

Research on Countermeasures of Green Transformation of Liaoning Manufacturing Industry Enabled by Digital Economy

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Abstract

The digital economy can improve the innovation capacity and service level of the manufacturing industry, promote the transformation and upgrading of the manufacturing industry, reshape the global value chain, improve the efficiency of resource allocation, enhance the total factor productivity and release economic vitality, and contribute to the high-quality development of the Chinese economy. The development of Liaoning's manufacturing industry is mainly reflected in the increasing policy support, the proportion of digital economy in GDP increasing year by year, the steady development of new infrastructure construction, the in-depth application of digital sharing platforms, and the continuous improvement of enterprise economic benefits. This paper analyzes the existing problems and puts forward countermeasures and suggestions such as strengthening the supporting capacity of digital infrastructure, balancing the digital development of manufacturing industry in various regions, strengthening the sharing of digital information infrastructure resources, and increasing the strength to deepen the key core technology fields.

Keywords

Digital Economy; Manufacturing; Green Transformation.

1. Introduction

Some scholars have found that the digital economy can improve the innovation capacity and service level of the manufacturing industry, promote the transformation and upgrading of the manufacturing industry, reshape the global value chain, improve the efficiency of resource allocation, enhance the total factor productivity and release economic vitality, and contribute to the high-quality development of China's economy[1]. Therefore, it is of great practical significance to study how the digital economy enables the high-quality development of the manufacturing industry, and the path, direction and effect of its empowerment for taking measures to enhance the contribution of the digital economy and formulating scientific and feasible policies and measures to promote the high-quality development of the manufacturing industry. Therefore, understanding how the digital economy enables the high-quality development of manufacturing enterprises can provide practical theoretical basis and practical reference for Liaoning Province to further promote the high-quality development of manufacturing enterprises, and then effectively improve the development quality of manufacturing enterprises.

2. Digital Empowerment Liaoning Manufacturing Industry Development Status and Dilemma

2.1. Development Status of Manufacturing Industry in Liaoning Enabled By Digital Economy

Liaoning is a big industrial province, and manufacturing industry is Liaoning's dominant industry. Promoting high-end, intelligent and green development of manufacturing industry and transforming and upgrading to service-oriented is the core and key to Liaoning's construction of a modern industrial system. In order to achieve new breakthroughs in comprehensive revitalization, Liaoning Province focused on the national major strategic plan, fully implemented the new three-year action for Liaoning's comprehensive revitalization, built "digital Liaoning and smart manufacturing province", accelerated the construction of three trillion-level industrial bases, continued to promote the digital transformation and intelligent transformation of traditional manufacturing enterprises, and increased efforts to seize the development opportunities of strategic emerging industries. We will promote the integrated development of industrial clusters, and strive to deepen the integrated development of advanced manufacturing and modern service industries. The digital economy enables the overall economic revitalization of Liaoning manufacturing industry, Liaoning should grasp the transformation opportunities brought by the digital economy, in-depth analysis of the development and innovation brought by the digital economy to the manufacturing industry from an all-round and multi-angle, and ultimately achieve the comprehensive revitalization of the manufacturing industry in Liaoning.

2.1.1. Increasing Policy Support

In 2021, the provincial finance set up 2 billion yuan of special funds to support the digital transformation and intelligent transformation of enterprises, nearly 90,000 enterprises in the cloud, 50,000 new 5G base stations, and the penetration rate of digital R & D and design tools of enterprises above designated size and the CNC rate of key processes reached 71.2% and 54.2% respectively. Liaoning has made great efforts to foster new industries, new business forms and new models, and emerging industries such as software and integrated circuits have entered the fast track of development. As of November 2021, the output of servers, integrated circuits, optical cables and industrial robots in Liaoning Province has increased by 102.9%, 46.3%, 18.3% and 10.1%, respectively. The operating revenue of software and information technology services in the province increased by 8.5% year on year. On July 23, 2022, the General Office of the Liaoning Provincial Government issued Several Measures to Accelerate the Development of Core Industries of the Digital Economy in Liaoning Province, which is the first time that Liaoning has issued an important document specifically supporting the development of core industries of the digital economy, reflecting the great importance of the provincial Party Committee and the provincial government to the development of the digital economy, especially to accelerate the development of core industries. The "Outline" of the provincial "14th Five-Year Plan" and the "Digital Liaoning Development Plan (Version 2.0)" both propose that by 2025, the core industry of the digital economy will account for 10% of GDP.

2.1.2. The Proportion of Digital Economy in GDP has Increased Year by Year

Liaoning's manufacturing industry has a good momentum of development with the blessing of the digital economy. According to statistics, in the first quarter of 2023, the industrial added value above designated size in Liaoning Province increased by 3% year-on-year, 0.6 percentage points higher than the national average, industrial investment grew rapidly, and structural adjustment began to achieve results. From the perspective of various regions, the manufacturing industry in 13 cities in Liaoning Province has achieved positive year-on-year growth. Among them, Huludao, Shenyang, Dandong, Chaoyang, Yingkou, Anshan, Jinzhou,

Dalian, the growth rate of 8 cities is higher than the provincial average. From the perspective of key industries, pillar industries play a significant role in pulling, the overall production situation is good, equipment manufacturing industry on the industrial added value of 7% year-on-year growth, of which, automobile manufacturing, special equipment manufacturing, chemical raw materials and chemical products manufacturing and other 9 industries growth rate of more than 10%.[2]

2.1.3. Steady Progress Was Made in the Construction of New Infrastructure

The development of the digital economy is inseparable from the construction of new infrastructure. In the past 10 years, Liaoning has formulated targeted measures for the development of the digital economy in the manufacturing industry, with the goal of accelerating the rapid development of the digital economy manufacturing industry and promoting the industrialization, scale and extensive of the digital economy. In 2023, Liaoning Province will set up and cultivate 10 provincial digital transformation promotion centers, 10 provincial industrial Internet platforms, and vigorously support the construction of 60 smart factories and digital workshops, and about 20 provincial smart agriculture application bases. At the same time, continue to vigorously carry out 5G infrastructure construction as the basis, build shared 5G base stations, achieve full coverage of independent networking, lay a solid foundation for the commercial application of 5G to the manufacturing industry, and let the manufacturing industry rely on the digital economy - 5G base station to fully carry out the construction of 5G base stations will bring new opportunities for the development of Liaoning.

2.1.4. In-depth Application of Digital Sharing Platform

Liaoning manufacturing industry has a strong foundation and rich category resources, and also has rich scene and data resources for digitalization. It can do a good job in the development and utilization of scene resources and digital industrialization data resources at the same time, which is also the advantage of the comprehensive development of the digital economy of Liaoning manufacturing industry. Liaoning Province has seven national-level shared manufacturing platforms, ranking second in the country. Among them, Dalian Jinzhou Tengda Metal Component Co., LTD. 's "Shared manufacturing platform project based on sheet metal industry", Liaoning Shunfeng New Material Technology Co., LTD.' s "Shunfeng New material intelligent shared manufacturing project", Dalian Gongxingda Information Technology Co., LTD. 's "Shared manufacturing project for digital transformation of manufacturing industry" has obvious characteristics. It has an industry-leading role in deep application and innovative development. Liaoning Province will continue to improve the digitalization level of enterprises, accelerate the construction of new infrastructure, strengthen the in-depth application of sharing platforms, establish and improve the shared manufacturing model of "platform order, process decomposition, and multi-factory collaboration", and promote the high-quality development of Liaoning manufacturing industry. In addition, Liaoning has a good foundation for the development of digital industrialization, the software industry started early, and the revenue of offshore outsourcing business continues to rank first in the country; Integrated circuit equipment accounts for about 18% of the country, and Beijing, Shanghai constitute the three key areas of the country, with core source, Tuojiang, Fuchuang and other technical level of domestic leading "hidden champion" enterprises.

2.1.5. The Economic Performance of Enterprises Continues to Improve

During the "13th Five-Year Plan" period, the quality and efficiency of the economic operation of Shengu Group has been significantly improved, with the average annual growth of the industrial output value of the enterprise by 7.7%, the average annual growth of the operating income by 13.3%, the average annual growth of the order quantity by 15.8%, and the average annual growth of the profit by 57%. During the "14th Five-Year Plan" period, intelligent manufacturing is still focusing on digital enterprises. On the basis of the achievements of the

integration of the two aspects of the "13th Five-Year Plan", we will continue to optimize, improve, expand and improve, and use information technologies such as cloud computing, Internet of Things, 5G, big data and artificial intelligence to engender new connotations and tasks for digital enterprises, and empower Shengyu Group to promote management innovation and digital transformation. Angang focuses on the three main lines of "industrial digitalization, digital industrialization, and data assets", gives full play to the advantages of massive data and rich application scenarios, promotes the deep integration of digital technology and the real economy, promotes the digital transformation of enterprises, strengthens the new engine of digital economic development, builds high-quality digital Angang, and creates a digital ecology.

2.2. The Realistic Dilemma of the Digital Economy Enabling the Development of Liaoning's Manufacturing Industry

2.2.1. Inadequate Level of Digital Infrastructure

In recent years, the digital infrastructure supporting capacity of Liaoning Province has been significantly improved, forming a competitive advantage in storage computing, network communication and other fields. However, from a comparative perspective, the depth and innovation of infrastructure development in Liaoning Province still lags far behind the advanced level of developed coastal provinces. One is the lack of underlying core technology. At present, the master degree of digital core technology is still not high, which seriously restricts the high-quality development of manufacturing enterprises. Second, the investment of supporting funds is limited. On the one hand, the government's investment in digital infrastructure construction is relatively low, which is difficult to meet the actual construction needs. On the other hand, investment institutions are reluctant to participate in the construction of digital infrastructure due to factors such as risk and profit, resulting in a large financing gap.[3]

2.2.2. The Enterprise is Small in Scale and Unbalanced in Development

Although the digital economy manufacturing industry has made great contributions to the development of the economy in some regions, in general, its industrial scale is small, and the radiation driving role is not very strong, and it is extremely necessary for the digital economy leading manufacturing enterprises or large enterprises with demonstration and leading role. The digital development of Liaoning manufacturing industry is still in the primary stage of information technology, that is, the application stage of local information systems, and the digitalization degree of equipment manufacturing industry is generally not high. Now take Dalian, a vice-provincial city, as an example. From the perspective of several pillar industries in Dalian, the informatization degree of automobile and rail transit is relatively good. The main reason is that the informatization of process and assembly line industries is relatively easy, and the degree of automation is very high. The degree of informatization in shipbuilding, equipment, bearing and other industries is generally not high, and the informatization construction of some key state-owned and large-scale enterprises is not yet comprehensive, and the degree of digitalization needs to be improved. Some small and medium-sized enterprises still stay in the local application of some information means, or even only stay in the completion stage of IT system construction.

2.2.3. Shortage of Complex High-level Talents in Digital Economy

To enable the high-quality development of manufacturing enterprises in the digital economy, it is not only necessary to train technical research talents, but also to train composite skills talents who apply technology to practice. However, from the perspective of the current talent structure of manufacturing enterprises, neither quantity nor quality can meet the requirements of giving full play to the enabling effect of the digital economy. The treatment of talents in Liaoning is generally not high, and the level of income directly affects whether high-end talents are willing

to work in these areas. The traditional manufacturing industry is not attractive enough, the salary is not competitive, and more talents flow to the economically developed areas, resulting in the imbalance of regional distribution of talents. At present, it is difficult for those regions with weak economic strength to introduce innovative talents in the digital economy. With the high quality development of manufacturing industry in Liaoning Province, the demand for complex high-level talents will continue to rise. Only by strengthening the introduction and training of complex high-level talents can we effectively alleviate the mismatch between supply and demand in the labor market, so as to enhance the empowering effect of digital economy on the high-quality development of manufacturing enterprises.

2.2.4. Difficult to Share and Integrate Data

At present, there are still multiple obstacles to the sharing of data elements, it is difficult to realize the free flow, development and sharing of data, and the phenomenon of data island is serious, which hinders the play of the value of data elements, leads to the repeated construction of information systems, and causes the waste of social resources. One is the lack of concept of data sharing. Most manufacturing enterprises only focus on internal data, the degree of openness and sharing between enterprises is low, and there are still information islands, which inhibits the superimposed effect of data assets. Second, the lack of authoritative and unified data standards. There are many manufacturing sub-industries, large industry differences, a wide variety of industrial equipment and different enterprise data formats, resulting in the industry has not yet formed an authoritative unified data standard, scattered data is difficult to integrate and transform into data assets to create value for enterprises. Third, the lack of effective supervision and governance system. There are various types of industrial data, covering research and development, process, procurement, equipment, manufacturing, users and other dimensions of data, if leakage or tampering in the process of data sharing and integration, it will bring major hidden dangers to business operations.

3. The Effect of Digital Economy Enabling the Green Transformation of Manufacturing Industry

3.1. Direct Effects of Digital Economy Enabling Green Transformation of Manufacturing Industry

With its characteristics of high growth, high technology, high diffusion, high synergy, and strong penetration, the digital economy has subverted the traditional manufacturing production mode, created a more brutal competitive environment for survival, and forced the manufacturing industry to transform to high-quality development. From the direct effect point of view, on the one hand, thanks to the rapid development and application of digital technologies such as the industrial Internet, the Internet of Things, and big data, industrial robots and artificial intelligence have replaced traditional labor, accelerating the transformation and upgrading of the traditional manufacturing industry to information and intelligence; At the same time, the development of digital technology reduces the application cost of large-scale simulation software, so that enterprises have the opportunity to simulate the key and difficult points that may be faced in the product design and production process in the research and development stage, and reduce the R&D cost of enterprises through technology empowerment. On the other hand, thanks to the high diffusion and strong penetration of digital technology, through the integrated development of "digital economy + manufacturing", some general technologies are shared by more and more enterprises, and new technologies continue to penetrate into the real economy through technology empowerment, forming a strong technology empowerment effect, so that the manufacturing production efficiency continues to improve and the industrial structure continues to optimize.

3.2. Indirect Effects of Green Transformation of Manufacturing Enabled By Digital Economy

3.2.1. Human Capital Empowerment

The rapid development of digital economy has further enriched educational resources, increased educational opportunities, and provided more advanced technical means for continued learning. Through learning and professional digital skills training, it optimizes the knowledge structure and skill structure of workers, promotes the transformation of simple labor force to complex labor force, and promotes the improvement of the comprehensive quality and level of human capital in manufacturing industry. Therefore, while the digital economy gives great impetus to the high-quality development of the manufacturing industry, it also enhances the demand for knowledge-based and skill-based human capital, forcing the quality of human capital to continue to improve, and its contribution to the high-quality development of the manufacturing industry continues to increase.

3.2.2. Enabling Industrial Upgrading

Digital technology, as a new economic form, enables the high-quality development of manufacturing by accelerating industrial integration and promoting the upgrading of the industrial chain. From the perspective of industrial integration, with the rapid advancement of digital industrialization and industrial digitalization, digital technology and data information have been widely applied and penetrated into various aspects of manufacturing procurement, production and sales, resulting in a variety of digital industry types, such as intelligent production, digital payment, e-commerce and other digital industry formats. The new business forms are conducive to the development of technology-intensive and knowledge-intensive manufacturing industries, broaden the scope of the industry, and form new driving forces that stimulate the vitality of the manufacturing industry, help guide traditional industries to carry out all-round digital transformation, and create new models such as intelligent manufacturing, personalized customization, and platform collaboration by reshaping traditional industrial organization models, production processes, and business models. To upgrade the structure of the manufacturing industry and promote its green transformation.[4]

4. Suggestions on Countermeasures for Green Transformation of Liaoning Manufacturing Industry Enabled by Digital Economy

At present, the insufficient level of digital infrastructure in Liaoning Province, the small scale and unbalanced development of enterprises, the shortage of complex high-level talents in digital economy, and the difficulty of data sharing and integration have seriously hindered the realization of the enabling effect of digital economy. Based on the previous analysis, this part proposes countermeasures and suggestions for the green transformation of the digital economy enabling manufacturing industry, so as to strengthen the enabling ability of the digital economy and promote the high-quality development of the manufacturing industry.

4.1. Strengthen the Supporting Capacity of Digital Infrastructure

4.1.1. Actively Layout Next-generation Information Infrastructure

As a key support to promote the deep integration of digital technology and the real economy, the new generation of information infrastructure is a new opportunity for traditional manufacturing enterprises to achieve transformation and upgrading. At the government level, Liaoning Province should improve the top-level design and support policies to create a good policy environment for the development of new infrastructure. First of all, it is necessary to plan the regional layout of new infrastructure according to the regional development characteristics of different regions, and formulate targeted short-term, medium-term and long-

term development strategies; Secondly, it is necessary to increase the special policy fund support for new infrastructure, expand the scope of support projects, and increase the amount of project support funds; Finally, it is necessary to expand investment and financing channels for new infrastructure projects, introduce relevant preferential tax policies, attract social capital to participate in new infrastructure investment, and stimulate the investment vitality of market players. The enterprise side should also fully understand the development opportunities in related fields of new infrastructure, grasp the development trend of related fields, and make strategic planning; At the same time, enterprises should also actively participate in the construction and investment of new infrastructure, and use the new infrastructure to promote the digital transformation of enterprises, and maximize the enabling function of the digital economy.

4.1.2. Promote the Digital Transformation of Traditional Infrastructure

With the advancement of the construction of a new generation of information infrastructure, the effect of traditional infrastructure is gradually weakening, and it is urgent to digitize and intelligent transformation, so that traditional infrastructure can better meet the needs of production and life on the basis of retaining its own functions. Liaoning Province should accelerate the digital transformation of traditional infrastructure such as railways, energy and power grids by new digital technologies, so as to improve the infrastructure level of digital economy and strengthen the enabling mechanism of digital economy for the development quality of manufacturing enterprises. On the one hand, it is necessary to actively promote the application of artificial intelligence in the field of traditional infrastructure, build intelligent service systems such as intelligent transportation, intelligent logistics, and intelligent resource management, deeply explore the intelligent service capabilities of traditional infrastructure, and create a good external facility system for the high-quality development of manufacturing enterprises. On the other hand, enterprises should also actively connect with digital platforms such as the industrial Internet and the Internet of Things, use platform technology resources to transform and upgrade internal hardware facilities, complete real-time monitoring and maintenance of machinery and equipment in all aspects of research and development and manufacturing, make production and manufacturing safer and more efficient, and provide a strong guarantee for the high-quality development of manufacturing enterprises.

4.2. Balance the Digital Development of Manufacturing Industries in Various Regions

Liaoning's digital economy started late and developed slowly. Although it has rich manufacturing resources and experience, the development of digital industry in the new era is obviously different from that of Jiangsu, Zhejiang and Guangdong provinces. Liaoning vigorously promotes the development of digital economy, but there is no guarantee that all cities can quickly penetrate the concept of digital economy. This has formed an imbalance in the development of the digital economy in the manufacturing industry in various regions. To solve this problem, it is necessary to promote the digitization process on the one hand, formulate corresponding policies and countermeasures according to the actual situation of the city, solve the problem of unbalanced development of the digital economy, establish digital systems according to the existing manufacturing advantages of different cities, and complete the digital high-quality development of the manufacturing industry in Liaoning Province with the support of the digital system structure. With points and areas, balanced development can improve the overall competitiveness of Liaoning manufacturing industry, and only in this way can we truly achieve high-quality development of manufacturing industry in the context of digital economy.

Economic reform should be carried out in combination with the actual situation of localization, and the manufacturing industry in the digital background can not be separated from this reform

track, and must be combined with the characteristics of the manufacturing industry in various regions of Liaoning, according to local conditions, comprehensive promotion and balanced development. According to the overall rational planning and layout of Liaoning Province, combined with the actual situation of Liaoning manufacturing industry, improve the overall digital economy planning and build a reasonable digital economy system. According to the regional characteristics and economic development characteristics of Liaoning, highlighting advantages and strengthening the leading role, Dalian and Shenyang play a leading role, through the implementation of policies, promote the construction of trans-regional digital economy manufacturing system, support regional cooperation and linkage, and jointly develop the manufacturing industry under the background of digital economy.

4.3. Strengthen Digital Information Infrastructure Resource Sharing

First, strengthen the sharing of digital information infrastructure resources. The full coverage of digital information network is established between cities and cities, between cities and towns, so that digital information can be connected to each other, and finally achieve the sharing of Internet digital resources. Share data production factors, make their orderly and effective flow, and finally achieve the optimal allocation of resources. Secondly, in the city with its own specific foundation, develop and expand its own advantages and promote the good development of the business environment, promote the development of the digital economy from various fields, set up a large logistics storage base, and encourage the development of e-commerce operations. Finally, the relatively slow development of northwestern Liaoning can enter the digital industry from a lower threshold, thereby driving the development of manufacturing, such as cross-border e-commerce, network broadcast, live delivery and other models. In combination with its own development advantages, the northwestern Liaoning region will open the digital door, promote the development of manufacturing industry, expand sales channels, break through the economic barriers between cities, and finally realize the development of high-quality manufacturing industry under the background of digital economy.

4.4. Consolidate the Foundation for Digital Transformation of Enterprises

Liaoning is in the learning and development stage of digital economy, the pace is fast but not big, we must be steady and steady, the concept of "digital" put forward, the southern city took the lead in the first gun, the development momentum is rapid, economic benefits can also be seen, all over the continuous promotion of digital construction, especially in Zhejiang Province, The local government regards cloud digitalization as the entry point of digital economic transformation, carries out transformation construction, and develops cloud enterprises, of which the manufacturing industry accounts for 47.79%. Cloud enterprises have paved a highway for the development of digital economy, making the rapid development of Zhejiang's digital economy. Of course, Liaoning Province's digital economy has not stalled, but rapid development, consolidating the foundation of digital transformation, to promote the digital transformation of enterprises, has introduced Huawei cloud, purple light cloud, Tencent cloud and other cloud platforms, the province's cloud enterprises 30,000. Although there is still a certain gap with other cities, the digital transformation is steady and moving forward steadily.[5]

The construction of digital infrastructure is a strong cornerstone for the development of digital economy. Ensuring the sharing of information resources and the rapid transmission of information is the most important fundamental and top priority of digital economy. This puts forward strict requirements for digital construction. First, build an information highway to accelerate the network, speed up information transmission, share information resources, and build 5G base stations. Second, the construction of manufacturing Internet platform, so that industry standards and policy information can be more efficient and rapid by more enterprises to understand, especially small and medium-sized enterprises, can effectively promote the

rapid development of the entire manufacturing industry. Third, the establishment of infrastructure such as big data centers can better ensure the rapid and orderly development of the entire industry. Nowadays, social data information is a resource and profit, and the establishment of big data centers is to achieve the reprocessing of data information, so that data resources can harvest greater value after processing. Fourth, all regions should share information resources with other regions to jointly promote digital development while giving full play to their own characteristics, and realize the coordinated development of strong and complementary advantages. Due to the unbalanced development of various regions, many resources are consciously concentrated in the flow like cities or first-tier cities, and the development of digital economy should not only be developed in cities, but also the digital economy in towns and villages. Balanced development is the ultimate goal of digital economy. This requires the continuous strengthening of the laying of digital economy, the vigorous development of the northwest Liaoning region, the sharing of digital information resources in Shenyang, Dalian and other cities, the laying and covering of digital infrastructure networks in townships, the narrowing of the digital economy gap between cities and townships, and the realization of coordinated development of digital economy.

4.5. Increase Efforts to Deepen Key Core Technology Fields

4.5.1. Break through Key Technical Difficulties in the Field of Digitalization

In order to break through the key technical difficulties in the field of digitalization, invest financial resources and manpower to research core technologies, find the bottleneck problems in the development of Liaoning's digital economy, research and breakthrough, the government should encourage and support enterprise innovation in the fields of new energy, advanced and sophisticated materials, and basic information software. Actively invest in the research and development of basic technologies, deeply cultivate the field of independent research and development and core technology, break through the entire constraint, and develop the digital economy. Liaoning needs to recognize the lack of new industries at this stage, through policy attraction, technology research and development, the establishment of digital communication equipment, electronic equipment and new energy industry such as manufacturing leading enterprises, the formation of the entire digital economy industry chain, only in this digital economy background, the manufacturing industry can develop in higher quality, in the entire digital economy system, Only in this way can the manufacturing industry be developed efficiently and with high quality.

4.5.2. Construct a Fair Competitive Environment and Business Environment from Institutions and Regulations

It is necessary to improve systems and regulations, create a level playing field and a business environment, so that enterprises can develop and innovate without worries, intellectual property rights in particular should be protected, and the legal system should provide strong support and security for technological innovation of enterprises. Thirdly, it is necessary to actively promote the establishment and development of new technology and digital enterprises, and provide incubation conditions and corresponding policy support, establish the construction of digital technology incubation system, cultivate and establish incubation bases with new models, new formats and new technologies, so that more new digital enterprises can grow and play a leading role, thus driving the development of the digital economy of the entire industry.

4.5.3. Cross-industry Linkage and Cross-field Cooperation

The key competition in the era of digital economy is digital technology, especially the development of the core areas of digital technology. Since we have realized this, we must effectively and quickly solve this problem. Under the premise of respecting the law of market

development and taking the market as the main body, enterprises should become the main body of digital economy research and development, and the government should provide regulations and assistance. In order to innovate the digital economy, build a digital economy system, and ultimately promote the healthy and orderly development of digital information in the entire industry. The government should lean resources and factors toward enterprises, truly take enterprise development as the main body, and serve the field of technological innovation. At the same time, it should guide all market factors to tilt toward enterprises, encourage enterprises to independently research and develop innovation, deepen core technologies, and be independent and controllable without relying on external sources. Support already large-scale enterprises to carry out digital transformation, cross-industry linkage, cross-field cooperation, digital information Internet as a platform, to drive more enterprises to carry out scientific and technological innovation, so as to achieve the rapid development of the digital economy of the entire industry.

4.6. Focus on the Cultivation of Enterprise Composite Digital Talents

Liaoning has 115 colleges and universities and has a considerable reserve of talents. These research institutes and universities have made many good achievements in the field of information technology sharing, but there is still a big gap compared with the developed areas in the southeast. It should focus on the frontier direction and key areas of digitalization in Liaoning Province, vigorously develop the integration of production, learning and research in colleges and universities under the background of digital economy, urge vocational schools and colleges and universities to set up digital economy majors and carry out relevant courses, promote in-depth cooperation among industries, schools and scientific research institutions, and cultivate technical talents with digital innovation ability. Second, use market training institutions to accelerate the transformation of digital technical talents to the manufacturing field, and cultivate a group of composite digital talents with both digital skills and manufacturing skills; Third, enterprises should also optimize the staff training system, through job rotation, competition, digital skills training and other ways, from the internal emphasis on the training of composite digital talents.

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