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Analysis of the Impact of Digital Transformation on Non-Financial Performance of Manufacturing Enterprises

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Abstract: As one of the important pillars of China's national economy, the development of the manufacturing industry has attracted much attention. The manufacturing industry has become a key development area due to its high technology content, capital-intensive, knowledge-intensive, and many more characteristics. With the rapid development of big data information technology, emerging technologies such as artificial intelligence have brought a lot of convenience to people's lives, and manufacturing enterprises have also realized the importance of reform and innovation, and have begun to carry out digital transformation. Based on the study of the motivation of digital transformation of manufacturing enterprises, this paper explores the transformation path of manufacturing enterprises to meet the needs of social development, and deeply analyzes the impact of digital transformation of manufacturing enterprises on enterprise performance, with a view to improving the unbalanced industrial structure and lagging technological development at the present stage through digital transformation.

Keywords: Manufacturing enterprises; Digital transformation; Non-financial performance

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1. Introduction

The manufacturing industry refers to the industry that provides industrial and consumer products for the simple production and expanded reproduction of various sectors of the national economy. The manufacturing industry is the main body of the national economy and plays a vital role in the country's economic development. With the advancement of national scientific and technological strength and the digital economy, enterprises have begun to focus on digital transformation, reform, and innovation of the original production mode. Digital transformation means that traditional enterprises, based on digital upgrading, touch the company's core business, innovate business models and value creation models, break through layers of barriers in operation and management, adjust production and operation models, promote organizational change, and stimulate innovation in marketing channels, forming a digital and intelligent new enterprise supported by digital technology to achieve healthy and sustainable development.

Digital transformation includes the application of digital technology in various aspects such as improving the level of digital cognition, formulating digital transformation strategies, constructing the framework of enterprise digitalization, internal research and development design, intelligent production and manufacturing, operation management, and reconstructing digital customer service. Therefore, digital transformation is a systematic change involving enterprise strategy, business, processes, organization, and talent. Regarding the impact of digital transformation on enterprise performance, there are two main viewpoints in the academic circle. One view is that digital transformation will not have a beneficial impact on enterprise performance, while the other view is that digital transformation has a positive effect on enterprise performance. This paper believes that digital transformation has a positive impact on enterprise performance. Based on research on the motivation for digital transformation in manufacturing enterprises, this paper explores the transformation path of manufacturing enterprises to meet the needs of social development and deeply analyzes the positive role of digital transformation on enterprise performance [1].

2. Motivation of digital transformation of manufacturing enterprises

2.1. Comply with the needs of social development and actively promote digital industrialization and industrial digitalization

Digital transformation is the development trend of today's society, and it is also a hot topic at this stage. Digital development is the basic work of building a modern socialist country while relevant departments should promote digital industrialization and industrial digitalization. Therefore, digital transformation is one of the key objectives of current development. The promotion of digital transformation is also inseparable from the support of relevant regulations and policies. The policies on digital transformation are constantly deepened, and it is proposed to accelerate the cultivation of the data element market, promote the open sharing of government data, enhance the value of social data resources, strengthen the integration of data resources, optimize and upgrade digital infrastructure, and continuously improve the digitalization level of public services. Improve the digital economy governance system and strengthen the digital economy security system. In this context, manufacturing enterprises seize the policy situation, carry out digital transformation, and actively respond to the strategic needs of vigorously developing the digital economy [2].

2.2. Follow the development trend of the industry and actively promote digital technology

Manufacturing enterprises have been following the development policy of "adhering to independent innovation, developing circular economy, and building green factories." The tendency and support of the state for the development of manufacturing enterprises also provide a guarantee for the digital transformation of enterprises in the manufacturing industry. Since entering the 21st century, the economic environment locally and internationally has become increasingly severe, resulting in a slowdown in the growth of manufacturing enterprises. The state has intensified its efforts to adjust and optimize the manufacturing industry, gradually guided by high-pollution and energy-consuming industries to high-tech and low-carbon directions, and eliminated backward production capacity. Simultaneously, manufacturing enterprises comply with the development trend of the industry, gradually begin to carry out digital reform, actively reform and upgrade, and put forward and promote the intelligent manufacturing service concept of the "trinity" of digital technology and physical business integration of process intelligence, product intelligence, and service intelligence. Manufacturing enterprises increase scientific and technological innovation, promote the innovation-driven transformation of the manufacturing industry to the direction of intelligent, green, and service-oriented upgrading, and realize intelligent manufacturing [3].

3. Implementation path of digital transformation of manufacturing enterprises

3.1. Digitization of product life cycle management

Through digital technology, manufacturing enterprises can realize the whole life cycle management of products. The establishment of a product life cycle management system can assist enterprises to comprehensively track and manage the design, manufacturing, commissioning, use, maintenance, and other links of the product, and improve the quality and reliability of the product. By introducing advanced digital technology, manufacturing enterprises comprehensively upgrade product design, manufacturing, debugging, and other links, and finally successfully achieve high-end, intelligent, and green products.

In the product development stage, the enterprise establishes an efficient digital Research and Development (R&D) platform for product design and adopts digital modeling technology to improve product development efficiency, reduce R&D costs, shorten product cycles, and improve product quality and performance. Concurrently, designers can also carry out personalized customized designs according to the different needs of users to improve customer satisfaction.

In the product production stage, manufacturing enterprises take digitalization as the core, introduce digital production line technology and combine information technology, intelligent manufacturing technology, and industrial automation technology to achieve intelligent, efficient, and sustainable production lines. It mainly includes the following three aspects: First, the digitalization of the production process and production management. Through the production process of digital modeling and simulation, while using advanced production management software and information tools, to achieve the optimization of the production process and production management process digitalization. Second, the digitization of quality inspection. Adopt digital inspection equipment and management systems to realize the detection and traceability of product quality. Third, equipment digitization. Through the use of advanced digital equipment such as Computer Numerical Control (CNC) machine tools and robots, information sharing and collaborative work between equipment are realized to improve production efficiency and quality [4].

In the product testing stage, manufacturing enterprises adopt digital debugging technology to realize the intelligent debugging of products. Ensure product quality and performance through digital debugging technology, adjust the product performance, and achieve the best performance under the premise of ensuring product reliability [5].

3.2. Digitalization of the whole process of product production

Manufacturing enterprises have independently developed manufacturing execution systems to achieve sustainable development of enterprises and improve the efficiency and quality of their production processes. The system takes the production process data as the core and realizes the upgrade and transformation of digital manufacturing through the comprehensive control of the production process. In terms of energy consumption, the manufacturing execution system further optimizes energy management and usage by monitoring equipment operation data. In terms of product quality, manufacturing execution systems can optimize production processes and resource allocation, comprehensively monitor and manage quality data in the production process, and reduce product returns and maintenance costs. In terms of production efficiency, the manufacturing execution system monitors production progress and quality problems in real-time, adjusts the problems found in time, and reduces the waste of invalid hours and production. In terms of corporate decision-making, the manufacturing execution system provides accurate data support for decision-makers through the analysis and management of production process and market trend data, reduces decision-making errors, and reduces enterprise costs [6].

The principle of a manufacturing execution system can be summarized in the following five steps. First is job-driven, converting the production plan into specific production tasks and assigning them to each production

unit. Operations can be customized and further adjusted according to customer needs, production plans inventory status, etc., to ensure the accuracy and feasibility of production plans [7]. Second is manufacturing execution system monitors production progress and equipment status through communication with production equipment and data collection. The system can automatically record and adjust equipment operation data to provide real-time data support for production management. Third is the manufacturing execution system through the data analysis and management of the production process, promptly finding the problems in the production process, putting forward optimization suggestions and improvement measures, and predicting and analyzing the production data and market trends to provide support for enterprise decision-making. Fourth is the manufacturing execution system collects, analyzes, and processes the quality data in the production process to ensure that the product quality meets the requirements. The system can timely discover and solve quality problems according to the quality data, prevent batch problems and product returns, and improve customer satisfaction. Fifth is the manufacturing execution system for raw materials, semi-finished products, and finished products inventory management, to ensure the accuracy and timeliness of inventory data, the system can automatically record inventory and warehouse data, inventory warning and prompt, improve the continuity and stability of production [8].

4. The impact of digital transformation of manufacturing enterprises on their non-financial performance

4.1. Social responsibility and sustainable development

Manufacturing companies understand the importance of environmental protection, so after digital transformation, companies are committed to reducing the negative impact on the environment and actively promoting the concept of sustainable development. There is no doubt that sustainable development is not only the key to the long-term stability of enterprises but also the embodiment of corporate social responsibility [9]. Therefore, manufacturing enterprises will apply sustainable development throughout all areas and all links of the enterprise, improve employees' environmental awareness and responsibility, and through cooperation with government departments and industry associations, promote the process of green development and a low-carbon economy. Enterprises are committed to achieving harmony and unity of economic, social, and environmental benefits. In the process of product design and production, enterprises focus on the use of energy-efficient technology and equipment to reduce energy consumption and pollutant emissions in the production process. The application of these technologies and equipment not only improves the efficiency of energy utilization but also makes a certain contribution to environmental protection [10].

4.2. R&D investment and enterprise innovation

R&D capability refers to the ability of enterprises to research and develop new projects and products in the field of technology, which is the vitality of enterprises and products. Strong R&D capabilities can attract and retain outstanding talents, improve products and services, stimulate the sustainable development of enterprises, help enterprises maintain competitiveness, and constantly improve products and technologies to meet market demand [11]. R&D investment can more intuitively reflect the changes in the core competitiveness of manufacturing enterprises after digital transformation. According to the change in the total amount and the proportion of R&D investment in enterprise operating income after digital transformation, it can be seen that R&D investment in the manufacturing industry is basically on the rise after digital transformation. Enterprises have invested more funds and resources in research and development and paid more attention to scientific and technological innovation and product research and development [12].

4.3. Internationalization strategy and transnational cooperation development

With the development of global economic integration, the competition in the manufacturing industry is becoming increasingly fierce. To improve the core competitiveness of enterprises, after digital transformation, enterprises actively promote internationalization strategy, expand overseas markets, and continuously improve their technical level and market competitiveness through cooperation and technical exchanges with internationally renowned enterprises to promote technological progress and industrial upgrading. Additionally, after the digital transformation, many manufacturing enterprises cooperate with foreign companies to achieve industrial internationalization, demonstrate the company's advanced technology and products, strengthen exchanges with international enterprises, provide technical support and services for digital innovation for many international enterprises, improve the layout of the whole industrial chain of enterprises, integrate international resources, and create distributed energy technology and equipment innovation centers. It is committed to the research and breakthrough of common key technologies to achieve the industrial development of energy-efficient use of technology and equipment [13].

4.4. Product upgrade and customer satisfaction

Customer satisfaction is an important index to measure the quality of enterprise products and services, which refers to the customer's satisfaction with the quality, performance, function, and other aspects of the purchased products and services [14]. For manufacturing enterprises, customer satisfaction is an important factor in measuring their market competitiveness, brand value, and enterprise development potential. After the digital transformation, the products and services of the enterprise have been upgraded, and the enterprise has been improved in terms of sales volume and industry status and has taken several measures in terms of after-sales service and customer relationship, classifying customer problems according to their urgency, scope of influence and difficulty of solving, to ensure that customer problems can be efficiently paid attention to and solved and maximize customer satisfaction [15].

5. Conclusion

To sum up, after digital transformation, manufacturing enterprises have made remarkable progress in product design and development, production and manufacturing, customer service and marketing, and organization and management. These advances not only enable enterprises to make breakthroughs in innovation potential and gain a more advantageous position in market competition but also provide customers with better product and service experience. Moreover, after the implementation of digital transformation, the number of R&D personnel in enterprises has increased significantly, indicating that enterprises pay more attention to technological innovation. To improve the innovation ability of enterprises, they have a stronger technical team, equipped with more R&D talents to launch more innovative products and services, and the overall quality and competitiveness of enterprises have been improved. Employees' environmental awareness and sense of responsibility are constantly increasing, which provides certain technical support for the digital transformation of enterprises.

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Disclosure statement

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