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Information Infrastructure and Corporate Finance

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Abstract: In the context of China's economic growth increasingly relying on the digital economy, the construction of information technology infrastructure has become even more critical, gradually becoming a focal point for major economies worldwide. Currently, new-generation information technology innovations, represented by big data, cloud computing, artificial intelligence, and others, are very active. These innovations continually give rise to new products, applications, and models through the integration of technologies. Given this backdrop, accelerating information technology construction to leverage IT for enhancing the efficiency of financial markets and achieving high-quality economic development becomes a crucial practical issue. Good information technology infrastructure can accelerate high-quality economic development. Based on this, this paper reviews related literature on information technology infrastructure construction, financial market operational efficiency, corporate innovation, and green finance, thereby clarifying the relationship between information technology infrastructure construction and corporate operational efficiency, corporate innovation, and green finance.

1. Introduction

China's economic growth is increasingly relying on the digital economy, the construction of information technology infrastructure is becoming even more important and has gradually become the focus of competition among the world's major economies.

In this context, accelerating the construction of information technology infrastructure has become a vital mission of our time. Existing literature mainly examines the impact of information technology infrastructure on corporate innovation capacity, export performance, company scale and production efficiency, as well as green finance. For instance, Han Xianfeng [5], Sun Zao and Xu Yuanhua[6], Xue Cheng [4], Li Lei [2], and Shen Kunrong [1] have studied the impact on corporate innovation capacity; Li Kunwang [7] examined its impact on export performance; Sun Weizeng [3] analyzed the impact on company scale and production efficiency; and Lianyan Fu [22], Feng Dong [23], and Chang Tang [24]explored its impact on green finance.

From the introduction of the "Broadband China" strategy in 2013 to the 2020 Government Work Report's emphasis on strengthening new infrastructure construction and developing the next-generation information network, it is evident that the government plays a crucial role in promoting information technology infrastructure. After years of efforts, what are the actual effects of the government's push for information infrastructure? Have they truly improved operational efficiency

for companies? Have they effectively promoted the development of green finance? Have they significantly enhanced corporate innovation capacity? These are critical questions worthy of in-depth study and concern.

Furthermore, government policy support has been pivotal in the construction of information technology infrastructure. Through a series of policies and measures, the government has not only accelerated the coverage of broadband networks but also promoted the development of new-generation information networks such as 5G technology, artificial intelligence, and big data. These technologies have not only enhanced the operational efficiency of financial markets but have also laid a solid foundation for achieving high-quality economic development. However, at the corporate level, whether these information technology infrastructures have genuinely translated into competitive advantages and innovation driving forces for companies still requires further empirical research and data analysis.

In summary, the evaluation of the effectiveness of information technology infrastructure construction and the further optimization of policies will be important directions for future research. Through in-depth analysis and comprehensive evaluation, a better understanding of the impact of information technology construction on companies and the overall economy can be gained, thus providing scientific basis for policy formulation.

2. The impact of information technology infrastructure construction on corporate finance.

There is an abundance of literature on the study of information technology infrastructure construction and macroeconomics, but there are fewer studies on the efficiency of financial market operations. In the following, we will mainly review the literature on three aspects: the relationship between information technology infrastructure construction and innovation, the impact of infrastructure construction on green finance, and the influence of information technology infrastructure construction on corporate operational efficiency.

2.1 Innovation Aspect

Regarding the impact of information technology infrastructure construction on corporate innovation capacity, there is some controversy in academic circles. Existing research conclusions can be broadly divided into two categories:

The first category believes that the construction of information technology infrastructure promotes corporate innovation: Shen Kunrong et al[1] utilized a quasi-natural experiment of the "Broadband China" strategy and found that network infrastructure significantly enhances corporate innovation quality and efficiency through two channels: market information and technical information availability. Similarly, Xue Cheng et al[4] also used a quasi-natural experiment of the "Broadband China" strategy and discovered that good network infrastructure not only facilitates the diffusion of technological knowledge from listed companies to their internal subsidiaries but also promotes technological cooperation with external companies. Li Lei et al[2] pointed out that information technology construction can significantly improve corporate patent quality through three channels: opportunity recognition, innovation platform construction, and innovative organizational forms, thus fostering "substantial innovation" rather than merely pursuing "quick and easy" utility models and design patents. Sun Zao et al[6] found that information infrastructure construction significantly promotes the innovation efficiency of China's high-tech industries.

The second category of research suggests that there is an inverted "U-shaped" relationship between information technology infrastructure construction and innovation: Han Xianfeng et al[5] believe that there is a significant inverted "U-shaped" relationship between informatization and technological innovation efficiency. That is, informatization levels within a certain range can significantly enhance

technological innovation efficiency. However, when the informatization level exceeds a certain threshold, its promoting effect on technological innovation efficiency gradually diminishes. Despite the current actual informatization level still being below the theoretical optimal level, continuing to strengthen informatization construction can help enhance its promoting effect on technological innovation efficiency.

These two perspectives reflect the complexity and multidimensionality of the impact of information technology infrastructure construction on corporate innovation capacity. By reviewing existing research, it is evident that information technology infrastructure may have different effects on corporate innovation capacity under varying environments and conditions. Therefore, future research needs to consider the specific mechanisms of the impact of information technology infrastructure construction on corporate innovation in different contexts more carefully, to provide more scientific and accurate evidence for policymakers.

2.2 Green Finance Aspect

The construction of information technology infrastructure significantly promotes the development of green finance.

Lianyan Fu[22] found that the construction of information infrastructure can directly reduce carbon emissions. Specifically, information infrastructure can optimize energy use and improve energy efficiency, directly reducing greenhouse gas emissions. Additionally, the construction of information infrastructure further influences carbon emissions through technological innovation. By introducing advanced technological means and innovative methods, information infrastructure construction can reduce carbon emissions on multiple levels. For example, through the application of smart grids and energy management systems, energy can be efficiently distributed and used, thus reducing the carbon footprint.

Feng Dong[23] used the "Broadband China" policy as a quasi-natural experiment for information infrastructure construction and conducted a difference-in-differences (DID) analysis, proving that information infrastructure significantly improves the greenhouse gas emission performance of cities. This study shows that the expansion of information infrastructure not only enhances data transmission and communication efficiency but also achieves positive effects in environmental protection. Through better data collection and analysis capabilities, cities can more accurately monitor and manage emission sources, effectively reducing greenhouse gas emissions.

Chang Tang[24] found that telecommunication infrastructure also plays an important role in promoting green technological innovation. Especially in promoting low-quality green technological innovation, the impact of telecommunication infrastructure is more significant. Although high-quality green technological innovation requires more resources and technical input, the widespread adoption of telecommunication infrastructure provides basic technical support for most enterprises and institutions, enabling green technological innovation to be realized on a broader scale. This means that telecommunication infrastructure not only promotes the development of high-end technology but also provides the necessary foundation for general technological innovation, pushing the widespread adoption and application of green technology across various fields.

Overall, the construction of information infrastructure promotes the development of green finance through multiple channels. It not only plays a positive role in directly reducing carbon emissions but also indirectly drives environmental protection and sustainable development goals through technological innovation.

2.3 Efficiency of financial market operations Aspect

Although research on the impact of information infrastructure construction on the efficiency of

financial markets is still relatively scarce, there is a wide range of studies on financial market efficiency both domestically and internationally.

For example, Wu Cen and Rao Pingui[8] explored the issue of stock price synchronicity, revealing the relationship between the efficiency of market information transmission and stock price volatility. Yongxin Xu[21] analyzed the factors contributing to stock price crash risk and examined the risk transmission mechanisms under different market environments. At the corporate level, Sun Liang and Liu Chun[9] as well as Li Antai[17] focused on the efficiency of corporate mergers and acquisitions and their impact on market integration. Sinan Gokkaya[19] further analyzed the flow of information and technological diffusion in cross-border mergers and acquisitions. Meanwhile, He Qing and Liu Erzhong[18] studied the determinants of corporate loan interest rates and the improvement of credit market efficiency.Regarding corporate Environmental, Social, and Governance (ESG) performance, Lei Lei and Zhang Dayong[14] found that good ESG performance can enhance a company's market value and long-term competitiveness. Cai Guilong[10] explored the effectiveness of capital market resource allocation, revealing the optimal paths of capital flow in the market. In terms of management and technological innovation, Liu Shuchun[11] researched how digital transformation in corporate management can improve input-output efficiency, demonstrating through case studies the role of information technology in optimizing business processes and enhancing productivity. Tao Shu[20] investigated the contributions of intellectual property protection to improving corporate innovation capacity and market value from the perspective of patent quality and corporate value.

Overall, while existing research covers several important areas of financial market efficiency, the direct impact of information infrastructure construction on financial market operational efficiency requires further in-depth exploration. Future research should pay more attention to how information infrastructure can enhance overall financial market efficiency by improving information flow and market transparency, thus providing more empirical support for policy formulation.

Specifically, Wu Cen et al[8] conducted an in-depth study and found that the registration and listing of a company have a significant negative impact on the stock price synchronicity of peer companies. This means that as a company gets listed, the market's attention and information transparency regarding that company increase, causing the stock prices of peer companies to no longer exhibit synchronized fluctuations. Yang Wei et al[13] discovered a positive correlation between anchoring ratio and stock price crash risk. This indicates that a higher anchoring ratio leads to a greater risk of stock price collapse for a company. Qian Xianhang[4], through a study from the perspective of executive heterogeneity, found that companies with executives who have media experience face a higher risk of significant stock price declines. This finding reveals the potential impact of executive background on stock price volatility. Gu Ming et al[16], based on a quasi-natural experiment of the relaxation of price limits on the ChiNext board, found that after the implementation of the policy to relax price limits, stock prices became more sensitive in reflecting public market information and included more firm-specific information, thereby significantly improving overall market pricing efficiency. Yongxin Xu[21] discovered that internet searches can effectively reduce the risk of stock price crashes. This indicates that investors who obtain information through the internet are better able to anticipate market changes, thus lowering the risk of significant stock price drops.In the field of corporate mergers and acquisitions, Sun Liang et al[9] found that after the China Securities Regulatory Commission (CSRC) established a technological management system for brokerage firms' workpapers, the performance of merger and acquisition transactions advised by pilot brokerage firms significantly improved. This indicates that the establishment of technological management systems plays a crucial role in enhancing the efficiency of corporate mergers and acquisitions. Sinan Gokkaya et al[19] revealed that the presence and quality of professional acquisition personnel are among the most important economic determinants of acquisition performance. This finding emphasizes the critical role of professional talent in merger and acquisition activities. In the realm of corporate loans,

He Qing et al[18] found a significant positive correlation between exchange rate sensitivity (the degree to which corporate value is affected by exchange rate fluctuations) and corporate loan interest rates. This means that exchange rate fluctuations have a significant impact on corporate financing costs.Regarding Environmental, Social, and Governance (ESG) performance, Lei Lei and Zhang Dayong[14]found that common institutional ownership significantly reduces corporate ESG performance, thereby supporting the notion of collusive behavior.Fang Xianming et al[15] discovered that ESG performance can significantly enhance corporate innovation output, with this effect being more pronounced in large enterprises and state-owned enterprises.Cai Guilong et al[10] found that enhancing information interaction between investors and companies helps reduce information integration costs and information asymmetry for retail investors, thereby lowering the cost of equity capital for companies.Liu Shuchun et al[11] found a nonlinear relationship between corporate digital investment and efficiency, characterized by an initial decline, followed by an accelerated decline until a turning point, after which the relationship becomes an inverted "U" shape. This indicates that the impact of digital investment on corporate efficiency varies at different stages. Xu Nan et al[12] discovered that smaller salary gaps significantly improve the stability of entrepreneurial teams, indicating that compensation structures have an important impact on team collaboration and corporate stability.Tao Shu[20] found that patents granted by busy examiners tend to be of significantly lower quality. Additionally, the busyness of examiners negatively affects a company's future stock returns, consistent with investors' underreaction to examiner busyness.

3. Conclusion

First, the construction of information technology infrastructure can significantly enhance the quality and efficiency of corporate innovation by optimizing information transmission and technological cooperation. However, there is still a debate about the relationship between informatization and technological innovation efficiency, suggesting an inverted "U-shaped" relationship where the promoting effect may diminish once a certain level of informatization is reached.

Second, the construction of information technology infrastructure plays a vital role in reducing carbon emissions and improving the greenhouse gas emission performance of cities. Through technological innovation and smart management systems, information infrastructure not only directly reduces carbon emissions but also indirectly promotes the innovation and application of green technologies.

Third, although research in this field is relatively scarce, existing studies indicate that the construction of information technology infrastructure can significantly improve the pricing efficiency and information integration capability of financial markets by enhancing the transparency and transmission efficiency of market information, thereby improving overall market operational efficiency.

In summary, the construction of information technology infrastructure has significant impacts on corporate innovation, green finance, and financial market operational efficiency in multiple ways. Future research should further explore these impact mechanisms to provide more scientific and accurate support for policy formulation.

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