



# A Dual-certification Integrated Data Property Registration and Application Innovation Paradigm

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**Abstract.** Currently, the registration of data property rights mainly includes two modes: registration of data assets and registration of data intellectual property rights. On the basis of analyzing the current development status of the existing two registration modes, this paper proposes an innovative model for the concurrent development of dual certificates, namely the registration certificate for data assets and the registration certificate for data intellectual property rights, from the perspectives of creation, confirmation, utilization, and protection of rights. Furthermore, it offers suggestions to accelerate the integration of dual certificates to promote the development and application of data property rights.

**Keywords:** data assets, data intellectual property, data property rights, dual certificate integration.

## 1 Introduction

The digital economy is a new form of economy based on data resources, supported by modern information networks, and driven by the integrated application of information and communication technology and the digital transformation of all factors. Data, as a key element of the digital economy, plays a significant role in promoting the effective use, circulation, and trade of data, as well as in fostering the healthy development of the digital economy. There is a close connection between the digital economy and data property rights. Data property rights have economic characteristics and can be divided into personal data property rights, corporate data property rights, and national data property rights based on their source and characteristics. The establishment of data property rights helps to improve the allocation efficiency of data resources and to stimulate the vitality of data in economic development<sup>[1,2]</sup>.

Internationally, countries and regions such as the United States and Europe place a high emphasis on the development of the digital economy and the development and utilization of data property rights. In terms of the development of the digital economy, the U.S. and Europe have introduced a series of policies and measures<sup>[3,4]</sup>. For instance, the U.S. has its "Digital Economy Agenda," and the European Union has its "Digital

Europe Program," all aimed at securing their leading position in the field of the digital economy. In terms of the protection and development of data property rights, the U.S. has adopted a more decentralized legislative approach, emphasizing the role of market mechanisms in protecting personal privacy. Within the American legal system, personal information is presumed to be the property of the individual and is protected by various industry-specific privacy laws, such as the Gramm-Leach-Bliley Act (GLBA), the Health Insurance Portability and Accountability Act (HIPAA), and the Children's Online Privacy Protection Act (COPPA). The European Union, on the other hand, has adopted a more comprehensive and systematic legislative approach to the protection of personal data, enacting a series of laws and regulations, including the General Data Protection Regulation (GDPR), to protect personal data and privacy.

Domestically, China has proposed a distinctive "trichotomy" framework for data property rights, namely the separation framework of "resource holding rights, data processing and usage rights, and product operation rights," aimed at breaking the deadlock in data trading and promoting the production and circulation of data by strengthening the rights to use data. Currently, the registration and application of data property rights have become a hot area of focus for various sectors including government, industry, academia, and research within the country. All parties are actively exploring innovative models for the registration and application of data property rights. At present, there are mainly two innovative models for data property rights: one is the registration and application of data assets<sup>[5]</sup>, and the other is the registration and application of data intellectual property rights<sup>[6,7,8,9]</sup>. These two models are independent of each other and are in the exploratory stage in terms of registration systems, service systems, and technical standards.

Based on the analysis of the current state of the two data property rights models mentioned above, this article proposes an innovative paradigm for the registration and application of data property rights from the perspective of "creating rights, confirming rights, using rights, and protecting rights." It aims to achieve the integration and development of data asset registration certificates and data intellectual property registration certificates. Finally, it provides development recommendations for the registration and application of data property rights based on the integration of the two certificates.

## 2 Data Asset Registration

### 2.1 Definition

Data assets refer to data resources that are legally owned or controlled by individuals or enterprises, measurable, and bring economic and social value to the organization. [3]

This paper provides a formal description of data assets using formalized language as follows:

Data Asset A: = {Dataset D | Economic Value E | Organization O | Data Attributes P | Compliance C | Value Function V},

where,

Dataset D: = {Values | Text | Images | Audio | Video | Other Data Items}

Economic Value E: = {Used to describe the economic importance of Dataset D to a specific entity}

Organization O: = {Represents an organization, an entity that owns or controls the data asset}

Data Attributes P: = {Accuracy of the data | Completeness of the data | Consistency of the data | Timeliness of the data | Security of the data | Other attributes}

Compliance C: = {Laws, regulations, and standards that Dataset D must comply with}

Value Function V: = {Represents the value of the data, a function that maps Dataset D to its potential or actual economic value}

## 2.2 Industrial Policy

At the national department level, the Ministry of Finance issued guidelines on strengthening data asset management and interim provisions on accounting treatment related to enterprise data resources in January 2024. Local policies have also been introduced in cities such as Beijing, Zhejiang, Wenzhou, and Dali to explore data asset registration management and promote the development of the digital economy.

## 2.3 Local Practice

China's data asset registration work is currently in the exploratory stage, and a unified registration system and service system have not yet been formed. Some provinces, cities, and local governments have already started practicing in the field of data asset registration, such as the construction of data asset registration platforms in Deyang, Qingdao, and Wuhan. The core functions of the data asset registration platform include compliance, registration, evaluation, assessment, accounting, and disclosure of data assets.

## 2.4 Development Needs

There are issues with unclear concepts and incomplete systems in the registration and application of data assets. There is an urgent need to establish a unified property registration system, including unified registration standards, agencies, and carriers, to promote the healthy development of the data element market.

# 3 Data Intellectual Property Registration

## 3.1 Definition

Data intellectual property refers to the exclusive rights enjoyed for innovative results generated in the process of collecting, processing, analyzing, and mining data resources. The subject of data intellectual property protection is data that is legally collected, processed by certain algorithms, and has practical value and intellectual achievement attributes, that is, protection for "data sets + rules + scenarios."<sup>[5]</sup>

This paper employs formalized language to describe data intellectual property rights as follows:

Data Intellectual Property Rights: = {Dataset | Scenario | Algorithm}

Dataset: = {Data Name | Industry Affiliation | Acquisition Method | Collection Time | Update Cycle | Data Example} Scenario: = {Scenario 1 | Scenario 2 | Scenario n}

Algorithm: = {Non-industry Standard Algorithms | Proprietary Algorithms}

### 3.2 Industrial Policy

At the national level, legislation has not yet directly reflected the legal provisions of data intellectual property rights. However, some local governments have been pioneering through legislative actions by their People's Congress. For example, Article 16 of the "Zhejiang Province Intellectual Property Protection and Promotion Regulations" released by the Zhejiang Provincial People's Congress in November 2022 explicitly proposes to explore the establishment of a data-related intellectual property protection and utilization system. Article 51 of the "Zhejiang Province Optimizing Business Environment Regulations" passed by the Zhejiang Provincial People's Congress in January 2024 clearly proposes the data intellectual property registration certificate as a preliminary certificate for data set holders, circulation transactions, revenue distribution, and rights protection.

### 3.3 Local Practice

In September 2022, the National Intellectual Property Administration organized the first meeting of the Data Intellectual Property Work Steering Expert Group in Beijing, proposing to accelerate the formulation of relevant policies and actively promote local pilot programs. In December 2023, the "Notice of the Office of the National Intellectual Property Administration on Deepening the Pilot Work of Data Intellectual Property Local Pilots" added Tianjin, Hebei, Shanxi, Anhui, Henan, Hubei, Hunan, Guizhou, and Shaanxi as 9 additional local pilot areas for data intellectual property in 2024, based on the existing 8 pilot areas including Beijing, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Shenzhen. In February 2024, the Zhejiang Provincial Market Supervision Administration released the "Opinions on Deepening Data Intellectual Property Reform and Promoting the Empowerment Development of Data Elements (Draft for Comments)," which clearly proposes to achieve a transaction value of more than 20 billion yuan and a registered enterprise output value of more than 1 trillion yuan by 2027.

### 3.4 Development Needs

There is an urgent need to build a unified national system for data intellectual property registration, to construct a unified technical platform for data intellectual property registration, and to formulate business norms and mechanisms for the operation of data intellectual property.

## 4 Innovative Paradigm for Data Property Registration and Application

### 4.1 Policy and Practice Exploration of Data Property

At the national level, the construction of the data property system is exploratory. On the policy level, the concept of data property rights was mentioned in the "Opinions on Building a Basic Data System to Better Utilize the Role of Data Elements" (Data 20 Articles) released by the State Council on December 19, 2022.

On June 29, 2023, the Shenzhen Development and Reform Commission issued the "Interim Measures for the Administration of Data Property Registration in Shenzhen City," making Shenzhen the first city in China to introduce a policy on data property registration. Shenzhen is the only city using data property rights, dividing them into two approaches: data resources and data product rights for registration. It has taken the lead in establishing a cross-departmental collaborative supervision mechanism in a systematic form, and has clearly defined the roles of different types of data property registration in combination with market demand and practical operation, achieving standardized management of data property registration.

### 4.2 Innovative Paradigm of Dual Certificate Integration for Data Property Registration

This paper posits that the relationship between data assets and data intellectual property rights is shown in the Figure 1 below, with their similarities and differences highlighted as follows: (1) Data assets fall within the domain of the data factor market, whereas data intellectual property rights are situated at the intersection of both the data factor market and the technology factor market. (2) Both data assets and data intellectual property rights possess attributes that are controllable, measurable, and monetizable, which facilitates the registration and application of data property rights. Consequently, this paper suggests integrating the registration certificates for data assets with those for data intellectual property rights, thereby proposing a conceptual approach to the registration of data property rights. Their relationship is shown in Figure 1 as follows:

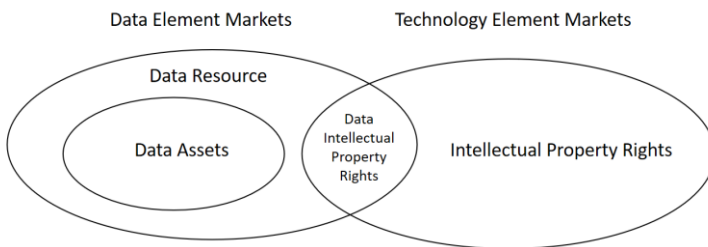
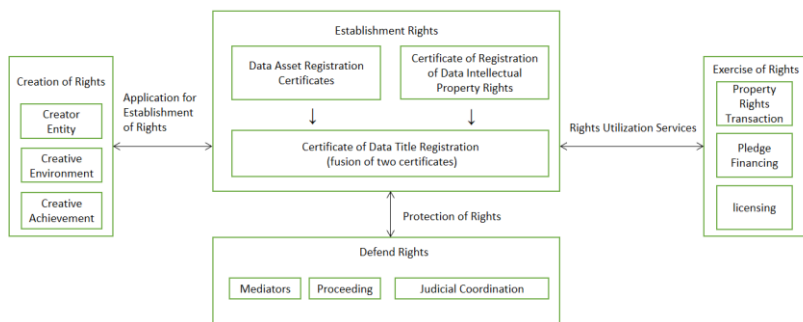


Fig. 1. Relationship between data assets and data intellectual property rights.

Building upon the previous context, this paper proposes an innovative paradigm for the integrated development of dual certificates, namely the registration certificate for data assets and the registration certificate for data intellectual property rights, from the perspectives of creation, confirmation, utilization, and protection of rights. The framework of this innovative model is depicted in Figure 2 as follows:



**Fig. 2.** Innovative Paradigm for the Integration of Certificates in Data Property Rights Registration and Application.

**Creation Stage:** The creator of data property rights can engage in the creation of data property rights within various creative environments, resulting in the creation of data property rights. During the creation process, to protect the originality of data property rights, blockchain technology can be utilized for evidence preservation, thereby providing protection for the data property rights.

**Confirmation Stage:** Unlike the traditional registration of data assets and data intellectual property, where the creator needs to submit two separate applications to obtain both a data asset registration certificate and a data intellectual property registration certificate, this article proposes the establishment of a unified data property rights registration platform. The creator only needs to submit one application to the data property rights registration platform to complete the registration of data property rights. The specific method is as follows: The creator applies for a confirmation of rights registration to the data property rights registration platform. After receiving the registration application information, the platform conducts a review of the data property rights. For applications that pass the review, a unified data property rights registration certificate can be issued to the creator. This certificate will include information about the data property rights holder, data intellectual property rights, and data asset registration details.

**Utilization Stage:** The creator can utilize the unified data property rights registration certificate across various application scenarios, such as for pledging data property rights for financing, trading, and licensing data property rights. During the utilization process, the data property rights registration platform needs to manage any changes in data property rights dynamically to ensure the validity of the data property rights.

**Protection Stage:** In the event of an infringement issue concerning data property rights, the creator can provide the judicial authorities with corresponding evidence of

the data property rights and proof related to the registration of the data property rights, facilitating the judicial authorities in evidence acceptance and legal recognition.

Through this integrated registration method, which consolidates two registrations into one, the efficiency of data property rights registration is significantly improved. It also avoids the repetitive submission of materials during registration and reduces the costs associated with the registration and application of data property rights.

## **5 Recommendations for Accelerating the Integrated Development of Data Property Rights**

The perfection of the data property rights system is an important foundation for the development of the digital economy. The registration and application of data property rights are innovative tasks that involve policy environment, standard specifications, data security, and industrial ecology. To better promote the registration and application of data property rights, the following recommendations are made:

On policy formulation, it is necessary for the competent authorities of data assets and intellectual property to jointly develop policies for the registration and application of data property rights, clarifying the registration and regulatory bodies to better promote the development of data property rights.

In terms of standardization, unified business and technical specifications for data property rights need to be established to standardize the registration process and technically standardize the registration platform.

Regarding data security, the importance of data security and privacy protection must be highlighted. It is essential to build infrastructure that ensures the security of data circulation, explore the application of secure technologies such as privacy computing and trusted data spaces, and safeguard the security of data property rights throughout their entire lifecycle.

In terms of industrial advancement, it is necessary to collaborate with all stakeholders in the industry to accelerate the creation of an ecosystem for data property rights. A cooperative framework for the industry ecosystem should be established, with clear rules and standards to ensure that all parties involved in data property rights can cooperate in a fair and transparent environment. Additionally, the development of digital merchants and third-party professional service organizations should be supported to enhance the efficiency of data element circulation and to activate new productive forces within data elements.

## **6 Conclusions**

This article posits that the integration of the Data Asset Registration Certificate and the Data Intellectual Property Registration Certificate is a feasible solution to improve the current data property rights system. By analyzing the two main models of data property rights registration, the article proposes an innovative paradigm framework composed of four modules: "creation of rights, confirmation of rights, utilization of rights, and

protection of rights." This framework achieves the integrated development and application of both the Data Asset Registration Certificate and the Data Intellectual Property Registration Certificate.

To better promote the development of the data property rights industry, it is recommended to introduce clear policies for industry organizations as soon as possible and to formulate and improve industry standards promptly.

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