

# Theoretical and Practical Research on the Recognition of Enterprise Data Element Assets

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**Abstract.** With the rapid development of digital economy, as a new core factor of production, the economic value and importance of data elements have become increasingly prominent, playing a key role in promoting economic growth, enhancing the competitiveness of enterprises and optimizing the allocation of resources. However, the economic characteristics of data elements make the identification of assets face many challenges, including the vague definition of property rights and the difficulty of value evaluation. In the context of the marketization of data elements, this paper analyzes the economic characteristics of data elements and combines with the reality of China to provide a theoretical framework and practical path for enterprises to construct the identification and confirmation of enterprise data elements assets. Starting from the theoretical basis of data element asset identification, this paper analyzes the development status and challenges of data element asset identification in China by combining qualitative analysis with quantitative analysis, and explores possible coping strategies, which provides a reference for building a scientific and rational data element asset identification system and a practical path for enterprises to identify data element assets.

**Keywords:** data elements, data assets, digitalization.

## 1. Introduction

The current wave of global scientific and technological revolution has ushered in a new era dominated by digitalization and intellectualization [1]. Under the background of the rapid development of digital economy, data has become a key factor of production, and its capitalization process is reshaping the enterprise value evaluation and management system. According to the White Paper on Global Digital Economy of China Academy of Information and Communications, the global digital economy will reach 41.4 trillion US dollars in 2022, accounting for 46.1% of GDP. Among them, the scale of China's digital economy is 7.5 trillion US dollars, ranking second in the world [2]. With the publication of the Twenty Articles of Data (2022) and other documents, China has taken the lead in bringing data elements into the scope of market-oriented allocation reform [3]. Various metaphors have been used to emphasize the importance and value of data as a critical resource for a company, with some equating the importance of data to the importance of human and financial resources [4]. Enterprises are seeking to use their data assets to create new value and gain competitive advantage, and the identification of enterprise data element assets has become the core challenge of theoretical exploration and industrial practice [5].

## 2. The Theoretical Foundation of Enterprise Data Element Assets

### 2.1. The Concept of Data Element Assets

Data elements refer to computer data and its derivative forms that are aggregated, processed, and refined based on specific production requirements. In accordance with the policy orientation proposed by the Fourth Plenary Session of the 19th CPC Central Committee that "data is incorporated as a factor of production" and the fundamental definition of factors of production, data elements refer to data assets capable of participating in social production and business activities, thereby creating economic value for their owners or users. Consequently, the concept of "data elements" represents a

specific characterisation of "data" within the context of the digital economy, viewed from the perspective of productive forces and relations of production. Its core lies in emphasising the pivotal role of data in value creation.

## **2.2. Economic Characteristics of Data Elements**

The recognition of enterprise data element assets is inseparable from the economic value derived from data elements, which is influenced by their economic characteristics. Consequently, rational asset recognition based on the economic characteristics of data elements is particularly crucial.

### **2.2.1 Non-Rivalry of Data**

Among data's numerous properties, non-rivalry signifies that data can be infinitely replicated and utilised without depletion. This economic characteristic, where any organisation may employ identical data, significantly influences its economic value [6]. Whilst this characteristic significantly promotes digital economic development, such as reducing operational costs through economies of scale, optimising resource allocation efficiency, and driving deep integration between traditional industries and digital technologies, it simultaneously introduces challenges. These include ambiguous data property rights and incomplete methods for rights distribution, rendering ownership confirmation, benefit allocation, and value assessment increasingly complex during the market-based allocation of data elements. This complexity partially constrains the release of data elements' potential. Reasonable recognition of data assets as economic factors can enhance the positive impact of data's non-rivalrous nature.

### **2.2.2 Non-exclusivity of data elements**

According to the standard definition of economics, non-excludability means that an item cannot exclude potential users from its service without cost. Specific to data elements, although at the legal and technical level, enterprises or organizations can claim rights through a series of means, such as setting access rights, implementing encryption protection, signing confidentiality agreements and other methods, to a certain extent, to construct the exclusiveness of data, so that it can only be used by authorized users, thus reflecting the characteristics of some private goods. However, in a practical environment, there are still significant challenges to achieving full exclusivity. The essential nature of data determines its non-exclusive tendency: as a digital asset, data can be copied at low cost, efficiently and indefinitely, and each copy does not impair the integrity and availability of the original data. This near-zero marginal cost of replication and dissemination capability makes it easy for data to break away from the management scope of the original controller and spread rapidly to multiple subjects and platforms once it is leaked or actively disclosed without authorization. In this case, even if the original subject of rights intends to recover or restrict the use, it is often difficult to effectively prevent third parties from continuing to acquire, use or even re-disseminate these data because of the high cost of traceability, limited technical means and the difficulty of law enforcement. Therefore, although data can be endowed with exclusive attributes under certain institutional and technical frameworks, its inherent non-exclusive characteristics are still particularly evident in the actual circulation and use process.

### **2.2.3 The scarcity of data elements**

From the perspective of property rights theory, the scarcity of data elements presents a dual structure completely different from that of traditional production factors, namely "natural scarcity" and "institutional scarcity". They not only constitute the economic basis for the definition of data property rights, but also affect the way to realize the value of data elements.

Natural scarcity does not refer to the limited physical amount of data, but to the limitation of high-quality and high-value data in the process of acquisition and formation [7]. This kind of scarcity is due to the scenario-dependent and real-time constraints of data generation, such as the natural upper limit of the amount of data generated by specific user behavior or device operation in unit time. In addition, the unique data resources formed by some subjects through long-term business

accumulation, such as the real road condition data of automatic driving, have irreplaceable value because of their scale and scene exclusivity, forming a de facto "source scarcity" and "quality scarcity". According to property rights economics, the emergence of property rights first comes from the relative scarcity of resources. This kind of scarcity is reflected in the high cost and limited access opportunities in the process of data formation, especially the exclusive data resources formed by some subjects through long-term accumulation, such as social relationship maps, which have the inherent demand of property rights definition because of their uniqueness and scale.

However, if we only rely on natural scarcity, it is still difficult to establish an effective property right structure because of its non-exclusiveness and non-loss of replication. The more important source of scarcity of data elements is institutional scarcity. Specifically, due to the significant value creation ability of data elements, data holders often take strict confidentiality measures before the expected benefits are fully realized, thus artificially creating the scarcity of data elements [8]. The institutional scarcity of data is to construct exclusivity artificially through law, technology and contract, so as to establish the basic framework of property rights. At the legal level, intellectual property system and compliance system endow data with legal ownership status. At the technical level, access control, encryption algorithms and other technical measures constitute a de facto exclusive mechanism to strengthen the control ability of the main body of property rights. At the commercial level, contracts and agreements further clarify the use of boundaries and conditions for re-transfer, forming the transfer of property rights.

Through the establishment of a standardized data element asset identification system, the data ownership relationship is first clarified, and the data circulation barriers caused by vague property rights are effectively reduced. The value evaluation standard makes the data value more explicit and reduces the information asymmetry.

### **2.3. The Necessity of Corporate Data Asset Recognition**

With the rapid advancement of the digital economy, data serves as a core production factor. Its recognition as an asset holds significant importance for enterprises: firstly, incorporating data assets into balance sheets enhances financial transparency and accurately reflects corporate value; secondly, clear data asset recognition optimises resource allocation, providing new financing bases for enterprises, such as collateral or securitisation, while aiding data development investment decisions. Furthermore, standardised asset recognition forms the foundation for the market circulation of data elements, facilitating transactions and sharing to foster the maturation of data element markets. Finally, data assetisation systematically enhances enterprises' management capabilities over data resources, fully unlocks data value, drives digital transformation, and strengthens market competitiveness. Consequently, recognising data elements as assets represents not merely an inevitable trend in accounting practices, but a core measure for enterprises to maximise data value and adapt to the digital economy era.

### **2.4. Current Status of Enterprise Data Element Asset Recognition**

According to mid-year reports for 2024, 55 listed companies on the A-share market disclosed data assets totalling RMB 4.193 billion. Of this amount, 74.5% was categorised as "intangible assets", 21.8% as "development expenditure", and 3.7% as "inventory". By industry, computer and communications sectors accounted for the highest proportion, while traditional industries such as machinery and equipment rose to second place, indicating accelerated penetration of data elements into traditional sectors. Regarding dynamic changes, the number of companies disclosing data assets in interim reports increased by 38% compared to quarterly reports, while the total value surged 52-fold, reflecting a significant rise in corporate recognition of data asset value [9]. However, 2024 annual report data shows that although the number of disclosing companies rose to 100, the total value declined to RMB 2.164 billion, with 63.57% recorded under "intangible assets". This discrepancy may stem from interim reports incorporating one-off recognitions of substantial development expenditures, whereas annual reports prioritise routine accounting treatment. By sector,

information technology services and manufacturing remain dominant, though the financial sector stands out notably, with nine banks and securities firms completing data resource recognition [10].

In the 2024 interim reports of listed companies, prominent enterprises across various sectors disclosed substantive progress in recognising data assets. The highest proportion of data assetisation occurred among information technology and software service providers. Shanghai Steel Union's subsidiary, Gangyin E-commerce, successfully recognised accumulated steel market data as intangible assets after allocating compliance costs, subsequently incorporating them into financial statements. Aerospace Hongtu leveraged its self-developed PIE-Engine platform to recognise remote sensing imagery, processing algorithms, and model data as data assets. Zhuochuang Information achieved recognition through its long-term database of commodity prices and supply-demand data, while Shandong Dadiwei recognised anonymised models and analytical data from government affairs and medical insurance sectors as assets. Telecommunications operators followed as the next largest sector in data asset recognition. China Mobile emphasised in its interim report that it has achieved "internal and external value empowerment" through data. Financial institutions hold a significant share based on financial transaction and credit risk data. Shenzhen Ruijie recognised its accumulated engineering project evaluation data as data assets. Several banks and securities firms, such as Pudong Development Bank and Industrial Bank, have completed their first data asset recognition operations at the group or subsidiary level.

### **3. Development and Challenges in Recognising Enterprise Data Element Assets**

China's practice in the identification of data element assets is as follows. In December 2022, the Central Committee of the Communist Party of China and the State Council issued the Opinions on Building a Data Infrastructure System to Better Play the Role of Data Elements, which for the first time proposed the establishment of a structural separation and operation mechanism of data property rights, and explicitly called for the exploration of supporting systems such as registration, evaluation and trading of data property rights, laying a policy foundation for data capitalization. In August 2023, the Ministry of Finance formulated and issued the Interim Provisions on Accounting Treatment of Enterprise Data Resources. This regulation specifies that data resources acquired and developed by enterprises through legal compliance can be recognized as "intangible assets" and included in the balance sheet when relevant conditions are met, and specifies in detail the recognition conditions, measurement methods and disclosure requirements of data resources.

However, according to the current situation of data element asset identification in the annual report of China's A-share listed companies in 2024, we can see that data element asset identification still faces many challenges. First of all, the proportion of disclosure scale is low, accounting for only 2% of the total number of listed companies, and the market reaction differentiation is obvious: the listed companies get positive feedback, while the undisclosed companies bear investors' doubts. Secondly, the industry generally has the problem of valuation difficulties, and the difference between the total amount disclosed in the interim report and the annual report is similar to the total amount disclosed in the annual report, which is quite different. In addition, there is a problem of different accounting treatment, only 63.57% of which is included in "intangible assets". Finally, inadequate information disclosure is also a problem today, which restricts the healthy development of the data factor market. From the perspective of property rights theory, inadequate disclosure of information can be regarded as a serious problem of information asymmetry. Data holders usually have an information advantage, while data sources, purchasers or regulators are at an information disadvantage.

### **4. Conclusion**

As reforms deepen to enable market-based allocation of data elements, determining appropriate asset recognition for data has become a pressing issue. Drawing on theoretical research and analysing

China's current market conditions, this paper examines existing practices in data element asset recognition and proposes pathways for its development.

To promote the standardised development of data asset recognition, this paper recommends focusing on the following areas: firstly, improving institutional design by establishing sector-specific standards for data asset confirmation and measurement; secondly, cultivating the market ecosystem by developing data asset valuation systems and trading platforms; and thirdly, strengthening the regulatory framework to ensure data asset quality.

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