

## Construction of Innovation and Entrepreneurship Ecological Environment of Scientific and Technological Talents in Liaoning Province

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**Abstract.** With the development of science and technology, digital technologies such as cloud computing, big data, artificial intelligence, and quantum computing are on the rise. The quantity and quality of talents, especially science and technology talents, are related to the technological independent innovation capability in Liaoning Province. These talents are significant to the revitalization of industries and to regional economic and social development. The construction of innovation and entrepreneurship ecological environment is conducive to promote the development of the real economy, technological innovation, modern finance, and human resources.

### Digital Transformation of Enterprises in Liaoning Province

The world is rapidly entering the digital economy era, and the wave of enterprise digital transformation has arrived. Gartner Group predicts that 75% of the majority of the company's business will be digital or on the road to digital transformation by 2020 [1].

In 2016, "Guiding Opinions of the State Council on Deepening the Integration of Manufacturing and Internet Development" is promulgated. It marks the beginning of a new phase in China's "integration of the two industries" and marks the industrialization era characterized by "standardization, automation and process" is turning into the Internet era characterized by "networking, digitization, and intelligence." The digital transformation of enterprises has also become a major concern of the whole society.

During the deliberation of the Guangdong delegation of the 13th National People's Congress in 2018, General Secretary Xi Jinping stressed, "Development is the first priority, talent is the first resource, and innovation is the first driving force. If China does not take innovation-driven development path, and if the old kinetic energy cannot be smoothly converted into new energy, we will not be truly strong. It is up to innovation to be strong, well innovation depends on talents [2]."

Liaoning Province is located in the hinterland of Northeast Asia. Its location advantage along the river, along the coast and along the border is remarkable. At the same time, as the leader of China's industrial economy, it has established a strong industrial base such as heavy industry and equipment manufacturing. Standing on the new era node, we will undertake the policy dividends of "the Belt and Road Initiative" and "Beijing-Tianjin-Hebei Coordinated Development", to develop the digital economy and build a large-scale equipment manufacturing base, a high-end intelligent manufacturing center, and a modern service industry center. This is the only way to complete the digital transformation in Northeast.

Talent support is the fundamental force for the sustained and healthy development of Liaoning's economy and society. How to attract talents, retain talents and cultivate talents is the primary issue. In response to this problem, we put forward the key points of "grasping talents is to grasp development, and talents are to promote Liaoning's development". It has successively implemented the "Three-Year Action Plan for Comprehensive Revitalization of Talent Services in Liaoning Province" and the "Liaoning Revitalization Talents Program". We actively dock the national "Thousand Talents Plan" and "Million Talents Plan", and focus on the "Five Regional Development Strategies" and "One Belt and Five Bases" to meet the demand for high-level talents.

## **Ecological Environment of Scientific and Technological Talents**

The talent ecological environment includes various external factors that affect the growth of talents. These factors involve politics, economy, culture, humanities, science and technology, education, and geographical environment. It is a huge complex system [3]. R.B. Liu and Z.Q. Bian believe that the social environment of talents is centered on talents and contains various social factors that affect the survival and development of talents, such as economy, material and culture. Each factor has direct or indirect effects on the survival and development of talents [4].

General Secretary Xi Jinping pointed out that "The cultivation and growth of scientific and technological talents has its own rules. It is necessary to provide a good environment for the development of scientific and technological talents, to find talents in innovative practice, to cultivate talents in innovative activities [5]." It can be seen that behind the competition of scientific and technological talents is the competition of talent ecology.

As an old industrial base in Northeast China, Liaoning Province is a large province of talents export, but it is not a strong province. According to the traditional statistical methods, the total number of talents in Liaoning Province ranks in the forefront of the country, but the economic coefficient of talents and the per capita GDP are lower. Among the total talents, the quantity and quality of high-level talents, especially big data, artificial intelligence, biomedicine, AR/VR, etc., which are in short supply in recent years, are far from being able to meet the needs of revitalization.

Since the reform and opening up, Liaoning has always been the export province of talents, especially the state-owned enterprises and institutions are the source of talent output. Compared with the southern provinces, there are still many gaps in terms of attracting talents, concentrating talents in the environment, motivating talents in the system, and protecting the legal system. The global mobility of scientific and technological talents has a very important impact on the technological innovation and economic development of all countries. The flow of talents, especially the flow of scientific and technological talents has become the largest human capital flow [6]. The curtain of a new round of talent wars in the world has just begun, and the issue of science and technology talents in Liaoning has become a realistic problem that must be solved in regional and national development.

## **Construction of Innovation and Entrepreneurship Ecological Environment in Liaoning Province**

Government Four-Tier Talent Ecological Environment System. To achieve the strategic goal of strengthening the province by talents, a large number of scientific and technological talents are needed. First of all, we should create an environment that can attract talents, train talents, serve talents and motivate talents, and then stimulate the potential of innovation and entrepreneurship of science and technology talents.

Political Environment (P.E.). A good talent policy environment plays a guiding role in the process of talents selection, cultivation, utilization and retention. At present, the most direct and effective way for countries around the world to compete for high-end talents is to implement various preferential talent policies. Regarding the construction of the talent ecological environment, in addition to the relevant national policies, Liaoning Province has also implemented relevant talent policies.

Economic Environment (E.E.). Liaoning Province is accelerating the transformation and upgrading of the industry, docking independent innovation and the "Belt and Road" strategy, strengthening and optimizing traditional industries and accelerating the development of emerging industries. The key to this series of work is to recruit and reserve scientific and technological talents.

Social Environment (S.E.). With the Chinese Dream as the spiritual orientation, we should build a high-quality living environment as the foundation background to construct a good talent ecological environment. The quality of the living environment has an important impact on the choice of talents. The city is the main gathering area of talents, it's necessary to continuously optimize the natural ecological environment. In the process of improving the natural environment, the government plays

a leading role. Health care and social security are important indicators for evaluating the living environment of talents. Thus it's also necessary to continuously improve health care expenditure and social security.

Cultural Environment (C.E.). At the cultural level, we should strengthen public opinion guidance and carry forward the social customs of "four respects." To form a good social atmosphere of "respecting labor, respecting knowledge, respecting talents, and respecting creation" in the whole society, it is not enough to rely solely on the government's regulations. It is also necessary to strengthen public opinion guidance to create a social atmosphere of lifelong learning. A strong social learning atmosphere is an important way to improve the overall quality of talents. Since the 16th National Party Congress, our country has been advocating the construction of a "learning society for lifelong learning and learning for all [7]."

Fig 1 (see the next page) shows the government "PESC" four-tier talent ecological environment system. For the construction of the talent ecological environment at the government level, it is necessary to do relevant work at the political, economic, social and cultural levels. The four levels are independent and interconnected. The economic level is the material basis for constructing the ecological environment of talents. The social level provides the basic environment for them, and the political aspects provide policy guarantees for them. The cultural level constitutes the spiritual guidance for the construction of the entire talent ecological environment.

Enterprise Three-Tier Talent Ecosystem. Under the new situation, there are many changes and challenges in the process of enterprise transformation. The main task is to focus on analyzing and mining the changes in the demand for scientific and technological talents under the background of sharing human resources based on the Internet. At the same time, consideration of the main industrial types and industrial structure of Liaoning Province, we focus on the analysis of the upgrading trend and talent demand characteristics of the manufacturing industry and modern service industry, and provides a basis for constructing the ecological environment of talents in line with the needs of enterprise upgrading and transformation. The enterprise three-tier talent ecosystem is shown as Fig. 2.

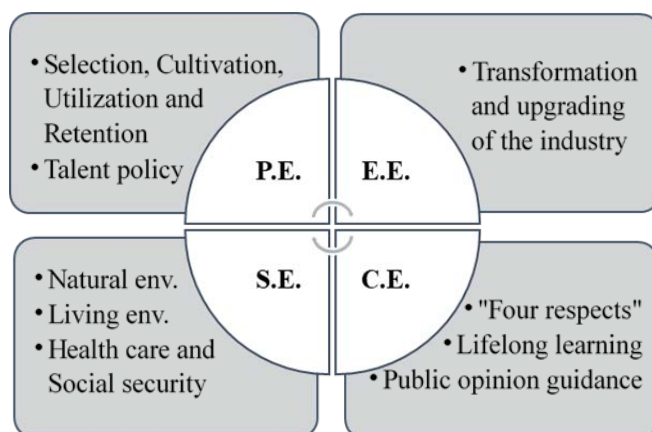


Figure. 1 Government "PESC" Four-Tier Talent Ecological Environment System



Figure. 2 Enterprise Three-Tier Talent Ecosystem

The quantity and quality of talents, especially science and technology talents, are related to the technological independent innovation capability in a region. It is related to the revitalization of industries and to regional economic and social development. The construction of innovation and entrepreneurship ecological environment is conducive to promote the development of the real economy, technological innovation, modern finance, and human resources [10]. The sense of well-being and security development promotes the construction of a harmonious society and the sustainable development of regional economic development.

Promote the Steady Implementation of the Strategy of Strengthening the Province. The world today has entered a "new four modernization" economic era with a highly knowledgeable economy, a highly scientific and technological economy, a highly talented economy, and a highly informationized economy. Implementing the talent strategy is an inevitable requirement for the revitalization of the old industrial base in Liaoning. It is also an inevitable choice for building a harmonious Liaoning. The scientific and technological talents play a real role in the economic development and are important for the implementation of the strategy of strengthening the province.

Promote the Effective Protection of Liaoning's Economic Development. The transformation of industrial structure and the upgrading of industrial energy levels have become an inevitable trend of industrial development in Liaoning Province. The development of the industry requires the promotion of a large number of scientific and technological talents.

The development of traditional industries requires talent pooling that meets the characteristics of the industry. The traditional industrial clusters in Liaoning Province are highly concentrated, and the scale is large. The demand for talents, especially science and technology talents is even stronger. Talent pooling can accelerate talent development and promote the transformation of talent resources into talent capital, so that talent capital can realize value appreciation to promote industrial development.

Emerging industries cannot do without technological innovation, and technological innovation mainly relies on talents who master innovative theories and technologies. Compared with traditional industries, high-level innovative talents and high-skilled talents are especially important for the development of emerging industries. In addition to training, the introduction of high-level scientific and technological talents is an inevitable measure to develop emerging industries.

## Summary

Through the construction of scientific and technological innovation and entrepreneurial ecological environment, it can promote the gathering of high-quality human resources to Liaoning Province, accelerate the marketization and internationalization of human resources, better play the role of scientific and technological talents, and stimulate the innovation vitality of various human resources. For science and technology talents, career is the appeal, the environment is attractive, and service is cohesive. In the grand cause of revitalizing Liaoning's old industrial base, we must establish a sound policy and legal environment for talents that focuses on training, evaluation, utilization and incentives.

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