

Research on the digital transformation of manufacturing industry under the background of digital economy

Yunyun Ni, Xiang Yu, Qi Xu

Qingdao City University, Qingdao 266100, China

Abstract: Under the current background of digital economy, strengthening digital construction has become the internal driving force for the development of many industries. In order to adapt to the development of The Times, the manufacturing industry needs to seize the opportunity to explore a new development path, so as to promote industrial development and obtain more economic benefits. However, while the digital economy brings development opportunities to the manufacturing industry, it also faces challenges in terms of capacity and investment. Relevant enterprises need to base themselves on reality, focus on the development of science and technology, promote the application of digital technology, pay attention to the construction of new digital infrastructure, and provide effective guarantees in terms of technology, talent and resources.

Key words: Digital economy; Manufacturing industry; Digital transformation

I. Development status of digital transformation of manufacturing industry under the background of digital economy

“China Manufacturing Digital Innovation Report (2023)” shows that at present, many small and medium-sized enterprises in China’s manufacturing industry have invested less in digital transformation, only 45.31% of enterprises have begun to try digital transformation, in this part of enterprises, more than 40% of enterprises have not achieved full coverage of automation equipment, The investment of most enterprises in digital transformation only accounts for less than 5% of total revenue of enterprises. Thus, in the context of the rapid development of the current digital economy, China still needs to strengthen the digital transformation of the manufacturing industry, with new technologies to drive the output and development of the industry, and then boost the progress of the overall economy of China.

II. Opportunities and challenges for the digital transformation of manufacturing industry under the background of digital economy

1. Opportunities

In general, the digital economy is a new economic development model guided and supported by the state. In order to effectively achieve the set development goals, the digital economy needs to be effectively integrated with the real economy, reduce costs and increase efficiency through the large-scale use of digital technologies, and optimize the traditional production chain. In the new era, the manufacturing industry is a key component of China’s economy, while the development of the digital economy and the implementation of relevant strategic measures provide strong support for the digital transformation and improvement of the manufacturing industry.

At this stage, China insists on implementing the concept of digital and information development, further deepening the reform of technology, and significantly improving the effectiveness of industrial development. It is not difficult to see that China’s manufacturing industry has to a large extent the basic support conditions for digital transformation. The support of digital economy strategic decision-making, the gradual maturity of digital technology, and the deep integration and application of a new generation of general technologies will create good development opportunities for the digital transformation and upgrading of the manufacturing industry.

In addition, for the digital transformation of the manufacturing industry, the whole process may be full of challenges and difficulties, but China’s understanding and research in this area is gradually professionalizing, and beginning to find the key points of success. At the strategic level, the deep integration of digitalization and business transformation is realized, and the transformation path and planning are constantly adjusted from the perspective of production practicalities. In terms of specific implementation, the digital transformation of the manufacturing industry requires enterprises to have comprehensive digital capabilities, including data collection, processing and analysis capabilities, as well as the application of advanced digital technologies for production, management and marketing. At the same time, enterprises need to actively explore and practice the path and mode of digital transformation, constantly optimize business processes, improve production efficiency and product quality.

2. Challenges

(1) Lack of targeted theoretical guidance

In the evolution of manufacturing economy, China is mainly based on the traditional manufacturing industry, and small and medium-sized private enterprises occupy a large proportion. Deep-rooted traditional development thinking controls the industrial chain of the manufacturing industry. Managers lack a perfect and profound understanding of digitalization, so they do not have a perfect and scientific methodology support in the whole process of transformation, and there are greater risks in the transformation behavior. In the process of the evolution of China’s manufacturing economy, the traditional manufacturing industry has always occupied a dominant position, of which small and medium-sized private enterprises occupy a large proportion. These enterprises are deeply affected by the traditional development thinking, which leads to the corresponding constraints on their manufacturing industry chain. Managers lack a complete and profound

understanding of digital transformation, so in the whole transformation process, they can not get perfect and scientific methodology support, resulting in greater risks in the transformation behavior.

(2) Lack of necessary supporting power

At present, the investment in digital transformation of China's manufacturing industry is insufficient, the lack of sufficient production ratio, the level of economic development and the scientific and technological investment of enterprises and the government are obviously unequal, and there is a big gap with the expectation. In addition, the digital development of the industry needs a large number of talents, and the digital transformation of the manufacturing industry in particular lack of talents, supply and demand imbalance, promote the development of digital transformation needs can not be met. On the one hand, the supply of digital technology is insufficient, and the manufacturing industry needs a lot of technical support in the process of digital transformation, including artificial intelligence, big data analysis, etc., and the supply of these technologies often cannot keep up with the development of demand. On the other hand, the digital transformation will lead to the increase of costs, because the need to invest a lot of money for equipment update, technology research and development, which will undoubtedly increase the operating costs of enterprises, reduce the profit margin of enterprises.

(3) The strength of digital transformation is weak

It is mainly reflected in the following points: First, the digital transformation of manufacturing-related enterprises lacks core technical support. Secondly, the internal organization management and innovation ability need to be improved. Finally, the phenomenon of data silos is still prominent, and there are major obstacles to the acquisition and sharing of data inside and outside enterprises.

III. Countermeasures for the digital transformation of manufacturing industry in the context of digital economy

1. Focusing on high-tech enterprises to empower the digital transformation of manufacturing

In fact, from the external environment, the digital economy has obvious complexity and variability. In the face of the new situation, in order to fully implement the digital transformation work, relevant enterprises should fully grasp the market dynamics and change information, and effectively improve the "resilience" of the industry, and the realization of this goal requires new and innovative technologies to empower the development of manufacturing enterprises. Objectively speaking, there are many production factors in China's manufacturing industry, so enterprises should form an efficient digital information system in the complex digital market to create favorable conditions for development. The digital information system not only needs to have a high degree of automation and intelligence, but also needs to be able to collect and analyze all kinds of data in real time and provide accurate information support to help the manufacturing industry make more intelligent decisions. The digital information system in the industry belongs to the basic intelligent operation means, which can build the "flexible" collaborative ability, promote the organizational structure to have high flexibility, effectively withstand the blow of external environment changes, and achieve long-term development goals. This collaborative ability can help different departments to better cooperate and coordinate, improve production efficiency and quality, but also can help enterprises better respond to market changes and customer needs. Based on the above requirements, it is ultimately necessary to focus on technology enterprises in the era of digital economy and empower the digital transformation of manufacturing industry with their rapidly developing strength and technology. Technology companies have advanced technologies and expertise that can help the manufacturing industry better achieve digital transformation. For example, some technology companies can help the manufacturing industry automate and intellectualize production processes and improve production efficiency and quality by providing intelligent industrial Internet platforms.

2. Breaking through the digital transformation trap based on the actual situation of the manufacturing industry

First, the digital transformation of the developing manufacturing industry needs to be based on reality and break through technical difficulties. The rapid development of the digital economy has driven the digital transformation of the market industry. Many manufacturing enterprises have begun to pay attention to digital transformation and actively introduce new technological means, such as artificial intelligence, cloud computing, big data and other new technologies. However, a single technology cannot meet the actual needs of manufacturing enterprises, so it cannot fundamentally achieve the goal of transformation and development. The digital transformation of the manufacturing industry is faced with the limitation of the development of the industry, and it needs to combine enough cross-domain knowledge, skills and resource support. In this process, the application of digital technology needs to be closely connected with the production equipment, development goals and manufacturing scenarios of the manufacturing industry, and be led by realistic needs, so that the digital transformation has a strong vitality in the manufacturing industry.

Second, we must break through the constraints of integration. The digital transformation of any industry cannot be achieved overnight. It needs to rely on the accumulation and summary of experience in stages, and the most critical thing is the integration and utilization of all-round digital technologies. From an objective analysis, there is no unified technical standards and protocols in China's manufacturing industry at present, and the phenomenon of data islands between systems and equipment is serious. Therefore, it is necessary to guide manufacturing enterprises to create a common platform that can connect business and information departments, achieve the convergence of technical standards and agreements, so that data elements in the manufacturing field can be shared and interoperable, and ultimately drive the rapid development of talent flow, technology flow and capital flow in the industry, and effectively allocate resources. Only in this way can digital transformation truly bring strong vitality to the manufacturing industry. In the process of digital transformation in manufacturing, we also need to focus on the unification of technical standards and protocols. In order to avoid the phenomenon of data islanding, it is necessary for manufacturing enterprises to establish common technical standards and protocols to realize the sharing and interworking of

data elements, and effectively allocate resources in this way to achieve the rapid development of talent flow, technology flow and capital flow of the industry.

3. Improve the supply factors to enable the digital transformation of manufacturing industry

In the context of the current digital economy, the manufacturing industry is facing unprecedented historical opportunities for development. The strong support of the government has provided a solid backing for the top-level planning of the industry, enabling us to create an effective digital economy development system at the bottom. In order to better respond to the demands of digital transformation, the manufacturing industry needs to improve the supply of various elements as soon as possible to provide guarantee for its sustainable development. First, it is essential to optimize the organizational structure of the manufacturing industry. With the wide application of digital technology, manufacturing enterprises need to realize the reform of internal management structure, so that the production mode has the characteristics of flexibility, the organizational structure tends to be flat, and the form of employment is more diversified. This reform not only helps to improve the production efficiency of enterprises, but also can better adapt to the changes and needs of the market.

Secondly, in the process of digital transformation, manufacturing enterprises also need to focus on talent training and introduction. Therefore, enterprises need to increase the cultivation and introduction of digital talents, and improve the digital literacy and skill level of employees through various ways. In addition, manufacturing enterprises also need to pay attention to the application and innovation of digital technologies. Digital technology is not only an important means for enterprises to achieve transformation and upgrading, but also a key factor for enterprises to improve competitiveness and expand market space. Therefore, enterprises need to constantly explore and innovate the application of digital technology, and integrate it into all aspects of product research and development, design, production, sales, etc., to realize the digital management and operation of the whole process.

Finally, enterprises need to increase investment in research and development funds. First, with the advantages of digital industry planning and guidance policies in manufacturing, we can attract private investment by allocating project support funds to provide the basic guarantee for digital transformation and upgrading of manufacturing enterprises. This move will not only help enhance the competitiveness of the manufacturing industry, but also help promote the development of the entire digital industry. Second, raise funds through various means to attract and guide manufacturing enterprises to implement digital reform. These funds will serve as a key force to promote the transformation and upgrading of the manufacturing industry and help enterprises achieve digital empowerment. In addition to relying on digital development projects within the industry to attract top-notch talents, we also need to establish strategic cooperation mechanisms with digital technology research and development institutions and universities at home and abroad. Through such cooperation, we can jointly develop new digital technologies and advance the digital transformation of the manufacturing industry. Universities and scientific research institutions in different regions are important bases for cultivating outstanding digital talents. In this regard, we should give full play to the advantages of these institutions, especially for the development trend of the digital economy in the future industry to cultivate excellent digital talents. In doing so, it can not only improve the competitiveness of China's manufacturing industry, but also lay a talent foundation for the country's long-term development.

IV. Conclusion

To sum up, driven by a new generation of digital information technologies such as the Internet of Things and big data, China's digital economy has made remarkable achievements. Continuous changes in the environment, policies and technology have brought valuable opportunities for the transformation of the manufacturing industry, however, there are some realistic obstacles in the process of digital transformation of China's manufacturing industry. First of all, many manufacturing enterprises have relatively weak thinking about digital operation. Secondly, the digital ability of manufacturing enterprises needs to be improved. In this case, the digital transformation of the manufacturing industry is more difficult, and the data dividend cannot be fully released in the industry. In order to better promote the digital transformation of the manufacturing industry, it is necessary for relevant enterprises to conduct in-depth research on the digital transformation of the manufacturing industry under the background of digital economy. Through a more favorable transformation planning path, the digital transformation of operation mode, organizational structure and production mode can be realized.

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