A Study on the Impact of Digital Transformation on the Corporate Innovation Performance

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Abstract: Over the past few years, the digital economy has become the mainstream of the business world, and the digital transformation path in the manufacturing industry has become the prevailing theme. Many results of studies also indicate that manufacturing innovative models and competitive advantages are dimensions that should not be overlooked during the digital era nowadays. Digital transformation fundamentally changes the way companies operate and interact with customers, with digitalization driving product, procedure, and technology innovation across factories. Digital transformation is no more an alternative to traditional manufacturing, but a necessity to remain relevant and competitive within the marketplace. Building on these backgrounds, this study is a qualitative literature review, implying that the data will be analyzed and explained utilizing information and documentation acquired from a variety of existing literature. To recognize the influences of digital transformation on manufacturing business performance, this research will review and summarise the relevant literature on digital transformation, competitive advantage, and innovation performance of firms, describing interactions among the three and exposing shortcomings of past literature. Therefore, this study will provide companies with valuable insights that help them stay relevant and competitive in this digital age of digitalization.

Keywords: Digital Transformation, Technology Innovation, Corporate Performance

1. Introduction

As the major body of China's deepening innovation-driven development strategy, the manufacturing industry is facing significant challenges to its survival as it loses its original competitive position because of the influences of the digital economy and unstable external environment. It is a general trend for manufacturing enterprises to undertake digital transformation, as Zhao et. al find that manufacturing enterprises can realize a digitally-driven product, procedure technology, and mode innovation through digital transformation, promoting the fusion of the digital economy and the real economy, and realizing the ultimate goal of smart production [1]. Digital transformation helps enterprises find ways to boost innovation and remain highly competitive, which is crucial to get transformation path for the manufacturing industry. Moreover, the competitive advantage gained by manufacturing firms during the new wave of digital generation is always linked to their capacity to absorb new technologies efficiently and rapidly [2]. Manufacturing companies that are adept at applying top-notch innovations to their business models are expected to obtain more favorable competitive advantages. Thus, it can be noted that competitive advantage is not just a product of

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operating model transformation or innovation, but also a mediating role in the relationship between digital transformation and digital innovation performance of manufacturing companies, allowing them to be more foresighted and flexible in navigating the changes in the digital economy. Within the scope of this study, the main objective is to comprehensively explore the digital transformation paths of manufacturing firms and their far-reaching impacts on organizational innovation performance and competitive advantage. Although available research has examined the digital transformation (DT) of traditional manufacturing companies, most of them are still in the early stages of exploring the value creation mechanisms and theoretical theory of DT. Therefore, there is a necessity to deeply examine the consequences of DT paths on firms' innovation and competitiveness.

In the following sections, this research will adopt the qualitative approach to define and summarize the digital transformation process, competitive advantage, and firms' innovation performance respectively within the manufacturing industry by reviewing existing literature. These contents provide insights into how the firms integrate digital technologies into their innovation strategies, the impact of digital technologies on competitive advantage, and useful strategies to deal with related challenges and risks. Then, the conclusion and the significance of digital management are drawn from the literature base, improvement suggestions are also raised for China's manufacturing enterprises to carry out DT strategies. In the end, the constraints within this study are summarized and an outlook is given on the directions regarding further research in the future.

2. Digital Transformation of Enterprises

The digitalization of enterprise is defined as the underlying shift in how an organization or business utilizes digital technologies to transform the way it operates, interacts with its customers, and achieves its objectives. Regarding the meaning of "enterprise digital transformation," Negroponte first put forth in his writings that the terms "digital penetration of enterprise production resources," "digital reconstruction of production relations," and "digital innovation of business activities" refer to the three main aspects of this process. Jensen's study, which is considered to be the first scientific article on the topic of digital transformation, highlights two main elements of digital systems, technology and data management [3]. Enterprise digitization had an early start in other countries, and it was not until the accelerated growth of the digital economy nowadays that enterprise digitization attracted widespread attention in China and became a trending topic in the Chinese manufacturing industry.

In the past research literature, academics have mostly studied the drivers and mechanisms of enterprise's digital transformation, gradually evolving to examine the impact of the digitization of businesses on their performance, as well as exploring the process of micro-path effects in more depth at the present stage. In terms of the drivers and mechanisms of enterprise digital transformation, enterprise digitalization is generically categorized as the three concepts - change, convergence, and reinvention, who argues that digital technology and talent, customer experience, and business models all drive digital transformation in the truly meaningful sense of the concept [4]. On the other side, scholars such as Porfirio et. al employ case and empirical studies to reveal the mechanisms of influence of antecedent variables, pointing out that the key to the digital transformation of a business is a user engagement, digitalization programme, and path. In contrast, the business model and change management are prerequisites for carrying out digital transformation [5]. From a corporate performance perspective, most scholars like Li & Wan believe that companies are able to achieve digital transformation through technological change and value creation, which creates a positive effect on corporate finance and innovation and so on [6]. Digital transformation enables support for green innovation in enterprises by encouraging innovation impacts, learning-by-doing mechanisms and spillovers, creating networks for innovation collaboration, and alleviating financial constraints [7]. The organizational resilience of firms is positively affected by digital transformation through exploratory and exploitative innovation. Melo et al. argues that the expansive performance of DT is

also reflected in the fact that it has become an important instrument to alleviate the burden of poverty and gender inequality, incorporating the three pillars (environment, society, and economy) of corporate sustainability in SEMs [8]. However, some scholars such as Rolland and Hanseth claim that some firms are hindered by the digital divide and the synergy dilemma as well as the multiple impact mechanisms that can cause firm performance to cancel each other out or even have a negative impact [9]. Finally, on the exploration of the process of micro-pathways in action, one aspect of micro-economics is that the degree of development of the digital economy outside the organization directly affects the degree of digitization of the firm and the process of digital transformation, prompting the organization to make strategic decisions about digital transformation. Another aspect is the internal capabilities of the firm as a digital mediation mechanism since scholars like that Wang believe that dynamic, absorptive, exploratory, exploitative, and service-related capabilities all play a completely or partially bridging function over the relation between DT and firm performance [10]. From a series of past studies, many scholars have generally acknowledged the positive impacts of DT and have begun to explore in depth the performance and mediating factors of DT in enterprises.

3. Enterprise Innovation

Innovation is a key driver of sustainable and solid business growth. Enterprise innovation reflects the long-term dynamism and creativity of an organization, and the innovation performance of an enterprise should be seen as the outputs or outcomes of its innovation activities, usually expressed in terms of research carried out through products or patents. Gemünden et. al proposed two dimensions to measure innovation performance, namely, product innovation success (including three indicators of product improvement, market success rate, and new product development) and process innovation success (including productivity improvement, resource consumption reduction, and labor cost reduction) [11].

There are also many differences in the definition and measurement of innovation performance. Generally speaking, there are three main perspectives on innovation activities: the first is the output perspective, which primarily measures innovation performance from the perspectives of products and patents; secondly, the output perspective measures innovation performance primarily from the perspectives of R&D expenses invested in R&D of new products, such as R&D investment intensity and R&D expenses. The number of patents obtained is a key indicator of the success of innovation success from the standpoint of innovation efficiency. Some scholars define enterprise innovation performance in their research as the improvement of overall enterprise performance caused by technological progress or the improvement of creative ability, which is ultimately reflected in market performance, financial performance, and other aspects of the enterprise.

After reviewing a wide range of literature exploring the relationship between digital transformation and business innovation, most scholars confirm that firms' efforts in digitization transformation effectively contribute to their innovation performance. Enterprise innovation performance is significantly improved by digital transformation, and digital transformation may also accelerate enterprise innovation [12]. The main ways in which digital transformation assists business expansion are by reducing costs, increasing revenues, improving productivity, and encouraging innovation. Among these, the greatest impact on policy is business innovation [12]. Both the degree of innovation in regional digital industries and the degree of digitization of firms promote business innovation. However, the excessive use of digital technologies may also decrease the long-term innovative capacity of enterprises [13]. The relationship between the use of digital technology and business performance, which in turn affects business performance, was fully mediated by innovation. Current literature mainly focuses on the relationship between digital transformation, innovation, and firm worth, but lacks exploration of other potential economic outcomes of firm innovation under the influence of digital transformation, therefore, this research argues that the correlation between digital transformation and corporate innovation leaves considerable research gaps and deserves to be explored in depth.

4. Enterprise Competitive Advantage

Competitive advantage describes the unique attributes, capabilities, or assets that an organization or business possesses that enable it to outperform its competitors in the market in which it operates [14]. It contributes to the organization's efficiency, effectiveness, or attractiveness towards customers compared to competitors and is an essential factor in reaching and maintaining a robust place in the competitive market. As a fundamental idea in the strategic management literature, the British economist Chamberlain first proposed the concept of competitive advantage. The competitive advantage of an enterprise is the comprehensive quality of an enterprise to gain the ability to outperform its competitors through rational allocation of resources and effective output to the market in the fierce market competition, thus winning more development opportunities.

Many businesses are turning to digital transformation as a new strategy to obtain competitive advantages. According to Adamik and Nowicki, all available data suggests that the benefits gained in the era of Industry 4.0 would be transient and ephemeral, easily "overcome" by rivals [15]. Within the framework of an ecosystem of rivals who are all vying for the same resources, new skills are developing. Creating distinct value for the consumer by utilizing new technologies and techniques faster than others in the sector is crucial [16]. By improving real-time corporate capabilities in quick situations, digital helps businesses gain indirect competitive advantages.

Additionally, gains in corporate innovation performance help businesses gain even stronger competitive advantages. According to Korhonen and Halén, the elevation of digital transformation to the level of business ecosystems and industries will necessitate the need for what is known as adaptability to gain competitive advantages [17]. Some SMEs could be able to incorporate internet technology into their entire plan, and this new technology might provide them with competitive advantages [18]. The company is benefiting from a competitive edge in the digital transformation and circular economy as a result of the transition to net zero manufacturing.

5. Research Gap

Based on the overview and integration of the relevant literature review, this study identifies the key factors on the microeconomic side that influence the ability of firms to digitally transform, one being the internal characteristics of the firm (business model, organizational management, and strategic orientation) that acts as a catalyst for the firm's digital transformation, while the other is the external environment of the firm where the organization is influenced by outside situational factors that motivate it to make the strategic decision to digitally transform itself, or to enhance or diminish the extent to which the digital transformation affects the firm's performance. Nevertheless, this study finds that research on digital transformation and innovation activities of companies still lacks a thorough analysis of the overall impact of internal and external factors, and the literature focuses on a single area lacking in wholeness and comprehensiveness. Secondly, it is a complex process for traditional manufacturing enterprises to coordinate their limited resources and capabilities to improve their competitiveness in the digital environment and achieve digital innovation performance. There is a dearth of discourse concerning mechanisms between digital transformation and the innovation quality of firms, and the connections and mechanisms between digital transformation and the quality of corporate innovation have not yet been clarified. Finally, there are gaps in the digital transformation scenarios and transformation recommendations regarding China's localized traditional manufacturing industries, and Chinese case studies are not typical and scarce.

Furthermore, the relationship between digital transformation and firm innovation remains underemphasized in the current literature, as most of them studying innovation typically focuses on corporate governance, innovation policy, innovation indicators and limitations, and the framing and development of the Internet of Things [19]. Research on how to successfully implement a digital transformation strategy and successfully obtain digital innovation performance by leveraging a firm's competitive advantage is slightly less developed.

6. Conclusion

In conclusion, the main focus of this study is to sort out the literature review on digital transformation, business innovation, and competitive advantage in the manufacturing industry and trace the overall lineage of its emergence evolution, and development. It can be concluded that in the current era of digital transformation, the impact of digital transformation on manufacturing business models and competitive advantage cannot be neglected. Digital transformation fundamentally shapes the way companies operate, interact with consumers, and win in an intensely competitive marketplace, and it creates a dramatic shift in the way business models. Further, innovation becomes essential to sustaining and expanding competitive advantage. Organizations that have the ability to implement up-to-date technologies and generate innovations tend to create new opportunities and achieve success in their marketplace. This implies that organizations are required to actively adopt digital techniques, innovate consistently, and give priority to engaging closer with their clients.

However, this research also has some limitations. It is primarily oriented towards large company environments. Still, small and medium-sized manufacturing firms with limited resources may face challenges in fully adopting digital technologies, which is a gap that has not been comprehensively considered in this study. Future research should be directed towards the digital strategies of small and medium-sized manufacturing firms. Another shortcoming of this field is the inherent limitation of the qualitative research methodology, which makes it difficult to concretely quantify the indicator metrics of digital transformation and its impact on corporate performance. Future research will bring in quantitative analysis based on this theme to identify more comprehensively the factors and mediating paths through which digitalization affects firms' innovation performance and to provide a more indepth knowledge of the relationship between the two.

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