a sustained growth in operating income. In order to objectively evaluate the impact of Lenovo Group's supply chain digital transformation on enterprise performance, the performance of Lenovo Group's from 2021 to 2023 was studied, and the changes in Lenovo Group's financial performance in the process of digital transformation were explored. In view of the IDG business revenue accounted for more than 75% of Lenovo Group's total revenue, so the selection of the same industry competitor Huipu operating data and computer manufacturing industry average data for comparative analysis, to assess the supply chain digital transformation on enterprise performance of the actual impact effect.

2.3.1 Year-on-year improvement in profitability

Profitability is the ability of a business to make a profit from its business. The digital transformation of Lenovo Group's supply chain has improved the efficiency of the supply chain and promoted the horizontal and vertical expansion of Lenovo Group's supply chain, thereby increasing operating income, reducing operating costs, and promoting profitability. As an important indicator, the net sales margin can reflect the competitive advantage of the enterprise in the market to a certain extent, and can also reveal the performance of the enterprise in terms of product price, operating cost and period expenses. Gross sales margin is the basis of net sales margin, which directly reflects the company's revenue and cost control side.

Therefore, this paper selects two indicators, gross sales margin and net sales margin, to analyze the impact of Lenovo Group's supply chain digital transformation on profitability.

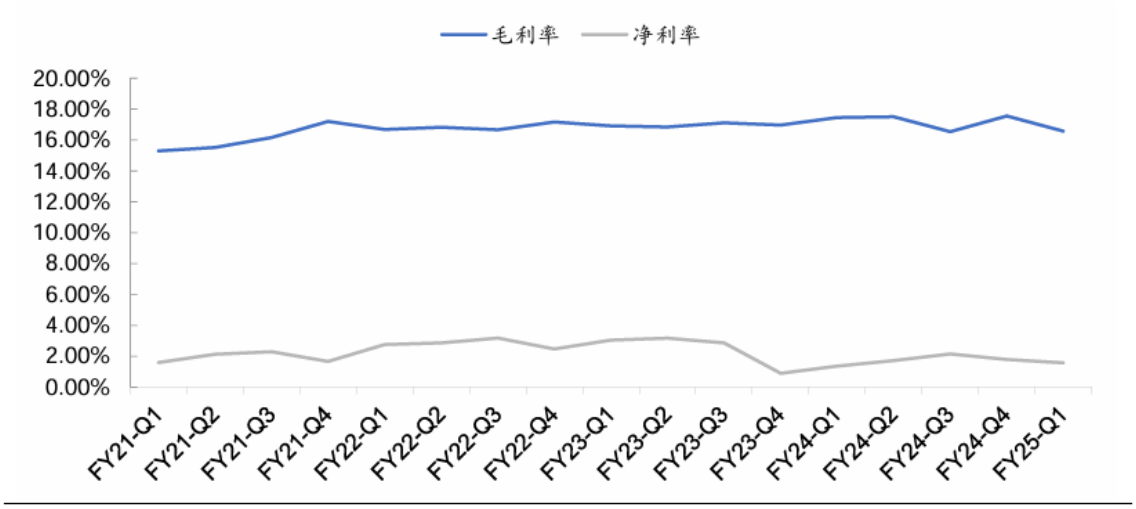

Figure 3.6 - Lenovo Group's net profit margin and gross margin for 2021-2024.

Source: Lenovo Annual Report, Hua'an Securities Database.

(1) Gross sales margin

Gross sales margin refers to the ratio of gross profit to sales revenue, which reflects the profitability of the enterprise in the course of operation. Gross profit refers to the difference between revenue and the corresponding operating costs, which directly reflects the operating efficiency of the enterprise and reflects the enterprise's control of product costs. According to the chart, the 3.8 shows the trend of Lenovo Group and sales gross margin between 2021 and 2024, Lenovo Group's gross margin shows a continuous upward trend. The improvement in Lenovo's gross margin was mainly due to the combined growth of the gross margin of the smart device business and infrastructure solutions business and solution services business. The construction of digital supply chain reduces the cost of Lenovo Group. Among them, the establishment of supply chain control tower enables intelligent decision-making in procurement, production, warehousing and logistics, and improves the operational efficiency of the supply chain. For example, digital procurement management reduces procurement costs and risks, intelligent warehousing reduces inventory levels and warehousing costs, and intelligent scheduling improves production efficiency. At the

same time, through service innovation, Lenovo Group established a solution service business, with a gross margin of 20% in 2021, and its business income increased year by year in 2021 and 2023, further increasing operating income. Together, these initiatives contributed to gross margin growth and highlighted the positive impact of supply chain digital transformation on corporate profitability.

(2) Net sales margin

Net sales margin refers to the ratio of net profit to sales revenue, reflecting the relationship between net profit and sales revenue. As a key indicator of a company's profitability, the net sales margin represents the company's ability to generate revenue. Figure 5.5 shows that Lenovo's net interest rate in 2021-2023 is on the rise.

From an industry perspective, the computer manufacturing industry has a large change in net interest rates from 2021 to 2023. From 2014 to 2016, Lenovo Group is in the exploratory stage of digital transformation. Combined with Figure 5.3, from 2014 to 2016, the rapid growth trend of R & D expenses, its sales net interest rate in the industry average rising trend, part of the reason is that Lenovo Group needs to invest in the construction of big data platform, resulting in net interest rate decline.

In 2020, all walks of life are affected by the epidemic, but Lenovo Group can "upstream", the main reason is two aspects, on the one hand, is affected by the epidemic, PC market demand due to online learning, office demand surge, driven by the entire computer manufacturing industry. On the other hand, it lies in digital empowerment, interconnection of all links in the supply chain, strengthening cooperation with upstream and downstream, effectively ensuring the material demand for emergencies, increasing the resilience of Lenovo Group's supply chain, and making Lenovo Group remain stable in operation. It can be seen that Lenovo's supply chain digital transformation strategy has been effective.

2.3.2 Operating capacity is relatively stable

Considering that the impact of the digital transformation of the supply chain on the performance and operational capacity of Lenovo Group is mainly reflected in the optimization of raw materials, finished goods inventory and the optimization of the

allocation of production resources, the focus will be mainly on the enterprise inventory turnover and fixed asset turnover efficiency. Therefore, this paper will select the two indicators of inventory turnover days and fixed asset turnover rate to conduct an in-depth analysis of Lenovo Group's operating capacity.

(1) Inventory turnover days

Inventory turnover days are used to assess the liquidity of inventory and the efficiency of the use of inventory funds. In general, lower inventory turnover days indicate faster inventory turnover, higher liquidity, and faster inventory realization or account collection. According to the data shown 3.7 the chart, Lenovo's inventory turnover days showed an overall upward trend between 2019 and 2023. From an industry perspective, with the upgrading of technology, many consumer electronics products are facing unsalable problems, resulting in a continuous increase in inventory turnover days across the industry. On the other hand, due to the saturation of PC market demand, the inventory turnover days of the whole industry are also increasing. Under the impact of the outbreak, PC market demand temporarily surged, manufacturers continued to increase inventory, and then with the sharp decline in PC market demand in 2022, the industry's inventory turnover days rose rapidly. The increase in Lenovo Group's inventory turnover days was mainly affected by the decline in market demand, and according to the financial statements, it was found that the increase in Lenovo Group's inventory was mainly due to two mergers and acquisitions. Motorola's acquisition fell short of expected earnings and mobile phone shipments continued to decline. Mergers and acquisitions have led to sales growth rates that are much lower than the expansion of the company's scale, and the growth rate of sales channels and market share has been unable to keep up with the expansion of the company's sales scale, resulting in a continuous decline in inventory turnover. Despite these challenges, Lenovo Group still maintains a certain degree of stability, and its inventory turnover days are far below the industry average. This is due to the rapid response capability of the digital supply chain, the establishment of a unified platform, real-time monitoring of demand and rapid planning and coordination of products, thereby inhibiting the growth of inventory turnover days to a certain extent.

In general, the digital transformation of Lenovo's supply chain helps to improve the operational capabilities of enterprises.

(2) Fixed asset turnover ratio

Fixed asset turnover, also known as fixed asset utilization, refers to the ratio of sales revenue to net fixed assets. According to the data shown in chart 3.8, it can be observed that in the preparation phase of supply chain digitization from 2014 to 2016, Lenovo Group's fixed asset turnover rate decreased year by year. However, once we enter the supply chain digital intelligence phase in 2017, the company's fixed asset turnover has improved significantly, Lenovo Group empowers the supply chain through intelligent decision-making, and Lenovo Group's fixed asset turnover rate has begun. Finally, it remains at a high level, which shows that the company has less idle and scrapped fixed assets, the use efficiency of fixed assets and the overall production efficiency of the enterprise are higher, and the optimization of raw materials and finished product inventory and the allocation of production resources are optimized. improve the efficiency of supply chain operation, and show that the digital transformation of Lenovo Group's supply chain has improved the enterprise's fixed asset management ability.

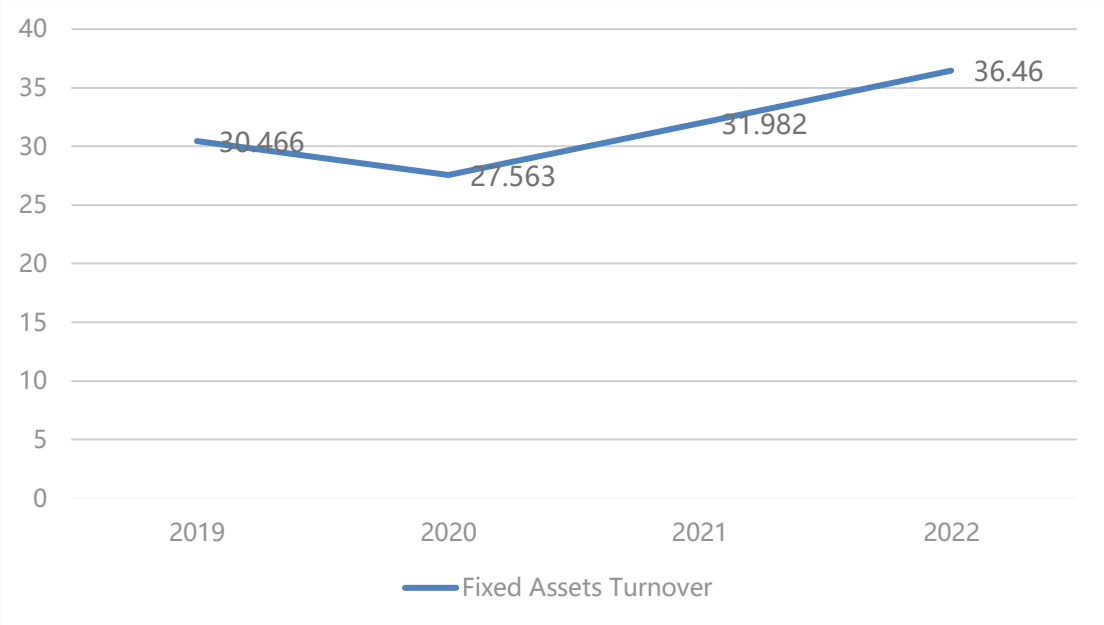

Figure 3.8 - Fixed Asset Turnover of Lenovo and HP from 2014 to 2022

Source: Lenovo Annual Report, HP Annual Report

2.3.3 Steady Growth of Growth Capacity

The growth capacity of an enterprise refers to the future development trend and speed of the enterprise, including the expansion of enterprise scale, the increase of profits and the growth of owner's equity. This paper analyzes the growth capacity of Lenovo Group through the growth rate of net profit and the growth rate of operating income.

(1) Growth rate of operating income

The growth rate of operating income refers to the ratio of the difference between the operating income at the end of the period minus the operating income at the beginning of the period and the operating income at the beginning of the period. This indicator is used to measure the growth of enterprises, the higher the growth rate, the higher the quality of business, the better the product market prospects, the stronger the competitiveness. According to the chart 3.9, the growth rate of Lenovo's operating income fluctuated greatly from 2014 to 20223. Between 2016 and 2017, the decline in annual revenue was mainly due to the impact of the business transformation experienced by the smartphone and data center businesses. Motorola's merger and acquisition business fell short of expectations, mobile phone business shipments continued to decline, mobile business revenue fell 10% year-on-year, and data center business revenue fell 11% year-on-year. However, in 2017, Lenovo launched a new IT system architecture with "end-edge-cloud-network-intelligence" as the core, which promoted the transformation and upgrading of customer first and the diversified transformation and development of 3S. With the formal entry into the intelligent stage of supply chain, revenue has increased significantly. As a result of the epidemic, Lenovo's global production capacity has been challenged in 2020, resulting in a slowdown in revenue growth, but this has also prompted Lenovo to recognize the importance of supply chain collaboration, actively build a supplier collaboration platform, strengthen cooperation with other companies in the industry chain, and improve the stability of the supply chain. By 2021, revenue growth will increase rapidly and maintain a steady growth rate in 2023. Although there have been some

fluctuations in the short term, in general, the digital transformation of Lenovo's supply chain has promoted its growth ability.

Year	2020	2021	2022	2023	2024
Operating income(billion)	50.716	60.742	71.618	61.947	56.864
operating income growth rate	-0.63 %	19.77 %	17.90 %	-13.50 %	-8.21 %

Figure 3.9 - Changes in Lenovo Group's Revenue Growth Rate from 2020 to 2024

Source: Lenovo Annual Report, Guotaian Database

On the basis of the previous theoretical analysis, the impact of Lenovo Group's supply chain digital transformation on the company's performance can be divided into two aspects. The first is a direct impact. Through intelligent decision-making, all links in the supply chain are enabled, the company's production efficiency, operational efficiency and management efficiency are improved, and operating costs such as logistics costs, procurement costs and storage costs are reduced, thereby affecting the company's financial performance; at the same time, The digital transformation of the supply chain has expanded the business scope, added new profit growth points, and realized the business collaboration between the newly established business and the original business, it promotes the growth of the original business, which in turn affects the financial performance of the enterprise. The second is the indirect impact. The digital transformation of the supply chain strengthens the connection between the enterprise and the upstream and downstream, and improves the transparency of information and the ability to promote and supervise each other; in addition, it has a positive impact on the upstream and downstream of the supply chain, further improving product quality and enhancing Product competitiveness affects corporate performance. The impact mechanism of supply chain digital transformation on Lenovo Group's corporate performance is shown in Figure 3.10.

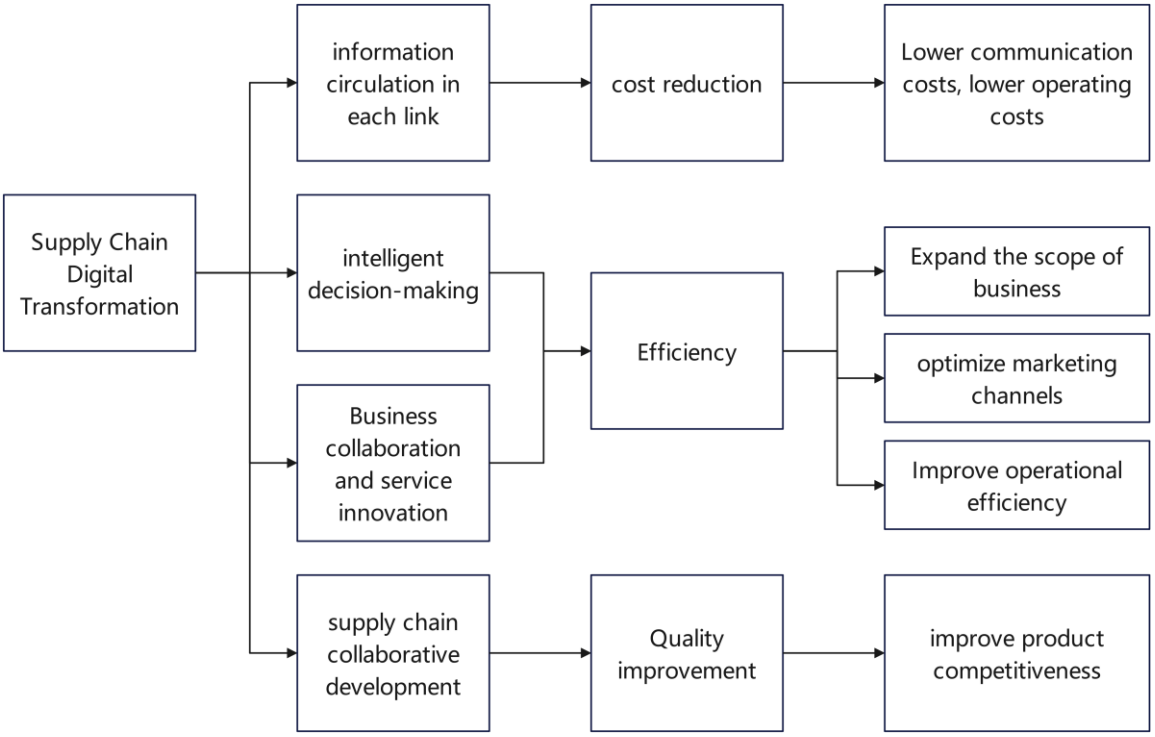

Figure 3.10 - The impact mechanism of Lenovo Group's supply chain digital transformation on its performance

In the traditional supply chain, many links need to rely on manual experience or tedious data processing to make decisions, resulting in the accuracy and efficiency of decision-making can not be effectively guaranteed, but also increased labor costs. And through the digital transformation of the supply chain, using historical databases in the data center, frequent simulations with scientific computing and efficient machines, the best choices can be made to improve operational efficiency. Intelligent decision-making empowers all aspects of the supply chain, affecting the company's production efficiency, operational efficiency and management efficiency, reducing labor costs, improving the accuracy and accuracy of decision-making, and thus affecting the financial performance of enterprises. Through the use of artificial intelligence, advanced analysis, blockchain and other technologies, Lenovo Group independently develops the supply chain intelligent control tower to realize the central connection of the supply chain. build an integrated collaborative system covering planning, procurement, manufacturing, logistics, quality and service, emphasizing data-driven, to create an agile, efficient and green global digital supply chain. The

system is designed to internally optimize operational solutions to achieve overall optimal operations within the supply chain ecosystem. By improving operational efficiency and increasing product capacity, Lenovo Group has successfully improved its corporate performance.

By building a supply chain ecosystem and using a supply chain collaboration platform, on the one hand, it improves the end-to-end information collaboration of the supply chain. The digital transformation of upstream and downstream enterprises in the supply chain alleviates the "bullwhip effect" of the supply chain, affects the decision-making behavior of supplier enterprises, and urges supplier enterprises to adopt a unique strategic model to improve their total factor productivity, optimize the supply structure, alleviate overcapacity, and provide better products and services for customer enterprises. On the other hand, the main chain enterprises formulate quality assurance policies to guide suppliers to improve their management level and improve product competitiveness. Lenovo Group to operate the Internet of Things, machine vision, big data analysis, cloud platform and other intelligent technologies, collaborative and deep integration of internal quality, supply chain quality, industrial quality and social quality of the four levels, to create an end-to -end The end-closed-loop intelligent quality ecosystem realizes high-quality cooperation with suppliers to ensure the factory quality of Lenovo products to the greatest extent, thus enhancing the competitiveness of products in the sales market.

2.3.4 Definition of Digital Transformation

Through the collation and induction of the relevant literature, we can see that in the existing research, scholars still have not reached a consensus on the definition of the concept of digital transformation. Although the focus of scholars' research is different, it is mentioned that the new generation of Internet technology has created the possibility for the development of digitalization in the process of digital transformation. Enterprises can change the business process, organizational structure and business model of enterprises through the comprehensive use of digital technology, so as to improve the performance of enterprises and enhance the

competitiveness of enterprises. Therefore, this paper defines digital transformation as, in order to improve the efficiency of enterprises, to achieve the supply chain upstream and downstream collaborative operation, the use of digital twins, AI and other emerging Internet digital technology on the supply chain business processes, business models, etc. to transform and change, so as to enhance the process of enterprise value creation.

2.3.5 Supply Chain Digital Transformation Definition

Supply chain digital transformation is an emerging concept in recent years, and scholars have no unified explanation for its definition, and there are slight differences between them. Some scholars believe that the digitization of the supply chain is the use of digital technology to cover the upper and middle reaches of the supply chain, including production and marketing, and some believe that it is driving the transformation of the supply chain model with digital empowerment. In general, the current research on the connotation of supply chain digital transformation mainly from the new technology level, the new technology and supply chain integration, so as to improve the ability of enterprises to manage data. Therefore, this paper defines it as the strategic behavior of enterprises using their own data governance capabilities to integrate a new generation of digital technology into all aspects of the supply chain, through data as a link, to improve the operational efficiency of the supply chain, and finally form a multi-party collaborative digital supply chain management system driven by consumer demand.

SECTION 3

RESERCH BACKGROUND AND SIGNIFICANCE

3.1 Research background and significance

3.1.1 Definition of Digital Transformation

Through the collation and induction of the relevant literature, we can see that in the existing research, scholars still have not reached a consensus on the definition of the concept of digital transformation. Although the focus of scholars' research is different, it is mentioned that the new generation of Internet technology has created the possibility for the development of digitalization in the process of digital transformation. Enterprises can change the business process, organizational structure and business model of enterprises through the comprehensive use of digital technology, so as to improve the performance of enterprises and enhance the competitiveness of enterprises. Therefore, this paper defines digital transformation as, in order to improve the efficiency of enterprises, to achieve the supply chain upstream and downstream collaborative operation, the use of digital twins, AI and other emerging Internet digital technology on the supply chain business processes, business models, etc. to transform and change, so as to enhance the process of enterprise value creation.

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3.1.3 Enterprise development

(1) Concept. Enterprise development is a dynamic concept, which refers to the adaptation of enterprises to the changes in the unknown environment in the future, according to the changes in the internal and external environment and development conditions to adjust the organizational structure, business model, business model, institutional mechanism, etc., so as to carry out adaptive adjustment measures, through adaptive adjustment can ensure that the enterprise can achieve sustainable operation, and ultimately achieve the goal of maximizing enterprise value.

(2) Common types of development. First, balanced development. Balanced development is the goal development mode pursued by enterprises, which refers to the steady development state of moderate development speed and controllable risks. The growth rate of corporate operating income has been positive for a long time and is higher than the inflation rate. The enterprise is well funded, able to pay various expenses, repay debts, and have a surplus for investment and business activities. The company's capital structure and debt structure are reasonable, and there are no major structural operational and financial risks. The second is to develop too quickly. The development of enterprises is not as fast as possible, too rapid development will lead to higher operating income growth and growth rate, but also accompanied by higher debt repayment pressure and asset turnover management pressure, the ratio of inventory, accounts receivable, short-term debt, long-term debt scale of enterprises has risen rapidly, and has put forward higher working capital requirements for enterprises, which can easily lead to enterprises falling into cash payment risks,

affecting the stability and sustainability of enterprise development. The third is low-speed development. Low-speed development refers to the development state that enterprises have no new products and services to enter the market, resulting in low profitability and zero or negative growth rate of operating income. The new production capacity of the enterprise is low, and the operating income, assets and liabilities have not increased significantly, which makes it difficult for the enterprise to support the corresponding investment and development projects. Fourth, slow development. Slow development refers to the development state in which the active investment of enterprises is reduced, but there is still a positive growth rate of operating income. Although the growth rate of enterprise operating income is positive, the growth rate is declining year by year, the growth rate of operating income is declining, the competitive advantage of products and services of enterprises is declining, and the rate of return on continuous investment and operation of enterprises is not high.

3.2 Literature Review

3.2.1 Policy support, national strategic orientation

With the vigorous development of the digital economy, the digital transformation of enterprises has become the trend of the times. Many scholars believe that the core of realizing the digital transformation of enterprises is to grasp the digital upgrading of enterprise supply chain. The country pays great attention to the digital reform of the supply chain. The "14th 5" plan proposes to accelerate the digital transformation of the industry and promote the coordinated development of big data and the entire industry chain. With the rapid development of high technology, the digital transformation of China's manufacturing industry has become a key factor to promote the rapid development of China's manufacturing industry.

(1) The state vigorously promotes the development of the manufacturing industry in the direction of service, digitalization, intelligence and networking. Enhancing the country's core competitiveness is an important measure for China's

manufacturing industry to move towards high-end manufacturing. In 2015, the "Made in China 2015" issued by the State Council proposed to promote the deep integration of informatization and supply chain, and clarified the digitalization of traditional enterprises,The upgrading of information-based industrial structure is the correct direction of industrial development. After 2016, the "Digital China" policy has been intensively launched. In 2016, the State Council put forward the specific development goals of "Digital China" in the "13th Five-Year" National Informatization Plan. In 2017, the report of the 19th National Congress of the Communist Party of China formally put forward the strategic concept of building a "digital China. In 2018, the 19th National Congress of the Communist Party of China made a strategic plan for China and a smart society. In 2020, the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China will "accelerate digital development" and build a "digital China" into the plan, which marks that digital development has become a clear policy focus of the country.

(2) Supply chain as a key node in the value chain of enterprises, digital supply chain is its future development direction. With the supply chain digital transformation, enterprises will face new organizational forms and form new business models. In 2018, the central government put forward the concept of "new infrastructure" for the first time, making it clear that digitalization is the current transformation needs of Chinese enterprises, accelerating their development while improving the quality of Chinese manufacturing products. In the "Fourteenth 5" Plan announced by the state in 2021, the manufacturing digital transformation action and the industrial chain digital upgrade action are listed as one of the key projects, and it is clearly proposed to promote enterprises to build agile, efficient, safe and stable digital supply chain and Supply chain network.

3.2.2 Industry competition intensifies, enterprises face transformation pressure

With the increasing complexity of business scenarios and the changing business environment, enterprise supply chain management is facing unprecedented challenges. Traditional supply chain management lacks timeliness and

comprehensiveness in terms of demand forecasting, production scheduling, and risk identification. Once unforeseen unfavorable factors occur, it may lead to supply breaks and sales declines. These risks will also affect partners in the supply chain, causing the entire supply chain ecosystem to be affected or even collapse. This requires enterprises to control the supply chain information comprehensively and accurately, and make reasonable decisions through intelligent analysis and early warning, and make rapid response and adjustment. In the industrial and 4.0 environment, supply chain 4.0 is the future development trend, to promote the digital transformation of the supply chain is a breakthrough in the company's comprehensive digital transformation, which is conducive to reducing the company's costs in all aspects, improve the company's production utilization rate, bring greater profits to the company, so that the company in the market to gain a competitive advantage.

At the same time, the global economy is showing a new trend, gradually transforming from an "industrial economy" to a "service economy". The most obvious is that many manufacturing enterprises are gradually changing the industrial chain from manufacturing as the center to service as the center, in order to seek their own competitive advantage. In particular, world-class manufacturing enterprises have consolidated their position and enhanced their competitiveness through business transformation and service model innovation. This kind of enterprise to the original manufacturing as the center to the service as the center of the process is the manufacturing service. But at present, the service-oriented degree of China's manufacturing industry is far from being comparable to that of foreign advanced countries, especially in R & D and design services, system integration services, overall solutions and personalized customization services, there are obvious shortcomings. "Made in China 2025" pointed out that service-oriented manufacturing enterprises has become the future trend of development. The integrated development of manufacturing and service industries can significantly improve the supply quality of China's manufacturing industry, promote the transformation of China's industrial structure, and enhance China's international competitiveness. Digital development can

promote the service upgrading of Chinese enterprises by improving the independent innovation ability of enterprises and optimizing the allocation of human resources.

3.2.3 The development of digital technology brings new opportunities

Through digital reform, enterprises can stimulate their own scientific and technological innovation and improve the production efficiency of the whole supply chain, so as to surpass other competitors in the market and enhance their core competitiveness. With the development and application of digital technology, the digital transformation of supply chain takes data as the carrier, organically integrates digital technology with real business activities, and realizes the purpose of data-driven business change and promoting the rapid development of the company. Digital technology drives the digital transformation of the supply chain, deep processing of initial data into data assets, using data assets as leverage, amplifying the role of human, capital and other factors, giving birth to new business models. In-depth exploration and research of data will help enterprises to achieve deep cooperation with enterprises. In supply chain management, product supervision, supply, transportation and other aspects are very important. Only by ensuring that there are no errors in each link, the gears of the transaction can rotate smoothly. Therefore, the use of big data in all aspects of supply chain management, in-depth verification and analysis of these data, can provide a reliable basis for the company's strategic decision-making.

3.3 Research ideas and methods

3.3.1 Synergy Theory

The theory of synergistic effect originated in the 1960 s and was first proposed by German physicists. It was originally described as a 1 kind of physical phenomenon, that is, a variety of different physical and chemical components are deployed, and the effect produced will far exceed that achieved by a single component. This obvious synergistic effect was later called synergistic effect. The famous American strategic management scientist Igor Ansoff introduced the concept of synergy into the field of

enterprise management for the first time in his book "Corporate Strategy", providing a new perspective for enterprise strategic planning. With the rapid development of enterprises and the increasingly fierce market competition, the theory of synergy has gradually attracted wide attention of scholars. They have conducted in-depth research and supplementation on synergy from multiple perspectives, and have continuously enriched and improved these 1 theoretical systems. In the practice of enterprise management, the synergy effect is that the enterprise realizes the optimization of the overall effect through the rational allocation and effective use of the same resources in the procurement, production, transportation, storage, sales and other links or processes. According to the scope of synergy, it can be divided into external synergy and internal synergy. External synergy mainly refers to the enterprise in the upstream and downstream of the industrial chain with other enterprises or When cooperating with partners, through the sharing of information and resources, we can achieve complementary advantages and improve the overall operational efficiency, thus creating greater overall value than a single enterprise. Internal collaboration, on the other hand, focuses on the cooperation between various departments or teams within the enterprise, and improves the production efficiency and logistics operation level of the enterprise through the sharing and optimal allocation of internal resources, so as to maximize the overall interests of the enterprise. Whether external or internal synergy, synergy is the key to achieve sustainable development and competitive advantage. Through the effective use of synergy theory, enterprises can better integrate resources, improve operational efficiency, and then stand out in the fierce market competition.

In the process of digital transformation of the supply chain, if enterprises want to take advantage of the synergy effect, they need to carry out cross-border resource integration and optimize the allocation of all resources. Enterprises need to transform data into experienced and valuable information resources, analyze and mine the large amount of data generated in supply chain operation and supply chain management, share and apply the knowledge and experience contained therein, and create new value for enterprises.

In this case, the synergies generated by the digital transformation of the supply chain have played a significant role in the entire process from the procurement of raw materials to the transfer of ownership of the goods to the end user. Each link of the whole supply chain realizes the sharing and coordination of information resources through digital tools and platforms, thus creating a new value-added effect beyond the original value. In terms of internal synergy, enterprises have successfully promoted in-depth cooperation and information sharing among internal departments through the use of digital tools and platforms. This collaborative mechanism not only greatly improves work efficiency, but also realizes the benign interaction and mutual promotion between various businesses. The close cooperation of all links within the enterprise has laid a solid foundation for the optimization and upgrading of the overall supply chain. At the same time, external synergies cannot be ignored. Through close cooperation with suppliers, downstream customers and other external partners, enterprises jointly develop new products, new services and solutions, and realize the improvement of the overall technical level of the supply chain and the enhancement of product market competitiveness. This cross-enterprise collaboration not only strengthens the stability and resilience of the supply chain, but also brings more business opportunities and development space for enterprises.

3.3.2 Supply chain management theory

As early as 1982, Keith Oliver and Michael D. Webber put forward the concept of supply chain management in a forward-looking way. They keenly observed that in the procurement, production, sales and other links of the supply chain, different goals may lead to the collision of interests in each link. If this conflict of interest is not properly managed, it may affect the overall operational efficiency. The two pointed out that it is necessary to seek and implement scientific management methods to integrate and coordinate the supply chain as a whole. The emergence of this management model is the bud of supply chain management. After continuous practice and development, supply chain management has become an indispensable part of

modern enterprises, which helps to optimize the allocation of resources, reduce costs and improve operational efficiency.

At present, supply chain management has become the focus of academic and practical fields. Many scholars have studied the concept and theory of supply chain management from different angles. British scholar Christopher clearly pointed out that supply chain management is essentially the efficient coordination of all links in the supply chain, such as suppliers and customers, in order to reduce the production and operation costs of enterprises and improve the overall operational efficiency. The American Vocational Society of Supply Chain Management elaborated on this from another perspective. They believe that supply chain management involves every aspect of product production, Including procurement, transportation and other aspects of planning and management. More importantly, it promotes close collaboration between upstream suppliers and downstream customers, ensuring the overall smoothness and efficiency of the supply chain. In China, scholars have given a richer connotation to supply chain management in combination with local practices. They generally believe that with the help of computer networks and other modern scientific and technological means, it is possible to achieve comprehensive and detailed planning, organization, coordination and control of core elements such as business flow, logistics, and capital flow in the entire supply chain, thereby improving the response speed of the supply chain. And flexibility to enhance the market competitiveness of enterprises. In summary, although different scholars and institutions have their own interpretations of supply chain management, they all emphasize a common core, that is, to achieve cost reduction, efficiency improvement and enterprise value maximization by coordinating and optimizing all links and processes in the supply chain.

With the continuous evolution and development of the supply chain, the complexity of its management has become increasingly prominent, and the traditional supply chain management model has been difficult to meet the needs of enterprises to continue to grow. In the traditional supply chain model, upstream and downstream enterprises often carry out related activities according to their own standards and

methods, resulting in poor information flow among enterprises, which aggravates the cost burden of the supply chain and reduces the risk response capacity. Therefore, this traditional way of supply chain management has been unable to adapt to the development trend of modern supply chain. In order to break this 1 deadlock, digital supply chain came into being. It takes data as a bridge, effectively links various departments within the enterprise, eliminates the information gap between the upstream and downstream of the supply chain, and breaks the limitation of "data island. Through the implementation of digital supply chain, enterprises can grasp the operation of the supply chain more efficiently and accurately, find and solve the existing problems in time, and then improve the overall efficiency and stability of the supply chain. Therefore, facing the challenges and opportunities of supply chain management, the traditional supply chain management model needs to be innovated, and the digital supply chain has undoubtedly become an important engine to promote the sustainable development of enterprises.

In this case, Lenovo Group accurately grasped the core of supply chain management, relying on advanced communication technology to fully empower all aspects of the supply chain. These 1 measures not only promote the scale, standardization and modularization of data resources, but also maximize the release of the value of data resources, and further promote the development of supply chain operations in the direction of specialization, collaboration and transparency. Through such optimization and upgrading, Lenovo Group has successfully improved the flexibility and efficiency of supply chain resource allocation, making the supply chain more flexible to respond to market changes, while significantly reducing the total cost of the supply chain. This series of measures fully demonstrated Lenovo's deep strength and excellent vision in supply chain management, and gave full play to the potential of supply chain management.

3.3.3 Value Chain Theory

Value chain theory, which 1 business strategy theory put forward by strategic master Porter in the 1980 s, explains the close relationship between the internal and

external environment of enterprises and business activities. The theory views a company's business processes as a series of processes that give value to products, from the purchase of raw materials to the sale of products to the transfer of ownership to the end consumer, which are considered value chain activities. In the value chain, the internal activities of the enterprise are carefully divided into two categories. The first is the main activities, including procurement, production, sales, marketing and service and other core links, these activities are a key part of the day-to-day operations of enterprises, directly related to the creation of products and the realization of value. The support activities include technology research and development, human resources management, procurement management and infrastructure construction, although these activities are not directly related to The production of products, but for the smooth progress of the main activities of enterprises to provide a strong support and guarantee. The external activities of the enterprise are equally important. It needs to cooperate closely with upstream and downstream customers to carry out value creation activities. This cross-border cooperation helps the enterprise to expand its market influence, enhance the competitiveness of its products and achieve higher value creation. The internal and external behavior of the enterprise together constitute the value chain of the enterprise, in which the internal value chain focuses on the optimization and integration of the internal activities of the enterprise, while the external value chain focuses on the interaction and cooperation between the enterprise and the external environment. The two complement each other and jointly promote the value creation and sustainable development of enterprises.

The core point of value chain theory is that enterprises can create higher added value by optimizing and integrating internal activities, thus enhancing the competitiveness of enterprises. In this 1 framework, the main activity plays the role of directly supporting the production of products or services, while the support activity provides the necessary resources and backing for the main activity, and the two are interdependent and work together. Putting the value chain theory into practice, enterprises can deeply analyze and optimize all aspects of the value chain, so as to comprehensively enhance the comprehensive competitiveness of enterprises. These

external activities essentially extend the enterprise's management of value transfer and creation activities vertically, extending forward to suppliers and backward to consumers, forming a more complete value creation chain. Only when the internal activities and external activities work together can the enterprise realize the maximization of value and really play the practical value of value chain theory. Therefore, when applying the value chain theory, enterprises should fully consider the optimization and integration of internal and external activities, and realize the sustainable development and value maximization of enterprises by continuously improving the efficiency and efficiency of each link.

Digital supply chain system is the integration of internal and external resources, through digital technology, customer demand as the center, to improve customer satisfaction and the core competitiveness of enterprises as the goal, with the value chain as the link, the procurement, production, sales, logistics and other whole management system. Realize the digital control of the whole process of supply chain operation, realize data sharing and real-time monitoring of the whole process of supply chain by breaking through the information barriers of information flow, logistics and capital flow, enhance the internal coordination ability and supply chain coordination ability of enterprises, and improve the efficiency of enterprise supply chain system. At the same time, the establishment of a digital supply chain system can optimize the supply of enterprise products and services, promote the digital transformation and upgrading of manufacturing and sales networks, and provide new momentum for enterprise development.

In this case, Lenovo implemented a series of innovative strategic initiatives to improve internal operational efficiency and overall competitiveness. First of all, Lenovo Group has carried out in-depth optimization and integration of internal activities, breaking the phenomenon of "data islands" among various departments, and realizing the unified management of various business data. This 1 process not only improves the ability to integrate data resources, but also transforms data resources into data assets with great commercial value through effective data governance. Subsequently, Lenovo Group uses machine learning and advanced algorithms to

conduct in-depth analysis of data assets, providing intelligent decision support for enterprises. Through the application of these technologies, enterprises can more accurately grasp the market dynamics and customer needs, and formulate more accurate market strategies, thereby significantly improving operational efficiency. In order to further expand its business map, Lenovo Group is also actively building a supply chain ecological platform to connect data with the upstream and downstream of the supply chain. This connection not only deepens the cooperative relationship between enterprises, suppliers and distributors, but also forms a close supply chain ecosystem. When suppliers and distributors gain an advantage in the market competition, they can provide Lenovo Group with better service and more competitive prices, which undoubtedly further promotes Lenovo Group as a core manufacturing enterprise competitiveness of the industry. To sum up, Lenovo Group has successfully improved its operational efficiency and market competitiveness by optimizing its internal activities, integrating data resources, using advanced technology and building a supply chain ecosystem, laying a solid foundation for its long-term development.

CONCLUSIONS

(1) Based on the previous analysis, the following conclusions are drawn from the case study of Lenovo Group's supply chain digital transformation:

The traditional manufacturing industry often faces multiple challenges in the process of promoting the digital transformation of the supply chain. Among them, the most significant difficulties include: first, the limited ability to process multi-source heterogeneous data in the supply chain, which makes it impossible for enterprises to fully integrate and utilize complex data resources; second, the lack of extensive accessibility of supply chain data leads to the inability to achieve end-to-end transparent management, which affects the accuracy of decision-making; third, the low utilization rate of a large amount of data generated in supply chain operations, failing to turn this data into valuable business insights. In order to overcome these difficulties, Lenovo Group has taken a series of measures to improve its data governance capabilities and promote the digital transformation of the supply chain.

First of all, through the establishment of a unified basic database and data center, Lenovo Group has successfully realized the unification and interconnection of the internal business data system of the whole group. These 1 measures not only improve the efficiency of data storage and management, but also ensure the quality of data, so that rich data resources can be transformed into valuable data assets, thus significantly enhancing data processing capacity. Secondly, Lenovo Group focuses on building an intelligent control tower of the supply chain, enabling all aspects of the supply chain through the use of intelligent decision-making technology. These 1 innovative practices enable the supply chain to achieve end-to-end visual management, greatly improving management efficiency and decision-making accuracy. Through the application of machine learning and various advanced algorithms, Lenovo Group has further released the value of data assets and significantly improved the data analysis capabilities of enterprises. Finally, in order to further optimize the allocation of resources, Lenovo Group actively build a supply chain ecosystem platform. This platform effectively promotes the formation of a close

community of interests inside and outside the enterprise, breaks the barriers between various links, and eliminates the phenomenon of information islands. Through the operation of the ecosystem platform, the internal and external resources of the enterprise can be better optimized, and the data collaboration ability has been significantly improved, thus promoting the full realization of the digital transformation of the supply chain.

As the key link between supply and demand, the significance of supply chain digital transformation is to meet customer needs more accurately and efficiently. In the face of the changing market, digital transformation has become the only way to continuously optimize the supply chain and improve service capabilities. Especially in enterprises like Lenovo Group, the digital transformation of the supply chain not only promotes the deep integration of service and manufacturing, but also the key to continuous innovation and competitiveness. In the process of promoting the digital transformation of the supply chain, Lenovo Group has always adhered to the customer-centric principle and is committed to creating a more humane and intelligent service system. Whether it is product design, organizational structure construction, or service model innovation, are closely around customer needs. This customer-oriented transformation strategy makes Lenovo's supply chain system closer to the market and more accurately capture the needs of consumers. To better predict and meet customer needs, Lenovo sets. The group also makes full use of customer data, with the help of intelligent analysis technology, to build a digital supply chain center. This center can not only provide collaborative support for all aspects of the enterprise supply chain, but also realize real-time data sharing and integration, and provide strong support for accurate decision-making. In this way, Lenovo Group not only improves the response speed of the supply chain, but also greatly improves the pertinence and satisfaction of the service. In summary, the digital transformation of the supply chain is an important driving force for the integration of Lenovo's services and manufacturing. The customer-centric, data-driven, intelligent and collaborative supply chain system enables Lenovo Group to better grasp the pulse of the market and provide customers with more high-quality and personalized services.

Lenovo's global supply chain network is complex, involving multiple links and regions, and its management is particularly difficult. In the wave of digital transformation, Lenovo Group actively uses advanced digital technology to bring significant efficiency improvement to supply chain management. Among them, the supply chain intelligent control tower plays an important role in supply chain management with its efficient data integration and analysis capabilities. It is like an intelligent brain, always monitoring every link in the supply chain to ensure the rational allocation of resources and efficient operation. Through the intelligent control tower, Lenovo Group has realized the optimization of internal coordination and improved the overall management efficiency of the enterprise. In addition, Lenovo Group has achieved real-time monitoring and fine management of the whole process of the supply chain with the help of technical means such as intelligent logistics, intelligent warehousing, intelligent customized planning and scheduling solutions. These intelligent systems not only help Lenovo Group better grasp the real-time dynamics of the supply chain, but also provide strong support for supply chain management driven by data, and further improve management efficiency. Finally, through the empowerment of all aspects of the supply chain through intelligent decision-making, Lenovo Group's production efficiency, operational efficiency and management efficiency have been significantly improved. At the same time, logistics costs, procurement costs, storage costs and other operating costs have also been effectively reduced, thus bringing better financial performance for enterprises. In summary, digital transformation has brought significant changes to Lenovo's supply chain management. Through the use of advanced digital technology and intelligent management tools, Lenovo Group not only improves the efficiency of supply chain management, but also brings more stable and sustainable development for the enterprise.

In the process of promoting intelligent manufacturing, Lenovo Group deeply applies digital technology to cope with the complex and changeable operating environment and ensure efficient and stable operation. In addition, Lenovo also actively implement the concept of "endogenous externalization", relying on its own

successful practice, to provide professional services and support for external customers. In this process, the new business and the original business to form a good synergy, a strong impetus to the continued growth of the original business. With the acceleration of the intelligent transformation of enterprises, the demand for infrastructure is becoming more and more vigorous. These 1 changes not only led to the growth of traditional servers, storage and network equipment, but also gave birth to the vigorous development of new edge computing, cloud computing and other technologies. Lenovo Group keenly captures these 1 trends and provides one-stop services for small and medium-sized enterprises with intelligent equipment, intelligent infrastructure and intelligent solutions through the layout of the full-stack intelligent trinity. Among them, the IDC business, ISG business and SSG business work together to form a strong synergy, to achieve the "1+1>2" efficiency, a strong impetus to the industrial intelligent manufacturing transformation process. On the road of digital transformation, Lenovo Group continues to summarize its own experience and combine it with its own strong service capabilities to export valuable knowledge and experience to other manufacturing companies. In this 1 process, Lenovo has gradually changed from an "enabler" to an "enabler" in the era of big data, actively helping other enterprises on the road of digital transformation. It is mentioned that the digital transformation of the supply chain has brought Lenovo Group a broader business development space. With the continuous expansion of business scope, Lenovo Group has been able to open up new profit growth points, which has laid a solid foundation for the improvement of corporate financial performance.

Under the wave of digital transformation, supply chain management is undergoing profound changes. This transformation aims to deepen the connection between enterprises and upstream and downstream, and jointly build a dynamic supply chain ecosystem. As the basis of this 1 ecosystem, digital ecology can effectively integrate multi-party resources and further enhance the competitiveness of enterprises. This transformation is not only the update of technology, but also the optimization of management system and the innovation of collaborative mechanism. By planning the digitalization of the whole process of the supply chain system, an

intelligent, interconnected, efficient and convenient supply chain management platform is built. This platform can realize data exchange and information sharing, and ensure that every link of the supply chain is visible, controllable and adjustable. In the supply chain ecosystem, all parties deeply exchange and share technologies, processes and excellent resources, which makes the whole supply chain system more stable and efficient. This integration and sharing not only strengthens the cooperation between each other, but also enhances the competitiveness of the entire industry to some extent. The development of intelligence provides a strong impetus for the digital transformation of the supply chain. Through the deep excavation of the original data base, the "3 flow integration" of information flow, logistics and capital flow is realized ". This integration not only promotes the intelligent connectivity of the supply chain in product development, production and market services, but also forms a positive synergy effect and enhances the transparency of information between each other. In this context, the cooperation between enterprises is closer, promote and supervise each other, so as to ensure the quality of products. This not only enhances the brand value and brand influence, but also enhances the competitiveness of the enterprise's products. Therefore, it can be said that the digital transformation of the supply chain is a key link to enhance the comprehensive strength of enterprises, and it is also an important force to promote the sustainable development of the industry.

(2) Emphasis on the development and storage of new generation technologies

Supply chain digital transformation is the deep integration of digital technology and supply chain model, with a comprehensive digital foundation, through the introduction of digital technology, the supply chain upstream and downstream links of the business management logic for a thorough reconstruction. This 1 process aims to get through the information flow, capital flow and logistics in the supply chain, to achieve the goal of "3 flow integration", and then to realize the visualization and digitization of the supply chain. Digital transformation is not only a long-term process, but also a process of gradual expansion from within the enterprise. In this process, enterprises first need to realize the internal links of information flow, capital flow and

logistics interoperability, to break the barriers between internal links and fragmented state. Subsequently, enterprises need to further open up the information flow, logistics and capital flow with upstream and downstream enterprises to form a closer and more efficient cooperative relationship. The application of digital technology in the supply chain production system and industrial chain can significantly improve the transparency of information, improve the accuracy of services, and then improve the overall operational efficiency. By establishing a mutual trust and interconnection mechanism between enterprises, the agility and adaptability of the system can be improved, and it can provide strong support for the innovation of digital supply chain management. Therefore, enterprises should attach great importance The development and stockpiling of next-generation technologies to drive the digital transformation of the supply chain. This not only helps to improve the competitiveness of enterprises and the ability to respond to market changes, but also brings broader development space and richer business opportunities for enterprises. By continuously promoting the digital transformation of the supply chain, enterprises can be in an invincible position in the fierce market competition to achieve sustainable development.

In the current economic environment, the cooperation between core enterprises and upstream and downstream enterprises is increasingly close, and the competition between enterprises has evolved into a comprehensive contest between supply chain and supply chain. In this situation, no company can complete the digital upgrade of the supply chain system on its own and gain a competitive advantage in the market. As a core company in the supply chain, in order to promote digital transformation and achieve success, it must establish in-depth partnerships with other companies in the chain and jointly build strategic alliances. Realize the complementary advantages of all resources, enhance the overall anti-risk ability, and win-win cooperation, so as to continuously consolidate and expand competitive advantages. In the process of digital transformation of the supply chain, in addition to focusing on the collaboration between various departments and business links within the enterprise, it is equally important to strengthen the collaboration between all stakeholders in the supply chain. Through the use of digital technology, the sharing of multi-party information

resources is realized, and the interests of all parties are closely linked, so as to maximize the overall interests and give full play to the potential value of the digital transformation of the supply chain. To further 1 this process, companies need to build supply chain ecosystems that share information and data. In this 1 ecosystem, we should actively seek and expand ecological partners, deeply explore the cooperation space of both sides, create common value through joint efforts, and finally realize the comprehensive digital upgrading of the supply chain and win the initiative of market competition.

In different links of the supply chain, each enterprise should tailor its own specific path of digital transformation of the supply chain according to its own actual situation. As the core, the main chain enterprise needs to play its leading and guiding role to promote the digital transformation of the entire supply chain. Taking Lenovo Group as an example, its active role in the digital transformation of the supply chain, the senior management of Lenovo Group attaches great importance to the overall digital strategy construction of the enterprise, and provides firm support at the strategic level. As a core enterprise in the supply chain, Lenovo Group not only actively implements its own transformation, but also effectively connects various node enterprises by building an industrial Internet platform to form a close cooperative relationship. In the process of transformation, Lenovo Group actively played a role in helping, giving strong support to partners in terms of technology, capital and other aspects. This support is not limited to its own layout, but also extends to key cooperative customers to assist them in digital upgrading in key links of the supply chain. The implementation of these strategies has achieved remarkable results in reducing inventory costs, improving operational efficiency, and ensuring product quality. Therefore, for the core enterprises in the supply chain, its radiation driving role is very important. In-out, we should not only pay attention to our own digital transformation, but also lead and drive the digital transformation of the whole supply chain, and promote the development of the whole supply chain to a more intelligent, efficient and collaborative direction.

As a supplier in the supply chain, companies should actively use their own scale advantages and resources to keenly capture the business opportunities contained in the digital transformation of customer companies. In view of the problems such as the low inventory management ability caused by the delay of information transmission and the opaque information environment, enterprises should deepen the reform and continuously improve the resilience of the supply chain in order to better respond to the problems.

At the same time, supplier companies need a deep insight into the changes in the demand structure of customers due to digital transformation, and accordingly form resource allocation decisions and corporate strategies that are different from other companies in the industry. On the basis of maintaining long-term and stable cooperative relations with customer enterprises, we should improve the flexibility and adaptability of production and realize the deep integration of intelligent production and supply chain management. This will not only enhance the market competitiveness of enterprises, but also achieve the optimization and upgrading of the supply structure. In short, supplier companies need to keep up with the pace of digital transformation, constantly innovate and improve their own operating models and management systems to adapt to the changing market environment and achieve sustainable development.

In the process of digital transformation of the supply chain, small and medium-sized enterprises often rely on the drive of the main chain enterprises. Enterprises with insufficient funds and resources can choose to cooperate with leading enterprises and use their platforms to complete the digital transformation. By cooperating with platform enterprises, using their digital resources, reconstructing business processes and management models, realizing online operation transformation and accumulating transformation experience. Then, combine the learning experience with the business for productization, cooperate with the chain main enterprise or other platform enterprises, promote the visualization of customer and product elements, and develop new products and services. Finally, enterprises cooperate with platform enterprises to promote the visualization of network and capability elements, establish sub-platforms

of independent capabilities, and cooperate with multiple platform enterprises to reshape the industrial structure and realize the digital transformation of the supply chain.

Enterprises should pay attention to the important role of digital development in promoting the transformation of service business. First of all, enterprises need to accelerate the innovation and application of digital technology, and constantly release the transformation and upgrading potential of digital technology. Secondly, enterprises should strengthen the construction of intelligent factories, apply artificial intelligence technology to the whole production process, and expand value-added services based on intelligent production, so as to expand the scope of service business. At the same time, enterprises should also collect the data generated throughout the production process, form unique data resources, form data assets through data governance, and stimulate the innovation vitality of the service business through data sharing and reuse. Furthermore, enterprises should form Internet business thinking. In the "Internet +" era, enterprises should fully integrate into the Internet, use Internet thinking to reconstruct the enterprise value chain and business form, improve business insight, constantly innovate business models and services, and provide personalized and customized services for customers. Finally, enterprises need to improve the construction of information infrastructure. In the digital age, enterprises need to connect and connect the subsystems of various business processes, establish an efficient information sharing platform, avoid the phenomenon of "information islands", and improve the efficiency of service innovation.

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