Mechanism Innovation and Policy Optimization for Market-Based Allocation of Data Elements in the Digital Economy Era

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Abstract

In the digital economy era, data, as a new type of production factor, plays a key role in promoting economic and social development. However, in the process of market-based allocation of data elements, there are problems such as unclear rights confirmation, obstructed circulation, and lack of pricing mechanism. These problems lead to the inability to fully release the economic value of data resources. To this end, it is necessary to explore innovative paths for data rights confirmation, transaction circulation, pricing, and credit guarantee mechanisms. By building a standardized data trading platform and credit rating system, the openness and security of the data market can be enhanced. By improving policies and regulations and promoting technological progress, an efficient, standardized and orderly data element market can be built, so as to fully explore the value of data and comprehensively improve the efficiency of circulation.

Keywords

Digital Economy, Data Elements, Market-based Allocation, Mechanism Innovation, Policy Optimization

1. Introduction

With the rapid development of digital technology, data has gradually become a core element to promote economic and social innovation and development. In the digital economy era, realizing the market-based allocation of data elements is the key to improving industrial competitiveness and promoting high-quality economic development [1]. At present, the data element market faces problems such as unclear property rights, unsmooth circulation, and lack of pricing mechanism [1]. These problems hinder the full release of the value of data resources. Therefore, it is urgent to explore the establishment of a standardized and efficient data factor market allocation system from the perspective of mechanism innovation and policy optimization to achieve the rational flow and value maximization of data resources [2].

2. The Current Situation and Challenges of Data Factor Market Allocation in the Digital Economy Era

2.1 Analysis of the Current Situation of Data Factor Market Allocation

In the digital economy era, data is a core production factor, and its market allocation directly affects the process of high-quality economic development. At present, the market allocation of data factors is still in its early stages, and there are many problems that need to be solved. The unclear definition of data property rights is one of the main reasons for the poor circulation of data [3]. The unclear definition of data ownership, use and income rights makes the division of responsibilities in the process of data circulation confusing, and the transaction parties face greater legal risks. This situation of unclear property rights not only restricts data market transactions, but also reduces the liquidity and value realization of data resources.

The data trading market has developed slowly and lacks a scientific and reasonable pricing model. Unlike traditional factor markets, data is a virtual factor, and its price is affected by multiple factors such as supply and demand, data quality, and application purpose. The pricing system is complex and has not yet been unified. Due to the lack of a scientific evaluation mechanism, price distortions often occur in the data trading market, resulting in a significant increase in transaction costs and inefficient market-based resource allocation [4].

Data monopoly is becoming increasingly serious, especially in the data market dominated by Internet giants. Enterprises that control core data resources have strong bargaining power, while small and medium-sized enterprises are at a disadvantage in the market due to limited data access channels. Large Internet platforms use technical barriers, data aggregation effects and resource monopolies to exacerbate the imbalance in the data market. This data monopoly pattern is not only not conducive to market competition, but also hinders innovation and entrepreneurship, and inhibits the enthusiasm of small and medium-sized enterprises to participate in the data economy.

2.2 Main Challenges Facing the Market-based Allocation of Data Elements

In the process of promoting the market-based allocation of data elements, the problem of lagging legal supervision is very prominent [5]. The existing legal framework has deficiencies in data rights confirmation, data circulation and personal privacy protection, resulting in frequent data leakage and abuse in data trading activities. The lack of a unified

legal system increases the compliance costs of market entities and threatens the healthy and orderly development of the data market.

Weak technical foundation is another bottleneck affecting the efficiency of market-based data allocation. There are obvious differences in data standardization and interoperability, and the data formats and interface standards between platforms are not unified, which leads to compatibility issues when data is applied across platforms and fields. The lack of maturity of technologies such as data cleaning, labeling, and desensitization makes it difficult to ensure the privacy and security of data in the circulation link. These technical shortcomings restrict the rapid advancement of data marketization.

The uneven quality of data and the difficulty in ensuring credibility are key factors hindering the market-oriented configuration of data. The diverse sources of data and the lack of unified quality standards make it difficult to ensure the accuracy and reliability of data in analytical applications. Especially in the process of data value assessment, due to the lack of a comprehensive quality detection mechanism, some low-quality or even false data flow into the market, reducing the scientificity and reliability of data utilization.

3. Innovative Paths for the Market-based Allocation Mechanism of Data Elements

3.1 Data Property Rights Confirmation Mechanism

The primary task of the market-based allocation of data elements is to clarify data property rights and build a scientific and reasonable data property rights confirmation system. Since unclear data property rights often lead to transaction disputes, it is necessary to explore and formulate a legal framework for data property rights confirmation, clarify the rights and responsibilities of data use and benefits, and achieve a clear definition of data ownership. When building a property rights confirmation mechanism, it is necessary to distinguish between data ownership and use rights, and clarify the rights and obligations of individuals, enterprises and platforms in data use through legislation. For complex data assets, a variety of property rights confirmation models should be established, such as through contractual agreements, rights and interests division, to ensure the legal effect of data ownership. Establishing a data asset evaluation system is also the key to the innovation of the property rights confirmation mechanism. Data asset evaluation is affected by multiple factors such as data type, quality and use. It is necessary to introduce a scientific evaluation indicator system to improve the fairness and operability of property rights confirmation. Through a comprehensive evaluation of data assets, not only can the market value of data be clarified, but also the risk of disputes in transactions can be reduced and the efficiency of market resource allocation can be improved [6].

3.2 Data Transaction Circulation Mechanism

Establishing an efficient data transaction circulation mechanism is an important way to promote the market-oriented allocation of data. Data transaction standards and platforms should be constructed to promote the standardization of data circulation based on unified data formats, interfaces and transaction rules. In the process of platform construction, it is necessary to take into account the diversity of data, while ensuring the openness and interoperability of the platform to achieve smooth circulation of data between different platforms and industries.

The security of data transactions is crucial. It is necessary to improve data labeling and desensitization technology to prevent sensitive information from being leaked during data circulation. By introducing advanced encryption technology and privacy protection algorithms, personal privacy can be effectively protected during data circulation. In addition, it is necessary to formulate data use agreements and permission control mechanisms to prevent unauthorized data abuse and ensure that data transactions are carried out within a legal and safe scope.

3.3 Data Pricing Mechanism

A reasonable data pricing mechanism is one of the core links of data market-oriented allocation. Due to the multidimensional characteristics and complexity of data, traditional pricing methods are difficult to accurately reflect its value. Therefore, it is necessary to adopt a multi-party game model, comprehensively consider the supply and demand relationship, quality, application scenarios and market trends of data, and build a scientific and flexible dynamic pricing system. In the multi-party game model, a comprehensive assessment is conducted based on the willingness of both parties to the transaction and the market situation to achieve real-time adjustment of data prices and avoid unreasonable pricing distortions.

To ensure the fairness and transparency of data transactions, blockchain technology can be used to achieve full traceability and non-tamperability of data transactions. With the help of blockchain technology, each link of data transactions is encrypted and recorded to ensure the authenticity and reliability of the data flow process. This decentralized technical means can enhance transaction trust, prevent transaction disputes, and provide technical support for the healthy development of the data factor market.

3.4 Credit Guarantee Mechanism of the Data Factor Market

In the process of market-oriented data allocation, credit issues directly affect the stability of market operation. It is crucial to build a scientific and complete data market credit evaluation system. By credit rating the data transaction behavior of market entities, transaction security and market transparency can be improved. When building a credit

system, a comprehensive credit assessment of the transaction parties should be conducted in combination with historical transaction records, compliance operations and market feedback, and a dynamic and real-time updated credit file should be established.

Strengthening data compliance review and credit risk management is also the key to the construction of a credit mechanism. By establishing compliance review standards and credit risk early warning mechanisms, potential risks in data transactions can be identified and eliminated in a timely manner. The establishment of a credit guarantee fund and a dispute mediation mechanism will help to quickly provide compensation and mediation when transaction disputes occur, thereby reducing the systemic risks of market operations.

4. International Experience in Market-based Allocation of Data Elements

4.1 Data Market-based Mechanisms in Developed Countries in Europe and America

Developed countries in Europe and America have accumulated rich experience in market-based allocation of data elements and formed relatively mature mechanisms. Taking the United States as an example, its data market-based allocation mainly adopts a market-led model, promoting the market-based circulation of data through data trading platforms and enterprise-independent trading structures. As an important commercial asset, data is widely used in finance, retail, technology and other industries. American companies focus on the market-based operation of data transactions, achieve transaction matching through data platforms, and have a high degree of data assetization. Platforms such as Dawex and Snowflake have promoted the sharing and commercialization of data and improved the convenience and standardization of data transactions.

In the process of market-based allocation of data, the United States attaches importance to platform development and has formulated unified data standards and interface protocols to ensure data interoperability between different industries and systems. Large Internet platforms such as Amazon and Google not only integrate data through platform strategies, but also actively expand data trading businesses and build a huge data market ecosystem. At the same time, the United States continues to improve data rights confirmation legislation to ensure that data transactions are carried out safely within the legal framework.

The EU places more emphasis on data rights confirmation and the construction of privacy protection mechanisms. As a leading region in global data protection, the EU has promulgated the General Data Protection Regulation, which clarifies the data subject's right to know, right to delete and right to data portability, and regulates data transactions and data processing behaviors. In data transactions, the EU pays attention to the simultaneous implementation of user data privacy protection and data rights confirmation, and has established a dual system with legal protection and platform supervision as the core. Under the constraints of GDPR, data trading platforms must strictly implement data anonymization and desensitization to ensure the legality and security of data transactions.

4.2 Marketization Practices of Data Elements in Major Asian Countries

Among Asian countries, China, South Korea and Japan have their own characteristics in the marketization of data elements. Relying on the innovative practices of data trading platforms and data exchanges, China has gradually built a multi-level data market structure. Represented by the Guiyang Big Data Exchange and the Shanghai Data Exchange, these platforms not only carry out data product transactions, but also pay attention to technical support for data pricing, rights confirmation and privacy protection. At the policy level, China has accelerated the top-level design of the marketization of data elements, issued the Data Security Law and the Personal Information Protection Law, and clarified data ownership and transaction details.

Japan and South Korea use government guidance and enterprise cooperation as the main promotion methods. The government actively promotes data marketization allocation policies and encourages enterprises to participate in data sharing and open platform construction. The Japanese government supports enterprises to build big data analysis platforms to promote the integration of manufacturing and data technology. South Korea promotes data interconnection and interoperability among enterprises through government-led data openness plans. South Korea also uses the "Smart Government" plan and the "Three-Year Strategy for Data Economy" to further promote data circulation and form a data marketization model of government-enterprise cooperation.

4.3 Reference and Inspiration from International Experience

The experience of European, American and Asian countries in the practice of data marketization allocation is of great reference significance to my country. Regulations first and mechanism guarantee are the key prerequisites for data marketization allocation. Whether it is data transactions in the United States or data privacy protection in the European Union, they all rely on a sound legal framework. Clarifying data ownership and transaction rules through legislation will help improve market transparency and lay a legal foundation for data circulation.

Relying on platform innovation and technology-driven is the core means to improve the efficiency of data market allocation. The United States and China have achieved remarkable results in data platform construction and have improved data circulation efficiency by building a unified trading platform. Especially driven by blockchain and big data analysis technology, the credibility and transparency of platform transactions have been greatly improved.

Establishing a credit evaluation and risk prevention and control mechanism can effectively reduce the potential risks in the data trading market. Drawing on the experience of credit system construction in Europe and the United States, through credit rating and risk monitoring, it is possible to timely detect violations and data leakage risks in data transactions and maintain the stable and orderly operation of the market.

5. Policy Optimization Suggestions for the Market-oriented Allocation of Data Elements in the Digital Economy Era

5.1 Legal Policy Support

In the digital economy era, legal protection is crucial for the market-oriented allocation of data elements. Clarifying the laws and regulations on the confirmation and circulation of data elements is the basis for realizing the market-oriented allocation of data. Since data is easy to copy and spread, it is difficult for traditional property law to effectively regulate it. Therefore, it is necessary to define data property rights from a legal perspective, including data ownership, use rights, income rights, and management rights. By clarifying the ownership and profit distribution in data transactions through legislation, transaction disputes and circulation risks can be significantly reduced.

Establishing a national data transaction management system is crucial to maintaining market order. In this process, the access review, operation management and risk control of the data transaction market should be strengthened to prevent monopoly and unfair competition. The management system should cover data asset evaluation specifications, transaction risk control and illegal punishment measures to ensure that market transactions are carried out in accordance with the law. Local governments should also carry out pilot reforms on the market-oriented allocation of data in light of regional characteristics to form a legal and policy system that is linked and promoted in a coordinated manner.

5.2 Technological Innovation Support

Technological innovation is the core driving force for promoting the market-oriented allocation of data elements. Promoting data standardization and the construction of open sharing platforms is the key to breaking data silos and eliminating circulation barriers. By formulating unified data formats, interface specifications and metadata standards, the interoperability of data between different industries and platforms can be improved. Vigorously promote the construction of a national data open platform, promote the orderly sharing of government data, enterprise data and public data, and further release the vitality of the data market.

Promoting the research and development of data security technology is also an important direction for policy optimization. Data security is related to the trust of market entities and the stability of market mechanisms. The research and development of independent and controllable data encryption, desensitization and traceability technologies should be accelerated to ensure the integrity and confidentiality of transaction data. Using blockchain technology to build a full-process traceability system for data transactions can effectively prevent data tampering and leakage. In terms of technical application, we should also explore the role of artificial intelligence in data quality assessment, privacy protection and compliance inspection, and consolidate the foundation of market-oriented allocation through technical means.

5.3 Improvement of Market Mechanisms

We should vigorously promote the construction of a multi-level data trading market and build a data trading network including national, provincial and local levels. In the national data trading market, we should focus on promoting cross-regional data interconnection and interoperability to form a unified data element circulation market. Local trading markets can rely on regional characteristic data resources to create professional and distinctive trading platforms and improve the digital level of regional economy.

Guiding social capital to invest in the construction of infrastructure for data marketization allocation can effectively solve the problem of insufficient funds for platform construction. At the policy level, special fund support policies should be introduced to support the construction of infrastructure such as data trading platforms, data storage centers and data service networks. Social capital is encouraged to participate in the technology development and platform operation of data marketization allocation through the PPP (government and social capital cooperation) model to form a diversified investment model.

5.4 Credit System Construction

In the process of data marketization allocation, the construction of a credit system is crucial to ensure the security of market transactions. Improving the credit evaluation system of data market entities can improve market integrity and transparency. When building a credit system, the credit score, data transaction history and violation record of the transaction entity should be comprehensively evaluated. Credit evaluation not only requires government supervision, but also the introduction of third-party credit service agencies to ensure the independence and fairness of credit data.

Establishing a cross-departmental collaborative data transaction risk management model can effectively respond to market risks. In practice, a management system that coordinates market supervision departments, industry associations and data trading platforms should be established. By real-time monitoring of data transaction dynamics and abnormal transaction behaviors, timely risk warnings can be issued to prevent market fluctuations caused by data quality issues

and illegal transactions. At the same time, a rapid resolution mechanism for data disputes should be established to mediate and arbitrate transaction disputes and data infringement incidents in a timely manner to reduce market operation costs and credit risks.

6. Conclusion

In the era of digital economy, the market-oriented allocation of data elements is the key driving force for promoting high-quality economic development. At present, the market-oriented allocation of data still faces problems such as unclear property rights, obstructed circulation, imperfect pricing mechanism and lack of market credit. Drawing on the successful experience of European, American and Asian countries, optimizing from the aspects of legal policies, technological innovation, market mechanisms and credit systems is an effective way to improve the efficiency of market-oriented allocation of data. By improving the data confirmation mechanism, building an efficient trading platform, promoting scientific pricing and improving the credit guarantee system, the rational flow and efficient allocation of data resources can be achieved, further releasing the potential and driving force for the development of the digital economy.

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