



Thinking and Research on the Innovation Mechanism of Scientific and Technological Talents' Work in the New Era

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Abstract. Talent is an important indicator for measuring a country's comprehensive competitiveness. Core cities have become talent innovation clusters. But the attractiveness of small and medium-sized cities still needs to be improved. This topic takes the vigorous implementation of the “Talent Revitalization of Weifang” action in Weifang as the starting point to research the working mechanism of scientific and technological talents in Weifang in the new era. We comprehensively summarize the achievements of talent work at key links such as attracting, nurturing, retaining, and utilizing talents. We can build a regional innovation talent highland. We propose feasible ideas to address the issues of insufficient innovation capability, limited support scope, weak introduction of concepts, and suboptimal development environment. At the same time, it also provides guidance and theoretical basis for small and medium-sized cities to improve the work of attracting and nurturing scientific and technological talents.

Keywords: Scientific and technological talents; Innovation; Mechanism construction; The thinking of attracting and educating.

1 Introduction

The introduction and cultivation of talents has always been a top priority for governments, and some countries and regions around the world have set up honorary awards and talent funding programs. The main purpose of which is to fund and recognize talents who have made outstanding contributions to the development of the country and society, and who have excelled in specific disciplines and professional fields. However, due to the institutional, economic, cultural and other aspects of the influence of each country, by adjusting the research policy and attracting the world's best talent competition [1-2]. Talent program funding policies have both similarities and differences due to national circumstances [3-6], as shown in Table 1.

Table 1. Characteristics of National Talent Support in Six Countries

Country/ Region	Source of funds	Scope of funding	Funding characteristics
America	National Science Foundation	For individual scientists, research teams and research institutions of higher education institutions and other academic institutions across the country	Universality and diversity
Australia	National Competitive Funding Scheme	Basic research and research training for local research individuals or teams	Develop local researchers
United Kingdom	British Council for Engineering and Nature Research	Provide financial support for British scientists and engineers as well as scientific research organizations	Stimulate the local scientific research and innovation environment
Germany	Humboldt Foundation of Germany	For German scientific research units and university institutions	Complete research in Germany to promote scientific development in Germany
Japan	Government departments such as the Ministry of Education, Science and Technology, Industry and Economy of Japan, Civil organizations	Set up various bonuses to support foreign scientific and technological talents to carry out scientific research in Japan	Flexibility, Autonomy
Singapore	Government R&D Fund	Pay attention to the funding of national universities and scientific research institutions, and at the same time pay attention to cooperation with first-class universities and scientific research institutions in developed countries such as Europe and the United States.	Competitive, Evaluative

Zhong Yunhua et al. divided the Party's 100 years of scientific and technological talent policy into five phases: starting frustration, restoration and adjustment, reform and breakthrough, standardization and deepening, and innovation and empowerment [7]. Since the reform and opening up, the implementation of the strategy of developing the country through science and education. The strategy of talent development and the strategy of strengthening the country with talents have been put forward successively, and the layout of scientific and technological innovation and talent work has been integrated, and promoted as a whole [8-9]. There are honorary titles such as Order of the Republic, Order of Friendship, Model of the Times, Academician, etc. For the attraction and cultivation of talents, there are National Top Science and Technology Prize, National Natural Science Prize, International Science and Technology Cooperation Prize, National Talent Project, etc., and the main source of funds is the National Natural Science Foundation of China, which provides financial support to honor the outstanding contributions to the country's deep plowing of basic research, cracking the problems of

development, overcoming the difficult challenges of reform, and safeguarding the harmony and stability of the society. The awards are mainly funded by the National Natural Science Foundation of China to recognize outstanding contributions to the country's fundamental research, cracking development problems, overcoming difficult reforms and maintaining social harmony and stability.

General Secretary Xi Jinping emphasized in the Central Talent Work Conference and the National Science and Technology Conference that we must always adhere to the principle of the Party's management of talent and the "four orientations", adhere to the demand for scientific and technological innovation as the pull, improve the level and quality of independent training of talent, optimize the environment for talent development, and accelerate the construction of the world's important talent centers and innovation highland [10-11]. Liu Xu et al. believe that according to the regional differences in the targeted development of improved policies, optimize various types of policy tools, refine the relevant policy provisions, and strengthen inter-departmental cooperation [12]. Wang Junling et al. have a significant evolution process from the four dimensions of Shandong's science and technology talent policy in the four dimensions of governance subject, governance rules, governance mechanism and governance goals. Overall, it shows a development trend of diversified talent attraction methods, diversified types of scientific and technological talents, and professional evaluation of scientific and technological talents [13].

Shandong is the first province in China to set up the Science and Technology Innovation Committee of the provincial party committee, with the secretary of the provincial party committee and the governor of the province as the dual directors, to strengthen the top-level design of science and technology innovation work. Shandong was the first in China to issue the "Measures for Strengthening the Training and Introduction of Young Scientific and Technological Talents in All Aspects", and has organized six consecutive editions of the "Entrepreneurship Qilu. Winning the Future" high-level talent entrepreneurship competition with a new overseas track. The ability to attract and gather talents has been significantly strengthened. The province now has 164 academicians of the two academies and academicians of overseas academic institutions residing in Qilu, and more than 5,000 leading talents at the national level, with the province's total talent resources exceeding 15 million, ranking the third in China. According to China Science and Technology Talent Development Report (2022), the full-time equivalent of China's R&D personnel (an internationally recognized indicator for comparing scientific and technological manpower inputs) will increase from 3.247 million in 2012 to 6.354 million in 2022, ranking first in the world.

2 Weifang Scientific and Technological Talents Attracting and Educating Method Effectiveness

In the strategic context of comprehensively improving the quality of independent training of talents, the new era has introduced new standards and new requirements for talent training. Weifang has vigorously implemented the strategy of strengthening the city with talents in order to deeply implement General Secretary Xi Jinping's important

thoughts on doing a good job of talents in the new era. As of 2024, the city's total talent resources amounted to 2.37 million people, with more than 180 collaborating academicians, 2 national engineers of excellence, 185 national key talents, 380 talents in Taishan series, and Weifang was selected as one of the top 100 most attractive cities in the country in terms of talent, ranking No. 3 in the province. Implementation of industrial talent gathering, high-end platform support, talent ecological optimization of the "three major actions", adhere to scientific and technological policies to stimulate talent, innovative platforms to cohesion of talent, industry-university-research cooperation to attract talent, scientific and technological projects to cultivate talent. The comprehensive compendium of scientific and technological talent work in Weifang has achieved notable results and highlights for the construction of a high-quality city and the transformation of old and new energy to provide support for the talent. Weifang has been providing talent support for the construction of a high-quality city and the transformation of old and new energies.

2.1 To Explore the Refinement of the "Policy Depression" and Build a New System of Characteristic Scientific and Technological Talents System

Relying on the Weifang Science and Technology Innovation Committee, it has strengthened the systematic planning and top-level design of the science and technology innovation system, formed the "1+N" policy system with "Talents to Develop Weifang" as the core of 24 articles, and issued 16 measures to strengthen the support of talents in key industries and 13 individualized industrial talent support policies. Personalized industrial talent support policies. It was issued "on strengthening the city's scientific and technological cadres and talent team building measures" and "on the implementation of [on the implementation of "Talent Revitalization of Qilu" action to create a new era of talent gathering heights of a number of measures] implementation measures" and other documents. Weifang City Science and Technology Reward Measures, Implementation Opinions on Further Promoting the Transfer and Transformation of Scientific and Technological Achievements, Weifang Innovation and Entrepreneurship Community Management Measures, and other series of inclusive policies have been revised, which have provided an effective institutional guarantee for the implementation of scientific and technological rewards, the disposal of achievements, the distribution of proceeds, and the construction of new research and development institutions, and so on.

Weifang Industrial Technology Research Institute to "Industrial Technology Research Institute + companies + funds + various types of innovation + incubation park" as the main framework structure, explore the establishment of "four unlike" R & D institutions. Weifang Modern Agriculture Shandong Province Laboratory with "Three Modes" strategic development positioning, explore the agricultural science and technology and rural revitalization of mutually reinforcing symbiosis of the new model, to become Weifang and even Shandong and the country's agricultural "seed bank". Weifang Advanced Optoelectronic Chip Research Institute of innovative layout of strategic

emerging industries, to promote the development of the semiconductor industry in Weifang and even in Shandong and the country. Shandong and the country's semiconductor industry "China Core". Weifang, which is aiming at future industries and key areas to implement the "one industry, one policy" precise support, the formation of "universal + customized" characteristics of the talent system system, to accelerate the promotion of new and old energy transformation in Shandong.

2.2 Creating "Three-in-one" Integration, the Implementation of Science and Technology Platforms to Attract and Nurture Talent New Model

In recent years, Weifang is committed to the construction of high-capacity innovation platforms to promote the growth of talents to build platforms. In accordance with the deployment of national, provincial and municipal science and technology innovation platform construction system, to create a new model of "talent + project + platform" integrated talent attraction. the implementation of science and technology innovation platform cultivation and enhancement action is to recommend the advantageous enterprises to declare the provincial level above the new R & D institutions, key laboratories and other major innovation platform construction. As of 2024, 37 national, 294 provincial and 1,576 municipal science and technology innovation platforms have been built in the fields of basic innovation, public service, industry, academia and research, etc. In the past three years, 34 major provincial science and technology innovation projects have been shortlisted, and the first to build a pattern of science and technology innovation platforms with a strong influence.

Weifang industrial science and technology discovery and science and innovation service platform for the key industries in Weifang. The use of advanced artificial intelligence algorithms describe the innovation portrait of enterprises, talent, capital, etc., in which the introduction of talent navigation module focuses on combing the scientific research teams of colleges and universities, enterprise technical executives and engineers, to establish the talent portrait and team cooperation network, and to carry out analysis and evaluation based on the talent portrait system, in order to support the city of Weifang to make full use of global innovation resources and provide navigation index for introducing top talents. To establish and improve the mechanism of scientific and technological talent demand and cultivation, develop in the direction of industry-university-research integration, and promote the precise matching of scientific and technological talents with enterprises and organizations [14]. In the past three years, Weifang has introduced 57 talents (team) projects approved above the provincial level. Weifang Modern Agriculture Laboratory of Shandong Province introduced a 695-member R&D team led by two academicians, supported by two young top talents, with PhDs and masters as the main force. Laoshan Water Power Platform has gathered more than 270 high-level talents and is promoting the construction of Shandong University Weifang Research Institute.

2.3 Adhere to the "Target Orientation" Targeting, and open up New Paths of Direct Cooperation Between Institutions

Based on the industrial characteristics and enterprise needs of Weifang, a series of docking activities of "Entering the Chinese Academy of Sciences" has been carried out innovatively. Since 2013, to explore the Chinese Academy of Sciences as the center, to build research institutes, key universities, science and technology service institutions as one of the open network of cooperation system, has gradually formed with the Chinese Academy of Sciences, 12 branches, 86 Chinese Academy of Sciences research institutes and more than 70 colleges and universities to fully establish a long-term docking mechanism. The implementation of the annual "Into the Chinese Academy of Sciences" Each year, which implements a series of docking activities for more than 5 times, and releases the first batch of Weifang science and technology innovation demands for more than 177 items.

Weifang experts as a link, we carry out the "famous school through train" activities for three consecutive years. We build liaison system of the establishment of key universities, research institutes, technical experts, mainly institutions of science and technology cooperation to attract experts from colleges and universities selected Weifang high-end think tanks, and effectively promote the deepening of cooperation between the industry, academia and research and innovation. To explore the working mechanism of technology transfer and transformation, and set up Weifang Collaborative Innovation Center of National Technology Transfer Center of Xi'an Jiaotong University. Innovative implementation of school-local cooperation "Double Hundred Actions". We collect 1885 enterprises of "ten industries" on the talent needs of 23,700, the total introduction of high-end talent more than 530 people, the new 109 cooperation platforms, the conversion of 824 scientific and technological achievements, resulting in economic benefits of 2.18 billion yuan. The economic benefits generated amounted to 2.18 billion yuan.

2.4 Constructing a Diversified "Talent Matrix" and Forming a New Situation of Increasing the Quantity and Quality of Talent Projects

Weifang focuses on advantageous industries and emerging industries, and builds a diversified talent pool by perfecting the cultivation mechanism of "high-precision, top-notch and shortages" talents, focusing on three-level talent attraction projects, such as national-level talents, Taishan series talents. Innovative work ideas and key initiatives, organizing policy briefing, candidate declaration, defense training sessions of three meetings, the selection rate of key talent projects gradually increased, to create a ladder of high-level talent team.

Adhere to the cultivation of local talents and the introduction of foreign high-end talent "two-handed" approach, one is the implementation of the innovation-driven development strategy, the realization of science and technology talents independent training, the cumulative cultivation of national high-level talent special support program of 30 people, Taishan industry leaders 145 people, Taishan scholars 33 people, the introduction of provincial-level top talent 3 people. Science and technology talent team level

layout is reasonable. Second, the implementation of talent enclave construction strategy, increase the introduction of overseas intelligence, the cumulative introduction of 2051 foreign experts, foreign high-end talent 303 people, 17 people selected for the national key foreign talent project, 27 projects selected for the provincial foreign talent project.

3 Problems in Attracting and Educating Scientific and Technological Talents in Small and Medium-Sized Cities

3.1 Insufficient Innovation Capacity of Local Scientific and Technological Talents

There are only four undergraduate colleges and universities in the city, and the rest are mainly higher vocational colleges and universities. The 14 research institutes included in the national statistics, only 2 are functioning well, and more than 70% of the enterprises have not invested enough in research and development. According to the report "Weifang Human Resource Development Plan (2019-2022)", about 30% of graduates with specialized education or above of Weifang nationality who are studying abroad are employed in foreign countries, and 60% of local university graduates have left Weifang, and fewer of them have really returned to their hometowns for innovation and entrepreneurship, and are able to play a role in it, and the problem of outflow of talents is more prominent, and it is difficult to provide sufficient talent support for the development of science and technology innovation [15].

3.2 Support for High-end Innovation Platforms is not Extensive

Cadorin et al. believe that the inevitable result of talent agglomeration at home and abroad in science and technology parks. The cooperation of stakeholders and the introduction of high-quality talents can effectively promote innovation and technology transfer in science and technology parks [16]. More than 50 enterprises in Weifang have established science and technology talent enclaves such as R&D centers or technology business incubators overseas outside the city through self-built, mergers and acquisitions, cooperation and joint construction and other ways. The city has not issued relevant management measures for the construction of talent enclaves, and nearly 80% of the talent enclaves are invested and operated entirely by the enterprises' self-financing, with less government support, insufficient R&D motivation, and insufficient value exertion.

3.3 The Concept of Introducing Scientific and Technological Talents is Not New

Some enterprises in the introduction of scientific and technological talent have heavy use, light training, the lack of advanced ideas and innovation. Some enterprises are wary of high-level talent, which fear of inputs without outputs, the second fear of peer

"poaching", the third fear of technology by the leakage of secrets, especially for fear of the loss of talent, which found another enterprise to weaken their own competitiveness.

4 The Thinking of Attracting and Educating Scientific and Technological Talents Well

4.1 To Formulate Reasonable Talent Policy Guidance to Stimulate the Vigor of Innovation

To implement of the differentiation of the development of support policies, for the same type of talent, and distinguish between the support of enterprises or new R & D institutions size, volume. According to the actual situation of the differentiation of the development of the "inverted triangle" support policy, so that the provincial and municipal funds to effectively play the maximum benefit. Combined with the actual situation in Shandong, we actively plan to establish a complete range of disciplines, talent category ladder reasonable "talent supermarket" system, especially to optimize the identification of young talent training mechanism, the development of accurate and effective use of talent policy [17], which is conducive to the enterprise to contact the talent and avoid the mutual needs each other, but do not understand, not be contacted.

4.2 Establishment of Scientific and Technological Talent Incentive Mechanism to Enhance the Power of Innovation

Make full use of the province's assessment mechanism introduced by the rate of college graduates to stay in Qilu, to promote the establishment of scientific and technological talents in Weifang or back to Weifang as Weifang growth incentives and work assessment mechanism, scientific and technological talents to stay in Weifang, which is included in the "a handful of projects". The implementation of universities and institutes in Weifang led the establishment of various types of research institutes and platforms to give the province and the city of talent project quota system, linked to the evaluation of excellence, support and subsidies, in accordance with the assessment of the index score to give the ladder of rewards to improve the enthusiasm and mobility of universities and institutes and key enterprises. To improve the reward mechanism and evaluation mechanism, establish a flexible salary system in line with international standards, focus on the career development mode of talents, and enhance the growth space of talents.

4.3 To Enhance the Platform Carrier Construction to Cultivate Innovation Ability

Fully relying on scientific and technological projects, R&D platforms, big science programs and big science projects, promote the all-round integration of talents, technologies and projects. Focusing on regional advantageous industries, adhere to the talent, project, platform "trinity" layout development, encourage enterprises and universities

to jointly build vocational education bases, joint laboratories, etc. To take the road of "deep integration of industry and education, school and enterprise a sportsman". We encourage and support conditional enterprises or new R & D institutions to set up domestic talent enclaves, offshore talent bases outside the center of the city where high-level talent is concentrated [18].

4.4 Authorities at all Levels to Emancipate the Mind to Promote the Cycle of Innovation

To release the main body of the employer in the autonomous role of talent attraction, clear rights and obligations of both parties, task indicators, etc. To enhance the sense of service, protection capabilities, and effectively ensure that the attraction of talent to catch, use well. We actively guide and train entrepreneurs to take the initiative to assume social responsibility, encourage leading enterprises in terms of capital, technology and talent with local small and medium-sized enterprises, colleges and universities in Weifang to establish links, we can stimulate the endogenous cycle of power and break the "foreign monks read the scriptures" inertia. Not only to help reduce their own costs, but also conducive to supporting the development and growth of small and medium-sized enterprises, to the development and growth of small and medium-sized enterprises. Development and growth, to the extension of the value chain of the industrial chain in Weifang.

4.5 The use of Digital Construction Means to Gather Innovation Factors

Digital governance capacity is an inevitable requirement to enhance scientific and technological innovation and develop new quality productivity. Each region in China has established its own talent information database. It is necessary to break the information barriers, realize interconnection and interaction, establish a black and white list system, and strengthen academic integrity management. The use of digital governance means to establish a foreign talent information database, including education, work, patents, achievements and other talent information in order to facilitate the evaluation, screening, the introduction of outstanding foreign talent, and standardize mistake of the talent intermediary.

5 Conclusion

Based on an in-depth analysis of the cultivation of scientific and technological talents in Weifang, this paper proposes several strategic recommendations to enhance the talent management framework. These include: developing sound policy guidelines, establishing robust talent incentive mechanisms, enhancing platform construction capabilities, fostering innovation cycles through open-minded approaches, leveraging digital infrastructure, and continuously improving comprehensive service support. These insights will serve as valuable references for Weifang and other small to medium-sized

cities nationwide in attracting high-caliber scientific and technological talents, building high-quality urban environments, and facilitating the transition from old to new growth drivers.

In the future, Weifang should focus on strengthening regional talent collaboration by establishing exchange and cooperation mechanisms with cities within Shandong Province and advanced regions outside the province, thereby creating a virtuous cycle of complementary, reciprocal, and shared talent resources. The city should also aim to create a distinctive talent brand by capitalizing on its strengths in modern agriculture and advanced manufacturing, attracting more industry-specific talents to Weifang. Additionally, it is crucial to elevate the level of talent services by refining the service system to provide convenient and efficient support such as housing, children's education, and healthcare for scientific and technological talents, thus fostering a favorable living and working environment. Furthermore, Weifang should reinforce its leadership in scientific and technological innovation, guiding the development and strengthening of strategic emerging industries, and offering broad platforms and spaces for scientific and technological talents to showcase their abilities. Through continuous optimization of the talent ecosystem, Weifang aims to further stimulate the innovative potential of scientific and technological talents, providing robust talent support for achieving high-quality development and constructing a technology-driven city.

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