

Digital empowerment and firm performance: The mediating role of dual innovation

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Abstract: This study examines the impact of digital empowerment on firm performance and analyses in depth the mediating role of dual innovation in it. With the rapid development of digital technology, digital empowerment has become an important way for enterprises to improve their performance. Through a combination of theoretical analysis and empirical research, this paper reveals how digital empowerment indirectly enhances firm performance through dual innovation-i.e., exploitative innovation and exploratory innovation. It is found that digital empowerment not only directly affects the operational efficiency and market competitiveness of firms, but also strengthens the innovation capability of firms through the mediating variable of dual innovation, which in turn has a significant positive effect on firm performance. The findings of this paper provide theoretical and practical guidance on how enterprises can effectively use new technologies to enhance performance in the digital era.

1. Introduction

In today's digital era, with the rapid development of information technology, digital empowerment has become a key factor in driving the sustainable development and competitiveness of enterprises. More and more enterprises are beginning to realise that digital empowerment not only improves operational efficiency, but also brings unprecedented market opportunities. However, how digital empowerment can be translated into actual enterprise performance improvement is still an issue worth exploring in depth. In this context, the theory of dual innovation provides us with a new perspective. Dual innovation, including exploitative and exploratory innovation, emphasises the importance for firms to continuously explore new markets and opportunities while maintaining their existing business. This study aims to explore how digital empowerment indirectly affects and enhances firm performance through the mediating variable of dual innovation. By deeply analysing the relationship between digital empowerment, dual innovation and firm performance, we expect to provide useful insights and guidance for the development of enterprises in the context of the new era.

2. Dual innovation theory and its application to firms

Dual innovation theory has been a hot topic in the field of strategic management in recent years, which emphasises how firms should balance the optimisation of existing business with the exploration of new opportunities in dynamic and complex environments. Dual innovation consists of two core dimensions: exploitative innovation and exploratory innovation. Exploitative innovation focuses on the refined use of existing knowledge, skills and resources to improve efficiency and effectiveness, while exploratory innovation focuses on the creation of new knowledge and the exploration of new opportunities to respond to possible future market changes. These two forms of innovation are not mutually exclusive, but require a delicate balance of resource allocation and management attention by the enterprise. The connotation of dual innovation lies in its duality: on the one hand, it requires firms to continuously optimise and improve their existing products, services and processes to consolidate their market position by improving quality, reducing costs and enhancing customer experience; on the other hand, it encourages firms to bravely step out of their comfort zones to find and develop new growth areas in response to changing market demands and competitive landscapes. This duality makes dual innovation an integral part of corporate strategy, especially in today's rapidly changing times. Dual innovation plays a crucial role in corporate strategy. Firstly, it is a source of sustained competitive advantage for firms. Through exploitative innovation, companies can continuously optimise their existing operations, improve efficiency and quality, and thus differentiate themselves in a highly competitive market. And through exploratory innovation, enterprises can explore new market opportunities and develop new products and services, thus creating new growth points. Secondly, dual innovation helps enterprises adapt to the ever-changing market environment. In today's digital and networked world, market demand and competitive landscape are changing rapidly, and enterprises need to continuously adjust and optimise their business models and strategic directions. Dual innovation provides a flexible way of thinking and a framework for action, helping companies to maintain their existing business while constantly exploring and experimenting with new possibilities. When it comes to where Dual Innovation meets Digital Enablement, we have to mention how digital technology provides a powerful support and driver for Dual Innovation. Digital technology not only improves the operational efficiency of enterprises, but also facilitates data collection, analysis and utilisation like never before. Through big data analyses, enterprises can more accurately understand market needs and customer preferences, providing precise directions and targets for leveraged innovation. At the same time, digital technologies provide powerful tools for businesses to explore new markets and opportunities. For example, through social media and online platforms, enterprises can quickly collect user feedback and market information, and adjust product design and marketing strategies in a timely manner. In addition, digital technologies also promote knowledge sharing and collaborative innovation within enterprises, providing a good organisational environment for the implementation of dual innovation. There is a deep intrinsic connection between digital empowerment and dual innovation. Digital technologies provide enterprises with massive amounts of data and advanced analytical tools, enabling them to gain deeper insights into the market and customer needs. This insight capability not only helps companies optimise existing products and services to meet customer needs (exploitative innovation), but also helps them identify new market opportunities and points of innovation (exploratory innovation). At the same time, digital technology can also optimise a company's internal processes and management model, improve its flexibility and responsiveness, and thus better support the implementation of dual innovation. The theory of dual innovation provides companies with important ideas for sustainable development and innovation in a complex and changing market environment. By balancing exploitative and exploratory innovation, companies can consolidate their existing market position while continuously exploring new markets

and business areas. Digital empowerment, on the other hand, provides strong technical support and driving force for the implementation of dual innovation. With the continuous development and application of digital technology, we have reason to believe that dual innovation will play an even more important role in corporate strategy.

3. The direct impact of digital enablement on business performance

As a key driver of enterprise development nowadays, the direct impact of digital empowerment on enterprise performance is reflected at multiple levels. From the perspective of improving the operational efficiency of enterprises, digital empowerment significantly optimises their business processes through the introduction of automated and intelligent management tools and systems. For example, through the implementation of Enterprise Resource Planning (ERP) systems, enterprises are able to integrate data from multiple processes such as purchasing, production, and sales, and realise real-time sharing and efficient use of information, thereby improving decision-making efficiency and the accuracy of production planning. In addition, the application of digital technologies such as the Internet of Things (IoT) enables enterprises to monitor the operating status of production equipment in real time, provide timely warnings and deal with potential problems, reduce downtime and improve production continuity. Digital enablement also plays an important role in enhancing the competitiveness of enterprises in the market. Taking the retail industry as an example, through big data analytics, enterprises can gain precise insights into consumer behaviour, including purchasing preferences, consumption habits, etc., so as to formulate more accurate marketing strategies. With the help of social media and e-commerce platforms, enterprises can establish closer ties with consumers, achieve personalised recommendations and customised services, and enhance customer satisfaction and loyalty. These initiatives not only help expand market share, but also stand out in a competitive market. In addition, digital enablement also directly contributes to the improvement of corporate financial performance by reducing operating costs and improving the efficiency of asset utilisation. For example, in the field of supply chain management, digital technology can help enterprises achieve real-time monitoring and predictive analysis of inventory to avoid inventory backlogs and stock-outs, thus reducing capital consumption and waste. At the same time, through the application of cloud computing and other technologies, enterprises can elastically adjust computing and storage resources, reducing IT infrastructure investment costs and maintenance costs. In several industries, there have been numerous enterprises that have achieved significant performance improvement through digital empowerment. Taking a well-known manufacturing enterprise as an example, it has upgraded the automation and intelligence of its production lines through the introduction of an intelligent manufacturing system. This has not only improved production efficiency, but also significantly reduced scrap rates and production costs. At the same time, with the help of data analytics, the enterprise has optimised its product design and production processes, and improved product quality and customer satisfaction. These improvements are directly reflected in the company's financial performance, achieving steady growth in sales and profits. Let's look at another case in the retail industry. A large supermarket chain has attracted a large number of new customers and increased the repurchase rate of old customers by implementing a digital marketing strategy and using big data analytics to accurately push personalised offers and advertisements. At the same time, the enterprise also optimised inventory management and logistics distribution through an intelligent management system to reduce operating costs. Together, these initiatives have contributed to a significant improvement in the enterprise's financial performance, enabling it to maintain its leading position in a highly competitive market environment. Digital enablement has a direct and positive impact on business performance in a variety of ways, including by improving operational efficiency, enhancing market

competitiveness and facilitating financial performance improvement. With the continuous development and in-depth application of digital technologies, enterprises will have more opportunities to use these technologies to optimise their operations, enhance market competitiveness and achieve sustainable development. Therefore, enterprises should actively explore and practice various possibilities and application scenarios of digital empowerment to cope with the increasingly fierce market competition and changing customer needs^[1].

4. The mediating role of dual innovation between digital empowerment and firm performance

In delving into the mediating role of dual innovation between digital empowerment and firm performance, we first need to clarify how dual innovation acts as a mediating variable on firm performance. Dual innovation, which encompasses the dimensions of utilisation and exploratory innovation, is a key strategy for firms to respond to market changes and enhance competitiveness. Exploitative innovation focuses on the optimisation and enhancement of existing capabilities, technologies and resources with the aim of improving efficiency, quality and customer satisfaction, while exploratory innovation focuses on the creation of new knowledge, the development of new technologies and the expansion of new markets in search of new growth points and competitive advantages. Together, these two modes of innovation constitute two important aspects of a company's innovation activities. By balancing and optimising these two types of innovation, companies are able to better adapt to market dynamics and thus improve their performance. The mediating role of dual innovation is particularly prominent in the context of digital empowerment. Digital technology provides enterprises with rich data resources and advanced analytical tools, enabling them to gain more accurate insights into market demand, optimise business processes, and develop new products and services. Dual innovation plays a crucial role in this process. Specifically, digital enablement improves business performance by facilitating the dual innovation capability of enterprises. On the one hand, digital technology improves an enterprise's data collection and analysis capabilities, providing strong support for exploitative innovation, helping it to manage its existing business in a more refined manner, and enhancing operational efficiency and customer satisfaction; on the other hand, digital technology also facilitates the exploration of new markets and the development of new products, promoting exploratory innovation and bringing new growth points to the enterprise. In order to understand more intuitively the mediating role of dual innovation between digital empowerment and enterprise performance, we can illustrate it through empirical studies and case studies. Taking a leading e-commerce platform as an example, the platform has significantly enhanced its dual innovation capabilities by introducing advanced digital technologies, such as big data analytics and artificial intelligence. In terms of exploitative innovation, the platform used data analytics to gain precise insights into consumer needs and optimise the product recommendation and customer service processes, improving the user shopping experience and platform stickiness. In terms of exploratory innovation, the platform developed a series of innovative products and services using AI technology, such as intelligent customer service and virtual fitting rooms, providing users with a new shopping experience and successfully expanding its market share. These innovations not only directly improved the platform's operational efficiency and customer satisfaction, but also led to a significant improvement in business performance through new business development. Further, we can theoretically analyse the mechanism of the mediating role of dual innovation. Digital empowerment provides enterprises with more information and resources, which are the basis for their innovation activities. Through dual innovation, enterprises are able to transform these resources and information into actual innovations, thus enhancing their competitiveness. Specifically, utilisation-based innovation helps enterprises to better meet the needs of existing markets and increase market share and profitability,

while exploratory innovation helps enterprises to explore new market segments and find new growth points. These two modes of innovation work together to drive improved business performance. In addition, digital enablement further strengthens the mediating role of dual innovation by reducing innovation costs and improving innovation efficiency. Digital technologies enable firms to acquire and process information more quickly, reducing the cost of trial and error and time costs in the innovation process. At the same time, digital technologies also provide enterprises with more innovation tools and platforms, such as cloud computing and open source communities, which reduce the threshold and difficulty of innovation. Together, these factors have contributed to the enhancement of enterprises' dual innovation capability, which in turn has a positive impact on enterprise performance. Dual innovation plays an important mediating role between digital enablement and firm performance. Digital empowerment helps enterprises better adapt to market dynamics, improve operational efficiency, and expand new business areas by promoting their dual innovation capabilities, thereby achieving improved enterprise performance. Therefore, in promoting digital empowerment, enterprises should pay full attention to the cultivation and development of dual innovation to achieve sustained innovation and competitive advantage^[2].

5. Conclusion

This study delves into the intrinsic links between digital enablement, dual innovation, and firm performance. Firstly, digital empowerment is confirmed as a key factor for firms to enhance their performance, which directly contributes to the improvement of firms' financial performance by improving operational efficiency and enhancing market competitiveness. Second, dual innovation, including exploitative and exploratory innovation, is revealed as an important mediator between digital enablement and firm performance. Digital technology not only optimises a firm's existing business, but also provides it with the possibility to explore new markets and opportunities, a process in which dual innovation plays a crucial role. Through the combination of theory and empirical evidence, this study clarifies the mechanism by which digital empowerment indirectly enhances firm performance through dual innovation, providing useful guidance for the innovative development of enterprises in the context of the new era. Enterprises should actively embrace digital empowerment while focusing on the balanced development of dual innovation to achieve sustained market competitive advantage and performance improvement.

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