



(REVIEW ARTICLE)



Research on the mechanism of enhancing digital innovation capability of strategic emerging enterprises-taking Haining manufacturing enterprises as an example

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World Journal of Advanced Research and Reviews, 2024, 22(01), 1671–1678

Publication history: Received on 08 March 2024; revised on 24 April 2024; accepted on 25 April 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.22.1.1277>

Abstract

In the context of the digital economy era, digital transformation has become a key driving force for the development of strategic emerging enterprises. The enhancement of digital innovation ability is especially important for strategic emerging industries, which can not only improve the market competitiveness of enterprises, but also promote the optimization and upgrading of industrial structure. After investigation and analysis, strategic emerging industries face the challenges of imperfect management and organization system within enterprises, weak government support, and insufficient innovation atmosphere in the social environment on the road to digitalization, and the enhancement of their digital innovation capability often requires the synergy of internal enterprise mechanism and external support. To address the above issues, this study takes manufacturing enterprises in Haining City, Zhejiang Province, as the object of research, and investigates the mechanism of enhancing the digital innovation capability of strategic emerging enterprises from three levels: the enterprise level, the government level, and the social environment level. This study has important theoretical and practical significance for understanding how strategic emerging enterprises can enhance their competitiveness through digital means, and how governments can formulate effective policies to support enterprises' digital innovation.

Keywords: Strategic Emerging Enterprises; Digital Innovation Capability; Manufacturing Enterprises; Haining City

1. Introduction

Against the background of continuous change of global economy and rapid development of technology, strategic emerging industries, as the new engine of China's economic growth, have been given the major mission of promoting high-quality development of economy. China has always attached great importance to the cultivation and development of strategic emerging industries, and in 2010, the State Council issued the Decision of the State Council on Accelerating the Cultivation and Development of Strategic Emerging Industries, which explicitly put forward the need to "seize the opportunity to accelerate the cultivation and development of strategic emerging industries[1]". With the implementation of the Outline of the Fourteenth Five-Year Plan and the Visionary Goals for 2035 of the National Economic and Social Development of the People's Republic of China (hereinafter referred to as the Outline of the Fourteenth Five-Year Plan), China has put forward a higher level of demands for the promotion of integration, clustering and eco-development of strategic emerging industries. The implementation of the "Fourteenth Five-Year Plan" (hereinafter referred to as the "Fourteenth Five-Year Plan"), China has put forward higher requirements for promoting the integration, clustering and ecological development of strategic emerging industries[2], which not only heralds a comprehensive innovation of the industrial development mode, but also provides new guidance and impetus for the innovation activities inside and outside the industry. As one of the key factors to promote the development of strategic emerging enterprises, digital innovation plays a crucial role in the transformation and upgrading of enterprises and the enhancement of core competitiveness. In the field of manufacturing, digital innovation can not only improve production

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efficiency and product quality, but also promote the generation of new products and the innovation of service mode, injecting new vitality into traditional industries. As an important manufacturing base in Zhejiang Province, Haining City's manufacturing enterprises urgently need to realize innovation breakthroughs by means of digitalization in the face of fierce competition in domestic and international markets and increasingly severe technological challenges. However, strategic emerging enterprises often face the problems of insufficient resource allocation, weak innovation ability and limited external support in the process of digital transformation, which becomes a bottleneck restricting their rapid development.

In recent years, the enhancement of digital innovation capability of strategic emerging enterprises has become an important research direction. In Liu Yirong's study, using a panel model, it is illustrated that government subsidies have a significant impact on the green innovation of enterprises[3]. This shows that government subsidies can not only provide financial support for enterprises, but also promote enterprises to carry out green innovation by guiding their innovation direction. Cao Lixia's study shows that diversified human resource management can help enterprises attract and retain various types of talents[4], thus improving the innovation ability of enterprises. And the research of Zhang Hongxia and Gu Yinkuan proves that financial supply-side structural reform can provide a better financial environment for enterprise innovation by optimizing the allocation of financial resources and improving the efficiency of financial services[5]. In the research on the mechanism of enhancing the digital innovation capacity of strategic emerging enterprises, scholars have proposed measures to promote digital innovation in strategic emerging industries from different perspectives. These measures can be categorized into three main dimensions: enterprise level, government level and social environment. The existing research analysis provides important theoretical support for us to understand the mechanism and path of enhancing the digital innovation capability of strategic emerging enterprises. It provides theoretical and practical references for promoting digital innovation in strategic emerging industries in Haining. In this study, we will draw on the innovation influencing factors verified by prior researchers, and then combine the actual situation of Haining's manufacturing industry to deeply explore and analyze the strategies to promote the innovation of manufacturing enterprises in Haining's strategic emerging enterprises. By considering the geographical characteristics and industrial environment, this study aims to propose a customized innovation promotion mechanism, with a view to providing theoretical and practical support for the enhancement of enterprises' digital innovation capability in a localized context.

2. Haining strategic emerging enterprises innovation capacity development status and existing problems

2.1. Analysis of the current state of development

With the deepening of digital transformation, the digital innovation capability of strategic emerging enterprises has become the key to their competitiveness. Against the backdrop of global economic integration and rapid development of information technology, digital transformation has become an important driving force for enterprise development. For strategic emerging enterprises, digital innovation capability is not only related to their competitive position in the market, but also the key to achieving sustainable development. Haining, as an important manufacturing base on the eastern coast of China, is of great significance for the digitalization process and the enhancement of innovation capability of its enterprises.

Haining enterprises have certain foundation and advantages in digital innovation. On the one hand, Haining enterprises actively introduce and absorb advanced digital technologies, such as big data, cloud computing, Internet of Things, etc., to improve the level of product intelligence and production efficiency through technological innovation. Secondly, enterprises continue to explore new business models, such as expanding the market through e-commerce platforms, realizing the integration of online and offline, and improving market response speed and service quality. In addition, enterprises initially apply digital means to optimize internal management, realize effective integration of information flow, logistics and capital flow, and improve decision-making efficiency and operational effectiveness. On the other hand, the government has introduced a series of supportive policies to encourage enterprises to increase R&D investment and support digital technology application and industrial upgrading. In addition, entrepreneurs have a certain sense of innovation, dare to take risks to try and tolerate mistakes and failures, and initially create an open and inclusive innovation culture.

2.2. Analysis of problems

With the deepening of globalization and the information age, digital transformation has become a key driver of sustained competition for enterprises. For strategic emerging enterprises, efficient digital innovation can not only improve their

market response speed and service quality, but also bring new business models and growth points. However, in the face of this wave of transformation, Haining's manufacturing enterprises are facing multiple dilemmas and challenges.

3. The internal management organization system of the enterprise needs to be improved

3.1. Insufficient cultivation and introduction of talents.

Haining manufacturing enterprises face the double dilemma of lack of talents in the process of digital innovation. On the one hand, there is a lack of sufficient internal digital talent training mechanism, resulting in a lack of ability of existing employees in data analysis, software development and other related fields; on the other hand, the enterprise's competitiveness in attracting external high-end digital talent is insufficient, making it difficult to quickly replenish the required skills gap.

Corporate culture is not conducive to digital innovation. Corporate cultures rooted in traditional manufacturing industries tend to emphasize processes and norms over rapid iteration and innovation. This cultural environment inhibits innovation and risk-taking among employees, resulting in slow and inefficient digital innovation across the organization.

Low investment in R&D. The overall investment in R&D by Haining's manufacturing enterprises is low compared to that of leading enterprises in the same industry. In particular, the lack of investment in digital technology and intelligent equipment makes it difficult for these enterprises to keep up with the pace of development of the industry in terms of technology, which affects the development of new products and the enhancement of market competitiveness.

Weak data management and analysis capabilities. Data is the core resource of digital innovation, and the ability of Haining manufacturing enterprises in data management and analysis has not yet been systematized and standardized. The lack of effective data collection, processing and analysis tools, as well as corresponding professionals, limits the ability of enterprises to utilize data-driven decision-making and innovation.

3.2. Government support needs to be strengthened

Inadequate construction of digital infrastructure. Although the Haining region has achieved some economic development, it is still deficient in the development of digital infrastructure. The lack of data processing centers limits the ability of local businesses to take full advantage of digital tools for innovation. In addition, the lagging infrastructure development of emerging technologies such as smart manufacturing and the Internet of Things (IoT) has also affected the application and expansion of enterprises in digitalization.

Insufficient policy support. Although the government has promulgated a series of policies aimed at promoting the development of high-tech industries, the actual effect of these policies is not significant for local manufacturing enterprises in Haining. In particular, the lack of financial support in terms of R&D subsidies makes enterprises more cautious in R&D investment and difficult to undertake high-risk innovation projects. The lack of targeted financial support and tax incentives further increases the resistance of enterprises on the road to digitization.

An immature talent development system. The key to digital innovation is to have a stable and high-quality talent team. In Haining, despite the government's increasing investment in education, the professional talent training system closely related to digital innovation is still immature. There is a gap between higher education and vocational education in connecting with the actual needs of enterprises, which makes it difficult for graduates to meet the needs of enterprises in terms of practical ability and innovation. At the same time, the lack of policy support for continuing education and on-the-job training limits the opportunities for existing employees to upgrade their digital skills.

3.3. The innovation atmosphere in the social environment has to be rendered

Low market demand for innovation. Haining, as a traditional manufacturing base, has a relatively traditional market environment with limited demand for digitally innovative products and services. Client companies and consumers are less receptive to emerging digital technologies, resulting in companies facing less market pull when making digital innovations. This situation diminishes the motivation and sense of urgency for companies to invest in research and development of digital products.

Financial support for business digital innovation is low. Financial institutions appear to be conservative in providing support for enterprise digital innovation projects. The lack of specialized financial products and services for innovation projects, coupled with an imperfect risk assessment system, makes enterprises encounter obstacles when seeking

financial support. Small and medium-sized enterprises (SMEs), in particular, have greater difficulty in obtaining financing without adequate collateral.

Small participation of social capital. In addition to government and financial institutions, the participation of social capital in enterprise digital innovation is also relatively limited. Social capital, including private investors and venture capital firms, has not invested enough in innovative enterprises, especially start-ups, making it difficult for enterprises to obtain sufficient financial support in the early stages of development.

The atmosphere of social innovation culture is poor. The Haining region still needs to cultivate a more positive innovation culture atmosphere. The current society at large is less tolerant of innovation failure and lacks a tolerant mindset towards innovation attempts and entrepreneurial failures. In addition, the local society is not strong enough to protect the achievements of innovation, and the protection of intellectual property rights needs to be strengthened, all these factors are not conducive to creating an environment that encourages exploration and innovation.

4. Mechanism for the development of innovation capacity of strategic emerging enterprises in Haining

In order to enhance the ability of Haining's manufacturing enterprises in digital innovation, it is necessary for multiple subjects to work together to form a good ecosystem of interaction and cooperation in order to promote the continuous improvement of the enterprise's innovation ability, so as to provide impetus for the high-quality development of the economy.

4.1. Enterprise level

In the process of digital innovation, enterprises play a central role and have a decisive impact on the enhancement of digital innovation capacity in Haining area. By setting up a model enterprise for digital innovation in Haining's manufacturing industry, it can not only play a demonstration and leading effect, but also drive other enterprises to move forward together on the road of innovation, thus realizing the enhancement of the overall manufacturing innovation capability. For the current problems faced by the manufacturing industry in Haining, you can start from the following aspects to enhance the enterprise's digital innovation ability:

4.1.1. Building a corporate culture that encourages innovation

Innovative talents are a key factor in promoting innovation. Enterprises should take the initiative to attract and cultivate innovative talents, attract external talents by providing attractive benefits and career development opportunities, and enhance the innovative thinking and capabilities of existing employees through training. Enterprises should build a diversified human resource management system, which not only enriches their knowledge base, but also helps them make breakthroughs in product development, service improvement and process optimization. A diversified talent team can provide enterprises with broader and deeper market insights and help them cope with the constant changes in the market. At the same time, a culture of openness and encouragement of innovation will help attract and retain talented people. In addition, through the implementation of equity incentive plans and other means, the compensation of employees can be closely linked to the long-term performance of the enterprise, which will inspire them to release their innovative potential[6] and promote the overall innovation ability of the enterprise. Finally, enterprises can strengthen their digital innovation capability by optimizing their organizational structure and management system, conducting a detailed analysis of the current situation of the enterprise, clarifying their own strengths and weaknesses, and formulating corresponding strategies and action plans according to the short-term or long-term innovation goals, so as to achieve a reasonable allocation of employees, business processes and organizational structure.

4.1.2. Improve enterprise data management and analysis capabilities

The information asymmetry problem faced by manufacturing enterprises in Haining restricts production efficiency and market responsiveness. Enterprises can establish close contact with consumers through market research and other means to fully understand consumer demand, thus guiding the innovation of products or services and making production and consumption more compatible, thus stimulating the innovation vitality of enterprises. At the same time, the application of big data and artificial intelligence technology can provide enterprises with valuable market insights and resource integration platforms, facilitate the generation of innovation inspiration, and assist the innovation process, making innovation more rapid and flexible. In addition, big data and AI promote the effective collection, processing and analysis of data, improving the ability of enterprises to utilize data-driven decision-making and innovation[7]. Therefore, Haining manufacturing enterprises need to further develop and utilize these technologies so that they can play a full role in the innovation process and enhance their digital innovation capabilities.

4.1.3. Promoting the transformation and upgrading of traditional manufacturing industries

Haining's traditional manufacturing industry, which mostly adopts traditional production modes, is difficult to meet the current market and enterprise innovation needs. Transforming and upgrading the traditional manufacturing industry can enhance its competitiveness, enable it to better adapt to market changes and improve its digital innovation capability. First, enterprises can increase their investment in technology research and development, improve their independent research and development capabilities, and promote the innovation and upgrading of products and services. Secondly, Haining's traditional manufacturing industry can transform to intelligence and automation, adopt advanced manufacturing technology and management mode, and improve production efficiency and product quality to adapt to changes in market demand.

5. Government level

As an important supporter of digital innovation, the government plays a crucial role in enhancing the digital innovation capacity of Haining region. By formulating and implementing corresponding policies and measures, the government is able to cultivate high-tech enterprises and enhance the comprehensive innovation capacity of manufacturing enterprises, which in turn promotes the improvement of the overall innovation capacity of Haining's manufacturing industry. In order to promote the development of Haining's manufacturing innovation capacity, the government can strategically layout from the following aspects:

5.1. Increased policy support

The government's policy orientation not only guides the direction of enterprise innovation, but also provides the necessary support and assistance for the development of enterprise innovation. The government can incentivize enterprises to carry out technological innovation through tax incentives to reduce their innovation costs and mitigate innovation risks[8]. For example, according to the industrial characteristics and development needs of the Haining area, the government can introduce tax incentives for digital transformation enterprises, such as reduction or exemption of enterprise income tax and value-added tax, etc. Especially for enterprises with large R&D investment and strong technological innovation ability, the government can give a greater degree of tax exemption and simplify the related tax process so that enterprises can enjoy tax incentives more conveniently. In addition, the government can provide financial support for the innovative activities of enterprises, adjust the R&D subsidy policy, set up special funds to support R&D activities, technological transformation and achievement transformation in the field of digital innovation, and enhance the support of financial institutions for innovative enterprises through risk compensation and loan guarantees.

5.2. Promoting the building of a talented workforce

Talent is the core resource of enterprise innovation and the key factor of innovation. While enterprises actively introduce and cultivate talents, Haining government should also be committed to optimizing the mechanism of talent introduction and cultivation. The government attracts and retains high-level talents through preferential policies that can provide housing subsidies, settlement fees, children's education, etc., especially those experts and technical backbones who have made remarkable achievements in the field of digital technology. In terms of talent cultivation, the government should promote the development of higher education and foster university-enterprise cooperation, so that the educational resources of universities can be combined with the needs of enterprises to orient the cultivation of innovative talents that meet the development needs of the industry. While the government supports the development of higher education institutions in the Haining region, it should also encourage universities to establish close partnerships with enterprises to cultivate professionals who meet the needs of digital innovation.

5.3. Improvement of digital infrastructure

Digital infrastructure is the cornerstone of enterprise innovation activities, and through the improvement of digital infrastructure construction, it not only improves the convenience and flexibility of enterprise innovation, but also enhances the vitality of enterprise innovation, which is a powerful driving force for enterprise innovation. On the one hand, the government can provide stable and reliable digital services for enterprises by strengthening digital infrastructure investment, such as investment in data centers, cloud computing platforms, broadband networks and other digital infrastructure. On the other hand, the government can promote the open sharing of public data[9]. The open sharing of public data can provide rich data resources for enterprises and promote data-driven innovation and business development.

6. Socio-environmental dimensions

The social environment has a profound impact on the digital innovation of enterprises, and there are significant differences in the degree of innovation support and tolerance received by enterprises in different social environments. An open and inclusive social climate that encourages innovation can significantly enhance the digital innovation capability of enterprises. In order to promote the formation and development of such a social innovation climate, the following key aspects can be addressed:

6.1. Building an orderly competitive market environment

Enterprises can invest in innovation only in an orderly and fairly competitive market environment. Therefore, first of all, market cooperation should be encouraged to stimulate Haining's emerging enterprises to cooperate with domestic and foreign enterprises in the field of digital technology, and to accelerate technological progress and innovative applications through technology introduction, joint research and development, and other modes. In addition, synergistic cooperation among local manufacturing enterprises should be promoted to realize resource sharing and collaborative innovation. Secondly, market competition needs to be strengthened to create a fair competitive environment to motivate enterprises to improve the quality of products and services and market competitiveness through digital transformation. Reasonable market competition can promote the innovation vitality of enterprises and improve innovation efficiency[10]. Finally, enterprises are guided to pay close attention to changes in market demand and adjust their digital product and service strategies in a timely manner in order to better meet the individualized and diversified needs of consumers. At the same time, encouraging consumers to adopt innovative products will enhance enterprises' incentive to innovate and profit margins by expanding the market share of innovative products.

6.2. Fostering a culture conducive to innovation

Innovation is not only the renewal of technology and products, but also a value deeply rooted in corporate culture and social cognition. First, it is recommended to build an industry-wide digital innovation platform, provide technical service support including data analysis, cloud computing and artificial intelligence, relax the threshold of enterprise digital transformation, and promote the sharing and exchange of knowledge and technology. Second, cultivate the entrepreneurial spirit of courageous experimentation and innovation, incorporate the concept of innovation into the corporate culture, encourage employees to actively participate in the digital transformation process, and create a positive and innovative atmosphere[11]. Finally, use local social resources such as industry associations, chambers of commerce and other organizations to establish a mutual trust mechanism among enterprises, promote the exchange of information and cooperation among enterprises, and jointly promote the innovation of Haining's strategic emerging industries in digital technology and business models.

6.3. Optimizing the environment for enterprise financing

Providing diversified financing channels for emerging enterprises is an important part of promoting structural reform on the supply side of finance. The Government and financial institutions should optimize financial products and services and provide a variety of financing methods, including equity financing, debt financing and policy loans, especially to provide more support to those enterprises committed to digital transformation projects. These measures will help to reduce the financial burden on enterprises in the innovation process, lower the risk of innovation and provide them with the necessary financial support, thus creating a financial environment conducive to the digital innovation of enterprises.

The mechanism for improving the digital innovation capacity of strategic emerging enterprises is shown in the following figure

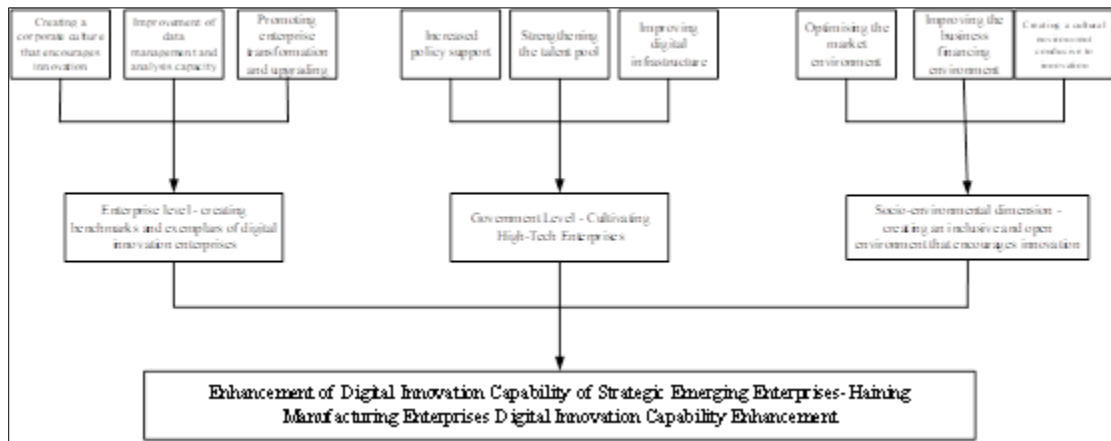


Figure 1 Mechanism for improving digital innovation capacity of strategic emerging enterprises

7. Conclusions

This study discusses how to improve the ability of Haining manufacturing enterprises in digital innovation, and proposes the necessity of multi-party subjects working together to form a cooperative ecology to promote the continuous improvement of enterprise innovation ability, and promotes the construction of a mechanism for improving the digital innovation ability of strategic emerging enterprises. The study shows that enterprises themselves play a central role in establishing an innovation culture, improving data management and analysis capabilities, and promoting the transformation and upgrading of traditional manufacturing industries. Meanwhile, the government, as a key supporter, provides the necessary external conditions for enterprises' digital innovation through policy support, talent team building and digital infrastructure improvement. In addition, the social environment also has a significant impact on the digital innovation of enterprises, and building a favorable market competition environment, cultivating a culture of innovation and optimizing the financing environment are the key factors to promote the digital innovation of enterprises.

Theoretical contributions and practical implications

- Theoretical contributions

This study provides an integrative framework that combines the enhancement of firms' internal innovation capabilities with the support of the external environment, and emphasizes the role of the government and the social environment in the process of firms' digital transformation. Through an in-depth analysis of manufacturing enterprises in the Haining region, this study further enriches the theory of the relationship between digital innovation and enterprise competitiveness, and points out the importance of innovative talents, data-driven and technological upgrading in the development of enterprise innovation. It promotes the construction and improvement of the theoretical system of the mechanism for improving the digital innovation capacity of strategic emerging enterprises.

- Practical Insights

This study highlights the importance of developing a practical digital innovation strategy. Firms need to establish an organizational culture that encourages innovation, attract and cultivate a diverse talent pool, and improve decision-making efficiency by leveraging big data and artificial intelligence technologies. The government should continue to deepen policy support, increase investment in digital infrastructure, and promote innovative activities among enterprises through public data sharing. In addition, it should strengthen inter-firm cooperation to stimulate market dynamics, as well as optimize financing channels to lower financial barriers for enterprises on the road to digitization.

- *Practical limitations and future prospects*

Although this study proposes a series of strategies to promote digital innovation in enterprises, there are some limitations. For example, the study mainly focuses on the macro level and policy recommendations, while insufficient consideration is given to the micro challenges and barriers that specific firms may encounter in the implementation process. In addition, since the scope of the study is specific to the Haining region, it may not be possible to directly generalize all the findings to enterprises in other regions.

Future research could further explore the specific needs and challenges of digital innovation for enterprises of different sizes and types, providing a basis for the formulation of more customized and precise policy measures. At the same time, it can compare the policy environments and market conditions in different regions or countries, and assess the impact of these factors on enterprises' digital innovation, so as to draw more generalized conclusions. In addition, as emerging digital technologies continue to emerge, future research should also focus on how these technologies can be effectively integrated into firms' innovation practices, as well as their long-term impact on firms' competitiveness and economic growth.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Funding

Zhejiang University of Finance and Economics Dongfang College, "Research on the Mechanism and Path of Enhancing the Digital Innovation Capability of Strategic Emerging Enterprises-Taking Haining Manufacturing Enterprises as an Example" (2023dfyz012).

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