The Influence Mechanism, Realistic Dilemma and Development Path of Digital Economy on Chinese Enterprises' Innovation

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Abstract. With the progress of China's digital economy, it is significant to study whether and how the advance of digital economy can enhance the innovation ability of Chinese enterprises. This text discusses the effect of digital economy advance on companies' innovation ability as well as its mechanism, as well as the realistic dilemma it faces, and then gives the concrete development path. This paper shows that digital economy promotes the development of innovation capability of Chinese enterprises through three aspects: reconstruction of innovation elements, improvement of external resources and reorganization of knowledge elements. On the other hand, financing is difficult and expensive, the imbalance of regional development of the digital economy, digital divide and digital poverty and other phenomena are realistic dilemmas that need to be faced and solved. In the end, the paper points out that the innovation capabilities of enterprises can be promoted by vigorously developing the digital economy, improving the digital level of enterprises, expanding the financing channels of enterprises through the digital platform, easing the financing restriction on companies, and narrowing the digital gap between metropolitan and villages through the active role of the government and society.

Keywords: Digital Economy; Enterprise Innovation Ability; Economic Development.

1. Introduction

With the development of relevant digital economy industries represented by big data and cloud computing, data has become a significant factor to promote the progress of Chinese enterprises. In order to integrate digital economy and real economy, the advance direction of digitization as well as intelligence is the right way, and digital economy technology should be used to comprehensively change traditional industries, improve factor productivity, and play the role of digital technology in promoting economic development. According to the Digital China Development Report (2020) 1), the added value of major industries in China's digital economy will increase to 7.8% of GDP in 2020, becoming an important force to promote economic development. Therefore, according to the current social trend of attaching importance to the development of industries related to the digital economy, this paper theoretically explains and empirically supports how the digital economy affects enterprise development, the realistic dilemmas faced in the innovation process and the concrete measures affecting enterprise innovation from multiple perspectives. (Http: / /www.gov.cn /xinwen /2021-07 /03 /content_5622668.htm).

2. Literature

Digital economy has become a social topic in recent years. Scholars mainly discuss the nature of digital economy and its influence on company innovation and development. First, digital economy and its characteristics. Before discussing the influence of digital economy on the innovation ability of enterprises, the concept of digital economy should be clearly understood. The concept of digital economy first appeared in the late 20th century, and its core meaning refers to the promotion of industrial digital development. Zhang (2019) [1] argues that the essence of digital economy is the coordination of human economic activities guided by technology to optimize resource allocation and the constant changes of new production organization modes. The OECD's model for calculating the level of digital economy takes factors such as employment contribution and social vitality into

account. Second, the impact of digital economy on enterprise innovation. First of all, the marginal input in the production process of enterprises can be greatly reduced because the production factors in the era of digital economy are characterized by low cost and high efficiency (Xu et al., 2022) [2], this can improve the operating profit of enterprises and increase the vitality of enterprises' innovation. Secondly, digital economy has changed the original financial service mode, and the phenomenon of information asymmetry between companies and financial institutions has been improved by using digital technology (Song et al., 2021) [3], which expands the financing channels of enterprises and ensures that enterprises have enough funds to carry out innovative activities.

3. Contribution

The contribution of this paper is mainly reflected in two aspects. First, from the perspective, most of the current digital economy-related materials focus on quantitative assessment, and there is a lack of explanation and exploration on how the digital economy affects company innovation from a qualitative angle. Therefore, this essay attempts to provide an important supplement to the research on the influence mechanism, dilemma and development path of the digital economy on Chinese companies' innovation from a qualitative perspective. Second, in terms of enlightenment, the research conclusion has important practical significance. On the one hand, this paper reveals the importance of digital economy to enterprise innovation and provides guidance for the country to accelerate the promotion of enterprise digitization. On the other hand, this paper points out the problems that enterprises need to face in the advance of digital economy, and points out the solutions and development direction for the challenges faced by Chinese enterprises under the digital economy.

4. The Influence Mechanism of Digital Economy on the Innovation of Chinese Enterprises

4.1 Reshaping Innovation Factors

The relationship between enterprise innovation and the supply of production factors is very close. At the level of capital, innovation requires much money input], and financing constraint is an important factor hindering enterprise innovation (Zhang et al., 2012) [4]. On the one hand, the development of digital economy can reduce the operating costs of enterprises. The emergence of digital technology not only reduces the searching costs of enterprises, but also makes the supply and demand of both sides of the transaction accurately match. On the other hand, the development of digital economy can greatly reduce the risk of company’s operation and improve the possibility of successful financing. For example, the emergence of sharing economy can improve the efficiency of resource allocation and reduce the cost of management and maintenance, so that enterprises can reduce operational risks, increase the capital inflow of scientific and technological innovation enterprises, weaken the capital restriction of technological innovation enterprises, and help scientific and technological innovation enterprises to obtain research and development capital support and accumulate research and development capital.

4.2 Improving External Resources

Supply chain concentration has an important impact on the innovation activities of enterprises (Meng et al., 2018) [5]. Too high concentration of supply chain will reduce the bargaining power of enterprises, thus bringing a negative impact on enterprises and making it difficult to obtain their innovation ability. On the one hand, digital economy facilitates the link between enterprises, making it more convenient for enterprises to receive information, and improving the timeliness of supply and demand market, solving the problems of information opacity in the supply chain. Thus, enterprises can reduce their dependence on suppliers and avoid the erosion of innovation resources. On the other hand, the emergence of digital economy has promoted the development of platform enterprises, making more new exchanges and cooperation between enterprises and customers. The attraction of

the platform to customers enables enterprises to connect more customers, reduce the degree of customer concentration, and avoid the behavior caused by high customer concentration that hinders enterprise innovation activities (Wang and Gao ,2017) [6]. Therefore, the advance of digital economy can reduce the concentration of supply chain and enhance the innovation ability of enterprises.

4.3 Reorganization of Knowledge Elements

The emergence of the digital economy is conducive to greater knowledge dissemination and enterprise innovation. First, the development of digital technology will make the market environment change rapidly. Relying only on the enterprise's own knowledge to innovate cannot keep pace with the development of the digital economy era. By promoting the connection of knowledge networks among enterprises, digital economy can break the regional barriers faced by knowledge transmission, so as to rationally allocate information resources within the industry (Zhang et al., 2011) [7], accelerate the speed of knowledge circulation, and thus improve the information circulation degree and knowledge reception rate among enterprises. Thus, enterprises' innovation ability can be improved. Secondly, in the context of rapid product changes, enterprises need to adapt to the rapidly changing market environment through continuous innovation. With the rapid advance of digital economy, the problem of backward information transmission can be effectively improved, and the cooperation efficiency of knowledge sharing between enterprises can also be improved (Zhao et al., 2021) [8], so as to ensure that the iteration of enterprise products follows the pace of market demand changes. Finally, talent is the basis of enterprise innovation. Enterprises can recruit new talents and integrate new knowledge into the production process. The resulting knowledge update can further improve the innovation capability of companies and lay a foundation for improving the innovation ability of enterprises.

5. The Difficulties and Challenges Brought by Digital Economy to Chinese Enterprises' Innovation

5.1 Financing is Difficult and Expensive

Innovation is the primary driving force. Through the combination of advanced technology and the financial field, digital finance provides a realistic possibility to solve the dilemma of the poor connection between the financial end and the physical end of capital supply and demand. Some scholars have pointed out that digital finance has changed the operation mode of traditional financial intermediaries and realized a new business model through intelligent algorithm and cloud computing, which is conducive to reducing the cost of financial services [9]. Also, with the support of advanced technologies such as big data and AI, digital finance plays an important role in improving the business efficiency of financial institutions, alleviating information asymmetry and expanding the sources of capital supply, etc., providing solutions to solve the financing problems of enterprises. However, it is worrying that digital finance is financial in nature and cannot completely get rid of the negative externalities and pro-cyclicality of financial risks. Under the superposition of advanced technology and network communication, the sudden probability and fluctuation range of risk contagion are likely to be greatly increased, which expands the risk exposure of the real economy (Tang et al., 2019) [9]. What ultimately affects the real economy is the corporate financing environment at the micro level. Meanwhile, digital finance also brings regulatory challenges. The current financial regulatory framework mainly focuses on prudential supervision, functional supervision and behavioral supervision. However, due to the lag of regulatory technology, digital, intelligent and dynamic financial innovation activities are difficult to be effectively monitored. In addition, some information companies that are not engaged in financial business but have an important impact on financial stability are still outside the regulatory framework (Li and Jiang, 2017) [10], which leads to the continuous exposure of regulatory gaps and the expansion of financial exposure. Undeniably, the rise of financial risks will inevitably increase the risk aversion of financial investors, which will be

transmitted to micro individuals and ultimately affect the financing stability and sustainability of real enterprises as well as the increase of financing costs.

5.2 The Level of Development of Digital Economy is Unbalanced among Regions

Although the total amount of digital economy has been growing rapidly, the development of digital economy still exists regional imbalance. First, the imbalance of digital economy development between regions is reflected in the imbalance of regional economic development in different provinces. There is a big difference in the level of digital economy development in every province in our country. From the perspective of total development volume, in 2017, the digital economy scale of Guangdong, Jiangsu and Shandong accounted for one-third of the national total digital economy, while the total digital economy scale of Northwest China was only equivalent to 4% of the national total digital economy, and the old industrial zone of Northeast China only accounted for 5.3% of the national total (OECD, 2017). This shows that in the era of digital economy, the digital economy industry in economically underdeveloped areas is still lagging behind. Second, the unbalanced development of digital economy is reflected in city and villages, and the digital divide between countryside and city is still quite obvious. According to the report, as of December 2017, the number of rural Internet users reached 209 million, 7.93 million more than that at the end of 2016, with a growth rate of only 4.0%, lower than the number of urban Internet users (6.2%). Internet penetration in urban areas is 71 per cent, while in rural areas it is only 35.4 per cent. In addition, there is a big gap between rural and urban Internet users in how to use digital technology to improve productivity. This imbalance will greatly widen the gap of digital economy resources between town and country, which will lead to the imbalance of innovation and development of urban and rural enterprises and further hinder the development of social economy.

5.3 The Digital Divide and Digital Poverty Remain

While the development of digital economy has brought new opportunities for the rapid development of small and medium-sized enterprises, it is undeniable that there is still a big gap between small and medium-sized enterprises and large enterprises in digitization. For example, e-commerce sales as a percentage of turnover tell a similar story. On average, electronic sales accounted for 17.1% of total turnover, but the turnover of large companies was 22.1%, while that of small businesses was 9% (Xiong and Dong, 2022) [11]. For small and medium-sized enterprises in China, there is also a big gap with large enterprises in the application of digital technology. Take ERP as an example, because of its high application risk, its penetration rate in small and medium-sized enterprises is less than 10%. Smes face greater trial and error costs and risks than larger companies and are more conservative in their use of digital technology. Secondly, digital poverty is also a major challenge of the digital economy affecting enterprise innovation. It is mainly manifested as the obstacles of the elderly in mastering digital skills, using smart devices smoothly and using online services flexibly, and the disadvantages of the elderly in network accessibility and ICT access (Qiu, 2021) [12].

6. The Path Analysis of the Influence of Digital Economy on Enterprise Innovation

6.1 Develop the Digital Economy and Raise the Digital Level of Enterprises

The improvement of enterprise digitization level can be realized by constructing digital ecosystem. The application of digital technology is reflected in every link of the value chain. For example, in the product design and development stage, enterprises can make big data analysis of market demand by using digital technology, so as to combine enterprise products with consumer demand. Then designers can design products that meet market demand by using digital design technology, such as VR/AR, computer bionics and other digital technology tools. For another example, in the production and

manufacturing stage, enterprises can strengthen the construction of industrial Internet and Internet of things, improve the intelligent level of production process, and promote the improvement of production efficiency. In the stage of production and market management, increasing the supply of digital technologies and equipment such as remote diagnosis and maintenance and intelligent customization will greatly improve the efficiency of production management of enterprises. In this way, through the integration of management and technology, accelerating the construction of digital infrastructure, promoting the collaboration of industrial digital ecology, building a more open industrial ecology, and developing strategies and long-term plans for enterprise digital transformation, the innovation capability of enterprises can be improved.

6.2 Expand Financing Channels and Ease Financing Constraints for Enterprises Through Digital Economy Platforms

The digital economy can help companies solve financing challenges in a number of ways. Firstly, information asymmetry can easily lead to adverse selection and moral hazard. In the case of information asymmetry, banks increase loan prices to avoid risks, resulting in higher financing costs, or implement credit rationing, and restrict financing to those with high information asymmetry. The improvement of enterprise digital development level can improve information transparency and reduce information friction by improving information disclosure ability and motivation (Li et al., 2021) [13]. The application of digital technology can also expand the depth and breadth of enterprise information acquisition (Qi et al., 2020) [14], optimize the integration of information collection, processing, analysis and application, alleviate information asymmetry (Han et al., 2019) [15], and help alleviate financing constraints. Secondly, digital systems can help enterprises establish credit records, drive the availability of formal financing with data, and alleviate financing constraints. Finally, the application of digital technology can reduce financial risks, better match resources with the risk characteristics of enterprise innovation projects (Wang et al., 2019) [16], so that they can better choose financing channels, promote enterprise deleveraging, and promote the stability of financial conditions (Tang et al., 2020) [17]. Thus, providing a strong financial guarantee for innovative activities. In a word, digital development can help enterprises expand financing channels, reduce transaction costs, expand financing scale, identify financial risks, stabilize financial conditions, and provide funding guarantee for enterprise innovation.

6.3 The Government and Society Should Play an Active Role in Narrowing the Digital Divide between Metropolitan and Countryside.

In order to narrow the digital divide between urban and rural areas, the country should strengthen the cooperation between various departments, mobilize and mobilize the central and local governments in the aspects of organization and input management, and do a good job in unified planning, coordinated management, use limited resources, and accelerate the process of the integration of the three networks (Mu, 2010) [18]. At the same time, the government can provide preferential tax and loan for enterprises with high-tech industries and information infrastructure to invest in rural construction (Zhao, 2009) [19]. On the other hand, college students, media workers and scientific and technological personnel are encouraged and supported to go into rural areas to carry out "information poverty alleviation" activities and improve the information literacy of rural residents, encouraging and supporting scientific and technical personnel who are well aware of farmers' hardships and needs to provide technical support to farmers. Fixed awards will be given to journalists who go deep into rural communities to explain the facts of the report and have a great influence on society.

Finally, narrowing the digital divide between urban and rural areas depends on the improvement of the information ecological environment. Therefore, the government should formulate fair information policies, improve laws and regulations related to the information industry, create an information environment conducive to the healthy development of rural areas, guide and standardize

the orderly development of rural informatization construction, so as to coordinate the development of urban and rural digital economy and promote company innovation.

7. Conclusion

Under the background of the rapid progress of digital economy industry, this essay expounds the relationship between digital economy and enterprise innovation from three aspects: influence mechanism, realistic dilemma and development path. In a word, this paper mainly draws the following conclusions. First of all, in terms of influence mechanism, digital economy can promote enterprise innovation by reshaping innovation elements. On the one hand, digital economy can reduce the operating costs of enterprises to alleviate the capital problems of enterprises, and it can also alleviate the capital restriction of enterprises by reducing the operating risks of enterprises and improving the availability of financing. Second, improving external resources is also a way for the digital economy to promote corporate innovation. Finally, the digital economy can stimulate the creative thinking of R&D personnel and promote the advance of enterprise innovation by expanding the knowledge network of enterprises, strengthening the learning and communication between R&D personnel and improving the communication between different departments. In addition, the paper also points out the difficulties and challenges faced by Chinese enterprises' innovation in the context of the development of digital economy, such as the difficulty in effectively monitoring financial innovation activities caused by the backward regulatory technology, which will affect the stability of enterprises' financing and the increase of financing costs. On the other hand, the gap in the ability of villagers to use digital technology in the east and west will lead to the gap in digital economy resources between regions, resulting in the unbalanced innovation and development of urban and rural enterprises and further hindering social and economic development. Finally, the phenomenon of digital divide and digital poverty is also a problem that enterprises need to face in the process of innovation. In view of the above phenomena, the article points out that enterprises can improve their innovation ability through the following aspects: firstly, they can vigorously develop the digital economy to improve the digital level of enterprises; secondly, they can expand the financing channels of enterprises through the digital economy platform to ease the financing constraints of enterprises. Thirdly, the government and all sectors of society should play an active role in narrowing the digital divide between urban and rural areas.

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