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Real-World Dilemmas and Implementation Pathways of Data-Asset Financing

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Abstract: With the further advancement of the market-oriented reform for data factor allocation and the official implementation of the Interim Provisions on the Accounting Treatment of Enterprise Data Resources, the practice of data-asset recording-on-balance-sheet and financing has developed rapidly. As a vital financial innovation to unlock the value of data factors and broaden corporate financing channels, data-asset financing has formed a pilot pattern covering multiple industries and regions across China. Nevertheless, data-asset financing is still in its initial exploration stage driven by policies. It is confronted with practical dilemmas including ambiguous legal ownership, difficulties in value evaluation, single financing modes, imbalanced market structure, and poor risk disposal channels. On the basis of sorting out its development status and practical motivations, this paper systematically analyzes the underlying causes of the above-mentioned dilemmas. From four dimensions: improving legal systems, constructing evaluation systems, promoting balanced development of market ecology, and perfecting risk-prevention-and-control mechanisms, it puts forward implementation pathways, so as to provide references for the standardized and large-scale development of data-asset financing.

Keywords: Data assets; Pledge-based financing; Data factors; Value evaluation; Financing modes

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1. Introduction

As a key production factor in the digital-economy era, value realization and capitalized allocation of data have become critical issues for high-quality economic development. In January 2024, the Interim Provisions on the Accounting Treatment of Enterprise Data Resources came into force, marking "the first year of recording data assets on corporate balance sheets" [1]. Existing studies on data-asset financing mainly focus on three aspects: first, the accounting treatment and value recognition of book-recorded data assets; second, the mode and process design of data-asset pledge financing; third, the risk and regulatory framework of data-asset financing. In general, most existing research focuses on interpreting individual cases and institutional provisions. There is a lack of integrated analysis of systematic dilemmas and deep-seated causes of data-asset financing, and

discussions on multi-dimensional collaborative solutions from institutional, market, institutional-actor, and corporate perspectives remain insufficient.

Nevertheless, China's data-asset financing is still at an early stage, characterized by scattered individual cases and limited overall scale. Its development is largely policy-driven with insufficient endogenous market impetus. Significant differences exist between data assets and traditional physical as well as intangible assets in terms of legal ownership, value evaluation, and risk management, bringing a series of deep-rooted institutional and market barriers. How to break through these practical dilemmas and build a standardized and sustainable data-asset financing system has become a key problem to be solved urgently for the market-oriented construction of data factors.

2. Development status and practical motivations of data-asset financing

2.1. Policy-driven rapid development

The vigorous growth of China's data-asset financing benefits from strong top-level institutional design. Released in December 2022, the "Twenty Measures for Data" innovatively put forward the property-right framework of "three-right separation," namely data resource holding right, processing-and-usage right, and product operation right, laying an institutional foundation for data right confirmation and circulation. In December 2023, the National Data Bureau together with 16 other ministries and commissions issued the Three-Year Action Plan for "Data Factor ×" (2024–2026). It explicitly proposes to "explore diversified investment-and-financing models in a legal and compliant manner" and lists "Data Factor × Financial Services" as a priority action.

Since 2024, local governments have responded actively. Beijing, Shanghai, Zhejiang, Guangdong, Shandong and other regions have rolled out supporting policies to realize the first pilot cases of data-asset financing. In terms of geographical distribution, Shandong Province ranks first nationwide with 18 enterprises obtaining financing, followed by Zhejiang (11 enterprises) and Guangdong (9 enterprises). Central-western provinces including Hubei, Sichuan, and Guizhou have also quickened their pace, forming a nationwide pilot landscape [1,2].

2.2. Dual empowerment of market demand and technical support

From the perspective of market demand, book-recording of data assets addresses the long-standing problem of accounting recognition for enterprises' data resources, yet it cannot directly solve the problem of market pricing. For science- and technology-oriented small-and-medium-sized enterprises (SMEs), the shortage of traditional collateral such as land and factory buildings often blocks their access to bank credit. Data-asset book-recording and financing open up new financing channels for such "asset-light yet data-rich" enterprises and effectively ease their financing constraints. For financial institutions, data-asset financing represents an emerging business area, which expands incremental markets and profit space and facilitates the innovation and upgrading of financial products and service modes [3].

From the perspective of technical support, the integrated application of cutting-edge technologies including blockchain, big data, and artificial intelligence provides a secure and credible technical environment for the confirmation, evaluation, transaction, and financing of data assets. Blockchain technology enables traceability over the whole process of data source, processing, and circulation, and smart contracts reduce risks of human intervention. The improvement of local data trading venues also provides market-oriented platforms for listing, circulation and financing matching of data assets.

2.3. Preliminary diversified exploration of financing modes

Currently, China's data-asset financing mainly takes the forms of pledge-based loans and non-pledge credit-enhanced loans. In October 2022, Bank of Beijing granted the nation's first data-asset-pledged loan of RMB 10 million against atmospheric environmental monitoring data of Rockaohua Technology Group. In March 2023, Shenzhen Weiyan Technology obtained RMB 10 million of the country's first non-pledge data-asset credit-enhanced loan with its data trading subject listed on Shenzhen Data Exchange.

Meanwhile, innovative modes such as data-asset securitization and data trusts are under active exploration. In July 2023, Hangzhou Gaoxin Jintou Holding Group issued China's first data-intellectual-property-oriented directional asset-backed notes, with 145 intellectual-property rights from 12 enterprises as underlying assets, at an issuance amount of RMB 102 million and a coupon rate of 2.80%. In the same month, China Southern Power Grid Guangxi Branch completed the registration of China's first data trust product. The Xi'an Beilin University Digital-Asset Insurance Innovation Center also launched the first domestic digital-asset insurance business.

3. Practical dilemmas faced by data-asset financing

3.1. Ambiguous legal ownership and deficient right-confirmation and registration system

The legal definition of data asset ownership serves as the prerequisite and foundation for financing, whereas dual constraints persist in this link. On the one hand, although the "three-right separation" framework distinguishes data resource holding right, processing-and-usage right, and product operation right at the policy level, there is a lack of high-level national laws to clearly define the connotation, boundary, and interrelationship of the three rights, leaving no solid legal basis for data right confirmation. Data of different categories follow vastly different right-confirmation logics and involve multiple parties in collection, processing, circulation, and usage with intricate interest relationships. Coupled with data's features of replicability, tamper-ability, and easy dissemination, ownership tracing and infringement identification become extremely difficult.

On the other hand, fragmented practices prevail in local data right-confirmation. Certificates issued by provincial-municipal authorities and data exchanges vary in names, criteria, and competent issuing departments, without unified standards or mutual-recognition mechanisms. Such fragmentation undermines the authority and credibility of certificates, which are poorly recognized by banks and other financial institutions. Compared with European and American jurisdictions that mainly regulate data usage through contract law, intellectual-property law and data governance rules, China's innovative attempts encounter more practical obstacles. Ambiguous ownership exposes financial institutions to potential infringement risks when disposing of default-pledged data assets, further reinforcing their prudent attitude.

3.2. Methodological dilemmas in value evaluation

Value evaluation constitutes the core of pricing for data-asset financing, yet mature and fair evaluation standard systems have not been established. Cost approach, income approach, and market approach have been adopted in practice, while all suffer from prominent limitations. Under the cost approach, costs of data assets are weakly correlated with their value; inputs in data collection, cleaning, and labeling cannot fully reflect potential benefits. Under the income approach, earnings of data assets are highly dependent on specific application scenarios and business modes, bringing enormous uncertainties to future income forecasting. For the market approach, active data-trading markets with high transparency are absent, resulting in insufficient comparable

transaction cases.

A deeper challenge lies in the dynamic volatility of data-asset value. Data assets are characterized by "one value for one scenario" and high timeliness. The same dataset differs greatly in value across business scenarios and may depreciate rapidly over time. Without repeated market transactions for price discovery or deterministic cash flows derived from specific contracts for valuation, static evaluation can hardly capture real value, creating huge challenges for value re-evaluation in banks' post-loan management. Take Lianxin Technology as an example: its data-asset portfolio was valued at RMB 365 million, which heavily relies on income forecasts under specific psychological-service scenarios. If model iteration or scenario changes occur, the valuation may fluctuate drastically, and its sustainability awaits market tests [4].

3.3. Single financing mode and structural imbalance of the market

Data-asset financing is characterized by an obvious single-mode feature. Almost all of the over 80 data-asset-financing cases since 2024 are debt financing dominated by data-asset pledge loans provided solely by commercial banks [3]. Essentially, bank debt financing follows traditional lending relationships with relatively short maturities, high capital costs, and heavy repayment pressure, and can hardly satisfy long-term and stable capital demands for data-asset development. Innovative financing instruments such as data-asset securitization and data trusts lag behind, and enterprises cannot obtain diversified capital from non-bank financial institutions and capital markets.

At the same time, severe structural imbalance exists among market participants. Driven by local governments, state-owned enterprises account for a large proportion of financing recipients while private enterprises are relatively few. State-owned enterprises and urban investment companies possess abundant public-data and government-data resources with high-density value, and their data assets are more likely to become valid collateral accepted by financial institutions after compliant right-confirmation and quality assessment. In contrast, numerous private SMEs own rich data resources and strong innovation vitality, yet they can barely obtain financing support due to weak risk-bearing capacity, poor data-governance foundations, and absence of government credit endorsement. Such imbalance distorts resource allocation, dampens the innovation vitality of tech-oriented SMEs, and deviates from the original intention of data-asset financing to serve the real economy. Geographically, eastern regions take the lead while central-western regions catch up. Concentrated cases in Shandong, Zhejiang, Guangdong, and other provinces may further widen the regional digital divide [2].

3.4. Financial risks and disposal predicaments triggered by unique attributes

Intrinsic attributes of data assets bring unprecedented risk-control challenges for financial institutions. First comes asset-security risk: due to the replicability and non-exclusiveness of data, enterprises can still use, back up, or even repeatedly pledge data assets after pledging them, which banks can hardly monitor, thus greatly weakening the effectiveness of guarantees. Meanwhile, data may be tampered with or forged, impairing its authenticity and value stability.

Second is value risk. Without mature evaluation standards and market references, current evaluations may deviate substantially from real value, leading to hidden dangers of over-valuation and accumulation of systemic risks. The value of data assets may suffer rapid and unpredictable depreciation affected by technological iteration, policy shifts, and changes in market demand [3].

The most intractable problem lies in asset disposal upon default: banks lack effective exit channels. By the end of 2023, there were 65 data-trading venues nationwide. Even Shenzhen Data Exchange, with the largest trading volume, only achieved cumulative turnover of RMB 6.5 billion, and most exchanges face operational difficulties. The non-standardized nature of data assets complicates auction and transfer, making it difficult for banks to recover creditors' rights through disposing of pledged assets. In addition, some enterprises prioritize the publicity effect brought by data-asset financing over in-depth development and management of data assets themselves. Consequently, poor quality and unstable value of data assets undermine their credibility as financing tools and may even give rise to false market prosperity.

4. Implementation pathways for data-asset financing

4.1. Improving legal regimes and unifying the right-confirmation & registration system

To break institutional bottlenecks of data-asset financing, top-level design should be optimized as a priority. At the national level, special legislation on data-asset financing shall be accelerated to clarify the legal status, ownership boundaries, financing principles, operational procedures, and risk-prevention requirements of data assets, providing clear legal grounds for financial institutions [1]. Based on the "three-right separation" framework, high-level laws should specify the connotation, acquisition approaches, circulation rules, and protection scope of data resource holding right, processing-and-usage right, and product operation right to eliminate ownership ambiguities [2].

Moreover, a nationwide unified registration system for data-asset right-confirmation shall be established to resolve fragmentation caused by divergent standards and multiple competent departments. A special registration agency can be set up, or services can be built upon national-level data-trading platforms to realize unified registration standards, certificate mutual recognition, and information sharing, so as to enhance the authority of right-confirmation outcomes recognized by financial institutions. In addition, regulatory authorities, responsibilities, and approaches for data-asset financing shall be defined to guarantee effective supervision and standardized market development.

4.2. Constructing scientific and standardized value-evaluation systems

Targeting methodological dilemmas in value evaluation, evaluation standard systems matching characteristics of data assets should be formulated. Competent administrative authorities, China Appraisal Society and data-trading venues shall jointly compile evaluation guidelines for data assets, specifying applicable evaluation approaches, parameter selection and disclosure requirements for different types of data assets to reduce subjectivity and arbitrariness in evaluation.

Considering the scenario-dependence and dynamic volatility of data-asset value, composite valuation models combining income approach and market approach shall be promoted. Evaluations should be scenario-oriented, time-sensitive, and traceable to avoid limitations of single approaches. Meanwhile, professional institutions and talent teams specialized in data-asset evaluation shall be fostered, and expert review mechanisms shall be set up. Technologies including blockchain and artificial intelligence can be adopted to realize full-process traceability of data source, processing, and circulation and provide objective foundations for valuation. Dynamic monitoring and re-evaluation mechanisms for data-asset value shall be explored; value re-evaluation shall be initiated when material changes take place in market prices, application scenarios, or technologies to support banks' post-loan management.

4.3. Promoting diversified financing modes and balanced market-ecology development

To change the current single pattern dominated by bank debt financing, a multi-level and diversified instrument system for data-asset financing should be constructed. While further developing pledge-based loans and non-pledge credit-enhanced loans, efforts shall be made to advance long-term financing instruments including data-asset securitization, data trusts, data insurance, data-asset financial leasing and data-asset bonds. Non-bank financial institutions, private-equity funds, venture-capital institutions, insurance companies and securities firms shall be encouraged to participate in data-asset financing, providing differentiated capital support for different phases of data-assetization and advancing market diversification.

In terms of market-structure optimization, local governments should reduce direct intervention in financing entities. Instead, fair financing environments for all types of enterprises shall be created by perfecting laws, optimizing business environments, and delivering public services. More support shall be provided for private tech-oriented SMEs in data-asset financing. Policy tools such as risk-compensation funds, fiscal interest discounts and tax incentives can mitigate risks and costs for financial institutions serving SMEs and stimulate innovation vitality of data-factor markets. Meanwhile, coordinated development of data-asset financing across eastern, central and western regions shall be promoted, and central-western regions are encouraged to explore differentiated paths based on local industrial features and resource endowments.

4.4. Perfecting risk-prevention-and-control mechanisms and asset-disposal channels

Facing risk challenges brought by unique attributes of data assets, financial institutions shall build risk-management systems adapting to data-asset characteristics. In pre-loan investigation, examination of the legality, compliance, and quality of data sources shall be strengthened. Third-party professional bodies including law firms, accounting firms and data-security assessment institutions shall be introduced to form multi-party risk-mitigation mechanisms. In mid-loan monitoring, blockchain smart contracts can be used to monitor the usage and track value dynamics of pledged data assets. Early-warning thresholds for value fluctuation shall be set to adjust pledge rates or require supplementary credit enhancement in a timely manner.

In post-loan disposal, mature and active data-trading markets are essential. Functions of data-trading venues shall be improved to facilitate standardized listing, auction, and negotiated transfer of data assets and establish special disposal channels and mechanisms. Meanwhile, risk-sharing tools such as data insurance and credit guarantees can be explored to reduce risk exposure of financial institutions. Pre-set default-disposal plans shall be included in financing contracts, clarifying liquidation paths of data assets and rules for residual-value return.

For enterprises themselves, they should abandon the short-sighted behavior of “valuing financing over construction.” Data-asset financing shall be deeply integrated with business innovation. Enterprises shall strengthen data governance, improve data quality, and expand application scenarios to continuously enhance the real value of data assets.

5. Conclusion

Data-asset financing is a vital financial innovation in the market-oriented reform of data factors. It plays a significant role in revitalizing corporate data resources, broadening financing channels, and deepening integration between the digital economy and the real economy. Despite positive progress and a multi-industry, multi-regional pilot pattern, China’s data-asset financing is still in the preliminary exploration phase, confronted

with deep-rooted dilemmas including ambiguous legal ownership, value-evaluation obstacles, single financing modes, market-structure imbalance and poor risk-disposal channels. Breakthroughs to such dilemmas require collaborative and systematic promotion among governments, financial institutions, data-trading venues and enterprises rather than single stakeholders. With continuous improvement of legal systems, evaluation standards, market ecology and risk-control mechanisms, data-asset financing will develop in a standardized and large-scale way and inject robust financial impetus into the high-quality development of China's digital economy.

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