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# Research on the Impact of “Artificial Intelligence" on Economy and Employment under the Background of Low Birth Rate

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## Abstract

The combined effect of China's aging population and artificial intelligence presents both challenges and opportunities.AI has injected new impetus into the economy by filling the labor gap and driving industrial upgrading. At the same time, the employment market needs to undergo structural adjustments through skills transformation and policy support. In the future, it will be necessary to combine technological innovation to build a "human-machine collaboration" model to cope with the profound impact of demographic structural changes.

**Keywords:** Background of the low birth rate, Artificial intelligence, Economy and employment

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# ผลกระทบของปัญญาประดิษฐ์ต่อเศรษฐกิจและการจ้างงาน บนพื้นฐานอัตราการเกิดต่ำ

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## บทคัดย่อ

ประชากรสูงวัยของจีนร่วมกับปัญญาประดิษฐ์ (AI) นำมาซึ่งทั้งความท้าทายและโอกาส AI ได้ฉีดกระตุ้นเศรษฐกิจด้วยการเติมเต็มช่องว่างแรงงานและขับเคลื่อนการอัพเกรดอุตสาหกรรม ในขณะเดียวกัน ตลาดการจ้างงานจำเป็นต้องปรับโครงสร้างผ่านการเปลี่ยนแปลงทักษะและการสนับสนุนนโยบาย ในอนาคต จำเป็นต้องผสานนวัตกรรมทางเทคโนโลยีเพื่อสร้างแบบจำลอง "การทำงานร่วมกันระหว่างมนุษย์และเครื่องจักร" เพื่อรับมือกับผลกระทบลึกซึ้งจากโครงสร้างประชากรที่เปลี่ยนแปลงไป

**คำสำคัญ:** พื้นหลังอัตราการเกิดต่ำ ปัญญาประดิษฐ์ เศรษฐกิจและการจ้างงาน

## Introduction

Against the backdrop of the rapid development of artificial intelligence technology and the low birth rate, The impact of AI on the economy and employment is complex and multifaceted. Low fertility leads to an imbalance in the demographic structure, with a reduction in the labor force and a contraction in consumer demand, posing a long-term challenge to the social economy. By the end of 2023, the total population of the country was 1.40967 billion, and The number of births in the year was 9.02 million (Wang, 2024). While AI is the core technology of the Fourth Industrial Revolution, Its development is both an important tool to address the aging issue and may potentially exacerbate structural issues such as labor displacement and childbirth support.

AI can replace repetitive, low-skilled jobs in manufacturing, logistics, and other fields, alleviating the labor shortage. With the help of smart parenting assistance systems, personalized medical services, and psychological intervention, Alleviate family child-rearing pressure, indirectly enhance the willingness to have children. The thesis is based on economic impact, employment structure change and policy coping.

Alleviate the pressure of low fertility to drive innovation Impact on the economy

AI plays an important role in addressing the economic challenges of low fertility against the backdrop of the low fertility rate.

AI can supplement labor force to improve production efficiency

Low fertility has led to a continuous shrinkage of the working-age population; AI is replacing repetitive, low-skilled jobs through robots and automation. Compensate for the labor shortage caused by the low birth rate. Industrial robots can operate continuously and with high precision, and their long-term operating cost is lower than that of human labor. Meanwhile, AI optimizes production processes, driving the transformation of manufacturing towards intelligence and enhancing total factor productivity. In 2023, the share of China's digital economy in GDP reached 42.8 percent and contributed to 66.45% of GDP growth; the digital economy effectively supported stable economic growth (Wang Zhiqin, 2024). By March 2024, the number of AI enterprises had exceeded 4,500.714 large models have completed the filing of generative AI services. China's core AI industry reached a scale of 578.4 billion yuan in 2023 (Pei Wei, 2024), become a new driving force for economic growth. QYResearch Research shows that, the global generative AI market size is expected to be approximately $33.29 billion in 2024.Expected to reach $214.64 billion in 2031; CAGR of 32.6% between 2025 and 2031 (QYResearch Survey, 2025). On January 16, 2024, world business leaders gathered in Davos, PwC unveils survey: A quarter of the world's chief executives predict that the deployment of generative AI will lead to at least 5% job cuts this year. (Golden Deer, 2024), Core scenarios for AI to supplement the labor force and improve production efficiency (see Table 1).

**Table 1.** Core scenarios for AI to supplement the labor force and improve production efficiency

| AI technology | Labor force supplement method | Efficiency improvement dimension |
|---|---|---|
| Automated process | Replace repetitive labor (assembly, quality inspection); | Production speed; error rate reduction |
| Intelligent prediction and scheduling | Optimize production plans, inventory management | Resource utilization rate; delivery cycle |
| Data analysis and decision-making | Auxiliary management decision-making (supply chain optimization) | Decision-making speed; market responsiveness |
| Smart collaboration tools | Enhance human capabilities (training, remote collaboration) | Employee skills; cross-departmental collaboration efficiency |

AI's boost to production efficiency is revolutionary; Its successful application requires multi-party synergy at the enterprise level, policy level, and individual level. In this case, companies invest in AI infrastructure, driving the transformation of employee skills. Policies to improve the lifelong education system, strengthen vocational training, and formulate AI ethical regulations. Individual workers need to actively learn data analysis or human-machine collaboration management. Adapt to technological change. Master the "AI Major" composite skills, systematically improve productivity by replacing repetitive labor, enhancing human decision-making, and creating new positions. Supplementary labor force to improve production efficiency technology support system (see Figure 1).

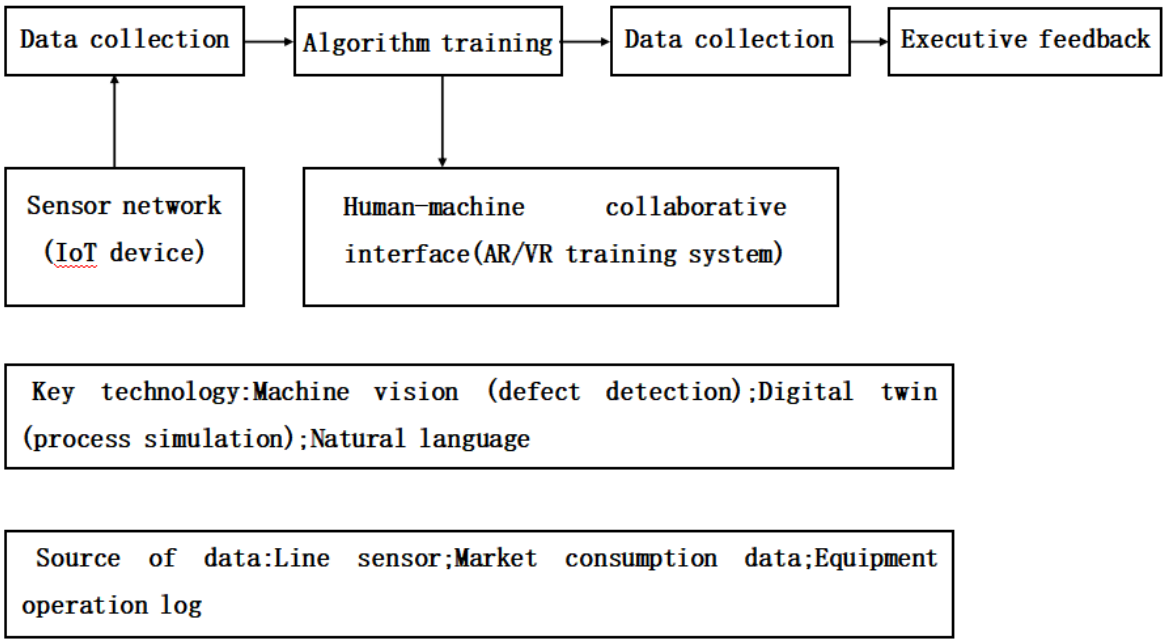


**Figure 1** AI Supplementing Labor Force to Improve Production Efficiency Technical Support System

AI can promote consumption upgrade and industrial transformation

AI accelerates the structural transformation of the industry towards a technology-intensive one; New energy, biomedicine and other emerging industries, as well as brain-computer interface, quantum information and other industries of the future, are highly dependent on AI, and have become new driving forces for economic growth.

1) Intelligent upgrade of consumption scenarios Smart technology reconstructs the "people, goods, and place" relationship, and efficiency is continuously improving. Federal Reserve Governor Cook noted that, AI-driven improvements in productivity can reduce business costs, driving profit growth and, in turn, wage increases (Cook, 2025), To further promote consumption. Smart home combines user preferences to generate outfit suggestions and integrates with e-commerce to push discount information, forming a closed loop of smart home and personalized service demand and supply. The digital transformation of retail and manufacturing has led to JD's digital human live streaming service brand exceeding 5,000, Driving GMV to exceed 10 billion (He Chang, 2024).

All-element cultural tourism and commercial services are launched online, promoting the upgrading of cultural tourism consumption. Eat, live, travel, play, shop, and enjoy" digital guide; AR scenic area integration of virtual and real, restoring the historical style of architecture, Combining VR device panoramic immersive experience, attracting global tourists.

2) Core driving force of industrial transformation Artificial intelligence, as the core industry in the new generation of information technology industry, is the core driving force of the fourth industrial revolution, It is supplementing labor, optimizing production processes and reshaping industrial structures, significantly boosting

global productivity. Low fertility is forcing the transformation of the industrial structure to a technology-intensive one.AI empowers smart manufacturing, smart agriculture and other fields. Promote the upgrading of traditional industries, drive emerging industries such as smart medical, autonomous driving and intelligent transformation of traditional industries, Lead the economic structure to upgrade to a technology-intensive one. The global industrial chain is accelerating restructuring, labor-intensive industries are shifting to Southeast Asia, and China's AI guarantees the competitiveness of high-end manufacturing.AI is empowering consumption upgrade, industrial transformation and global pattern restructuring with deep technology and scenario innovation. Currently, the industry is showing a trend towards customization, AI applications are shifting from general scenarios to vertical fields such as medical imaging diagnosis and industrial quality inspection. The main performance is as follows:

Production process reconstruction.AI algorithm optimizes the entire manufacturing chain, AI drug R&D technology innovation success rate, efficiency improvement. According to statistics, enterprises adopting predictive maintenance can reduce equipment downtime by 30%-50% and maintenance costs by 20%-40%, Its core lies in achieving fault prediction through data models (Chen, 2020)

Service model innovation. Harvard Medical School has joined hands with top research institutions such as Stanford University and Brigham and Women's Hospital. A revolutionary research result was published in the journal Nature - CHIEF, a brand new AI pathology model. The model was able to achieve an accuracy of nearly 94% when diagnosing 19 types of cancer. It provides unprecedented efficient tools for the diagnosis and prognosis prediction of cancer. Signifying the advent of a new era in the field of medical diagnosis (Wang et al., 2024)

New business format incubation. The main forum of the 2024 Digital Technology Ecology Conference was released. China has initially built a rather comprehensive industrial system for artificial intelligence, The core industry of AI has a scale of nearly 600 billion, The number of enterprises in the upstream and downstream industrial chains exceeds 4,700, covering various related links such as chips, computing power, data, platforms and applications (Guo Qian, 2024). New categories such as smart cars and humanoid robots are speeding up commercialization. AI is the core driving force for industrial transformation, including the synergistic progress of technology, data, policy, market and other dimensions. Algorithm breakthroughs need to match data governance capabilities, and policies such as investment in computing power infrastructure provide a foundation for technology implementation. AI “Technological breakthrough ⟶ Data activation ⟶ Efficiency revolution ⟶ Policy protection ⟶ Industry restructuring ⟶ Ecological win-win” chain, become the key support to drive the transformation of the industry.

3) Policy and environmental support National strategic layout, carry out "AI " action, promote "AI consumption" into the "Action Plan for Boosting Consumption" (Zhu Lingzhen, 2025).China's first AI data training base and Beijing's largest public computing power platform have been put into operation with the strongest computing power facilities to train the "most brain (Cao, 2024).Large model parameters break through the level of 100 billion, and the Chinese understanding ability reaches the level of human experts. But there are technical breakthroughs and challenges such as data islands, computing power gaps, and ethical risks. Pay attention to the ethical construction of human-machine collaboration and the democratization of AI for SMEs, so as to achieve a balance between technological dividends and social. With technological breakthroughs such as multi-modal

interaction and embodied intelligence, AI will drive consumption from "functional satisfaction" to "emotional resonance" and industry to "flexible manufacturing ecological service".

AI has optimized resource allocation and social services

Artificial intelligence, through data-driven decision-making and intelligent scheduling systems, is restructuring resource allocation models and reshaping the form of social services, Its impact has permeated the entire production, circulation, and consumption chains, as well as various fields of social governance.

1) Resource optimization from experience to intelligence Labor reallocation under precise matching of industrial factors.AI completes intelligent matching of talents and positions through the analysis of skill map and job requirements.AI prediction models are gradually becoming an important means for enterprises to improve their financial management level and enhance their market competitiveness. It can not only improve the efficiency and accuracy of budgeting, but also help enterprises better respond to market changes and make more scientific and reasonable strategic decisions.AI remote sensing system for three-dimensional modeling and intelligent management of urban land use, land planning approval cycle is shortened, and utilization rate is improved.

2) From inclusive to precise service improvement Dynamic allocation of medical resources, precision public services.AI triage system analyzes data from thousands of hospitals in real time, Effectively compress emergency patients' waiting time. Learning platforms through knowledge graph analysis, Adaptive personalized educational services, Improvement of learning efficiency for rural students. Urban safety early warning, Social governance intelligent innovation such as community service, Service demand matching degree improvement.

3) AI integration technology and its iterative upgrade Multimodal technology fusion medical image analysis system, integrating multi-source data, and improving diagnostic accuracy. Smart agriculture system integrates satellite remote sensing and soil sensor data, improving the accuracy of irrigation decision-making. Innovation of human-machine collaborative mechanism. The AI-assisted decision-making system in the Citizen Service Center has reduced the case time. The intelligent system of the court automatically parses legal documents, which shortens the case trial cycle.

With the in-depth implementation of the "New Generation Artificial Intelligence Development Plan", AI will bring huge social and economic value to the improvement of resource allocation efficiency and the inclusive coverage of social services.

The impact of social structural transformation on the employment market

What AI brings is not simply the replacement of jobs, but a reconfiguration of the factors of production.

1. AI era job displacement and new career creation AI and big data industries provide more employment opportunities for young people. AI’s reshaping of the job market presents a dual effect of "substitution and creation”. Its essence is to promote the leap of labor structure to high-value fields.

1) Job replacement under the penetration of technology. The standard jobs in manufacturing, services, and finance are dying out at an accelerating pace. Positions such as legal document drafting and entry-level data analysis face the risk of replacement. The standard teaching positions in the education field are under attack, and AI teachers can generate personalized learning paths based on students' wrong answers. Regional and industrial differences are significant. The manufacturing clusters in the Pearl River Delta and the Yangtze River Delta face

the greatest pressure of substitution. The high value-added industries such as finance and medical care coexist with "substitution and upgrading".

2) New occupations in the ecology technology. Emerging strategic positions become human-machine collaborative positions.AI trainers who are responsible for data annotation and model optimization, prompt word engineers who enhance the quality of AI output through optimized instructions, AI ethical advisors who craft algorithmic moral codes become tech-supportive positions. Top global companies are increasing dedicated positions to address AI ethical risks.AI medical analyst combining clinical experience with AI diagnosis results; system engineer overseeing the intelligent manufacturing of industrial robots, The positions of industrial 3D large model, 3D intelligent architect, etc. have emerged as the times require.

3) New paradigm for human-machine collaboration First, the new paradigm of individual capability upgrade path. Reconstruct from single skill to "AI tool application  domain expertise" compound skill transformation. Engaged in lifelong amateur learning through AI education platforms, focusing on strengthening creativity and critical thinking. Second, a new paradigm for policy safeguard mechanisms. Cover retraining and social security pilot projects in the fields of intelligent manufacturing, digital marketing, etc.

AI-driven skill upgrade and new transformation of education

1) Workers need to move to creative, high-skills areas. The importance of "human-specific skills" such as critical thinking and interpersonal communication is highlighted. The education system needs to incorporate AI technology training and a lifelong learning mechanism.AI-driven skills transformation and education transformation are forming a new pattern of mutual reinforcement. Its core is to reconstruct the goals of talent training, reshape the form of education, and recreate the path of career development.

2) Education shifts from "transmission of knowledge" to "ability building". The AI-induced transformation of education represents a fundamental innovation in the way human civilization heritage is passed down. It shifts from "standardized training" to "personalized empowerment," with the ultimate goal of unlocking human potential. The direction of reform in the education system revolves around restructuring university curricula to include courses such as AI ethics and human-computer interaction., and the deepening of industry-education integration in various aspects.

AI to promote gender equality and flexible employment

AI-powered new models such as telecommuting and the platform economy provide flexible work opportunities, enabling women to balance their careers and families.

1) Technology empowerment breaks the employment circle AI replaces physical labor, releasing women's potential. Automation in manufacturing has liberated assembly line workers, with women turning to high-value-added positions such as data analysis and quality control.

The proportion of female practitioners has significantly increased. In the logistics field, robots have replaced sorting work, giving birth to new positions such as intelligent warehouse dispatchers. Women use AI-assisted tools to boost efficiency in making short videos.

2) More opportunities for women to find employment Technological advances become accelerators of gender equality. Flexible employment breaks the limits of time and space, gender equality breaks the boundaries

of cognition, Technological innovation and institutional reform reshape the new form of culture. Not gender but capability as the measure of value, Not physiological differences but creativity define employment possibility. The proportion of women in AI trainer positions is increasing. Metaverse scene designers, engineers in emotional computing, and other cutting-edge professions are seeing a surge in female practitioners. The gender distribution of emerging professions has been optimized.

3) Reshaping the elasticity characteristics of employment AI has reshaped the elasticity characteristics of the employment market and promoted the process of gender employment equality through technological innovation and industrial restructuring. Forming a virtuous cycle of "efficiency improvement; opportunity expansion; fairness guarantee" in terms of technological empowerment, opportunity restructuring and institutional innovation.

Constructing an economic and employment environment for human-machine collaboration

Building an economic and employment environment for human-machine collaboration, It is necessary to systematically promote from the aspects of technical base, institutional design, governance model, and educational support. Constructing a logical framework for the economy and employment of human-machine collaboration (see Figure 2) This framework emphasizes the interconnection of technology, institutions, capabilities, and international collaboration. Through the progressive path of “Infrastructure as a foundation– Institutional innovation as the safeguard – talent capability empowerment – Global ecological co-construction” Progressive path Realize the sustainable development of human-computer collaborative society.

Constructing a technical support system for human-computer symbiosis

The government has increased its investment in the AI field, attracting talent through tax incentives, scholarships, and other measures. Such as: China plans to exceed 1 trillion yuan in core AI industry scale by 2030, driving related industries by 10 trilliony (Qi Yidong, 2020).

1) Smart infrastructure upgrade Deploy quantum computing nodes and edge computing gateways to achieve data processing upgrade. Shenzhen has built more than 3,000 5G AI edge computing nodes, supporting real-time decision-making efficiency improvement of factories[14.Build a distributed data lake, integrate government affairs, medical, transportation and other fields of data, and achieve cross-domain collaboration through federated learning.

2) Innovative human-computer interaction technology Develop a multimodal interactive system integrating speech, gesture, brain-computer interface and other technologies, Building a digital twin city. The concept of "Digital

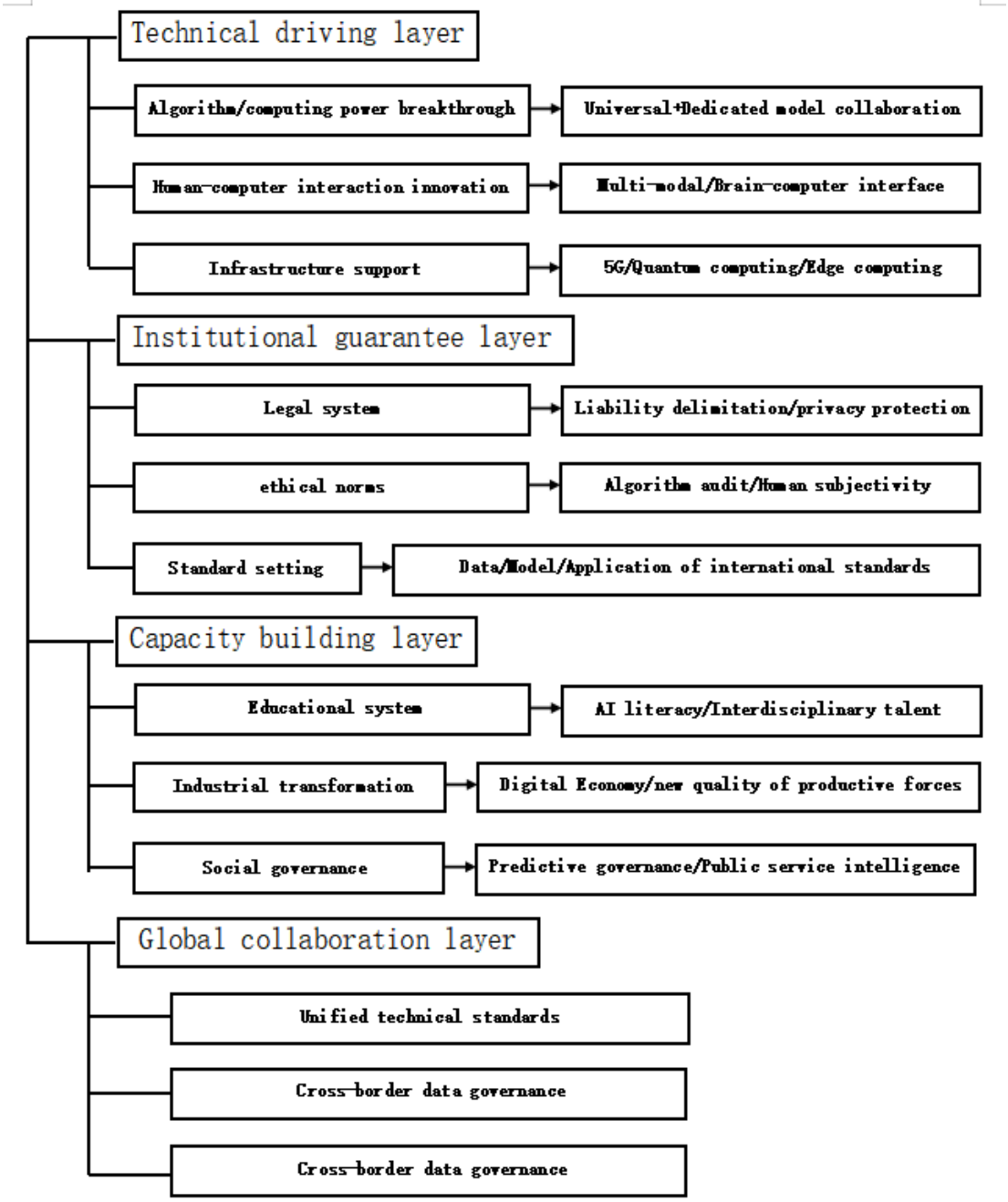


**Figure 2** Logical framework of human-machine collaboration

Twin City" was first proposed in 2017,China's 14th Five-Year Plan (2021-2025) development strategy outlined in the 14th Five-Year Plan states that it will explore the construction of digital twin cities, The overall layout plan for the construction of digital China in 2023 was once again proposed, “Universally enhance the integrity, systematisms, and synergy of the construction of digital China” and explore the construction of digital twin cities and other requirements. Realize dynamic mapping between physical and virtual space.

Establish a framework of institutional safeguards for human-machine collaboration

Establish an unemployment relief and retraining system to mitigate the impact of technological unemployment. Establish data privacy laws and AI ethical guidelines to prevent technology misuse.

1) Ethical and safety norms The National Artificial Intelligence Standardization General Group and the Artificial Intelligence Sub-Committee of the National Information Standardization Technical Committee released the "Guide to Artificial Intelligence and Governance Standardization" in March 2023, Decomposing and concretizing the requirements of each principle based on the perspective of standardization, and sorting out and refining 10 items of artificial intelligence principles with strong feasibility. Provide operational guidance for the development of specific standards later. The European Parliament approved the EU AI Act on 13 March 2024, contain numerous rules aimed at supporting the responsible use and development of AI. Establish a data sovereignty protection mechanism and use blockchain technology to achieve data ownership and traceability.

2) The innovation of policy synergy mechanism Build a cross-sector joint decision-making mechanism. Integrate the resources of departments such as the National Development and Reform Commission, the Ministry of Industry and Information Technology, and the Ministry of Science and Technology Coordinate the formulation of a roadmap for the development of AI industry. Establish a "digital skills portfolio" to record the trajectory of workers' skills improvement. Implement "Human-Machine Collaboration" vocational certification.

Cultivating a human-machine collaborative educational ecosystem

The "no-man farm" that promotes the integration of AI with traditional industries improves agricultural efficiency, Smart factory and other intelligent manufacturing to alleviate the labor shortage caused by the low birth rate. Although AI has provided short-term relief from the impact of the declining birthrate, it may face issues such as a mismatch in labor skills and insufficient innovation momentum in long term.

1) Curriculum system renewal and innovation Offering AI compulsory courses in basic education to cultivate computational thinking and digital literacy. On March 2025, the Beijing Municipal Education Commission issued the "Beijing City's Work Plan for Promoting Artificial Intelligence Education in Primary and Secondary Schools (2025-2027)", which pointed out, starting from the autumn semester of 2025, AI general education is carried out in primary and secondary schools throughout the city. No less than 8 class hours per school year, to achieve comprehensive popularization among primary and secondary school students.

2) Teacher-student capability perfected and upgraded Promote the deep integration of educational informatization and teaching and learning and innovate teaching models (The Central Committee of the Communist Party of China & State Council, 2025). In the AI teacher personalized human-computer cooperative education scenario, the "AI Teaching Assistant" program is implemented, Provide intelligent lesson preparation, student performance analysis, etc. for teachers. Build a digital portrait system for teachers to dynamically evaluate the development level of AI teaching capability. Implement mutual recognition of AI capability certificates, vocational skill certificates and academic education credits. Develop metaverse education scenarios, support cross-border collaboration, and enhance students' cross-cultural communication skills.

The economic and employment path of human-machine collaboration

Explore the path to achieve human-machine collaboration in the economy and employment, Build an AI dialogue environment of "government, enterprise, university, public". Realize the reconstruction of human-machine rights and responsibilities; Encourage enterprises to open AI capability interfaces, Lower the threshold for the application of technology in small and medium-sized enterprises through policies such as tax preferences; Establish regional computing power sharing centers, balance the distribution of digital infrastructure, and achieve technological inclusiveness; Establish an application model for AI "regulatory sandbox", allowing innovation and trial and error within a controllable range. Economic and employment realization paths of human-machine collaboration (see Table2).

**Table 2** Pathways to the Economic and Employment Realization of Human-Robot Collaboration

| Dimension | Core elements | Implementation path | Key technology |
|---|---|---|---|
| Technical basis | 1. Algorithm and computing power upgrade (quantum computing, edge computing)<br>2. Human-computer interaction technology (Multimodal interaction, Brain-computer interface)<br>3. General and specialized large models collaboration | 1. Increase investment in AI basic research<br>2. Drive the development of the "generalist-specialist collaboration" model (general large model industry-specific model)<br>3. Construct national-level Computing power infrastructure | Federated learning; distributed storage; differential privacy technology. |
| Data governanc e | 1. Data sharing and open platform<br>2. Data security and privacy protection<br>3. Data ethics and compliance review | 1. Establish cross-industry data standards<br>2. Establish a data ownership and transaction mechanism<br>3. Strengthen data anonymization processing technology | Blockchain proof; homomorphic encryption; data sandbox. |
| Ethics and law; | 1. Human-machine liability demarcation (e.g,attribution of liability for accidents in autonomous driving)<br>2. Algorithm Bias Removal<br>3. Protection of human subjectivity | 1. Issue the "Ethics Guidelines for Artificial Intelligence"<br>2. Establish an algorithm audit system<br>3. Perfecting the regulations on the identification of AI tort liability | Explainable AI (XAI); ethical map; legal AI assistant system. |

**Table 2** (Cont.)

| Dimension | Core elements | Implementation path | Key technology |
|---|---|---|---|
| Education and Talent | 1 .AI literacy for all<br>2. Human-machine collaboration skills training<br>3. Interdisciplinary talent training (Technology+ ethics +domain knowledge) | 1. Incorporate AI ethics into basic education curriculum<br>2. Construction of industry-education integrated training base<br>3. Establishment of human-machine collaborative innovation laboratory | Virtual reality teaching; adaptive learning system; AI tutor. |
| Social governance | 1. Predictive governance (risk early warning based on big data)<br>2. Multi-subject collaboration (government-enterprise-public)<br>3. Public service intelligent transformation | 1. Construct a three-level governance platform of "provinces-cities-counties".<br>2. Promote the "big linkage, micro-governance" model economy and industry<br>3. Establish AI-assisted decision-making system | Social computing; Collective intelligence; Digital twin city. |
| Economy and industry | 1. Industrial digital transformation<br>2. New quality productivity cultivation (such as intelligent manufacturing, smart agriculture)<br>3. Employment structure adjustment | 1. Formulate AI industry support policies<br>2. Establish "AI industry" pilot demonstration zones<br>3. Improve the system of vocational transition | Industrial Internet; Digital twin; Smart supply chain. |
| International collaboration | 1. Global technical standard unification<br>2. Cross-border data flow rules<br>3. Joint response to AI ethical challenges | 1. Participate in international AI governance organizations (such as the OECD AI Principles)<br>2. Promote the "Belt and Road" AI cooperation initiative3.Establish a multinational ethics review alliance | Cross-border data hub; multilateral agreement framework; Joint technical certification |

## Conclusion

Reconstructing the economic and employment situation of human-machine collaboration is, fundamentally, a process of dynamic equilibrium between productivity and production relations, as well as technical logic and social values. It is necessary to adhere to the value orientation of "people-oriented," incorporate humanistic care into technological innovation, and reserve elastic space in institutional design, eventually achieving symbiosis and prosperity between technological empowerment and human value.

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