

# Research on the High-quality Development Strategies of Dalian Software Industry in the Digital Economy Era

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## ABSTRACT

Under the guidance of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Dalian is taking great strides towards the digital economy era, and the software industry is constantly developing and growing. However, there are still certain problems in the development of the software industry at present, the reasons of which are analyzed in depth in this article and the following profound suggestions from multiple perspectives and all directions are put forward: utilizing policy guidance to optimize the soft industry policy environment, strengthening the brand and promoting the creation of the "Four Famous" project, taking multiple measures simultaneously to improve the construction of software public service system, gathering advantages and expanding the scale of the software industry, adopting independent innovation to enhance industrial support capabilities, deeply integrating and promoting industrial application empowerment, expanding channels to support the development of the software industry, and exploring potential and strengthening the cultivation and introduction of industrial talents, in order to comprehensively promote the high-quality development process of Dalian software industry.

**Keywords:** Digital economy, Software industry, High-quality development.

## 1. INTRODUCTION

With the continuous expansion of information technology applications, digitalization has become the main theme of today's economic development and many enterprises are accelerating digital transformation. The G20 Hangzhou Summit in 2016 defined the digital economy in the G20 Digital Economy Development and Cooperation Initiative as a series of economic activities that use digital knowledge and information as key production factors, modern information networks as important carriers, and the effective use of information and communication technology as an important driving force for efficiency improvement and economic structure optimization. In October 2019, President Xi Jinping emphasized at the opening ceremony of the China International Digital Economy Expo that "China attaches great importance to the development of the digital economy. Guided by the new development

concepts of innovation, coordination, green, openness, and sharing, China is actively promoting digital industrialization and industrial digitization, guiding the deep integration of the digital economy and the real economy, promoting high-quality economic development." [1]

During the 34th collective learning of the 19th Political Bureau of the Central Committee of the CPC, General Secretary Xi Jinping pointed out that "We must comprehensively promote industrialization and large-scale application, cultivate large software enterprises with international influence, focus on breaking through key software, promote the software industry to become bigger and stronger, and enhance the innovation and supply capacity of key software technologies." [2] With the continuous release of a series of plans such as the "Development Plan for Digital Economy during the 14th Five-Year Plan Period", the "Development Plan of Software and Information Technology Service Industry during

the 14th Five-Year Plan Period", the "Digital Liaoning Development Plan", and the "Development Plan of the Digital Economy in Dalian during the 14th Five-Year Plan Period", software has gradually become an engine industry that attracts high-end talents, accumulates innovative elements, and enhances urban competitiveness.[3] These have enhanced the confidence in the development of the software and information service industry through the digital economy, pointed out key development areas, directions, and paths to promote high-quality development of the software industry, and stimulated the innovation and creativity vitality of Dalian. This study is based on the above background.

## **2. ANALYSIS OF THE DEVELOPMENT STATUS AND EXISTING PROBLEMS OF DALIAN SOFTWARE INDUSTRY**

In the fields of basic software, industrial software, artificial intelligence, intelligent terminals, and information communication equipment, there is a lack of independent innovation ability and core competitiveness. Most commissioned development is concentrated on the application level and enterprises with widespread influence and industry leading status haven't emerged. There is a lack of information technology solutions for system integration, as well as operations and data service services based on Internet platforms [4]. The development of intelligence and informatization in the manufacturing industry is relatively backward, and enterprises lack investment in embedded software development.[5] Compared with advanced cities, Dalian lacks high-end talents in the digital economy, more targeted software talents, and various emerging industry talent policies, which affect the development of emerging industries.

The reasons for these are that, firstly, the software industry structure in Dalian is not reasonable enough, with a large amount of resources being poured into services, while neglecting the importance of operation and lacking consumer enterprises, resulting in the software industry scale not being expanded; secondly, the software development mainly leans towards the application layer, implementing a commissioned customization model, while lacking independent research and development products, making it difficult to fundamentally improve efficiency; finally, Dalian's traditional industries failed to carry

out digital transformation in time, and failed to form domestic demand to drive the development of the software industry.

## **3. SOLUTIONS TO THE ABOVE-MENTIONED PROBLEMS**

Based on the current development status of Dalian software industry and the analysis of its reasons, this article proposes the following 8 countermeasures and suggestions to solve the problems:

### ***3.1 Utilizing Policy Guidance to Optimize the Soft Industry Policy Environment***

The first is to guide and cultivate major projects. Dalian should rely on the national science and technology plan and other measures to focus on improving the weak links in industries, improving basic capabilities, and targeting key directions and fields of software industry development. By formulating relevant incentive policies, Dalian should guide the cultivation of a group of major projects with high innovation level, strong driving effect, and strong demonstration effect, leverage key areas to achieve breakthroughs, and drive the overall scale of the industry to rapidly expand.

The second is to formulate and implement preferential tax policies. Dalian should actively formulate and implement preferential tax policies, and coordinate and plan the use of funds, so that software enterprises can have material benefits, and stimulate their vitality and competitiveness.

The third is to deepen the docking of industry and finance. Dalian needs to guide the society and financial capital to actively participate in industrial innovation and establish a risk investment mechanism. It needs to accelerate the development of financial product services such as intellectual property mortgage financing, and accurately meet the needs of enterprises. It also should expand financing channels and support eligible enterprises to list.

### ***3.2 Strengthening the Brand and Promoting the Creation of the "Four Famous" Project***

The first is to support the creation of a famous software city. The country needs to support Dalian in creating a famous high-level software city in China. Dalian needs to gather innovative elements such as industry, technology, and talent, gradually

form a source city driven by innovation, a benchmark city for industry-city integration, and build a new pattern of industrial development with "innovative city leading and multi-point linkage".

The second is to optimize and strengthen famous software parks. Dalian needs to build a brand of Dalian software parks, continuously expand its industrial scale, and promote its high-quality development. It should rely on software parks to create emerging and characteristic industrial clusters, promote mutual promotion between the software industry and other industries, optimize and strengthen the software industry, and strive to create famous software parks in Dalian.

The third is to internally cultivate and externally introduce famous software companies. Dalian aims to cultivate high-quality enterprises as national key development targets, and support weaker competitive enterprises through mergers and acquisitions to achieve the effect of 1+1>2. It needs to improve its investment promotion mechanism, introduce advanced foreign technology and investment projects, and attract brand enterprises to establish research and development centers, China headquarters, etc. in Dalian.

The fourth is to make every effort to create famous software brands. It needs to concentrate its efforts on improving its research capabilities, strive to develop software products with independent intellectual property rights, and establish its own software brands in Dalian. It also needs to rely on famous software companies to create high-end and practical software products and solutions, and form the core competitiveness of famous software brands.

### ***3.3 Taking Multiple Measures Simultaneously to Improve the Construction of a Software Public Service System***

The first is to strengthen the construction of service carriers. It needs to build technology innovation platforms and innovation and entrepreneurship incubators to provide support for industrial innovation. It should improve the public service platform and provide various necessary guarantees for the development of the software industry. It also needs to fully leverage the organizational role of industry associations, deepen communication and cooperation, and promote the development of industry management services.

The second is to strengthen the construction of the standard system. The country should support

leading enterprises in Dalian, key universities, research institutions, etc. to participate in the formulation and revision of standards at all levels, and to enhance the industry status. Dalian should actively promote the evaluation and certification of advanced information technology standards, including ITSS, DCMM, CMMI, etc., to improve the core competitiveness of enterprises and gain wider recognition.

The third is to strengthen software quality management. Dalian should promote the research and development and application of verification testing, configuration analysis, quality management and other tools, encourage enterprises to establish a benchmarking international quality management system, and strengthen software quality management capabilities.

### ***3.4 Gathering Advantages and Expanding the Scale of the Software Industry***

The first is to develop new industrial software and promote the transformation and upgrading of the manufacturing industry to a new level. It should continue to promote independent research, development and application of automatic control industrial software products, actively promote industrial Internet, and create an industrial software ecosystem.

The second is to develop new technologies and seek new opportunities for the development of the software industry. Dalian should take the lead in the times and focus on developing software technology products in emerging fields such as big data, cloud computing, blockchain, 5G, and industrial Internet. It needs to develop independently innovative products in relevant fields and gradually promote their application.

The third is to improve the level of software public services and optimize the development ecology of the software industry. Dalian should vigorously develop a Dalian Software Industrial Park, attract investment, cultivate talents, effectively drive the development of the software industry, and become a guide and support for the development of the software industry.

### ***3.5 Adopting Independent Innovation to Enhance Industrial Support Capabilities***

The first is to lay a solid foundation and focus on tackling core and key technologies. Dalian needs

to consolidate the technological foundation of the software industry, which is a prerequisite for independent innovation and enhancing industrial support. It needs to master core and key technologies, and concentrate efforts on overcoming difficulties, which are the key to independent innovation and enhancing industrial support capabilities.

The second is to arrange the cutting-edge technical research. Dalian should encourage research institutions, universities, and enterprises to collaborate on multiple frequencies, comprehensively arrange cutting-edge technologies such as the metaverse, AI, and RPA, vigorously attract investment, and coordinate the allocation of resources, concentrate elite troops to carry out original and integrated innovation, and create a new highland of cutting-edge technology.

The third is to build a collaborative innovation system. Dalian should strengthen cooperation among universities, research institutions, and enterprises, jointly build science and technology innovation centers, engineering technology research centers, etc., actively establish an innovation and entrepreneurship community, improve the collaborative innovation system, and gather advantageous resources to work together to promote the cause of independent innovation.

### ***3.6 Deeply Integrating and Promoting Industrial Application Empowerment***

The first is to promote the transformation and upgrading of traditional industries. Dalian needs to promote the deep integration of information technology and manufacturing industry, promote the transformation and upgrading of manufacturing management and technology, and utilize information technologies such as big data, cloud computing, blockchain, and artificial intelligence to empower traditional industries such as machinery, metallurgy, and petrochemicals, enhance their intelligence, networking, and digitalization levels, and continuously promote the emergence of new technologies, industries, business forms, and models.

The second is to accelerate the docking of applications. Dalian needs to improve the supply and demand docking of software in key industries and strengthen the localization application of industrial software in relevant fields in Dalian. It should assist application units and supply enterprises in carrying out adaptation verification

and promote the application of key software in information engineering through multi-party collaboration.

The third is to deepen the integration and standard implementation of industrialization and informatization. Dalian needs to further consolidate its information technology, industrialization integration management, and technological foundation, implement and permeate the national standards for the integration of industrialization and informatization into all aspects, conduct a comprehensive evaluation of the integration of industrialization and informatization, actively explore a development path that is in line with the actual situation of integration of industrialization and informatization in Dalian, and promote the application empowerment of the industry with the integration of industrialization and informatization.

### ***3.7 Expanding Channels to Support the Development of the Software Industry***

The first is to coordinate various special funds to support the development of the software industry. Dalian should coordinate the allocation of various municipal-level special funds, and strive for special funding support such as national and provincial-level scientific research projects and science and technology support plans. It should strengthen support for key software industry fields, major software technology projects, and application demonstrations, and provide key support for industry pilot key projects.

The second is to leverage the guiding role of government financial funds. Dalian needs to amplify the leverage effect of financial funds, fully uses the leverage role of industrial investment, and guide social capital to establish multi-level fund structures, such as special development funds established within enterprises, to solve the financing difficulties of enterprises in multiple dimensions.

The third is to allocate financial resources reasonably. Dalian should vigorously promote innovative financing methods and support the development and application of corresponding digital economy software industries. It needs to support various software enterprises to enter various levels of capital markets for financing.

### ***3.8 Exploring Potential and Strengthening the Cultivation and Introduction of Industrial Talents***

The first is to support characteristic software colleges. Dalian needs to strengthen the construction of software related disciplines in universities, consolidate the foundation, innovate research, and leverage its strengths to develop software colleges into a base for cultivating composite talents with high innovation ability and a wide range of expertise.

The second is to build a talent training base. Dalian should encourage cooperation between schools and enterprises, support universities, vocational colleges, and enterprises to jointly build practical training bases, increase practical training efforts, cultivate applied talents, and avoid students from empty talk and acting blindly.

The third is to strengthen the introduction and cultivation of high-end talents. Dalian needs to formulate a municipal level plan for attracting high-end talents in the software industry, improve talent policies, improve talent incentive mechanisms, teach students according to their aptitude, take multiple measures to cultivate high-end talents, and strengthen the efforts to introduce high-end talents.

## **4. CONCLUSION**

In the era of digital economy, Dalian software industry is facing opportunities and challenges of a new round of technological revolution and industrial transformation. During the "14th Five-Year Plan" period, the development of Dalian software industry should be based on a new stage of development, fully, accurately, and comprehensively implement the new development concept, construct a new development pattern, adjust the industrial structure, combine the characteristics of Dalian to revolve around the "14th Five-Year Plan" for the development of Dalian's digital economy, and take the promotion of high-quality and high-speed development of Dalian software industry as the main line, the technological innovation, model development, and institutional change as the internal driving force, the promotion of the digitization of the real economy as the path, and the promotion of the development of industrial software and cutting-edge technology as the starting point and foothold, so as to continuously cultivate new forces and driving forces, create a new ecosystem of the software industry, enhance the supply capacity and

independent innovation capacity of key software, provide strong support for accelerating the construction of "a strong digital city and an intelligent manufacturing Dalian", and strive to make the software industry a new driving force for the development of Dalian digital economy, so that Dalian can embark on the development path of the software industry with Dalian's unique characteristics, with a brand new attitude and full enthusiasm, to rush towards the new era of the digital economy, meet new challenges in the software field, and showcase Dalian's strength in the digital tide.

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