Strengthen the Construction of Talent Team to Promote the Development of Strategic Emerging Industries

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Abstract

The development of strategic emerging industries is the main direction of China's economic development at present. It represents a new direction of future science and technology and industrial development, reflecting the development trend in the world of knowledge economy, circular economy, low carbon economy. The development of strategic emerging industries relies mainly on the key core technology. Technology research and development depends on the talent. Talent is the source of innovation and the fundamental development of emerging industries. Speed up the construction of talents team; change the mode of talent training; strengthen the reform of practice teaching in order to promote the development of strategic emerging industries.

Keywords: Strategic emerging industries, Cultivation of talents, Innovation

Developing strategic emerging industries are very significant strategic initiatives for China to implement the transformation of economy growth mode, adjust economic structure, and achieve the healthy development of China's economy future. In 2012, the State Council promulgated the "the Twelfth Five-Year national strategic emerging industry development guideline". In 2015, strategic emerging industries can form the basic pattern of healthy development and promoting coordinate. The pattern will have significantly enhanced to upgrade industrial structure which can enhance the value of gross domestic product (GDP) to reach about 8%. By 2020, the added value of strategic emerging industries can account for the proportion of GDP around 15%, greatly increasing capacity for absorbing and promoting employment.

1. China's Strategic Emerging Industries Status

Strategic emerging industries are based on major technological breakthrough and significant development demand, representing the new direction of future of science and new industries. What's more, strategic emerging industries are knowledge and technology-intensive, less consumption of material resources, growth potential, comprehensive good benefits. At the present stage, its focus is on the development of energy saving, a new generation of information technology, biology, high-end equipment manufacturing, new energy, new materials, new energy vehicles and other industries. Currently, there are 31 provinces and municipalities are focused on the development of new materials and new energy industry. There are 30 provinces and municipalities regard the biological industry as the focus of development; 29 developing high-end equipment manufacturing industry and energy-saving environmental industry; 28 developing the new generation of information technology industry; 18 are new energy automotive industry. (Gu Qiang & Dong Ruiqing, 2013)

Table 1 lists the export situation of some China's technology products of strategy emerging industries in 2009 and 2011. From table 1, can be found that there is a lot of growth in absolutely terms for China's exports of high-tech products from 2009 to 2011, but it is not difficult to find that most of the technical products are the status of the export trade deficit, indicating there is no competitive advantage for these high-tech products in China.

Table 1. Part of the strategic emerging industry products export of China

(Unit: $ 100 million)

Technology products of strategic emerging industry	Export		Import		Export surplus	
	2009	2011	2009	2011	2009	2011
Computer and communications technology	2.824.65	3.929.43	3.098.53	1.056.41	-273.88	2.873.02
Life science and technology	110.59	178.43	94.77	157.96	15.82	20.47
Electronic technology	510.75	865.84	1.484.81	2.139.75	-974.06	-1.273.91
Computer integrated manufacturing technology	50.97	89.40	196.91	469.26	-145.94	-379.86
Aerospace technology	26.84	45.99	140.35	190.15	-113.51	-144.16
Photoelectric technology	209.27	321.14	385.38	542.03	-176.11	-220.89
Biotechnology	2.96	4.14	3.6	4.49	-0.64	-0.35
Materials technology	29.63	47.16	50.74	59.33	-21.11	-12.17

Source: China statistical yearbook of science and technology in 2012.

Table 2 lists the production and operation situation of high technology industry in China in recent years. Derived from table 2, the number of enterprises of China engages in high-tech industry is on the rise overall. With the development of the emerging technology industry, the emerging technology drives increasing state every year in many factors, such as the number of employee, creating profits, taxes paid to the state and investment funds. However, the emerging industry is a typical knowledge-intensive industry. Compared with the traditional industry, the demand for talent is much higher, higher sensitivity of knowledge, and requiring a large number of high-level personnel sustained and effective supply. Emerging industries talent is always in short supply. Especially, high-level innovative talents are extremely scarce.

Table 2. The basic situation of China's high-tech industry

Indicates	2000	2005	2006	2007	2008	2009	2010	2011
Number of enterprises(a)	9758	17527	19161	21517	25817	27218	28189	21682
Average number of employees (ten thousand)	390.0	663.3	744.5	843.0	944.8	957.5	1092.2	1146.9
Profit (100 million RMB)	673.5	1423.2	1777.3	2395.8	2725.1	3278.5	4879.7	5244.9
Taxes (100 million RMB)	1033.4	2089.6	2611.2	3353.4	4023.9	4660.3	6753.1	7813.8
Number of R & D institutions	1379	1619	1929	2217	2534	2845	3184	3254
R&D personnel of full-time equivalent (ten thousand years)	9.2	17.3	18.9	24.8	28.5	32.0	39.9	42.7
R & D expenditure (100 million RMB)	111.0	362.5	456.4	545.3	655.2	774.0	967.8	1237.8
New product development funds (100 million RMB)	117.8	415.7	510.0	652.0	798.4	925.1	1006.9	1528.0
Number of patent applications (pieces)	2245	16823	24301	34446	39656	51513	59683	77725
Effective number of invention patents (pieces)	1443	6658	8141	13386	23915	31830	50166	67428
Total number of projects completed or put into operation (a)	2734	7095	7507	7789	8534	9780	10723	13204
Investment (100 million RMB)	563.0	2144.0	2761.0	3388.4	4169.2	4882.2	6944.7	9468.5
New fixed assets (100 million RMB)	421.0	1464.0	1898.3	2071.3	2574.2	3160.5	4450.4	6355.2

2. Team Construction of Strategic Emerging Industry Talent

Talent is the source of innovation. The development of strategic emerging industries is indispensable on talent team with good quality and reasonable structure. General talents in China are relatively more, less innovative talents. Generally more educated talent, application technology talent is relatively small. General industry workers are more, and senior skilled workers are less. So building strategic emerging industry talent is imminent. (Hong Gongxiang & Zhang Lei, 2012)

(1) Transforming the university training model

It is reported that the national college entrance admission average is 75% in 2012. As a result of the number of higher education expansion, the academic undergraduate education has run from academic elite education to practical mass education. The talents training form of our country's universities is mainly focused on the classroom teaching, examination evaluation and the theory of learning, ignoring the theory of practice. Although some universities pay attention to the theory of practice to some extent, the system is often not flexible enough. Especially, the training objectives, Curriculum structure and content, teaching mode, teaching evaluation systems can't keep up with the needs of the development of era. In the curriculum design, we can learn the method from Taiwan Higher Vocational Colleges which is called "Delphi" method. This method is generally stared from the perspective of industry analysis, using the Delphi method to carry on the industry analysis: Occupation-Job-Task-Skill-Operation. It determines the ability to catalog and competency standards for future work, then develop educational goals, curriculum content and activities planning, and curriculum assessment activities. (Bao Jie, 2006) Therefore, we should integrate the modern educational concepts in the teaching process, transforming the traditional planned pattern mode into a modern training mode of talent which is targeted and practical to promote the development of China's strategic emerging industries.

(2) Strength university-enterprise cooperation

Strength university-enterprise cooperation, encourage and guide universities and enterprises jointly to establish talent training base of emerging industry. Cultivate professional and technical talents by active combination with the relevant industries and enterprises. Enterprises learning stages must be jointly developed by schools and related enterprises, and ensure the effective implementation of the training program, so that students can really get into enterprise for learning. In addition, according to business demand to implement "ordering cultivation", and according to the training objectives of enterprise talents, combined with their own intellectual ability structure, build talent training base of strategic emerging industry with distinctive features, obvious advantages, university-enterprise cooperation and university-industry cooperation. The base has distinctive vocational education features, directional training applied talents, inter-disciplinary talents and technical talents. It also provides talent support for industry development in order to better meet the needs of the strategic emerging industry development of talent. Table 3 is about the science and technology activities of higher schools from 2006 to 2011. You can see, from table 3, the research and development institutions are as rising per year as the number of relevant people, and government and business investment are also increased. All of this shows that enterprises and our country are highly desired and attached importance to talent training.

Table 3. Science and technology activity of higher schools in China

Indicates	2006	2007	2008	2009	2010	2011
R&D institutions (a)	4154	4502	5159	6082	7833	8630
R&D personnel (ten thousand people)	42.1	44.8	47.8	50.9	59.4	63.2
R&D personnel of full-time equivalent (ten thousand years)	24.2	25.4	26.6	27.5	29.0	29.9
Government funds (one hundred million yuan)	151.5	177.7	225.5	262.2	358.8	405.1
Enterprise funds (one hundred million yuan)	101.2	110.3	134.9	171.7	198.5	242.9
R&D project (subject) number	365294	375425	429096	476708	547717	604107

(3) Build platform for industry talent and attract top talent

Provide a solid talent base around for industrial base and demonstration garden, and focus on building talent aggregation platform. Through overseas students pioneer park, postdoctoral entrepreneurial base, schools-entrepreneurship, innovation and laboratory incubator, and other forms, make it a special region of aggregation and attracting high-end talent. (Yi Shan & Wang Xiaoqun, 2013) We should strengthen foreign intelligence importation for high-lever overseas students as an important source of innovative talents. Table 4 is about the case of Chinese students abroad-return from 2001-2011. We can see, from table 4, the number of Chinese study abroad is rising, also increasing the proportion of students returning, more than half in 2011. However, we still need to create conditions to attract shortage talents of high-lever from overseas. At the same time, strength connection with overseas students as well as overseas Chinese, create conditions, actively attract overseas students.

Table 4. Abroad and home case of students studying abroad(unit: person)

Year	Studying abroad	Returned overseas students	Proportion
2001	83973	12243	14.58%
2002	125179	17945	14.34%
2003	117307	20152	17.18%
3004	114682	24726	21.56%
2005	118515	34987	29.52%
2006	134000	42000	31.34%
2007	144000	44000	30.56%
2008	179800	69300	38.54%
2009	229300	108300	47.23%
2010	284700	134800	47.35%
2011	339700	186200	54.81%

Source: China statistical yearbook of science and technology in 2012.

(4) Make full use of high-tech zone as emerging industry carrier

High-tech industry development zone of China, which is based on intelligence intensive and open environment, mainly relies on domestic technology and economic strength to fully absorb and draw lessons from foreign advanced science and technology resources, capital and management means. And rely on system innovation and technological innovation to build a favorable environment for attracting outstanding scientific and technological personnel and running managers innovation and entrepreneurship.

High-tech zone has a good system, policy and service environment. It sets up a series of enterprise innovation and industry training system from technology development, technology transfer, business incubation to industrial agglomeration and clustering. Explore and form an effective mode of cultivating growth enterprises and industrial cluster, being the birthplace of emerging industry in China. (Bin Jiancheng, 2012)

National high-tech zone is currently gathering 7,000 research and development institutions, and more than 700 national engineering (technology) research centers and open laboratories. At the same time, cluster into 560,000 scientific and technical personnel, absorbing 52,103 MS, 9,358 PHD, 5,615 overseas students, and establishing a batch of post-doctoral mobile station and over 300 industrial technical inspection testing platform. As a result, there is a significant improved on science and technology sharing and public services.

3. Countermeasures of brain drain in emerging industries

For a long time, Chinese government has always attached great importance to cultivating talents. However, the high-tech brain drain problem is very serious, there are a lot of people inflow the United States, Europe, Canada and other developed countries every year. Therefore, the demand for emerging industries characteristics develop and introduce incentives policies adapting to the strategic emerging industries, and attract more high-tech innovative talents.

(1) Perfect compensation policies

Strategic emerging industry talents are innovative talents, with strong creative ability and potential, belonging to the value-added of scare resources. Therefore, for these people, enterprises need to develop a scientific and reasonable performance appraisal and evaluation mechanism, perfecting compensation system, providing competitive pay levels to promote the rational talent flow of emerging industries. For qualified enterprises, they can attract these talents involved to create value for enterprises through stock options. Of course, they can avoid the loss of these talents.

(2) Reasonable talent distribution

From the perspective of regional distribution of strategic emerging industries talent, coastal developed regions such as east China and south China are the most intensive areas of talent. From the point of city distribution, Beijing, Shanghai, Guangzhou, Shenzhen the four cities gather more than 30% talents. Other domestic owe developed and underdeveloped provinces is week for attracting human capital. Resulting in line with its own regional advantages in the development of strategic emerging industries lacks the necessary high-tech talent, seriously inhibited the independent innovation development of strategic emerging industries. Therefore, the central and western regions should start from the talent base construction, build business platform, strive to create support personnel pursuing their careers, help talents build a good social environment, and take effective measures to implement. Regarding strategic emerging industry cluster area as the carrier to optimize the spatial structure of human resources, form a modern industry agglomeration district with a rational layout of talent and industry coordination-interaction.

(3) Improve the mechanism of talent training

Build a good platform for personnel training, combine with the development of regional strategic emerging industries, increase the professional choice for college students and employment orientation guidance, optimize talent environment and employment environment. Then, strength basic management of public service. Through improving the public service platform, enhance integration of human resources capacity, promote talents at all levels accumulation, optimizing, sharing, form the coordinating training system. Carry out the personnel quality promotion project, coordination the use of higher education, vocational training, enterprise cultivation, national communication, and other ways to build a more collaborative level training system, and gradually form a enhancement system for collaborative training and exercise of foundation, backbone and strategic echelon personnel. (Chen Haiping, 2012)

(4) Build culture atmosphere of encouraging innovation

Innovation is the soul of a national progress and an inexhaustible driving force for national prosperity. But innovation road is not easy, numerous failures and try, again and again, even disciplines in the development of scientific discoveries, inventions. Thus, it not only requires persistent perseverance of innovative talents, but also need external inclusive cultural environment and atmosphere, encourage innovation, cultivate fearless failure risk-taking and enterprising spirit and confidence of innovational talents.

A year ahead, nurture tree valley; ten years ahead, plant trees; one hundred years ahead, cultivate people. Adhere to the principle of combination between the introduction of talent cultivation and talents to use, improve the quality and efficiency of strategic emerging industry talents, and promote sustained and healthy development of strategic emerging industries.

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