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The Mechanism and Efficiency Improvement of Data Elements Driving the Development of the Intelligent Economy

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ABSTRACT

In the era of digital economy, data elements have become a key production factor driving the innovative application of artificial intelligence technology, and it has a profound impact on the development of intelligent economy. This paper first defines the core connotations and characteristics of data elements and the intelligent economy, then systematically analyzes the three major mechanisms by which data elements drive the development of the intelligent economy, and finally delves into the practical predicaments faced in the current process of data element empowerment, and proposes effective paths to promote the development of intelligent economy from four dimensions: data governance, technological support, element collaboration, and institutional innovation. The research aims to reveal the inherent logic between data elements and the development of intelligent economy, providing theoretical reference and practical guidance for promoting high-quality development of intelligent economy and building new advantages of intelligent economy.

KEYWORDS

Data elements; Intelligent economy; Element allocation

1 Introduction

In the context of the deep integration of digital technology and the real economy, the intelligent economy is a new economic form supported by cutting-edge technologies such as artificial intelligence, big data, and the Internet of Things. It is becoming the core engine leading economic transformation and upgrading, and cultivating new quality productivity. Unlike traditional economic forms, the growth momentum of the intelligent economy is no longer confined to traditional production factors such as capital and labor. Its essence lies in the in-depth empowerment of data elements, computing power and algorithms to achieve intelligent reconstruction of all links in production, distribution, exchange and consumption. However, in practice, the value release of data elements still faces many constraints such as incomplete data governance system, insufficient technological adaptation, and lagging institutional guarantees, which leads to the need for further improvement in the quality and efficiency of intelligent economic development. In this context, analyzing the internal mechanism of data elements driving the development of intelligent economy, and clarifying the practical predicaments and breakthrough paths of the development of the intelligent economy holds significant theoretical and practical significance.

2 Definition and Characteristics of Data Elements and Intelligent Economy

2.1 The Core Connotation and Characteristics of Data Elements

As a new type of production factor that differs from traditional production factors in the digital economy era, data elements refer to various data resources that can participate in the production process and create economic value after being collected, cleaned, processed, and analyzed. Its core connotation is reflected in two levels: From the perspective of value, data needs to be transformed into effective information with functions such as decision-making reference, production empowerment, and service optimization through certain technical processing before it can become a true production factor; From the perspective of participatory dimension, data needs to be integrated into economic activities such as production, distribution, exchange, and consumption, and work together with other production factors to achieve value creation. Data elements possess unique characteristics that distinguish them from traditional production factors, such as non-competitiveness and reusability, non-exclusivity, diminishing marginal cost, and spatiotemporal boundlessness.

2.2 The Core Connotation and Characteristics of the Intelligent Economy

The intelligent economy is a new economic form that is supported by new-generation information technology, takes data elements as the core driving force, and deeply integrates artificial intelligence, big data, the Internet of Things and other technologies with the real economy to achieve intelligent, efficient and green development of economic activities. The intelligent economy can enhance production efficiency, optimize product services, cultivate new business models, and promote high-quality economic development through the optimal allocation of data elements and the continuous empowerment of technological innovation. It has the following characteristics: First, data-driven. In the development of the intelligent economy, the conduct of economic activities, the improvement of production efficiency, and the innovation of business models all rely on the value release of data elements. Second, technological intensity. The speed and depth of innovation in cutting-edge technologies such as artificial intelligence, big data, cloud computing and the Internet of Things directly determine the development level of the intelligent economy. Third, business format innovation. The integration of data elements with traditional industries can give rise to new industries, new business forms and new models, break the boundaries of traditional industries and reconstruct the industrial value chain. Fourth, efficiency-oriented. The core advantage of the intelligent economy lies in optimizing resource allocation, reducing transaction costs, and enhancing production efficiency through intelligent means, thereby achieving a simultaneous improvement in the quality and efficiency of economic development.

3 The Mechanism of Data Elements Driving the Development of Intelligent Economy

3.1 Mechanism Analysis of Factor Allocation Optimization

The circulation and sharing of data elements can break down the information barriers in the traditional economy, making it more convenient for market entities to access various types of information, including supply and demand information, price information, and quality information, and achieve the analysis and preprocessing of massive data, thereby clearly grasping market dynamics, consumer demands, resource distribution, and other situations. This can reduce reduce decision-making errors and transaction costs caused by information asymmetry, thereby promoting the high-quality development of the intelligent economy. As a key factor driving the development of intelligent economy, data elements can accurately characterize the demand characteristics and supply capabilities of market entities, and with the help of artificial intelligence algorithms, achieve efficient matching between supply and demand, enabling enterprises to optimize product design, production planning, and supply chain layout based on consumer demand data, and achieve on-demand production.

3.2 Mechanism Analysis of Technological Innovation-driven Development

Through in-depth analysis and mining of data, technology research and development entities can discover the direction and breakthrough points of technological innovation, optimize the performance and accuracy of algorithm models, promote the continuous iteration and upgrading of core technologies, and provide stronger technical support for the development of intelligent economy. Meanwhile, data elements have the characteristic of being unbounded in time and space, which can break down the barriers between different technical fields and promote the deep integration of technologies such as artificial intelligence, big data, cloud computing, and the Internet of Things. This will give rise to new technological paradigms and innovative achievements, providing a core driving force for the innovation of business forms and models in the intelligent economy. In addition, enterprises can quickly obtain cutting-edge technological information through the collection of data elements, accelerate technology introduction, absorption, and re-innovation, shorten the transformation cycle of technological achievements from research and development to application, improve the efficiency of scientific and technological achievement transformation, and empower the development of intelligent economy.

3.3 Mechanism Analysis of Industrial Structure Upgrading

Data-based intelligent management platforms and intelligent production systems can not only optimize production processes, improve production accuracy, and reduce production costs, but also improve enterprise decision-making efficiency, optimize resource allocation, strengthen risk control, and promote the transformation of industrial structure towards high-end and intelligent development. The development and utilization of data elements can foster emerging industries such as big data services, artificial intelligence, and high-end equipment manufacturing. Meanwhile, the cross-border integration of data elements with traditional industries can give rise to new business forms such as intelligent manufacturing, intelligent logistics, intelligent finance, and smart healthcare, break the boundaries of traditional

industries, reconstruct the industrial value chain, and promote the transformation of the industrial structure towards diversification and innovation, thereby expanding the development space of the intelligent economy. With the support of data platforms, enterprises in the upstream and downstream of the industrial chain can achieve information sharing, resource complementarity, and collaborative cooperation, forming an industrial layout featuring complementary advantages and coordinated development, promoting the intelligent upgrading of the industrial structure, and thereby enhancing the efficiency of intelligent economic development.

4 The Practical Predicaments of Data Elements Empowering the Development of the Intelligent Economy

Although data elements have a significant driving effect on the development of the intelligent economy, the following practical predicaments still exist in the specific practice process, which restrict the development of the intelligent economy: Firstly, the data governance system is incomplete and the circulation of elements is not smooth. There are differences in data collection, storage, processing, and transmission standards among different departments, industries, and enterprises, and there is a lack of a unified and efficient data circulation platform, which makes it difficult to achieve data sharing and circulation. Moreover, the ambiguous definition of property rights for data elements, coupled with frequent risks such as data leakage and abuse. This leads to concerns about data sharing between businesses and individuals, with a large amount of data in a "dormant" state. Secondly, there is insufficient technological adaptation and the efficiency of data conversion is relatively low. The algorithm models and underlying architectures of core technologies such as artificial intelligence and big data still face bottleneck problems, with a high dependence on foreign technologies. Additionally, there is a shortage of composite talents who understand both data technology and industry applications, resulting in weak capabilities in processing, analyzing, and applying data elements, making it difficult to meet the needs of deep mining and efficient transformation of data elements. Thirdly, institutional safeguards are lagging behind and the market environment is not favorable. The laws and regulations concerning property rights protection, transaction rules, security supervision, privacy protection, and other aspects of data elements are still not sound. The traditional market supervision model is unable to cope with the new problems and challenges brought by the development of the intelligent economy, resulting in the coexistence of lagging supervision, excessive supervision, and supervision absence, which affects the stability of market order.

5 The Practical Path of Empowering Intelligent Economic Development with Data Elements

5.1 Improve the Data Governance System and Smooth the Channels for Element Circulation

The government should play a leading role, collaborate with industry organizations, enterprises and other entities to develop unified standards and specifications for data collection, storage, processing, transmission, security, etc., achieve the unification of data formats and mutual recognition of semantics, promote the sharing and circulation of data elements, in order to provide solid support for giving full play to the enabling effect of data elements on the intelligent economy. Government departments need to improve the data security guarantee system, strengthen the research and application of data security technologies, and establish a data security monitoring and early warning mechanism, emergency response mechanism and accountability mechanism to ensure the safe circulation and compliant use of data elements. It is necessary to accelerate the construction of a data circulation platform, integrate various data resources, improve data trading rules and processes, cultivate a mature data trading market, encourage the development of specialized data service institutions, provide supporting services such as property rights confirmation, pricing, evaluation, and notarization for data trading, improve the efficiency of data element circulation, and inject new momentum into promoting the training of artificial intelligence big models and the development of intelligent economy.

5.2 Strengthen Technological Innovation Support and Improve Data Conversion Efficiency

It is necessary to focus on core technology fields such as artificial intelligence, big data and cloud computing, increase investment in research and development, support enterprises, universities and research institutions to carry out joint research and development, break through the "bottleneck" problems of key core technologies, build an independent and controllable technology system, so as to provide technical support for giving full play to the driving role of data elements in the intelligent economy. Government departments need to be committed to optimizing the layout of computing power resources, accelerating the construction of national hub nodes of the national integrated computing power network, and enhancing the supply capacity and balance of computing power resources. At the same time, efforts should be made to strengthen the construction of new infrastructure such as 5G, data centers and cloud computing platforms,

improve the efficiency of data storage, processing and analysis, and thereby promote the high-quality development of the intelligent economy. Government departments can take the lead in establishing a collaborative education mechanism among universities, enterprises, and research institutions, encourage universities to optimize the settings of related majors such as data science and artificial intelligence, add interdisciplinary integration course modules, integrating real projects from enterprises and cutting-edge topics from research institutions into the teaching process, and support enterprises and universities to jointly build internship and training bases and joint laboratories, provide students with immersive practical scenarios to cultivate compound talents who not only master data technology but also are familiar with industry needs, and consolidate the talent foundation for the development of intelligent economy.

5.3 Improve the Institutional Guarantee Mechanism and Optimize the Development Environment

In the era of intelligent economy, it is necessary to revise and improve the existing laws and regulations, accelerate the formulation of specialized laws and regulations related to data elements, clarify the property rights ownership, trading rules, security supervision, privacy protection and other contents of data elements, increase law enforcement efforts against various illegal and irregular behaviors, and create a favorable development environment for giving full play to the promoting role of data elements in the intelligent economy. Not only that, it is necessary to establish a data element collaborative governance team composed of departments such as the Ministry of Industry and Information Technology, market supervision and other departments. On this basis, efforts should be made to promote policy formulation, standard unification, market supervision and other work in a coordinated manner, build an inter regional data element collaborative governance alliance, break down administrative barriers, promote cross regional data circulation and sharing, and accelerate the formation of a national integrated data element governance pattern. In addition, all regions should establish incentive mechanisms for the innovative application of data elements, and provide tax reductions, financial subsidies or credit support to enterprises that have achieved outstanding results in data element mining, technological innovation, and scenario application, so as to stimulate enterprises to fully explore the application value of data elements in the development of the intelligent economy.

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