

Research on Path Selection and Policy Synergy of "AI+" Empowering In-depth Integration of Digital and Real Economy

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Abstract

This paper examines how China's "AI+" agenda can move digital-real integration beyond the adoption of digital tools and into the reorganization of production, factor allocation, and industrial governance. The analysis is situated within the "AI+" Action, the effort to cultivate new quality productive forces, and the market-oriented reform of data factors. Drawing on digital economy, industrial convergence, innovation ecosystem, and multi-governance theories, it traces four channels of AI-based industrial change: the productive use of data, iterative algorithmic improvement, computing infrastructure, and deployment in industry-specific scenarios. It then links six current obstacles, ranging from an uneven supply of industrial AI and weak adoption among SMEs to blocked data circulation, fragmented policies, and delayed risk governance, to four routes for implementation: better infrastructure, industry-specific adoption, stronger firm-level capabilities, and iterative experimentation in concrete scenarios. The paper's main contribution is a policy framework that coordinates central and local governments, departments, policy instruments, and the balance between development incentives and regulation. Together, these elements connect the mechanism of AI-based change with feasible implementation paths and policy support for new quality productive forces.

Keywords

AI+; In-depth Integration of Digital and Real Economy; Path Selection; Policy Synergy; New Quality Productive Force.

1. Introduction

Digital development in China is moving beyond consumer-side expansion and into production. As the digital sector penetrates the real economy, their relationship increasingly turns on the reorganization of production rather than the addition of isolated digital tools. The State Council's Opinions on Deeply Implementing the "AI+" Action treats artificial intelligence as a general-purpose technology for use across industries. Compared with the earlier "Internet+" approach, this agenda reaches further into industrial activity[1]. The Opinions on Constructing a Data Basic System and the reform decisions of the Third Plenary Session of the 20th Central Committee place that agenda alongside the construction of new quality productive forces and market-oriented data allocation[2][3]. Together, these policies create an institutional setting for AI-based industrial change. In this paper, deep digital-real integration therefore means changes to production functions, factor allocation, and industrial governance.

International studies discuss the economic characteristics of digital technology, organizational changes caused by digitalization, recombination of innovation and entrepreneurship, and the role of generative artificial intelligence on productivity in real-world scenarios. Domestic research focuses on the formation of new quality productivity[4]and also examines the improvements brought by digital technology in service specialization, industrial collaboration, and the correspondence between digital and reality. These works clarify the overall

characteristics and micro-foundations of digital transformation, but they rarely address the following points: Most of the literature focuses on how technology is used within a single firm, and how artificial intelligence changes production and factor distribution throughout the industry system. In terms of implementation path, many studies are static and one-sided, and do not care about the differences between industries, enterprises, and application scenarios. Policy research is also fragmented, without explaining why division of power, overlap of projects, and mismatch of incentives could hamper implementation. This paper aims to study how industrial activities change, what bottlenecks hinder these changes, what implementation paths are suitable for different situations, and how policies can provide support. The specific approach is to first divide the internal mechanisms into four parts, and then establish a layered path system tailored to specific issues. The main contribution lies in proposing a four-dimensional policy coordination framework. This framework links theory, diagnosis, and institutional arrangements, providing a foundation for the implementation of "Artificial Intelligence +" initiatives and the advancement of high-quality industrial transformation[5].

2. Related Concepts and Theoretical Basis

2.1. Core Concepts

"AI+" is a national strategy that uses artificial intelligence as a general-purpose technology across industries and social domains. The earlier "Internet+" approach mainly reduced transaction costs by improving connectivity. "AI+" reaches into the production function itself through cognitive automation, predictive optimization, and autonomous decision-making. The possible modes of production may change due to the combination of three elements: data, algorithms, and computing power. The plus sign here represents a multiplicative relationship, where data is treated as a production factor, algorithms as labor tools, and computing power as infrastructure.

The boundary between the virtual and physical sectors will ultimately be broken down, enabling both sides to jointly create value at multiple levels. Data is being allocated into production through the market, industrial technology and digital technology are converging at the technological level, and at the industrial level, we are seeing the emergence of intelligent manufacturing, industrial internet, and digital agriculture. Enterprises are also undergoing more comprehensive digital and intelligent transformations, while regulatory authorities are increasingly using digital regulation. All of these are manifestations of integration.

Policy coordination involves bringing policy tools and implementers together for harmonization. It encompasses the relationship between the central and local governments, coordination among different departments, and whether industrial policies, technological policies, fiscal policies, and talent policies are aligned. It also involves the timing of development incentives and risk regulation. When enterprises integrate artificial intelligence with industry knowledge and specific application scenarios, they can empower the industry with intelligence. This integration enhances overall production efficiency, improves production processes, and supports the emergence of new business models.

2.2. Theoretical Foundations and Analytical Framework

This section refers to four sets of theories, each corresponding to a different part of the problem; Innovation ecosystem theory no longer focuses on individual companies, but focuses on complementarity, modular relationships, and joint investment, allowing multiple parties to create value together. The theory of industrial integration explains why the integration of technology and market blurs the boundaries between digital and physical activities, and also explains why the system needs to be adjusted when the boundaries change. The digital economy theory uses data as a factor of production, and it shows how the increasing role and

benefits of networks support AI to create value. Finally, the theory of multi-governance absorbs the idea of multi-center governance and explains how the government, market and social forces divide power and responsibility. This last perspective provides the basis for the analysis of policy coordination in this paper.

3. Internal Mechanism and Era Value of "AI+" Empowering In-depth Integration of Digital and Real Economy

3.1. Internal Empowerment Mechanism

There are four mechanisms that connect "AI+" with changes in the real economy. Data is the starting point, and AI turns equipment signals, process parameters, supply chain records, and market transactions into usable production assets, narrowing the information gap between internal and external enterprises. Then, the algorithm turns some decisions made based on experience into rules that can be continuously updated from the data. Based on this, enterprises can perform equipment maintenance in advance, flexibly arrange production, inspect quality, and accelerate research and development. Large industrial base models also reduce the cost of acquiring and applying knowledge in different production environments; The size of these applications depends on the computing infrastructure, national hubs, edge facilities, and the arrangement of "East Data and West Computing" that schedules eastern data processing demand to western computing resources. Value is ultimately realized in specific industrial scenarios. Enterprises combine industry knowledge, industrial software, and equipment. Examples such as blast furnace optimization, agricultural ecological monitoring, and financial risk control demonstrate how a general technology can become a unique productivity in a specific industry. Field studies on generative AI have shown significant improvements in worker productivity and output quality in knowledge-intensive tasks, proving the importance of deployment in specific scenarios.

3.2. Reshaping Effects on Industrial Systems

These mechanisms change production, factor allocation, and management methods from different directions. Enterprises shift from mass production to data-supported customization, from rigid assembly lines to modular manufacturing, and from post-inspection to predictive quality control. digital twin extends this change to the supply chain, allowing companies to simulate production, test different solutions, and coordinate multiple levels of suppliers with lower costs and greater resilience. Data can also be used as an independent input into factor allocation, and can be recombined with capital, labor, and technology to obtain returns that traditional arrangements cannot obtain. The change in management methods is slow, and predictive tools and scenario-based regulation allow regulators to increase continuous digital monitoring beyond post-event inspections.

3.3. Era Value and Strategic Significance

At the macro level, "AI+" should serve three policy objectives. It supports the formation of new quality productivity, which can be understood as a production model driven by innovation, technology-intensive, and characterized by higher quality and efficiency. In this context, AI acts as an amplifier. It also aims to bridge the gap between digital and physical activities. Consumer platforms may lead to financialized circulation, transferring value away from physical production. However, industrial AI can operate within the production process itself, enabling a closer integration of the two sectors. A further effect is industrial upgrading. Intelligent energy management can improve resource allocation and support a green, low-carbon transition, while AI-for-Science can accelerate scientific discovery. The four mechanisms described above therefore matter for national industrial goals as well as for the performance of individual firms.

4. Current Situation and Core Bottlenecks of "AI+" Empowering Digital-Real Economy Integration

4.1. Phased Achievements

Implementation of the "AI+" Action has advanced in industry, applications, infrastructure, and policy. More intelligent manufacturing demonstration factories and high-level production lines have been established, and manufacturers continue to adopt digital research and design tools. Applications have spread across areas such as autonomous-driving pilots, AI-assisted drug discovery, smart medical diagnosis, and intelligent customer service. National computing hub nodes, open-source foundation models, and provincial data exchanges have expanded the underlying digital infrastructure. The "AI+" Action, the data basic system, and local implementation plans also provide an initial policy structure, although the degree of coordination among these measures remains uneven.

4.2. Core Bottlenecks

The move from demonstration projects to industry-wide adoption still faces seven constraints. On the supply side, leading AI vendors tend to serve standardized consumer and internet uses, while industrial users require reliability, real-time response, safety compliance, and substantial customization. General-purpose models therefore remain some distance from industrial-grade systems. Adoption also differs sharply across industries. Automotive and electronics manufacturers have integrated AI more deeply, but medium- and low-technology industries, agriculture, construction, and most SMEs remain at an early stage of informatization. For many of them, technology adoption has not produced comparable performance gains. SMEs face an additional cost problem: limited digital skills, weak data foundations, high upfront spending, and uncertain returns may widen an emerging "intelligence divide." Data cannot circulate easily when property rights are unclear, platforms remain isolated, pricing and trading rules are immature, and security risks are unresolved. Commercialization is another weak link. Fragmented cooperation among government, industry, universities, and research institutes, together with poor technology brokerage and misaligned incentives, slows the movement of laboratory results onto production lines. Policy authority is divided across AI, digital economy, industrial, and data-governance programs, creating overlaps, gaps, duplicate local programs, and subsidy competition. Risk governance has lagged as well, particularly in relation to algorithmic bias, data security, market concentration, and labor-market adjustment.

5. Multi-dimensional Path Selection of "AI+" Empowering In-depth Integration of Digital and Real Economy

The following four routes match these constraints with different levels of infrastructure, industry, firm capability, and application scenario.

5.1. Infrastructure Optimization Path

Reducing deployment costs first requires better computing and data infrastructure. National computing hubs should interconnect more effectively, green computing capacity should expand, and edge nodes should be placed near industrial clusters. Computing-sharing arrangements can then give SMEs access without requiring each firm to build its own facilities. Data markets need a parallel set of rules: clearer property rights, graded exchange arrangements, transparent pricing and transactions, and a system that links data contribution to value realization and benefit sharing. Model infrastructure is the third element. Support for open-source foundation models, industrial pre-training corpora, and integrated deployment and inference services would reduce duplicate investment by regions and industries.

5.2. Differentiated Industrial Empowerment Path

Different industries require different deployment paths. The manufacturing industry needs an intelligent system that covers design, process, production, logistics, and after-sales, and these links can be connected by digital simulation and industrial basic models. Agriculture can use shared data platforms to promote precise planting, intelligent breeding, unmanned machinery, and full-chain traceability. The situation in the service industry is different. The financial industry can use risk control models, medical and health care can be used for auxiliary diagnosis, logistics and transportation can improve scheduling arrangements, and education and tourism can provide more personalized services. The combination of artificial intelligence and scientific research is the same. By combining AI with basic science, material simulation, drug development, and climate prediction, a new research approach will be formed, and the scientific sources of industrial innovation will be more solid.

5.3. Micro-Entity Optimization Path

From the perspective of enterprises, policies should treat leading enterprises, small and medium-sized enterprises, and specialized and innovative enterprises separately. Large enterprises can build open platforms, release industrial models and development tools, and share AI capabilities with suppliers and customers, so that they can play a coordinating role in the entire industry ecosystem. Small and medium-sized enterprises need to obtain lightweight, modular, and code-free services at a lower cost, including pay-per-use applications, computing power vouchers, public data, and collective procurement, all of which can reduce their adoption costs. Specialized and innovative "little giant" enterprises are in different positions, and they can combine their industry knowledge with AI in narrow scenarios to form advantages in specific segmented fields. These three types of enterprises interact with each other, platform capabilities spill over, and specialized applications send new knowledge back into the ecosystem.

5.4. Scenario Iterative Innovation Path

Conducting experiments around scenarios is to deal with the disconnect between technology development and practical application, which is commonly known as the "two-faced" problem. Some applications, such as visual inspection, intelligent knowledge management, and collaborative office tools, can be reused in different industries. Other applications need to be specifically adjusted according to specific industries; These applications can be found through scenario discovery, open bidding, sandbox testing, dynamic evaluation, and scale replication. Repeated testing reduces trial and error costs and allows the implementation process to adapt to changes in technology and requirements. The scenario development can also connect the first three paths. Infrastructure, industry design, and enterprise capabilities don't generate much value if they don't come together in practical applications.

6. Policy Synergy Mechanism and Optimization Strategies for In-depth Digital-Real Economy Integration

6.1. Institutional Defects and Coordination Dilemmas

Several institutional features prevent existing policies from working together. Sectoral departments divide responsibility for top-level design, and no single arrangement integrates their programs. Industrial support favors supply-side subsidies even when weak demand is the binding constraint. Fiscal and tax incentives often do not match the long investment cycle and uncertainty of industrial AI, while talent programs remain separated from the interdisciplinary skills that industrial applications require. Regulation is fragmented and usually responds after problems appear. The result is a policy dispersion trap: many instruments operate at once, but

departmental responsibilities overlap in some areas and leave gaps in others, and broad incentives do not fit the different constraints faced by firms and industries.

6.2. Construction of a Four-Dimensional Policy Synergy Governance Framework

Between the central and local authorities, different tasks should be clearly distinguished; The central government is responsible for setting national standards, data interfaces, safety bottom lines, and assessment indicators; Local governments are more suitable to use their own industrial advantages to design pilot projects. National demonstration zones can link these two types of roles, but participation rules and performance evaluations must limit local protectionism and prevent competition for duplicate subsidies.

The coordination between departments should not allow artificial intelligence, digital economy, industry, agriculture, finance, and data governance to be managed separately. This work is to be carried out by a permanent inter-ministerial joint meeting; The meeting unifies standards, shares supervision information, and integrates project approval. In this way, the institutional gap between upstream technology supply and downstream industrial application can be filled. Policy tools should also be coordinated with each other; The industry policy should provide more application scenario lists and public artificial intelligence platforms instead of subsidizing specific enterprises. Technology policies can focus on cutting-edge research, open-source ecosystems, and artificial intelligence for scientific research. Tax policies should extend R&D expense tax deduction to industrial artificial intelligence, smart devices can depreciate faster, and government procurement can create initial demand. The talent policy should have a "industrial artificial intelligence engineer" training system, university courses need to increase interdisciplinary content, and existing workers need to receive large-scale skill upgrades. The timing, target audience, and implementation intensity of these tools should be considered together and cannot be determined individually.

Development incentives and risk regulation form the final coordination problem. Regulatory sandboxes and experimental rules can allow reasonable failure during pilot projects. At the same time, algorithm audits, data-security compliance, AI safety standards, and antitrust enforcement need to develop alongside deployment rather than after it. Labor-market adjustment belongs in the same framework: transitional assistance and retraining can reduce the social cost of worker displacement by intelligent systems.

6.3. Institutional Innovation and Long-Term Guarantee Systems

For this framework to work in the long term, several institutional arrangements can play a role; Use a national "artificial intelligence + Industry Integration Committee" as a permanent cross-departmental body to replace the temporary coordination group; In areas with conditions, policy test zones can be set up to test the rules of data, labor, and capital integration under controllable conditions. The digital policy intelligence system can simulate policy effects, track implementation, and discover the interaction between individual departments that are easily overlooked. Third-party independent evaluation is conducted every five years to provide a fixed error correction mechanism for the entire system. The application scenario list and standards should be updated regularly, and the changes of international artificial intelligence industry policies should be continuously monitored. These arrangements can turn coordination into long-term administrative capacity and keep the incentives for innovation and industrialization ongoing.

7. Conclusion

This paper regards the deep integration of digital and physical as a problem of industrial transformation and policy coordination, rather than simply using technology. Data, algorithms,

computing power, and specific industry scenarios determine how artificial intelligence enters production. However, these effects are repeatedly constrained by infrastructure, industry differences, enterprise capabilities, and application testing. Therefore, the policy should connect the various layers of the system; the central and local governments should have clear division of labor and cooperate with each other; Unify standards and exchange information between departments; Policy tools such as industry, technology, finance, taxation, and talent should support each other. Development incentives should also be adjusted according to regulatory changes. These paths and policy frameworks can explain how the artificial intelligence+ action promotes the formation of new productivity in the real economy.

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