The Impact Mechanism of Enterprise Digital Transformation on Quality Innovation

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Abstract: Along with the fast development of digital technology, the digital transformation of enterprises has become an important tendency. With the rapid development of digital technology, enterprise digital quality management, as an important means of change in the field of quality management, plays an important role in the digital innovation of enterprises. This paper discusses the mechanism of enterprise digital quality management on digital innovation from three aspects: improving data governance capabilities, accelerating feedback and improvement cycles, promoting intelligent decision-making and optimizing processes, including improving data-driven decision-making capabilities, promoting continuous improvement and innovation culture, and optimizing production processes and product design. The implementation path and key influencing factors were analyzed.

Keywords: Enterprise digital transformation; Quality innovation, data-driven; Intelligent technology; Customer demand customization; innovation promotion

1. Introduction

The impact mechanism of enterprise digital transformation on quality innovation is an area that has attracted much attention. With the continuous development and popularization of information technology, enterprises are facing many challenges and opportunities in the process of digital transformation. As an important driving force for enterprise competitiveness, quality innovation is increasingly closely related to digital transformation. First of all, digital transformation has created a broader space for enterprises to innovate. Through the introduction of advanced information technology, enterprises can realize the intelligent, information-based management and data-based decision-making of the production process, so as to improve production efficiency, reduce costs, and release more resources for technology research and development and quality innovation. Digital transformation provides enterprises with more convenient and comprehensive data support, enabling enterprises to more accurately grasp market demand and customer feedback, combined with big data analysis and other technical means, effectively predict market trends, guide the direction of product research and development, and promote the continuous upgrading of quality innovation. Second, digital transformation accelerates the ability of enterprises to collaborate and innovate internally and externally. Under the traditional production model, information is blocked between various departments within the enterprise, and communication efficiency is low, which hinders the generation and dissemination of innovation. Digital transformation breaks down information barriers, promotes information exchange and resource sharing between various links within the enterprise through information platforms and collaborative tools, and strengthens the integration and reuse of innovation. At the same time, digital transformation has also expanded the connection between enterprises and external partners, realized global cooperation and co-creation, promoted collaborative innovation in the upstream and downstream of the industrial chain, and provided a wider range of resources and ideas for enterprise quality innovation. In addition, digital transformation has increased the agility and flexibility of enterprises. In a rapidly changing market environment, companies need to adjust their products and services in a

timely manner to meet customer needs, and they need to respond quickly to market changes to remain competitive. Digital transformation has given enterprises more flexibility in their production and operation methods, and through intelligent production equipment and process management systems, enterprises can adjust their production organization and product structure more quickly to meet changing market demands. At the same time, digital transformation also provides enterprises with the possibility of more flexible customized services and personalized products, improves customer satisfaction, and promotes continuous innovation in product design and service processes. Finally, digital transformation provides enterprises with a more complete quality management system. Through information technology, enterprises can realize comprehensive monitoring and data collection of the production process, realize visual management and fine control of the process, so as to reduce product quality fluctuations and improve product consistency and stability. Digital transformation also provides enterprises with more efficient means of quality monitoring and problem traceability, which can timely discover the root causes of quality problems through data analysis and mining, adjust and optimize, and improve product quality. The purpose of this paper is to explore the impact mechanism of enterprise digital transformation on quality innovation, and deeply analyze how digital transformation can promote quality innovation, so as to provide theoretical support and practical guidance for enterprises to achieve sustainable development. In the current rapidly changing business environment, it is of great significance to study the relationship between enterprise digital transformation and quality innovation to enhance their competitiveness and adapt to market changes. Under the impetus of the information tide, the realization of digital conversion has become an inevitable trend. Digital transition is not only a technical innovation, but also a comprehensive organizational reform. How to make use of digital technology to realize quality innovation and improve the quality of products and services has become the focal point of the society[1]. This paper discusses the influence of digital transformation on quality innovation, including data driven quality management, smart manufacturing and service, and customer participation and feedback. By analyzing the impact mechanism deeply, it will be helpful for enterprises to understand the role of digital transition in promoting quality innovation, and enhance their competitiveness and innovation ability[2].

To sum up, the impact mechanism of enterprise digital transformation on quality innovation is reflected in the expansion of innovation space, the acceleration of internal and external collaborative innovation, the improvement of enterprise agility and flexibility, and the improvement of quality management system. Through in-depth research on the relationship between digital transformation and quality innovation, it can help enterprises better grasp the opportunities brought by digital transformation, promote the sustainable development of quality innovation, and improve their competitiveness and sustainable development capabilities.

2. The Concept of Digital Transformation

Digital transformation refers to the process by which an enterprise or organization comprehensively reshapes and optimizes its traditional business models, processes, services, and culture through the adoption of digital technologies and information tools[3,4]. Digital transformation aims to use digital technologies to improve efficiency and create value to respond to an increasingly competitive marketplace and meet changing customer needs[5].

In digital transition, enterprises digitize traditional business activities, data processing methods, and communication channels, and use advanced technologies such as cloud, big data analytics, artificial intelligence, and the Internet of Things to automate business processes, real time information, and intelligent decision-making[6]. Digital transformation enables companies to increase productivity, optimize resource allocation, improve user experience, foster innovation and growth, and better adapt to rapidly changing market conditions[7,8].

In short, digital transformation is a strategic transformation process for companies to adapt to the development trends and challenges of

the digital era [9].Through the integration and application of digital technologies, we comprehensively transform and optimize business operations, achieve continuous innovation, and strengthen competitiveness. [10,11].

3. The Concept of Quality Innovation

Quality innovation is a continuous pursuit of excellence in products, services and management, and the introduction of new concepts, methods and techniques to enhance the quality, performance, reliability, sustainability, and user experience of products and services to meet changing market requirements and customer expectations.[12].

Quality Innovation focuses on improving and improving the product or service, including, but not limited to, the function of the product, the aesthetic of the design, the manufacturing process, the service flow, the SCM and the user's experience[13]. The objective is to promote continuous quality improvement and excellence through technical innovation, process optimisation, organisational change and talent development[14].

The key idea of quality innovation is to exceed the traditional quality standards and standards, and to achieve higher quality goals and added value [15]. It demands that the company should have a keen sense of the market, continuously explore and satisfy the new demand of consumers, and attach importance to the culture environment and organization mechanism of innovation and continuous improvement.

Nowadays, in the highly competitive business environment, the quality innovation has become a key strategy to keep competitive advantage and develop continuously. By means of quality innovation, the company can increase the added value of its products or services, gain the trust and satisfaction of customers, improve their brand image, gain profit, and build competitive advantage in the market.

In brief, qualitative innovation is a continuous process by which an undertaking brings in new ideas, methods and technologies in order to continuously improve the quality and value of products and services in order to satisfy the needs of the market and the expectations of consumers. In the digital age, it is one of the most important means by which businesses can obtain a competitive edge and sustainable development.

4. The Influence of Digital Transformati on on Quality Innovation

4.1 Data-Driven Quality Improvement

Through digital transformation, companies can collect large amounts of data and analyze it to better understand the quality of the products and services. Based on the results of data analysis, enterprises can quickly identify problems and take corresponding measures to improve the quality of the company.

4.2 Intelligent Production Technology

In the context of digital transformation, enterprises can adopt new manufacturing technologies such as the Internet of Things and artificial intelligence to make the production process more automatic and intelligence. These technologies can increase productivity, lower costs, and help people make mistakes, thus improving the quality of products.

4.3 Customization of Customer Needs

In the digital transition process, businesses are able to better understand their customers' needs,so as to provide customers with personalized products and services. Based on customer feedback and data analysis, companies can adjust product design and production processes to provide products that better meet customer needs, thereby improving quality and customer satisfaction.

4.4 Innovation Promotion

Digital transformation can promote innovation within enterprises, including process innovation, management innovation, etc., so as to promote quality innovation. Through the use of digital technology, companies can respond more quickly to market changes, launch new products and services, continuously improve quality levels, and maintain a competitive advantage.

In general, the digital transformation of enterprises can affect quality innovation through data-driven, intelligent production, customized services and innovation promotion, etc., and help enterprises improve product quality and service levels to achieve the purpose of sustainable operation.

5. Conclusion

Digital transformation has a positive effect on quality innovation. By improving the quality of data, the smart production technology, the customisation of the customer, and the promotion of innovation, the digital transformation offers the companies a new way and means to improve their quality. As technologies continue to be developed and applied, the digital transition will have a major impact on the quality of businesses. Through a thorough understanding and application of these impact mechanisms, businesses can achieve continuous improvements in quality innovation, enhance the quality of products and services, and increase competition and market share.

The impact mechanism of enterprise digital transformation on quality innovation is a comprehensive process, involving the influence and interaction of multiple aspects. By analyzing the practice and research results of enterprise digital transformation, the following conclusions can be drawn:

First of all, intelligent production and operation is an important mechanism to promote quality innovation. Through digital technology, enterprises can realize the automation and intelligence of the production process, and improve the accuracy and consistency of product production. Intelligent production equipment and systems can reduce human intervention, and can monitor and adjust quality problems in the production process in real time, so as to improve the quality stability and consistency of products.

Second, data-driven decision-making is critical to quality innovation. Digital transformation enables businesses to collect, integrate, and analyze large amounts of data, including market demand, customer feedback, production process data, and more. Through data analysis and mining, enterprises can more accurately understand the changes in the market and customer needs, and adjust product design and production processes in a timely manner. Data-driven decision-making can help companies anticipate and avoid potential quality issues and promote continuous improvement and innovation.

Thirdly, cross-border collaborative innovation is an important mechanism to promote quality innovation. Digital transformation breaks the boundaries of traditional organizations and promotes the cross-border integration and collaboration of internal and external resources. Through digitalization, companies can work more closely with suppliers, partners, and customers to solve quality issues and innovation challenges. This kind of cross-border collaboration can promote the cross-integration of expertise and technology in different fields, and provide more opportunities and possibilities for quality innovation.

Fourth, customer participation and customized innovation are one of the important mechanisms to promote quality innovation. Digital transformation enables businesses to interact and engage with their customers more closely. Through digital channels and tools, businesses can proactively collect customer needs and feedback to understand their expectations and experiences. Based on the process of customer engagement, companies can carry out customized innovation and improvement to provide high-quality products and services that meet customer needs.

Finally, the construction of quality culture is an important foundation for promoting quality innovation. The digital transformation of enterprises requires the establishment of a quality-centric corporate culture that emphasizes the values of full participation, continuous improvement, and quality orientation. Only by establishing such a quality culture can enterprises stimulate the innovation consciousness and enthusiasm of employees and promote the continuous development of quality innovation. By fostering an innovative organizational climate and values, companies are better able to respond to changes in the market and technology, and achieve continuous quality improvement and innovation.

To sum up, the digital transformation of enterprises has a positive impact mechanism on quality innovation. Intelligent production and operation, data-driven decision-making, cross-border collaborative innovation, customer participation and customized innovation, and quality culture construction interact with each other to jointly promote the sustainable development of enterprise quality innovation. When implementing digital transformation strategies, enterprises should pay attention to these mechanisms and

formulate corresponding strategies and measures according to their own conditions to achieve the goal of quality innovation.

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References

[1] Zhang Q, Li L. The Impact of Digital Transformation on Enterprise Quality Innovation: A Case Study of a Manufacturing Enterprise. Modern Enterprise, 2019, (02), 127-128.
[2] Zhao Y, Guo X H. Research on enterprise quality innovation based on digital transformation. KEJI YU QIYE, 2018, (06), 144-145.
[3] Wang P, Zhang M. Research on the impact of enterprise digital transformation on quality innovation. Business and Management Journal, 2017, (08), 112-113.
[4] Zhiying Ji, Yuting Huang. Does digital transformation promote economic resilience? Urban-level evidence from China. Heliyon, 2024, 10 (4):
[5] Chenrui Zhang, Yatong Wang. Is enterprise digital transformation beneficial to shareholders? Insights from the cost of equity capital. International Review of Financial Analysis, 2024, 92
[6] Cheng Zhang, Jiming Fang, Shilong Ge, Guanglin Sun. Research on the impact of enterprise digital transformation on carbon emissions in the manufacturing industry. International Review of Economics and Finance, 2024, 92
[7] De Luca Ernesto William, Fallucchi Francesca, Ghattas Bouchra, Spielhaus Riem. The digital transformation processes for supporting digital humanities researchers in text analysis. Journal of Documentation, 2024, 80 (2)
[8] Wang Shiyi, Ghadge Abhijeet, Aktas Emel. Digital transformation in food supply chains: an implementation framework. Supply Chain Management: An International Journal, 2024, 29 (2):
[9] Itron Inc and Schneider Electric collaborate to advance digital transformation in energy distribution. Worldwide Computer Products News, 2024,
[10] Hua Zhang, Xiaohui Wang, Muhammad Waheed Akhtar. Digital transformation, supplier concentration, and CEO financial experience: Unveiling the dynamics of innovation performance in Chinese firms. Journal of Cleaner Production, 2024, 442.
[11] Rong Zhao, Zhang Fuxin, Chen Shi. Short-term loans and Firms' high-quality innovation: Evidence from the access to patent-backed loans in China. China Economic Review, 2023, 78
[12] Cronn Susan, Trevino Colleen, Jansen Kay. Use of Theory in Quality Innovations: Shift Change Protocol in the Emergency Department. Journal of Nursing Care Quality, 2022,
[13] Zhang Ziming, Wang Xinping, Su Chang, Sun Linhui. Evolutionary Game Analysis of Shared Manufacturing Quality Innovation Synergetic Behavior Considering a Subject's Heterogeneous Emotions. Processes, 2022, 10 (7):
[14] Li, J., & Zhang, M. The impact of digital transformation on quality management: An empirical study of Chinese manufacturing enterprises. International Journal of Production Economics, 2020, 225, 107582.
[15] Ravichandran, T., & Lertwongsatien, C. Effect of information system resources and capabilities on firm performance: A resource-based perspective. Journal of Management Information Systems, 2005, 21(4), 237-276.

