Research on the Innovation Mechanism of Scientific and Technological Personnel Evaluation

Weifang Song[1]

[1] Railway Police College, Zhengzhou, Henan, 450053

Abstract: On the basis of scientific classification of scientific and technological talents, this paper analyzes the characteristics of different types of innovative scientific and technological talents such as basic research and applied basic research, technology development and application, innovation and entrepreneurship. Based on the theory of competency model and the theory of individual innovation behavior, the innovative scientific and technological talents appraise the iceberg model, and adopt the top-down and bottom-up methods to innovate knowledge, innovate skills, influence and innovation ability, Innovation power and management capacity and other indicators under the framework of detailed indicators of clustering and screening, the formation of different types of innovative scientific and technological talent evaluation index system.

Keywords: Innovation Mechanism, Personnel Evaluation, Scientific Result

1. INTRODUCTION

The key to technological innovation lies in talent. With the increasing competition, the region regarded science and technology talent as a strategic resource and enhance the competitiveness of the core factors. Who has a high-quality and highly skilled scientific and technological personnel, who will have the core competitiveness, also has the initiative to develop. How to introduce and retain scientific and technological talents, and give full play to the role of scientific and technological personnel, as the region to achieve its sustained and rapid socio-economic development of the urgent task. The psychologist theory proposed by American psychologist K. Lewin argues that the value created by a person is related to his or her own quality and is closely related to the surroundings in which he is, if a person is at a disadvantage Environment, it is difficult to give full play to his talent, so as to achieve the desired achievements. So a region can be enough to attract science and technology talent, while encouraging scientific and technological personnel to fully play their own talent, you need to provide a good science and technology talent to help grow and develop the social and ecological environment. In this paper, through the construction of scientific and technological personnel social and ecological environment evaluation system and the corresponding evaluation model, the regional scientific and technological personnel social ecological environment comprehensive measurement, the talent social ecological environment to make a reasonable evaluation and prediction, found that the local scientific and technological personnel social ecological environment problems, thus For the region to attract talent, retain talent, tap the potential to provide the basis for talent, and thus promote regional economic construction and development.

2. THE BASIC THEORY OF THE CONSTRUCTION OF EVALUATION INDEX SYSTEM

Research on the characteristics of innovative scientific and technological talents can be divided into empirical research and non-empirical research. Wang Guangmin and Lin Zeyan through the questionnaire and other empirical research methods, research of China's innovative scientific and technological talents and high-tech talent quality characteristics, found high creativity and creativity, strong learning ability, technical ability, team spirit and good environment Adaptability is a common feature of these innovative technology talent. Other researchers are also based on the research put forward the innovative science and technology talent should have the quality characteristics. Wang Lu-lu's research on the characteristics of innovative talents of science and technology, including positive attitude of life, innovation consciousness, comprehensive knowledge structure, independence and other quality characteristics; Wang Lu-lu (School of Economics and Management, Nanjing University of Aeronautics and Astronautics, The core competence includes independent learning ability, innovation and practice ability, resource control ability, self-cognition ability, interpersonal relationship ability, innovation consciousness, self-knowledge ability, innovation ability and so on. In this paper, Self-fulfilling needs and good physical fitness. In 2006, General Secretary Hu Jintao put forward in the speeches of the academicians' meeting that the innovative talents should have the following main qualities and qualities: one is the noble ideal of life; the second is the aspiration and courage to pursue the truth; The scientific thinking ability; four is a solid professional

foundation, a broad international perspective, keen professional insight; five is a strong spirit of unity and cooperation. Based on the existing research results, the characteristics of innovative scientific and technological talents in China can be divided into three categories, namely, psychological behavior characteristics, knowledge and skills characteristics and working characteristics. Further analysis of the characteristics of different types of scientific and technological personnel found that three types of innovative scientific and technological talents have both common features and personality characteristics. (1) First of all, from top to bottom, according to the frequency analysis of relevant literature at home and abroad, combined with the depth of interviews with experts, put forward the first-class indicators under the framework of innovative scientific and technological personnel evaluation index system in the three indicators of primary program and design survey Questionnaires. Pre-survey, through statistical analysis, to further establish the indicators used in the survey. (2) to conduct a formal expert survey, access to all kinds of experts on the assumptions at all levels of scoring. The main investigators include experts engaged in talent management, experts specializing in talent research, and scholars and experts engaged in scientific research in other fields. (3) from the bottom up, the use of factor analysis method for exploratory analysis of factors. Factor analysis is a multidimensional statistical analysis method that uses some of the variables with intricate relationships as a few comprehensive factor variables and minimizes the loss of information from the perspective of studying the dependence of the original variables correlation matrix The According to the expert scoring situation for correlation analysis and testing, variable variables correction and clustering, the formation of secondary indicators and three indicators and the establishment of the various levels of indicators between the relationship.

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The evaluation mechanism is closely related to the innovation ability of the scientific and technological talents in colleges and universities. The scientific, reasonable, systematic and operable evaluation mechanism of science and technology talents in colleges and universities is to guide the growth of science and technology talents, form a rigorous and realistic cultural atmosphere and stimulate the original innovation ability. important. However, some problems existing in the evaluation mechanism of scientific and technological talents in colleges and universities in our country have restricted the promotion of scientific and technological innovation ability in our country. The concrete manifestation is that the value orientation is not clear. The value orientation of the evaluation of scientific and technological talents in colleges and universities is not clear, and the practice of talent evaluation and the number of papers, the number of projects and funds, and the number of patents are very common. Too much emphasis on the number of evaluation-oriented scientific and technological personnel to anxious, easy to fall into the "scientific research is to publish papers or declare the project," the vicious circle, from the actual, contributed to the quick success, impetuous exaggeration and other bad atmosphere, but also ignored the science and technology support teaching and innovative talents An important guide to training. In addition, the existing research funding management system and scientific research personnel pay distribution mechanism also affects the value orientation of university science and technology talent evaluation. Scientific evaluation of talent should be quality and value-oriented, with the actual contribution to the main. Classification evaluation is not in place. At present, the evaluation standard of scientific and technological talents in colleges and universities is more simple than that of single, and it is not limited to the diversification of evaluation indexes, which is limited to papers, patents and various scientific research projects and research funds. A single evaluation criteria and even become a scientific and technological personnel to write papers, but also do a good job research, but also do a good job transformation and technology promotion, so the evaluation of the talent is thousands of people side of the "all-rounder", without any expertise and Characteristics, but also strangulation of talent in a certain area of potential. In essence, the current evaluation criteria are not "tailor-made", but with the

same ruler to evaluate the different types of research talent, or with the same ruler to evaluate the different stages of growth in the talent, ignoring the scientific research and talent growth Rules, evaluation results easily deviate from the objective reality.

3.   EVALUATION   INDEX   SYSTEM CONSTRUCTION PROCESS AND METHOD

To take the top-down and bottom-up combination of the form of the previous proposed innovation knowledge, innovation skills, influence, innovation, innovation and management capabilities as innovative scientific and technological personnel evaluation of primary indicators, and further based on literature research Law, frequency analysis, empirical methods and factor analysis methods to form an innovative scientific and technological personnel evaluation of secondary and tertiary indicators system. (1) First of all, from top to bottom, according to the frequency analysis of relevant literature at home and abroad, combined with the depth of interviews with experts, put forward the first-class indicators under the framework of innovative scientific and technological personnel evaluation index system in the three indicators of primary program and design survey Questionnaires. Pre-survey, through statistical analysis, to further establish the indicators used in the survey. (2) to conduct a formal expert survey, access to all kinds of experts on the assumptions at all levels of scoring. The main investigators include experts engaged in talent management, experts specializing in talent research, and scholars and experts engaged in scientific research in other fields. (3) from the bottom up, the use of factor analysis method for exploratory analysis of factors. Factor analysis is a multidimensional statistical analysis method that uses some of the variables with intricate relationships as a few comprehensive factor variables and minimizes the loss of information from the perspective of studying the dependence of the original variables correlation matrix The According to the expert scoring situation for correlation analysis and testing, variable variables correction and clustering, the formation of secondary indicators and three indicators and the establishment of the various levels of indicators between the relationship.

For the establishment of innovative entrepreneurship evaluation indicators, the first use of expert advice directly form the initial three-tier index system framework. Because the innovation and entrepreneurship and the other two types of talent is different, it is more talented people's leadership, market awareness, the field of technology frontier control and foresight, public relations awareness, and now the literature on this research is relatively small, Therefore, in order to better highlight the characteristics of such talent, the index factor of the primary program should come from the reality of the investigation and expert interviews. On this basis, the use of factor analysis, according to expert scoring on the primary indicators to carry out the relevant analysis and testing, indicators of correction and clustering.

4.   EVALUATION   INDEX   SYSTEM   OF INNOVATIVE TALENTS

Based on exploratory factor analysis, the clustering results of all kinds of innovative scientific and technological talents are shown in Table 4. It can be seen that there are 6 common indicators in the secondary evaluation index system of three kinds of innovative talents, and the characteristic indexes of basic research, technology development and application and innovation entrepreneurial science and technology talent evaluation are 7, 11 and 11. The number of subjective and objective indicators of the three types of scientific and technological talents is 6/7,4 / 13 and 3/14 respectively, and the engineering and technical innovation talents are mainly subjective qualitative evaluation. Under the framework of the second index, the number of the three indicators of the three types of scientific and technological talents were 39,50 and 46 respectively, which comprehensively expounded the idea of innovative scientific and technological talents. In the six secondary common indicators, different types of scientific and technological personnel evaluation of the three indicators are still different. (1) papers on the situation. The basic research talents mainly examine the situation of the published papers in the past 10 years, the growth of the number of papers published in the past 10 years, and the H index (which combines the quantitative indicators and the quality indicators (citations) ; And engineering and technical personnel did not send the amount of inspection, innovation and entrepreneurship talent only qualitative study of its representative papers on the situation, but did not have the quantitative evaluation indicators. (2) bear or participate in the project situation. Various types of personnel to study the type of project, project level, etc. are different. (3) have intellectual property rights. In addition to investigating the application of intellectual property rights, authorization, the engineering and innovation and entrepreneurial talents also examine the application of intellectual property. (4) peer recognition. Basic research talents mainly examine the extent of their recognition in academia, and the other two types of talents mainly examine the extent of their recognition by industry and industry counterparts. (5) learning ability. Compared with the other two types of talent, basic research talents pay more attention to the discovery of their knowledge of hot spots, as well as the ability to analyze test phenomena and data. (6) Interest-oriented. Basic research talents emphasize their ability to enjoy happiness in scientific research activities, dedication to the cause of scientific research; the other two types of talent more emphasis on the market competitiveness of scientific research activities have

a strong tendency to hobbies. 4.3 Analysis of the characteristics of indicators for basic research talents, more attention to its innovative knowledge-related capabilities and output, focusing on the impact of papers, commitment to scientific research projects, to carry out the experimental capacity and the responsibility of scientific research and so on. For engineering and technical personnel, pay more attention to engineering practice ability, focusing on engineering practice and design capabilities, intellectual property licensing industry, industry analysis, project planning, decision-making and implementation capabilities. For the innovation and entrepreneurship talent, pay more attention to its own market capacity, focusing on the practice of entrepreneurial practice, business environment, economic awareness, and marketing and management capabilities, including whether the entrepreneurial experience and whether the experience of research and development products; Whether the industry is within the scope of national incentive policies, whether it has reached the leading domestic or international advanced level, to fill the gaps or lead the development of related industries, or have greater market potential and expected economic benefits; whether the technology is leading in the country or abroad Advanced, after the introduction should be able to produce the desired expected economic benefits, and promote the development of related industries.

5. FRAMEWORK DESIGN OF SOCIO - ECOLOGICAL ENVIRONMENT EVALUATION SYSTEM FOR SCIENCE AND TECHNOLOGY TALENTS

In the study of talent environment, Ravestein put forward the theory of "push-pull" dynamics in his book "The Law of Immigration"; LarrySjaastad, Michael Todaro analyzed the reason of talent migration from the economic point of view; Dasgupta and Partha Studied the relationship between regional environment and talent flow. In these studies, the reasons for influencing the flow of talent include the government's public policy, social environment, traffic conditions, economic conditions and other factors. In the domestic literature, Zhang Zengsheng thinks that the geographical environment, regional policies, laws and regulations, social security system, economic development and transportation convenience of talents will have an impact on the gathering of talents. Zhu Xingzhen puts forward that talent flows into or out of a certain area, Is based on the expectations of the region's environment, including population welfare, price level, regional economic policy, the construction of human settlements and the inclusion of foreign culture; Guizhao Ming's research on the human environment involves the social environment, infrastructure environment, Political stability and other public factors.

According to the existing literature, we summarize the common environment for attracting talents (for all talents): the regional development environment, the construction of the security system, the educational conditions of children, the comfort of life, the social security situation and the convenience of transportation. In addition, we need according to the characteristics of scientific and technological personnel to analyze the individual needs of the environment: (1) science and technology talent with "convergence". Science and technology talent is more inclined to flow to high-tech industry cluster. Jiang Zhaomei pointed out that the high-tech industry has the characteristics of gathering in space, and many high-tech enterprises gather in space and form a stable technical and economic network with scientific research institutions, universities and service industries in the region. The network can reduce costs, activate resources, expand information exchange, enhance the spill of knowledge, and thus promote technological innovation. So the region if there are more scientific research units and high-tech enterprises, will be more conducive to the development of their own talent and talent to play, but also help their own quality and skills to enhance the science and technology talent has a greater attraction ; In addition, the number of scientific and technological achievements reflects the atmosphere of regional science and technology innovation, a good atmosphere can also attract a large number of scientific and technological personnel. (2) science and technology talent with "foreign" nature. Science and technology talent to foreign or domestic foreign-funded enterprises tend to flow. Science and technology talent as the main force of scientific and technological innovation, as the pursuit of various countries and regions, each country have developed to attract science and technology talent-oriented immigration policy, while domestic and foreign enterprises are also thirst for science and technology talent. As the scientific and technological personnel are generally well educated, have a better understanding of foreign culture, foreign-funded enterprises in the work of cultural and language barriers smaller, while foreign companies relaxed working environment, a good working atmosphere and advanced technology level more Conducive to scientific and technological personnel to create activities. In addition, areas with high openness are more inclusive of foreign cultures. (3) the work of scientific and technological personnel tend to exist in the form of intellectual property rights, if the local government to improve the intellectual property laws and regulations, to strengthen the protection of intellectual property rights, to create conducive to the dissemination of innovative achievements and promote the environment, science and technology personnel is likely to Regional flow. The number of patent applications in a region reflects the importance

of intellectual property in the region, and the number of scientific and technological innovation systems introduced by the government not only reflects the degree of protection of intellectual property rights, but also reflects the incentive for technological innovation. In addition, the technology business incubator provides physical space and infrastructure for newly established science and technology SMEs and provides a range of service support to reduce entrepreneurial risk and entrepreneurial costs, reflecting support for technological innovation, Venture capital similar to the effect, so the number of technology business incubator is also an important personality environment.

(4) the rapid development of science and technology today, which determines the scientific and technological personnel need to continue to learn to keep up with the pace of technological development, which requires local high level of high school for scientific and technological personnel exchanges and learning; and, Access to scientific and technological information and technology development frontier, regional networks, information more developed can also affect the inflow of scientific and technological personnel, per capita post and telecommunications business can reflect the speed of access to information. (5) scientific and technological personnel as a high-level talent, the spiritual level also has a higher demand, if the region has more libraries, cultural centers, museums and other cultural sites on science and technology talent is a great attraction. According to the above analysis and the principle of constructing the index system of talent social ecological environment, this paper divides the social and ecological environment of science and technology talents into five levels of scientific and technological development environment, science and technology environment, open system environment, harmonious environment and living environment 29 second-level indicators were set up under each level.

Science and technology development environment is a reflection of regional talent social and ecological environment of the core elements, it directly determines the total amount of talent and structure. The economic foundation is the fundamental and prerequisite for social development. Good economic development conditions can meet the material needs of scientific and technological talents. It is the material basis for attracting and retaining the talents of science and technology. Therefore, the economic environment is the most important indicator of science and technology talents. Science and technology development environment indicators include per capita GDP, industrial output value, per capita annual disposable income of urban residents, per capita annual consumption expenditure of urban residents, urban workers average wage.

Technology itself is the environment that can directly promote the long-term development of scientific and technological talents. It is pointed out that if there are more scientific research units and high-tech enterprises in the region, it will be more conducive to the development of talents and talents of science and technology talent, but also contribute to the improvement of their own quality and skills, so their own development environment should include high The total number of high-tech enterprises, the number of R & D activities, the number of scientific and technological achievements; the number of patent applications and the number of scientific and technological innovation systems introduced by the government reflect the protection of intellectual property rights, Property rights protection environment to carry out research; In addition, we join the expenditure of science and technology activities to reflect the region's emphasis on scientific research and innovation, adding technology business incubator reflects the support of scientific and technological innovation. These indicators reflect the environment can determine the development of scientific and technological personnel themselves.

Open system environment for the scientific and technological personnel to provide more opportunities for employment and technical exchanges, making science and technology talent have a broader platform to display their ability to ensure that science and technology talent to "stay live, The The selected open environmental indicators include the total amount of imports and exports, the amount of foreign direct investment, the total industrial output value of foreign-invested enterprises and the number of foreign-invested enterprises. Comprehensive protection system construction, children's education conditions and social security situation and other environmental environment to build a common environment to protect the environment. The comprehensive protection of the environment, for the development of science and technology talent, including insurance, employment, health care, children's education, public safety and other aspects of social security, is to attract talent and stability of the important factors. Common environmental protection indicators include social security and employment expenditure, medical and health expenditure, education expenditure, public safety expenditure. However, in order to realize the value of scientific and technological talents, it is necessary to construct the harmonious environment of science and technology talents, including the number of colleges and universities and the number of cultural places such as library. Common security environment and personality harmonious environment together constitute a harmonious environment, a good security environment can promote the harmonious development of scientific and technological talents and regional environment.

The living space environment reflects the degree of convenience in the area, which includes the comfort

and convenience of living in a common environment, as well as the availability of information in a personalized environment. Longing for convenience, comfortable life is the people's general psychology, a good living space environment to help attract and retain science and technology talent. In the choice of work and entrepreneurship, people tend to first consider the living environment of living space environment. Living space environmental indicators include per capita road area, per million people have public transport vehicles, per capita park green area, built area green coverage, urban built area and per capita post and telecommunications business volume.

6. CONCLUSION

Scientific and technical personnel, experts, managers can interact with the system to share information; talent evaluation found that the information is the system of large data mining module automatically completed, and then by the multi-expert coordination operations, supervision and completion of the final decision of scientific and technological personnel. The fuzzy cognition discovery method based on large data is applied to the actual science and technology talent evaluation and discovery procedure, which is helpful to the support and decision support of the scientific and technological personnel, which enhances the informationization and automation degree of the program, and finds the active way, Which reduces the human factors and subjective effects in the evaluation.

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