



Analysis on the Characteristics of Young Scientific and Technological Talents in China

A Case Study of Selected Candidates in the China Association for Science and Technology Youth Talent Promotion Program

Yuqiu Zhao and Renliang Jiang^(✉)

School of Public Management, Tianjin University of Commerce, Tianjin 300134, China
jiangrl@tjcu.edu.cn

Abstract. Young scientific and technological talents are the reserve force of scientific and technological talents. It is necessary to study their group characteristics in order to train talents better. This paper selected the selected candidates of the China Association for Science and Technology Youth Talent Promotion Project as the research objects. Firstly, we used the data publicly available on the Internet to collect resume information and build the database of this group. Then we conducted multi-angle analysis. The results show that the national support for science and technology talents is increasing; the age distribution of the selected candidates is concentrated; the field of materials science is the most popular, and the field of communication is in the ascendancy; the number of females in China's young scientific and technological talents is too small, but females have special advantages in some fields.

Keywords: Young scientific and technological talents · Group characteristics · Youth Talent Promotion Program

1 The Research Background

In September 2021, the Central Talent Work Conference pointed out that it is necessary to build up a large contingent of young scientific and technological talents. Put the policy focus of cultivating national strategic talent force on young scientific and technological talents, and support young talents to play the leading role. We will formulate and implement a special program for talents in basic research, and provide long-term and stable support to a number of young talents who have made outstanding achievements in natural sciences and have obvious potential for innovation. Under the background of building a powerful country with talents, China pays special attention to the training of scientific and technological talents, and young scientific and technological talents are their main force and new force. In this paper, young scientific and technological talents are selected as the research group. The program greatly helps young scientific and technological talents with high potential and high creativity, and helps to make up the structural shortage of supporting young scientific and technological talents. This paper analyses the characteristics of the selected group, and provides ideas and methods for

further understanding the growth law of scientific and technological talents and helping to train scientific and technological talents.

At present our country scholars analyse the scientific and technological personnel group characteristics of path similar to that of the existing literature is mostly choose certain types of scientific and technological personnel as the research object, collect their resume information and use CV analysis, questionnaire investigation, etc. to form a database for quantitative and qualitative analysis. The content gives priority to characteristics of demography, education background, inherited relations, both at home and abroad results output. Some have added comparative analysis with foreign situations to draw conclusions in various aspects. The above elements provide references and ideas for this paper. This paper selected the selected candidates of the China Association for Science and Technology Young Talent Promotion Project as the research objects, from the gender and age, disciplines and multi-faceted analysis recommended units, designed to induce young talent group characteristics of science and technology in our country, to help create mass youth science and technology talent team, all-round training talents to provide theoretical support.

2 Study Design

2.1 The Research Object

Selected candidates of the China Association for Science and Technology Young Talent Promotion Project are selected as the research objects in this paper, hereinafter referred to as “selected candidates of the promotion project”. By December 2021, there are seven sessions of selected candidates, among which the 1st and 2nd sessions only include name, major and work unit information, and the 7th session only includes recommended unit information. The total number of participants was 2,120.

2.2 The Data Source

The information of research objects is from the list of selected candidates of the Youth Talent Promotion Project of China Association for Science and Technology published on the Internet, including name, gender, date of birth, research field, work unit, recommended experts, and recommended units. Based on the information, the age of the selected candidates at the time of selection was calculated, and the disciplines of the selected candidates were distinguished according to the information of their major and the table of subject names of the Ministry of Education. Finally, the data information is made into a database and saved into Excel software for systematic analysis.

2.3 The Research Content

This paper adopts resume analysis method to make comparative analysis and overall analysis for the selected candidates of promotion project. The research mainly includes three parts: analysis of gender and age, analysis of disciplines and analysis of recommended units. Comparative analysis is conducted in the analysis part of gender and age,

overall analysis is conducted in the analysis part of discipline, and overall analysis and comparative analysis are combined in the analysis part of recommended units to study the changing trend and overall situation, so as to explore the group characteristics of young scientific and technological talents. In addition, gender and age were used for cross-analysis of disciplines and recommended units to enrich the research content and conclusions.

3 The Results of the Study

3.1 Gender and Age Analysis

The information of the 3rd to 6th selected candidates of the promotion project included gender and age. The number of selected candidates from the first to the seventh promotion project is 182, 206, 278, 285, 332, 400 and 437, showing an increasing trend every year. In 3rd session, there are 217 males, accounting for 78.06%, and 61 females, accounting for 21.94%. In 4th session, there are 224 males and 61 females, accounting for 78.60% and 21.40%. In 5th session, there are 250 males and 82 females, accounting for 75.30% and 24.70%. In 6th session, there are 309 males and 91 females, accounting for 77.25% and 22.75%. The number of males increased every session, and the number of females in the 3rd session was equal to that in the 4th session, then increased. In each session, the proportion of male selected candidates was more than 75%, while the proportion of female selected candidates was less than 25%. There were fewer female selected candidates than male selected candidates, and the change trend of gender ratio was not obvious in each session.

The age distribution of the selected candidates in each session is generally the same, with 31 being the most, followed by 30 and 29. Most of the selected candidates are in the 29–31 age group. According to the calculation, those aged 29–31 accounted for 77.70% of the total in the 3rd session, 84.91% in the 4th session, 84.94% in the 5th session and 84.25% in the 6th session. The average age of the selected candidates was 30.2 years. In terms of the trend of the number of people in each session of the same age, the number of selected candidates in the major distribution groups is increasing every year.

Overall, gender and age analysis shows that the number of selected candidates in the promotion project is increasing year by year, indicating that China is increasing its support to young scientific and technological talents, raising them to a strategic height and speeding up the cultivation of innovative talents. In terms of age, the selected candidates of the promotion project are concentrated in the age range of 29–31 with strong concentration, which reflects the age requirement of the China Association for Science and Technology on the selected candidates of the promotion project. It also reflects the representativeness of the selected candidates of the promotion project for young scientific and technological talents in China. In terms of gender, the proportion of female scientific and technological talents is very small, and the situation is basically the same from session to session, without improvement, which is a problem worthy of attention.

3.2 Disciplines Analysis

The information of the selected candidates from the 2nd to 6th promotion projects includes professional information. This paper sorted out the professional information and compared it with the subject field table given by the Ministry of Education. If the name of the selected major information is the same as the name of the secondary discipline given by the Ministry of Education, the corresponding name of the primary discipline will be found according to the name of the secondary discipline. If the name of selected majors is not the same as the name of the second-level discipline given by the Ministry of Education, the top ten disciplines will be counted according to the name of the first-level discipline given by the Ministry of Education through relevant information query and retrieval.

It can be seen from Fig. 1 that the number of discipline fields of Materials Science and Engineering ranks first and has a big gap with other disciplines. The second is Information and Communication Engineering, which is an emerging field with rapid development, and the third is Biology. The number of other disciplines in the top ten is roughly the same, with no significant difference.

The authors selected the gender and age data of the selected candidates and conducted cross-analysis with their disciplines to further enrich the research results. Among them, the gender analysis of cross section in the discipline, and the sample can be divided into two groups of male and female. The sample gender rate is 3.4. The gender rate more than 6.8 disciplines as predominantly male scientific and technical personnel. The gender rate

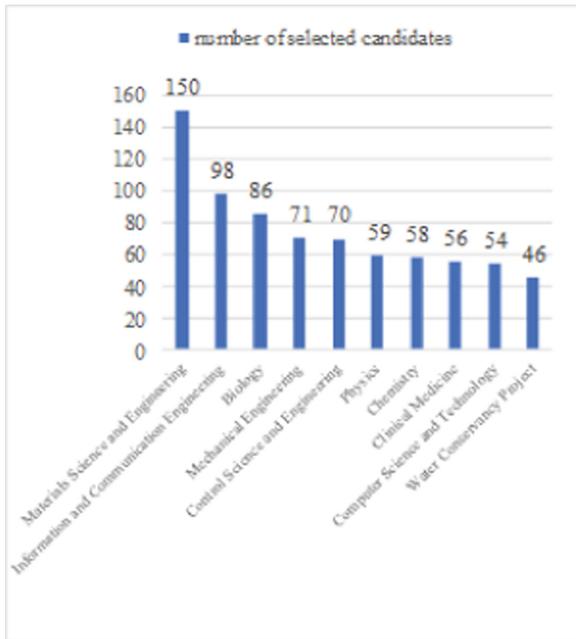


Fig. 1. Distribution of selected candidates' disciplines for the promotion project. Notes: data available from the 2nd to 6th sessions

less than 1.7 disciplines as predominantly female scientific and technical personnel. In the crossover analysis of age to disciplines, the selected candidates are divided into two groups: those over 30 years old and those under 30 years old. The sample age rate is 0.95. Disciplines with an age rate more than 1.9 in the crossover analysis are considered as dominated by science and technology personnel over 30 years old. Disciplines with an age rate less than 0.475 in the two groups are considered as dominated by science and technology personnel below than 30 years old.

According to the calculation, there are 11 disciplines with gender rate greater than 6.8, including mechanical engineering, mechanics, geological resources and geological engineering, power engineering and engineering thermophysics, forestry, etc. There are 17 disciplines with gender rate less than 1.7, including basic medicine, traditional Chinese medicine, surveying and mapping science and technology, metallurgical engineering, chemical engineering and technology. There are 9 disciplines with age rate greater than 1.9, including surveying and mapping science and technology, psychology, grass science, textile science and engineering, shipbuilding and ocean engineering, etc. There are 2 disciplines with age rate less than 0.475, including crop science and nuclear science and technology.

By above knowable, such as mechanical engineering, geological resources and geological engineering mechanics, engineering disciplines give priority to males in science and technology personnel. Such as basic medicine, traditional Chinese medicine, surveying and mapping science and technology fields give priority to females in science and technology personnel". It is important to note that each kind of medical disciplines predominantly female scientific and technical personnel, including basic medicine, traditional Chinese medicine, pharmacy, clinical medicine, public health and preventive medicine. The number of female selected candidates in basic medicine and traditional Chinese medicine is more than that of male. Science and technology of surveying and mapping, psychology and other disciplines are dominated by science and technology personnel aged over 30. Crop science, nuclear science and technology disciplines are dominated by science and technology personnel aged below 30. On the whole, the gender difference of the selected disciplines is greater than the age difference of the selected disciplines.

3.3 Recommended Units Analysis

The information of the selected candidates of the 1st, 3rd and 7th promotion projects includes the recommended units. The statement of the 1st recommended units is slightly different from the other sessions, so the 1st and other sessions will not be studied jointly. Association of Civil-military Integration of China Association for Science and Technology has been renamed as Association of China Association for Science and Technology innovation and Integration. Therefore, the two names are combined and studied, and the "Association of Civil-military Integration of China Association for Science and Technology" in the 3rd and 4th sessions is replaced with "Association of China Association for Science and Technology innovation and Integration".

This paper summarizes the recommended units selected from the 3rd to 7th promotion project and sorts out the top recommended units. It also analyses the proportion of the number of selected candidates in the recommended units in each session, and selects six

units that occupy a large proportion in each term to analyse the changing trend of their proportion in each session.

The top three recommended units for the 3rd to 7th promotion project are Association of China Association for Science and Technology innovation and Integration, the Consortium of Advanced Materials Society of China Association for Science and Technology, and Association of Life Science Societies of China Association for Science and Technology. The quantities are 289, 219 and 182 respectively, far outnumbering the rest of the units. The number of China Electronics Society and China Railway Society is 78 and 67 respectively, slightly more than other units.

As can be seen from Fig. 2, the proportion of recommended selected candidates in each unit had different trends in each session. The association for Innovation and Integration of China Association for Science and Technology and the Association for Advanced Materials of China Association for Science and Technology had the same trend, with a slight decrease in the proportion from the 3rd to the 4th session and a continuous increase from the 5th to the 7th session. The number of life science associations of China Association for Science and Technology decreased as a whole. The number proportion of Chinese Society of Electronics and Chinese Society of Communication fluctuated steadily, and the number proportion was the highest in the 5th session. The proportion of the number of China Railway Societies was stable as a whole, rising steadily from the 3rd to the 6th session, and falling somewhat in the 7th session.

The authors select the gender and age data of the selected candidates and conducted cross-analysis with their reference units to further enrich the research results. The analytical methods and standards are the same as the interdisciplinary analysis, so it will not be repeated.

According to the calculation, there are 8 recommended institutions with a gender rate greater than 6.8, including Chinese Society of Rock Mechanics and Engineering, China Coal Society, China Railway Society, Chinese Society of Hydraulic Engineering, Chinese Society of Artificial Intelligence, etc. There are 15 recommended institutions with a gender rate less than 1.7, including Chinese Society of Toxicology, China Association

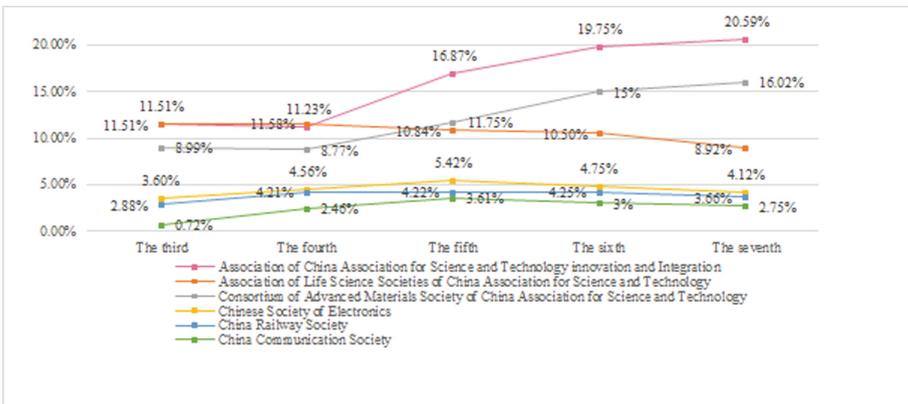


Fig. 2. Some units recommend the number of candidates accounted for trend. Notes: data available from the 3rd to 7th sessions

of Traditional Chinese Medicine, Chinese Society of Acupuncture and Moxibustion, Chinese Sleep Research Society, and Chinese Geographical Society. There are 10 recommended institutions with an age rate greater than 1.9, including Chinese Society of Acupuncture and Moxibustion, Chinese Psychological Society, Chinese Society of Aeronautics, Chinese Society of Tropical Crops, Chinese Society of Space Science, etc. There are 5 recommended institutions whose age rate less than 0.475, including International Society of Zoology, Chinese Society of Scientific and Technical Information, Chinese Society of Systems Engineering, Chinese Mathematical Society, and Chinese Nuclear Society.

By above knowable, rock mechanics and engineering society of China, China coal society, China railway association recommend units give priority to males of science and technology workers. The Chinese society of toxicology, the association of Chinese medicine, acupuncture society of China and other recommended units give priority to females of science and technology workers. The disciplines closely related to the gender preference. Chinese Society of Acupuncture and Moxibustion, Chinese Psychological Association, Chinese Society of Aeronautics and other recommended units mainly have science and technology personnel aged over 30. International Society of Zoology, Chinese Society of Scientific and Technical Information, Chinese Society of Systems Engineering and other recommended units mainly have science and technology personnel aged below 30. The gender difference of the selected candidates on the whole is greater than the age of the selected candidates in the recommended units.

4 Conclusion and Enlightenment

4.1 The Number of Selected Candidates Has Increased, and the State Has Increased Its Support for Scientific and Technological Talents

The increasing number of selected candidates of the Youth Talent Promotion project of China Association for Science and Technology reflects the continuous expansion of China's youth science and technology talent group in recent years, and also reflects the increasing state support for this group year by year. This is in line with China's goal of building itself into a major talent center and innovation hub in the world. It is important to make more efforts to take the lead in scientific and technological innovation, make good use of the baton of talent evaluation, and form a growth echelon of strategic scientists. Young scientific and technological talents, as the most energetic and potential talent team, face many difficulties in the process of scientific research. They need the support and promotion of the state. The state can optimize the evaluation mechanism for young scientific and technological talents, refine the index construction of innovation, and design the evaluation system based on the innovation value, ability and contribution, so as to provide the most targeted support for talents. Treat talents with long-term goals, train young scientific and technological talents with high potential, and reserve talents for strategic scientists.

4.2 The Age Distribution of the Selected Candidates at the Time of Selection was Concentrated, and the Relationship with the Disciplines and the Recommended Units was not Obvious

From the 3rd to the 6th session of the China Association for Science and Technology Young Talent Promotion Project, the age of the selected candidates was concentrated in 29 to 31 years old, accounting for about 80% of the 25 to 34 years old age group, with an average age of 30.2 years old. It can be seen that the age distribution of the selected candidates was very concentrated and rarely over 31 years old. Strict age restrictions on selected candidates contribute to this. The relationship between the age of the selected candidates and their fields of study and recommended units was not obvious, which shows the insignificant influence of age on scientific research achievements. China Association for Science and Technology may consider relaxing the age limit for the selected candidates of the Young Talent Promotion Program, paying more attention to their innovative value and scientific research achievements, and selecting the selected candidates based on their scientific research strength.

4.3 The Field of Materials Science is the Most Popular, and the Field of Communication is in the Ascendant

According to the distribution of the disciplines of the 2nd to 6th sessions, the number of materials science and engineering discipline is much larger than that of other disciplines. From the recommended units, China Association for Science and Technology advanced materials society association recommend the number of entries overall ranked second, and each session of proportion are rising, draw materials science in the high temperature in China youth science and technology talents. It is important to note that the information and communication engineering discipline list number ranked second, China communication society recommend the number of entrants rank, combining with the state of communication technology in recent years has been the strong construction, such as 5G technology research and development. The momentum of development in this field at the right moment, the demand for technical personnel and scientific and technological personnel will increase further. It is suggested to focus on these disciplines and recommended units, train and support corresponding scientific and technological talents according to needs, and build China's scientific and technological talents system more efficiently.

4.4 The Number of Females in China's Young Scientific and Technological Talents is too Small, But Females Have Special Advantages in Some Fields

The number of selected candidates of the 3rd to 6th China Association for Science and Technology Young Talents Promotion Project is only 23%, which is too small, and females occupy a great disadvantage in the young scientific and technological talents team. Although China has recognized that female scientific and technological talents face bottlenecks in their career development and introduced relevant policies and measures, the results are not obvious. This paper finds that female scientific and technological talents have obvious advantages over males in medicine, agriculture and other fields,

and the number of female selected candidates in some fields even exceeds that of males. The state can provide targeted support to female scientific and technological talents based on their advantages and characteristics, identify their strengths, create a more women-friendly research environment, improve policies and measures, and effectively implement them to stimulate their enthusiasm, initiative and creativity.

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