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Review Article

Pathways for Promoting High-Quality Employment Development through Digital Talent Digital Talent during the "15th Five Year Plan" Period

Shengwen Yan[1]*
[1]Institute of Management, Beijing Academy of Social Sciences

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***Corresponding author:** Shengwen Yan
Institute of Management, Beijing Academy of Social Sciences

Abstract

During the "14th five year plan" period, Beijing has made achievements in the artificial intelligence industry foundation, talent scale, education policy and international talent introduction, but in the face of the practical difficulties of employment, there are still structural bottlenecks such as the lack of refinement of talent classification, the disconnection between evaluation mechanism and industrial demand, and the lack of policy coordination. During the "15th five year plan" period, it is suggested to build systematic countermeasures from the three dimensions of "classified allocation, evaluation and incentive, and ecological optimization", including the establishment of "four levels and nine categories" dynamic talent map, the improvement of multiple evaluation and risk tolerance mechanism, and the strengthening of top-level design and regional collaboration, aiming to enhance the global competitiveness of Beijing's digital talent development, support the country's high-level scientific and technological self-reliance and high-quality development, so as to promote the high-quality development of employment.

Keywords: Artificial intelligence talents; Digital talent development; Talent classification evaluation; Integration of production and education; Policy coordination; Employment development.

1. Development status of digital talents represented by AI in Beijing at the end of the 14th five year plan

During the "14th five year plan" period, relying on the innovative pattern of "three cities and one district", Beijing has formed significant advantages in the cultivation of artificial intelligence industry and the development of digital talents, laying a solid foundation for the further development of the "15th five year plan".

(1) Solid industrial foundation, leading the country in the scale and quality of digital talents

As the source of AI innovation in China, Beijing has built a full chain ecosystem of "basic research - Technology Research - industrial application". According to the data of 2024, Beijing has gathered 30% of the country's AI core enterprises (Baidu, byte hopping, etc.) and 40% of the national AI laboratories (Zhiyuan Research Institute, embodied intelligence data training base, etc.), and the scale of AI core industry has exceeded 300billion yuan, accounting for 22% of the country's total. The total number of digital talents reached 380000, accounting for 19% of the country, including 45% with master's degree or above, 12 percentage points higher than the national average; Tsinghua University, Peking University and other 10 colleges and universities have more than 12000 annual graduates majoring in AI. Five colleges and universities have entered the top ten of the global AI academic institutions, and their academic influence has continued to improve.

(2) The practice of education and policy has been steadily promoted, and the integration of production and education has achieved initial results

In terms of education layout, Beijing takes the lead in promoting the discipline construction of artificial intelligence. Beijing accounts for 15% of the 440 colleges and universities approved to set up artificial intelligence majors nationwide, forming the embryonic form of "artificial intelligence+x" cross training, such as the "artificial intelligence+medical" major of Peking University and the "artificial intelligence+communication" major of Beijing University of Posts and telecommunications, with an annual training of more than 3000 compound talents. In

terms of policy practice, we will implement the "Ai+" action of the 2024 government work report, build a "Haidian Yizhuang" digital talent training corridor, build eight national production and education integration bases, and build 12 enterprise research institutes with leading enterprises such as Baidu and Huawei and universities, with an average annual R&D investment of more than 10million yuan, to promote "co construction of courses, mutual assignment of teachers, and joint research of projects". Beijing, Tianjin and Hebei jointly promote the robot vocational education talent co education plan, and jointly cultivate more than 5000 highly skilled talents in 2024, laying the foundation for regional talent flow.

(3) External opportunities and internal demand are superimposed, and the momentum of development continues to increase

In the external environment, the penetration of the global digital economy has accelerated, with Beijing's digital economy accounting for 42% of GDP. AI technology has been deeply integrated into medical, financial, manufacturing and other fields, giving birth to new occupations such as big model trainer and AI ethics specialist. In 2024, 18000 relevant jobs will be added, and 72% of college graduates list the field of artificial intelligence as their first choice for employment. In the global competition, China has added the k-visa for foreign young scientific and technological talents. Beijing takes this opportunity to optimize international talent services. In 2024, it introduced more than 1200 overseas AI high-level talents, an increase of 65% over 2021. At the national strategic level, the "15th five year plan" focuses on "integrated development of education, science and technology talents". As an international science and technology innovation center, Beijing's positioning of cultivating strategic scientists and outstanding engineers is further highlighted.

2. Prominent problems faced by the development of digital talents in Beijing during the Tenth Five Year Plan Period

Although Beijing has a solid foundation for the development of digital talents, there are still three structural problems that restrict the release of talent effectiveness compared with the goal of a global digital economy benchmarking City, combined with the in-depth penetration of the digital economy and the intensification of global talent competition.

(1) The refinement of talent classification is insufficient, and the allocation efficiency is out of line with industrial demand

First, the classification system is incomplete, and there is no basis for the identification of compound talents. The existing "four types of talents" system (Strategic scientists, leading talents, technical talents and skilled talents) only covers the basic layer and the technical layer. There is no subdivision standard for the vertical fields of medical AI, financial technology and other application layers. The "ai+x" compound talents lack a unified identification framework. In 2024, there will be a talent gap of 12000 in the field of medical AI in Beijing, and the loss rate will exceed 20% due to identification problems. Second, centralized management is decentralized and cross regional flow costs are high. Digital talent management involves 9 departments. The qualification certification is scattered in 12 institutions, and the recognition standards of 16 administrative regions are different. For example, the qualification of "AI algorithm engineer" in Haidian District needs to be re-examined in Tongzhou District, and the cross regional flow time cost increases by 30%, which is lower than that in Shanghai and Shenzhen. Third, the policy response lags behind, and the support of small, medium and micro enterprises is weak. The "Ai talent shortage index dashboard" in Beijing only covers 53 core enterprises (the coverage rate is less than 50%), unable to capture the needs of emerging fields; The policy coverage of small, medium-sized and micro enterprises is low. Compared with the subsidy of Shenzhen "Suanli coupons+data coupons" (up to 5million yuan/year), similar policies in Beijing only cover Enterprises above designated size. 76% of small, medium-sized and micro enterprises are facing "difficulty in attracting talents and more difficulty in retaining talents", and the brain drain rate will reach 28% in 2024.

(2) Insufficient suitability of talent evaluation, innovation incentive and risk tolerance to be strengthened

First, the evaluation criteria are out of line with the industrial value and ignore the commercialization potential. 72% of the investors listed "education of famous universities" as the core index of AI project financing. An AI medical enterprise had no "985 background" in its team, and although its products were launched in 30 hospitals, the financing was still blocked. Compared with the "dynamic integral system" of Zhangjiang in Shanghai (included in the income of technology transformation), Beijing's evaluation was difficult to reflect the actual contribution. Second, barriers exist in career development channels and cross-border mobility is not smooth. It is difficult for enterprise R&D achievements to replace academic papers to participate in the Title Review. In 2024, the rejection rate of enterprise ai r&D personnel's application for senior title "no SCI papers" reached 45%; The assessment cycle of scientific research institutions is short (1-2 years), and they are not tolerant of long-term projects such as large-scale model training, so as to curb disruptive innovation. Third, the incentive mechanism is not flexible enough and the transformation of R&D investment is weak. Shenzhen implemented the "R&D investment as profit assessment", and the allocation of Beijing's special funds is still constrained by the "number of previous achievements". In 2024, the R&D investment of Beijing's AI enterprises accounted for 8.3% (lower than 12.5% in Shenzhen), and the AI patent conversion rate

of colleges and universities was only 6.3%, much lower than that of Stanford University (42%).

(3) Lack of policy synergy and mismatch between ecosystem and regional competition

First, the absence of top-level planning and policy fragmentation. Beijing has not yet issued a special plan for talents in the digital economy, and there are significant differences in policies among regions (there are 15 differences between the "golden seed" in Haidian District and the "Phoenix plan" in Chaoyang District), and the administrative cost of enterprises' declaration has increased by 40%; The connection between central and local policies is not smooth, and the approval rate of AI training data exit is only 32% (1/3 of Silicon Valley), which restricts international cooperation. Second, the structural imbalance between talent supply and demand and the weakness of small and medium-sized enterprises. Big Internet companies attract 70% of high-quality graduates with the highest annual salary of 1.2 million yuan, and the recruitment cycle of AI posts in small and medium-sized enterprises is 62 days (2.5 times that of big companies); There are less than 50 strategic scientists (only 1/8 of Silicon Valley), and 30% of AI researchers under the age of 35 (less than 50% in developed countries). Third, the training system is disconnected from the industrial iteration, and the new vocational training lags behind. Only 6 of the 28 colleges and universities with AI majors have advanced courses such as aigc, and 38% of the 2024 graduates need "secondary training" from enterprises; Vocational skills training focuses on data annotation (accounting for 60%), the coverage of new occupations such as large model trainers is less than 20%, and the annual training scale is 32000 person times (far less than 100000 person times in Shenzhen).

3. The core countermeasures for the development of digital talents in Beijing during the Tenth Five Year Plan Period

Closely follow the requirements of "integrated development of education, science and technology talents" in the national "15th five year plan", aim at the development goal of high-quality employment, and put forward countermeasures from the three dimensions of "classified allocation, evaluation and incentive, and ecological optimization", so as to create a globally competitive digital talent development paradigm.

(1) Build a dynamic and accurate talent classification and allocation system to meet the in-depth needs of the industry

Establish a dynamic classification map of "four layers and nine categories". Referring to the "decision-making layer - coordination layer - execution layer - support layer" architecture, nine major fields, including algorithm architects and AI ethics specialists, are subdivided (see Table 1). The post capability matrix is updated quarterly, the standards for vertical fields such as medical AI are improved, the "ai+x" identification guidelines are formulated (for example, "ai+medical" needs to have both algorithm capability and clinical cognition), the "technology research and development+industrial application" dual track certification is implemented, and the overlapping of cross domain qualifications is allowed.

Table 1: "Four layers and nine categories" digital talent map of AI in Beijing

Tier/Domain	Strategic Scientists (Decision-Making Tier)	Leading Talents (Collaboration Tier)	Technical Talents (Implementation Tier)	Skilled Talents (Support Tier)
Algorithm Architects	Strategic Planning and Resource Allocation	Cross-Domain Technology Integration	Core Algorithm R&D	Model Optimization and Deployment
Data Scientists	Data Strategy Design	Multi-Business Data Governance	Data Analysis and Modeling	Data Cleaning and Annotation
AI Ethics Specialists	Ethics Framework Formulation	Collaborative Risk Management	Compliance Review	Ethics Annotation Implementation
Intelligent Hardware Engineers	Hardware Technology Roadmap Planning	Software-Hardware Collaborative Development	Chip/Sensor R&D	Equipment Debugging and Maintenance
Industrial Internet Engineers	Industry 4.0 Strategic Layout	Industrial Chain Digital Collaboration	Industrial Protocol Development	Intelligent Transformation of Production Lines
Digital Twin Modelers	Digital Twin Strategy Design	Virtual-Physical Mapping of Multi-Systems	3D Model Construction	Data Collection and Synchronization
AI Product Managers	Product Ecosystem Strategy	Demand-Technology Connection	Full Product Lifecycle Management	User Experience Feedback
AI Trainers	Training Paradigm Innovation	Scenario-Based Training Solutions	Multi-Modal Model Training	Data Annotation and Preprocessing
AI Operations & Maintenance Engineers	O & M System Architecture Design	Collaborative Fault Response	System Monitoring and Optimization	Daily Maintenance and Log Management

Implement cross sectoral collaborative governance. Set up a joint meeting of digital economy talents led by municipal leaders, establish a mechanism of "one window acceptance and parallel approval", and reduce the process time by more than 50%; Get through the databases of the Bureau of human resources and social security and the Bureau of economy and information technology to realize mutual recognition of 23 indicators (such as the achievement of converting professional titles for enterprise AI product certification); A "special window for digital talent service" was set up, and the core post qualification was "universal throughout the city". Cross regional floating talents received a maximum subsidy of 100000 yuan for settling down.

Innovative support tools for small, medium and micro enterprises. Upgrade the "Ai talent shortage index dashboard", monitor 300 large, medium, small and micro enterprises, and issue a monthly demand list; Small, medium-sized and micro enterprises will be given subsidies of "computing power coupons+data coupons" (up to 3million yuan/year); The "leading+small, medium and micro enterprises" pairing mechanism was established, and 20 leading enterprises were organized to train 3000 practical talents. The leading enterprises received a subsidy of 8000 yuan per person.

(2) Improve the evaluation and incentive mechanism to meet the needs of innovation, and release the vitality of talents

Build a diversified evaluation system. The pilot "talent contribution index" includes six indicators, including technology transformation income (more than 10million yuan a year), patent citation rate, etc; Promote the mechanism of "substitution of technological achievements" (the income from patent transformation ≥ 1million yuan can replace academic achievements); In the pilot "industry professor" sequence, the CTO of an enterprise can concurrently serve as a doctoral advisor in Colleges and universities.

Strengthen risk tolerance and R&D incentives. Establish a "list of disruptive technologies" and implement "non consensus review" on basic algorithms and other fields; Introduce the "government underpinning" model in Singapore, and give 70% R&D risk compensation (up to 50million yuan) to projects in the strategic field; The "R&D investment is regarded as profit assessment" is implemented, the R&D investment of enterprises is deducted by 175%, and the income of university achievement transformation team is increased to 40%.

Promote mutual recognition of international qualifications. Launched the "ZhongGuanCun Silicon Valley technology passport" and built a certification alliance with Berlin and Singapore to achieve cross-border mutual recognition of the qualifications of six scarce positions; Build an "international talent community" in Zhongguancun to provide multilingual services, and return the local retained part of the personal income tax of overseas high-level talents in full.

(3) Build a collaborative and efficient digital talent development ecosystem to serve the national strategy

Improve top-level design and department collaboration. The five year plan for the development of talents in the digital economy in Beijing (2026-2030) was issued, specifying that the total number of talents will exceed 600000 and the number of strategic scientists will reach 100 by 2030; Set up a "digital talent policy special zone" in Yizhuang to pilot the deferred tax payment of equity incentive; Unify the policy standards of each district and avoid "multiple declaration".

Deepen the integration of production and education and regional collaboration. The "3+2+1" training mode of pilot colleges and universities (3 years of general education+2 years of practical training+1 year of incubation), and the coverage of Frontier courses will reach 100% by 2026; Build 10 national production and education integration bases and support 15 "enterprise naming research institutes" (with an annual investment of 10million yuan); Promote the "Beijing xionglang digital talent commuting certificate", build five Beijing Tianjin Hebei AI training bases, and realize mutual recognition of qualifications among the three places.

Strengthen resource coordination and ecological monitoring. Set up a 30billion yuan digital talent fund, and the government will invest 30% in top talent enterprises (up to 50million yuan); We will implement the monitoring of the "digital talent ecology index" (12 secondary indicators), and issue a report every six months. By 2030, the talent density will reach 85% in Silicon Valley, and the average annual increase in the volume of technology contract transactions will be 20%.

General Secretary Xi Jinping stressed that "hard power and soft power, in the final analysis, depend on talent strength". During the "15th five year plan" period, the development of digital talents represented by artificial intelligence in Beijing is the strategic fulcrum for coping with global scientific and technological competition and cultivating new productivity, and also the core practice of implementing the national strategy of "integrated development of education, science and technology talents". Only by improving allocation efficiency through dynamic classification, releasing innovation vitality through multiple evaluation, and strengthening global competitiveness through collaborative ecology, can we promote the deep integration of digital talents with industry, technology, and region, build Beijing into a global artificial intelligence talent highland, provide solid support for the country's high-level scientific and technological self-reliance, and inject strong momentum into the high-quality development of employment.

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General Secretary Xi Jinping profoundly pointed out that "artificial intelligence is a strategic technology leading this round of scientific and technological revolution and industrial change, with a strong spillover driving 'head geese' effect", and stressed that "the construction of talent team should be placed in a more prominent position, and efforts should be made to build a highland of high-level talents". At present, it is at the critical juncture of the conclusion of the 14th five year plan and the layout of the 15th five year plan. The global economic recovery is weak, and international trade frictions continue to escalate. As a "strategic area" of science and technology competition among large countries, AI has entered a stage of intense competition for talents; China's digital economy has accelerated its penetration into the industry in depth. As the country's first global digital economy benchmark city and an international science and technology innovation center, Beijing undertakes the core mission of cultivating new productivity and supporting the country's high-level scientific and technological self-reliance. In this context, systematic research on the development path of digital talents represented by AI in Beijing is not only the need to solve the current realistic needs of talent classification, evaluation and ecology, but also the inevitable choice to implement the national strategy of "integrated development of education, science and technology talents" and create a talent highland with global competitiveness. It has important demonstration significance for promoting the high-quality development of the capital, leading the innovation of the national AI industry and promoting the high-quality development of employment.

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