

The Development of China's Digital Economy and the Training of Digital Talents

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ABSTRACT.Currently, the economy pattern in China is transiting from the industrial economy to digital economy. To achieve the development of digital economy, China owns great potential and solid foundation. With the digital economy transformation in China, it is obvious to see that the scarcity of digital talents in the future will continue to increase. Through analysis upon the demand and supply of digital talents in China, it is found that there exists a large gap of digital talents in between. At last, concerning the issue mentioned above, the paper puts forward the corresponding suggestions for talent training.

KEYWORDS: Digital economy, Digital economy talents, Ai

1. Introduction

In recent years, the digital economy has been a topic of more concern to countries in the international economic field. The United States, the European Union and other developed countries have formulated development plans in the field of digital economy. China has also introduced corresponding policies to promote the development of the digital economy. As the basic digital technology of the digital economy has brought major changes and changes to the three existing industries, production, consumption, and services, China's digital economy talents. The problem of shortage has gradually emerged. The structure of this paper is as follows: The first part analyzes the development status of China's digital economy, the second part discusses the demand and supply of China's digital economy talents in short supply in the future, and the third part proposes strategies for training Chinese digital talents.

2. The Development Status of China's Digital Economy

2.1 The Scale of China's Digital Economy Keeps Expanding

According to the statistics, the scale of China's digital economy has risen from 18,630.1 billion yuan in 2015 to 358,40.2 billion yuan in 2019, with an increase of 92.27%; the proportion of digital economy in China's GDP has increased from 27% in 2015 to 36.2% in 2019. Besides, by 2019, the contribution rate of digital economy to GDP has reached 67.7%^[1]. Developing in fast pace, the scale of digital economy in China ranks the second in the world, but there is a large gap when compared with the United States, which ranks first in terms of the digital economy. A new picture of the global digital economy in 2019 pointed that in 2018, the digital economy aggregate in the United States was about \$12.34 trillion, and that in China was about \$473 million. In the same year, the scale of digital economy in the United States accounted for 60.2% of the GDP, while that of China was about 30%.

2.2 Internet Users Are Increasing

By March 2020, the number of Internet users in China has reached 904 million, the Internet penetration rate has reached 64.5% and the number of mobile Internet users has reached 897 million. Compared with 2015, Internet users increased by 31.29%; Internet penetration increased by 133%; and mobile Internets users increased by 44.71%. In addition, netizens in China per capita spend 30.8 hours per week online^[2]. In 2019, the number of Internet users in the United States reached 312 million and the Internet penetration rate reach 90%.

2.3 Online Retail Develops in Fast Pace

China's E-Commerce Report 2019 pointed out that, China's total online retail sales in 2018 and 2019 were \$1520.1 billion and \$1934.78 billion respectively, with the growth rate of 27.3% in 2019, ranking first in the world; the second is the United States, whose online retail sales in 2018 and 2019 were \$514.84 billion and \$586.92 billion respectively, with the growth rate of 14% in 2019.

The development of e-commerce is inseparable from the digital platform. According to Digital Economy Report 2019 released by the United Nations Conference on Trade and Development, it points out that, the United States and China account for 75% of the block chain related patents, 50% of global expenditure in Internet of things and over 75% of the global public cloud computing market. Besides, digital platforms in both countries account for 90% market value of the world's 70 largest digital platforms, among which 7 "super platforms" -- Microsoft, then Apple, Amazon, Google, Facebook, Tencent, Alibaba account for 2/3 of the total market value. These platforms are playing a significant role in the development of digital economy and take up an important position in relevant fields. For instance, Google, owns approximately 90% of the Internet search market. Facebook accounts for 2/3 of the global social media market, which ranks as the first social media platform among more than 90% of the world's economies. Amazon occupies nearly 40% of the market share in global online retail activities. In China, Wechat (Tencent) has more than 1 billion active users, and the payment solutions offered by it and Alipay (Alibaba) together almost occupies the entire mobile payment market in China. It is estimated that Alibaba owns nearly 60% of the e-commerce market in China.

3. The Supply and Demand of Digital Talents in China

3.1 Demand for Digital Economy Talents

Until now, there has been no consensus on the concept of digital economy talents. Different institutions have different definitions for digital economy, but in terms of demand for digital economy talents, the answer is consistent. The supply is not adequate to the demand. According to the Research Report on Employment and Talents Under Digital Economy released by BCG(Boston Consulting Group), the scale of China's overall digital economy by 2035 will be close to \$16 trillion and the total employment capacity will reach 415 million. If the effective talent strategies are not implemented, a huge gap for talents may come up^[3].

In addition, Digital Transformation of China's Economy: Talents and Employment defines the digital talents as talents with ICT skills and employees with ICT complementary skills, and it divides digital talents into 6 categories including digital strategic management, in-depth analysis, product research and development, advanced manufacturing, digital operation and digital marketing. At present, the distribution of digital talents in China is quite uneven, where talent of product research and development accounts for 87.5%; digital operation account for 7%, while in-depth analysis intelligence such as big data analysis and business intelligence accounts for about 3.5%, advanced manufacturing accounts for 0.84%, digital strategic management accounts for 0.8% and digital marketing accounts for 0.35%. Fields such big data, business intelligence, advanced manufacturing are all short of talents^[4].

Taking the artificial intelligence as example, according to the New Generation of Artificial Intelligence Development Planning released by the State Council, it mentions that the scale of artificial intelligence core industry shall exceed 150 billion yuan by 2020, and the gap of talents in artificial intelligence industry of China will reach 300,000. However, due to characteristics of being intensive and interdisciplinary, a relatively high threshold is set for artificial intelligence industry. On top of that, the actual enterprises also put forward higher requirements for relevant positions. Since China's cultivation for relevant talents in artificial intelligence industry has just started, enterprises have less demands for recruiting the new graduates.

3.2 Supply of Digital Economy Talents

Based on the data provided by China's National Bureau of Statistics, the number of national employees engaged in software and information technology service industry in 2018 reached 6.43 million, and the data only indicated practioners in software and information technology service industries. According to the China's E-Commerce Report 2019 issued by E-commerce and Information Department of Ministry of Commerce, in China, there are 51.2565 million employees engaged in the e-commerce industry, together with 20.1057 million people engaged in the information technology, relevant services and supporting industries.

The Development Report of Talents in Artificial Intelligence Industry (2019-2020 Edition) points out that, the problems of artificial intelligence talents are particularly prominent, which are mainly embodied in following three aspects: first problem is the imbalance between talent supply and demand which can hardly support the rapid expansion of industrial scale; second problem is the imbalance of talent structure existing in different levels, different technical directions and different posts; third problem is that quality of talent is not matching between industrial end and educational end since effective alignment cannot be guaranteed. The quality of talent training is difficult to meet the

industrial demand^[5].

From perspective of the supply of artificial intelligence talents in colleges and universities, there are a total of 376 colleges and universities all over the world establishing the artificial intelligence relevant majors or research orientations, among which 168 are located in the United States and only 57 are located in China, and almost half of them (26) have been established in recent years; The total amount of Chinese talent enrolment for artificial intelligence in colleges and universities is only 179,349.

4. Thoughts on the Training of Digital Talents

4.1 Draw on the Experience of Foreign Digital Talents Training

The core of digital economy is the application of digital technology. Taking artificial intelligence as an example, countries including the United States, European Union have initiated the basic research and application research upon digital technology earlier. In terms of talents training in the artificial intelligence field, instead of pursuing the expansion in scale, they focus more on establishing the core status of information science and technology, cooperating with other disciplines, strengthening interdisciplinary teaching and scientific research, making full use of their own advantages in the field and collaborating with relevant enterprises, vigorously training the practical talents and successfully establishing an ecosystem of artificial intelligence talents^[6]. In aspect of digital talents training, the EU attaches importance to economic and industrial demands, formulates corresponding development strategies for talents with digital techniques and implements them by resource integration in various ways and channels.

The United States has a good interaction between the promotion, application and research and development in the field of Internet fields. Expecting to apply the Internet to all aspects of production and life, it provides fund support and professional training for the application of experimental achievements and tries to transfer the outputs from laboratory to the products on the market.

Likewise, Chinese government can also set up some training centers on digital technology or require some large-scale digital enterprises to give training to teachers in colleges and universities as well as employees in the company, which will promote the China's marketization of the laboratory results.

Digital skills are regarded by developed countries like the United States as the core skills, which are skills of information, media and technology. But in China, the development of such skills are always neglected. In the teaching of colleges and universities, it is advised to introduce some digitalized teaching aids, which enables students to improve their digital skills when learning in a digital teaching environment. Nevertheless, the improvement of digital skills not only relies on colleges and universities. So far, different industries and enterprises have raised different requirements for digital skills. Hence, the enhancement of digital skills is also a systematic program, which requires the joint actions by science and technology sectors, industrial sectors, enterprises, colleges and universities.

4.2 Train Digital Talents with Assistance from Multiple Channels

Currently, the training of digital related talents in China still mainly relies on colleges and universities as well as research institutions, while the remaining depends on digital technology related enterprises. From perspective of colleges and universities, the training of digital talents in China is relatively imbalanced and the amount of digital talents among different regions is not balanced, either. For instance, in aspect of big data, by February 2020, the statistics released by the Ministry of Education show that the number of general colleges and universities with records of establishing the "big data and data science major" has reached 446, and that of "big data technology and application major" in higher vocational colleges has reached 1355^[7]. When it comes to artificial intelligence, since the research in this field started late, the major of artificial intelligence was officially approved to be included in the undergraduate major list in 2019. At present, the training of artificial intelligence talents is still in the exploration phase.

Considering that artificial intelligence is a highly interdisciplinary subject, the teaching resources in colleges and universities need to be further strengthened. Besides, more interdisciplinary researches and teaching activities can be carried out within and among colleges and universities, which can promote the deep cooperation with digital enterprises and help train relevant talents jointly. In aspect of science and technology talents, China has launched a series of programs such as "Thousand Talents Programme", "Ten Thousand Talents Programme", "Cheung Kong Scholars Programme" as well as "Digital Craftsman" released by local government. Among digital enterprises in China, there also come some enterprise universities, such as Huawei University, Haier University, Aliyun University, JD University, etc. Colleges and universities with digital economy technology related majors or small and medium-sized enterprises in demand of digital upgrading can carry out in-depth cooperation with these enterprise universities in combination with local or their actual situation and further improve their digital skill levels or train more digital talents.

Now China's economy is transforming from industrial economy to digital economy, where it agriculture, manufacturing and service industries are all confronted with pressure of digital transformation. There is still a gap existing between talents trained from China's higher education and talents satisfying the needs of enterprises, thus the training of digital talents cannot completely rely on colleges and universities, but requires the involvement and assistance from government, enterprises and industries.

4.3 Universities and Enterprises Try out “Digital Talents Sharing”

Currently, there are not many enterprises in China having completed digital transformation. And there are many small and medium-sized enterprises in China. Chinese retail, agriculture, manufacturing and life service industries have not developed a high level of digitalization, nor have the industries. The vast majority of small and medium-sized enterprises have not applied those emerging technologies such as Internet of things, artificial intelligence, big data and cloud computing into their operation and management. Only few enterprises are in the stage of digital marketing. In fact, all these are facing the problem of talent shortage in digital technology. The solution to these problems all lie in the training of talents. For enterprises without developing digitalization or whose digitalization are still in initial phase, it is feasible for them to reach cooperation with enterprises that have completed digitalization. Besides, enterprises with conditions can try out “digital talent sharing” with universities and enterprises with high degree of digitalization, and conduct training on talents of other similar majors and transform them into digital talents, or adopt apprenticeship to accelerate the process of digital talent training. For colleges and universities, it is not compulsory to adopt the bachelor-master-doctor pattern for talent training, some flexible modes such as project-based or application-based talent training method with orientation to solve the practical problems of enterprises are also available.

5. Conclusion

With the development of digital technology, the importance of the digital economy is increasingly being paid attention to. The scale of China's digital economy, the number of Internet users, and online retail sales are all increasing. The demand and supply of talents in the digital economy are even more unbalanced. In the future, the supply of talents in China's digital economy will exceed demand. In terms of the cultivation of digital talents, Europe and the United States already have relatively mature experience, while my country is still in its infancy. Therefore, in the future, governments, enterprises, industry associations, and universities will need to cooperate to jointly cultivate the digital talents needed by enterprises.

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