

# Research on the Impact of Digital Technology and Servitization on the Performance of Manufacturing Enterprises

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**Abstract:** This article mainly discusses the impact of digital technology and service-oriented on the performance of manufacturing enterprises. It first elaborates on the background of the trend of service-oriented manufacturing and the significance of its enterprises. Then, based on the impact of digital technology on the performance of manufacturing enterprises, several practical and feasible measures are proposed, mainly focusing on the long-term layout of service-oriented, shortening the low period, enhancing the competitive awareness of state-owned manufacturing enterprises, improving the driving force transformation, achieving simultaneous progress digitally, configuring digital and service-oriented elements, and eliminating the monopoly of digital resources. Followed by lowering the threshold for private enterprise resource acquisition, promoting financial digital development, breaking the financial dilemma of service-oriented manufacturing, continuously improving the performance level of manufacturing enterprises, and promoting the development of manufacturing enterprises.

**Keywords:** Digital technology; Service-oriented; Manufacturing enterprises; Performance; Influence

**Online publication:** September 2, 2024

## 1. Introduction

With the continuous development of digital technology, some manufacturing enterprises have focused on specific services and adopted a trend of service-oriented management. To some extent, this has brought about significant changes in people's demand for products. So, this also clearly reflects the importance of service, as it serves as an added value to the product and has become a major measure to make customers more satisfied. Digital technology and service-oriented technology need to promote the transformation of manufacturing enterprises in terms of strategy and technology, which also affects the performance of manufacturing enterprises.

## **2. Background of the service-oriented trend in the manufacturing industry**

With the progress of science and technology and the constant changes in market demand, new development trends have been brought to the service-oriented manufacturing industry. In the current specific operation process of manufacturing enterprises, traditional methods are still the main focus, and enterprises only attach importance to product sales. Therefore, to achieve economic benefits and enhance their core competitiveness, enterprises will use measures such as promoting cost reduction and ensuring product quality. However, due to changes in people's demand for products, the traditional single-product production method can no longer meet the needs of consumers, and consumers attach more importance to the level of service. Based on this, manufacturing enterprises have begun to utilize market differentiation, coupled with the continuous development and application of the Internet of Things (IoT) technology, to provide important technical support for the realization of service-oriented manufacturing <sup>[1]</sup>.

## **3. The significance of service-oriented manufacturing enterprises**

To achieve service-oriented manufacturing, manufacturing enterprises need to enhance their competitive awareness in the future. Thus, to make customers more satisfied and increase market share, manufacturing enterprises need to strengthen their service capabilities and ensure the quality of services. Servitization signifies that the manufacturing industry provides personalized services to customers, sets brand standards, establishes a good brand image, promotes its transformation, and enhances the core competitiveness of the enterprise. In addition, the service-oriented manufacturing industry can avoid increasing production costs for enterprises, promote their reduction, and also bring economic benefits to manufacturing enterprises <sup>[2]</sup>.

## **4. The impact and mechanism of digital technology on the performance of manufacturing enterprises**

The impact of digital technology on the performance of manufacturing enterprises is mainly reflected in the following aspects.

### **4.1. The impact of digital technology on the performance of manufacturing enterprises**

#### **4.1.1. Change the production mode of manufacturing enterprises**

The continuous development and application of digital technology have brought changes to the production methods of manufacturing enterprises and also promoted production transformation. Fully utilizing digital technology in the production line of manufacturing enterprises is beneficial for improving the level of production automation and forming a certain scale to ensure the quality of production. Simultaneously, with the help of advanced human-machine intelligent equipment, cooperation can be achieved to improve the speed of production, and the implementation of digital technology integration monitoring and feedback mechanisms is conducive to monitoring the specific status of nodes and achieving real-time warnings. In this way, it promotes the stability of the entire production line of manufacturing enterprises. Overall, digital technology plays an important role in manufacturing production and specifically utilizes value to ensure that enterprises achieve the expected production goals and promote better operation of manufacturing enterprises.

#### **4.1.2. Drive product innovation and upgrading**

For manufacturing enterprises to develop better under the changing market demand, they need to have a high sense of innovation, produce products that meet customer needs, and continuously improve their service

level. At this point, fully utilizing digital technology can help achieve product innovation and further adjust current consumer demand, making manufacturing enterprises and the market closer to meeting consumer needs. Concurrently, leveraging the role of digital technology and making reasonable use of it can ensure the smooth operation of manufacturing enterprises, achieve quantifiable business goals, and enhance the core competitiveness of manufacturing enterprises in the increasingly fierce competition in this market <sup>[3]</sup>.

#### **4.1.3. Optimize enterprise management methods**

The emergence of digital technology has brought positive impacts on enterprise productivity, organizational rights, and management methods to a certain extent. Making good use of digital technology not only helps integrate data resources but also enables real-time sharing of resource information, enabling manufacturing enterprises to better manage and continuously improve their management level. In addition, real-time monitoring and tracking of digital products promotes manufacturing enterprises to provide after-sales service based on monitoring results and carry out traceability management.

#### **4.1.4. Implement enterprise collaborative operations**

With the continuous development of manufacturing enterprise business, business processes have become more complex and the demand for enterprise collaboration has also increased. At this point, the importance of utilizing digital technology is reflected, as the application of this technology enables enterprises to carry out collaborative operations, establish good cooperative relationships with other enterprises, and achieve cost reduction goals. At the same time, with the help of digital platforms, manufacturing enterprises can not only collaborate but also share real-time data information <sup>[4]</sup>.

### **4.2. The mechanism of digital technology on manufacturing performance**

The impact of digital technology on manufacturing enterprises mainly relies on some mechanisms, because whether in the process of interconnection or interaction, it can not only promote the production of manufacturing enterprises but also improve production efficiency and enhance core competitiveness. Specifically, it is mainly reflected in the following aspects.

Firstly, the improvement of manufacturing enterprise performance through digitalization mainly involves the introduction of digital technology. With the continuous development of digital technology, not only expands the specific scope of applications but also forms a good scale and improves the depth of applications. Utilizing digital technology in specific production can achieve the goal of automated batch production, improve production capacity, and avoid increasing costs for manufacturing enterprises. Simultaneously, leveraging the role of digital technology in product development, and making reasonable use of digital technology during product development, to better research and development, shorten the development cycle, achieve product design, innovate the designed products, and continuously upgrade them.

Secondly, the improvement of manufacturing enterprise performance through digitalization relies on digital technology innovation. In terms of innovative digital technology, the main focus is on technology and business. Innovation is still a key focus in the specific management of enterprises and can provide impetus for their development. The impact and specific improvement of digitalization on the performance of manufacturing enterprises rely on digital technology innovation. Implementing digital innovation can promote the collaborative development of enterprises, improve the level of collaboration, achieve economic benefits for manufacturing enterprises, and achieve win-win goals.

Finally, the improvement of manufacturing enterprise performance through digitalization relies on the enhancement of digital capabilities. By improving digital capabilities, to a certain extent, it can promote the

development of business models and achieve business model reconstruction. Concurrently, in the specific process, integrate data and intelligent decision-making to improve its integration <sup>[5]</sup>.

Overall, manufacturing enterprises need to improve their current performance through digitization, which often requires multiple approaches, such as introducing digital technology, utilizing it reasonably, and continuously innovating. The above mechanisms also have certain connections, which are beneficial for manufacturing enterprises to produce and enhance their competitiveness. With the emergence of digitalization, it will have a positive impact on manufacturing enterprises in various aspects. In the future, digitalization will continue to develop in various aspects. The level of digital technology is not high, and it can still play an important role in the innovative development of manufacturing enterprises.

## **5. The impact of service-oriented on the performance of manufacturing enterprises**

In terms of manufacturing service innovation, the process of manufacturing service transformation is the most important part. The so-called service-oriented approach is to apply service factors to the production of manufacturing enterprises, providing customers with high-quality services. Servitization also has an impact on the performance of the manufacturing industry, such as improving product-added value, avoiding risk issues for enterprises, and promoting cost reduction for enterprises. This is mainly reflected in the following aspects.

### **5.1. Enhance sales and added value of manufacturing enterprises**

To achieve service-oriented manufacturing enterprises and innovate in services, so that manufacturing enterprises can better sell, obtain more sales revenue, continuously improve the added value of manufacturing enterprises, establish a good brand image, and ensure product quality. Also, it helps manufacturing enterprises achieve supply chain management, improve profit margins, and achieve economic benefits. Taking smart furniture product manufacturers as an example, starting from product software, through continuous upgrades and cloud services, we provide customers with a convenient lifestyle, achieve home intelligence, improve product performance, improve service quality, make the enterprise more value-added, and also increase the company's profit level.

### **5.2. Ensure the service quality of the enterprise**

With the continuous development of society and scientific and technological progress, competition between markets has become increasingly fierce. During this period, consumers have paid more attention to service issues. Manufacturing enterprises achieve service-oriented, adding service elements to product production, strengthening service capabilities, and making customers more satisfied. For example, in terms of installation, manufacturing enterprises provide high-quality services. After installation, they also pay attention to after-sales service and provide free consultations to customers. This not only allows the enterprise to have a good reputation, but also enhances its influence, retains customers, and promotes the improvement of the enterprise's performance level.

### **5.3. Improve customer satisfaction**

The impact of service-oriented on the performance of manufacturing enterprises is also reflected in the following aspects. It helps manufacturing enterprises grasp the needs of customers, continuously improve and meet their needs, enhance customer loyalty, and ensure greater customer satisfaction. The most important point is to gain some market share, thereby promoting the development of manufacturing enterprises and gradually achieving development goals <sup>[7]</sup>.

## **5.4. Improving operational efficiency of enterprises**

The service-oriented nature of manufacturing enterprises helps to enhance their business and their level of operations. Taking a semiconductor manufacturer as an example, for better production, during the specific implementation period, the intelligent control system is utilized to play a role in production, achieve automated operations, improve the level of automated production, and also improve speed to ensure that there are no problems with production quality. Additionally, enterprises utilize IoT technology to monitor the real-time operation of equipment, identify faults, and improve existing production plans based on the results obtained, minimizing production cycles and ensuring smooth completion of production work.

Overall, servitization has a significant impact on the performance of manufacturing enterprises, and they need to attach great importance to service work, strengthen service capabilities, and promote product transformation in the future. If necessary, manufacturing enterprises can establish service centers based on the current situation, communicate with customers more, understand their needs in the specific communication process, provide personalized services to customers, make customers more satisfied, and gradually achieve the service-oriented upgrade of manufacturing enterprises <sup>[8]</sup>.

## **6. Measures to improve the performance level of manufacturing enterprises**

The service-oriented approach of manufacturing enterprises is particularly important. Through reasonable application and the introduction of advanced digital technology, the performance level of manufacturing enterprises has been significantly improved, and the added value of products can also be enhanced, boosting the competitiveness of manufacturing enterprises. Therefore, in the future, for manufacturing enterprises, attention should be paid to the impact of digital technology and service-oriented services on enterprise performance, and new service methods should be sought to establish a good service system, improve service levels, and ensure that manufacturing enterprises can achieve economic benefits. In detail, manufacturing enterprises can take the following measures.

### **6.1. Pay attention to the long-term layout and shorten the low period of service-oriented development**

Digital technology and service-oriented services typically have long-term impacts on manufacturing enterprises. Hence, it is necessary to draw the attention of manufacturing enterprises, and plan and layout reasonably based on the current situation. Be mentally prepared, consider the possible problems in advance, formulate response plans in advance, and also have the foresight and adjust the inner mentality. Overall, from the perspective of manufacturing enterprises on the left side of the turning point, they should focus on their development strategies and explore whether further improvements are needed, as well as their feasibility. Manufacturing enterprises on the right side of the turning point need to recall the challenges and problems they faced in promoting strategic transformation in the past and draft a report to reduce turning point costs, bring economic benefits to manufacturing enterprises, and further promote their development <sup>[9]</sup>.

### **6.2. Enhance the competitive awareness and the driving force for service-oriented transformation**

In the increasingly fierce competition between markets, both products and services have become the focus of consumer attention. However, based on the current development of manufacturing enterprises, they only focus on work tasks and lack a strong sense of competition, failing to better promote service-oriented transformation

and a low level of management. So, in the future, for manufacturing enterprises to better develop, enhance their core competitiveness, and occupy a certain position in this fierce market competition, they need to have a competitive concept, improve their competitive awareness, form new business ideas, and ensure that they have multiple market shares. If necessary, external regulatory assessments need to be conducted. Manufacturing enterprises should start with the existing balance system and modern enterprise system, optimize them reasonably based on the current situation, learn more from the successful experiences of other enterprises in daily life, borrow from them appropriately, improve motivation, and gradually achieve service-oriented transformation so that manufacturing enterprises can do better, become stronger, and improve their performance level in the future.

### **6.3. Realize the advancement and configure elements of digitalization and service**

To better develop and achieve development goals, manufacturing enterprises need to recognize the importance of digital technology and service-oriented development, clarify development ideas, and formulate reasonable development plans. During the specific development period of manufacturing enterprises, not only service-oriented elements need to be applied, but also digital technology needs to be utilized. However, this will have a certain impact on the development process and performance of the enterprise. Therefore, in the future, it is necessary to achieve a reasonable allocation of service elements and pay attention to the proportion of digital elements. For example, in the process of transformation in manufacturing enterprises, it is inevitable to encounter problems. At this time, digital technology can be introduced, the level of digital technology can be improved, digital elements can be applied, and reasonable configurations can be made to promote the digital development of manufacturing enterprises, improve their performance level, and solve the problems encountered during the service transformation period. If manufacturing enterprises have accelerated the implementation process of service transformation and made progress, and also have competitive advantages, it is necessary to promote service transformation, maintain the advantages of manufacturing enterprises, and enable manufacturing enterprises to occupy a certain position in this fierce market competition.

### **6.4. Eliminating the monopoly of digital resources and lowering the threshold for private enterprises to access resources**

With the development of the digital economy, problems of resource monopoly and institutional imperfections have emerged one after another, leading to manufacturing enterprises being unable to obtain information technology resource information as soon as possible, and the infrastructure is not advanced. This situation will also affect the promotion of a service-oriented level of digital resources and is not conducive to accelerating the process of service-oriented. Therefore, in the future, it is necessary to eliminate the monopoly of digital resources and lower the threshold for private enterprises to access resources. Based on the current situation, we will improve the governance system of the digital economy, fully tap into important information resources, share data information in real-time, establish a unified data management system, improve data interconnectivity, avoid isolated data, ensure data quality, and enhance data reliability. Simultaneously, corresponding policies can also be successively introduced to achieve policy guidance, provide support for manufacturing enterprises in terms of funding, accelerate the process of service-oriented implementation, improve the quality of services, and gradually achieve high-quality development of manufacturing enterprises.

### **6.5. Promote the digital development of finance and break through the funding dilemma of manufacturing services**

Within enterprises, even if financial resources are fully grasped, they can still be obtained in a timely manner. To



some extent, the demand for service-oriented funds cannot be fully met, which in turn affects the development of service-oriented manufacturing. Realize digitalization of the financial industry, avoid the above-mentioned problems, achieve a rational allocation of financial resources, continuously improve the service-oriented level of manufacturing enterprises, and meet funding needs. However, to promote the integration of financial institutions and technology, it is necessary to attach great importance to the development of digital finance and form a good model, which is difficult to achieve solely by storing data information. Additionally, there is also a lack of external data. This requires the government to pay attention to its role, formulate corresponding policies, draft corresponding documents, and comprehensively open up data channels based on ensuring that there are no security issues with information, thereby promoting the development of digital finance.

## 7. Conclusion

In summary, manufacturing enterprises need to fully recognize the impact of digital technology and service-oriented services on their performance, and in the specific production process in the future, make reasonable use of digital technology, formulate service-oriented business strategies, adopt effective service methods, ensure service quality, clarify their positioning, and apply technological innovation achievements well. To this end, improving production efficiency, achieving automated production, establishing a good brand image, improving customer satisfaction, meeting customer needs, and improving the performance level of manufacturing enterprises.

## Disclosure statement

The author declares no conflict of interest.

## References

- [1] Jiang Z, Wang J, Li J, 2023, The Process of Manufacturers Promoting Leapfrog Service-Oriented Transformation through Digital Technology: A Case Study Based on Nori Corporation. *Journal of Management Engineering*, 2023(3): 56–58.
- [2] Ren B, 2023, The Transformation of China's Economic Growth Model Driven by the Expansion of Growth Factors under the Background of Digital Economy. *Economic and Management Review*, 2023(1): 99–101.
- [3] Xie X, Chen J, 2022, Multidimensional Collaborative Innovation in Supply Chain and Enterprise Performance: A Meta Analysis Test. *Journal of Management Engineering*, 2022(2): 36–39.
- [4] Wang H, Li Y, Tan Q, 2022, The Impact of Digital Transformation on Enterprise Performance Based on Meta Analysis. *Journal of Systems Management*, 2022(1): 89–91.
- [5] Hu C, Liang K, 2022, How does the Service-Oriented Manufacturing Industry Affect Customer Satisfaction? *Technical Economy*, 2022(6): 25–28.
- [6] Li X, Chen G, 2019, Research on the Relationship between Information Technology Investment, Technological Innovation Dynamic Capability, and Enterprise Performance. *Science and Technology Progress and Countermeasures*, 2019(16): 59–62.
- [7] Chen J, 2010, Empirical Testing of Service oriented Manufacturing Industry and Business Performance: A Comparative Study of Chinese and American Listed Companies. *Business Economics and Management*, 2010(4): 57–59.
- [8] Yu F, Wang L, 2022, Research on the Path of Digital Technology Empowering Technological Innovation in Chinese

Manufacturing Enterprises. *Scientific Research Management*, 2022(4): 89–93.

- [9] Wu X, Fang K, Liu T, et al., 2022, The Governance Mechanism of Manufacturing Services in the Digital Context: A Study on Contract Governance and Relationship Governance. *Scientific Research*, 2022(2): 102–105.

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