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The Legal Basis, Functions, and Improvement Path of the Data Property Rights Registration System

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Abstract. As data has become a key factor of production, data property rights confirmation has emerged as a core issue in the development of the digital economy. The data property rights registration system transforms factual control into legal rights through registration, thereby performing the functions of ownership proof, information transparency, transaction security, and corporate compliance. However, the current data registration system faces practical dilemmas such as insufficient normative foundations (due to the absence of specialized high-level legislation) and inconsistencies in object definition (e.g., data resources, products, assets) and review mechanisms (formal vs. substantive). To address these issues, a dual-layer normative system of "legal empowerment and administrative regulation implementation" should be constructed, along with the unification of object classification standards and the introduction of a third-party substantive review mechanism. These reforms will promote the unification and standardization of the data property rights registration system, enhance its legal credibility, and facilitate the healthy development of the digital economy.

Keywords: data property rights, data property rights registration, public credibility of registration

1. Introduction

As a new type of production factor, the realization of data's value heavily depends on its circulation, transaction, and utilization, with clear ownership being a prerequisite. Therefore, the problem of data rights has begun to show in institutional construction. In December 2022, the Central Committee of the Communist Party of China and the State Council issued the "Opinions on Building Basic Data Systems to Fully Leverage the Role of Data Elements" (hereinafter referred to as the "Twenty Data Measures"), and also put forward exploring "new ways to register data property rights" and officially added the data property rights registration system to the national top-level design, making it an indispensable link in the construction of the basic data system. In March 2026, the 15th Five-Year Plan specifically stated in its policy goals that "the structural separation system of data property rights will be improved, and a nationally unified data property rights registration system will be established," thus providing direction for the development of the data property rights system.

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Driven by the overall policies of the country, many places across China have begun to experiment with the practice of data property rights registration and established several types of models, including data property rights registration, data intellectual property rights registration, data element registration, data asset registration, and data product registration. For example, in September 2023, the Shenzhen Municipal Development and Reform Commission issued the "Interim Measures for the Administration of Data Property Rights Registration in Shenzhen," and in December of the same year, the Hainan Provincial Big Data Administration issued the "Implementing Rules for the Confirmation and Registration of Data Products on the Hainan Data Product Supermarket (Interim)." In April 2024, the Nanjing Municipal Data Bureau released the "Interim Measures for Data Asset Registration in Nanjing," and in July of the same year, the Xiamen Municipal Data Administration published the "Interim Measures for the Administration of Data Asset Registration in Xiamen." All of these endeavors share the common goal of clarifying data ownership and advancing the development of data transactions; thus, they have accrued rich practical experience that supports the standardized, rule-of-law-based construction of the data property rights registration system.

The present system for registering data property rights still has some theoretical flaws and practical problems. Data is not the traditional subject of property rights theory. Because it is not exclusive and can be replicated, the existing theory of property rights cannot be applied directly. Therefore, there are problems with ambiguous rules for the confirmation of rights, unclear boundaries of rights, and high institutional operating costs that restrict the efficient use of data. Explanations in different areas have inconsistent standards for application; thus, it is not possible to achieve mutual recognition of registration results among the regions. Institutional barriers have been introduced, the cost of transactions for market entities has increased, and this is not in line with the strategic aim of building a unified national market.

Before conducting the analysis, we first need to define the fundamental idea of "data property rights"; that is, although "property rights" in economics generally refer to the economy of resource use and cost-benefit analysis, the corresponding concept in law is "property", which signifies a subject's right to directly control an object with exclusive effect. In the context of "data property rights registration," this paper does not use the term "property rights" simply as an economic concept but rather based on the following reasons: First of all, in the top-level policy documents, such as the "Twenty Data Measures", "data property rights" has been included and is now used to refer to the property rights system for data, carrying normative force in institutional discourse. Second, the "data property rights" discussed in this paper are essentially property in the legal sense, that is, the rights of a data holder to possess, use, benefit from, and dispose of data under their lawful control, which is the legalization of "factual control." Therefore, the term "data property rights" in this paper can be regarded as a synonymous expression for "data property" in the context of the data factor system. Based on this, this paper intends to start from the legal rationale and functional positioning of the data property rights registration system, systematically analyze the main dilemmas it faces in practice, and propose improvement pathways, with the aim of providing a theoretical foundation and decision-making reference for the construction of China's data property rights registration system.

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2. The legal foundation and functional positioning of the data property rights registration system

2.1. The legal foundation of the data property rights registration system

2.1.1. Freedom of factual control is the prerequisite for realizing the value of data

The reason data can become an object of property rights lies in its economic value. The "Interim Provisions on the Accounting Treatment of Enterprise Data Resources" issued by the Ministry of Finance in 2023 included data resources in enterprise balance sheets for the first time, recognizing that data is highly likely to generate economic benefits for enterprises, thereby signifying the confirmation of data's property attributes at the accounting system level. Enterprises can leverage data assettization for capital operations such as financing and pledging. However, these economic activities must be based on the subject's freedom of factual control over the data. In other words, if market entities cannot exercise actual control, effective utilization, and autonomous disposal of data, the economic value of data cannot be transformed into actual productivity.

2.1.2. Data property rights are the protection of the freedom of factual control

The freedom of factual control is an important interest of rights holders and the core protected object of property rights. Articles 13 and 51 of the Constitution of the People's Republic of China provide a legitimacy basis for the freedom of factual control enjoyed by both property owners and non-owners. From the perspective of institutional function, the property rights established by law essentially achieve the protection of the freedom of factual control of property owners by restricting that of non-owners.

According to Locke's labor empowerment theory, the input of labor is the legitimate basis for the creation of property rights [1]. Correspondingly, the creative input condensed in data processing activities should also receive legal protection. The "Measures for the Implementation of Company Registration Administration" revised in 2024 incorporated data assets into the scope of non-monetary capital contributions, marking the initial legal confirmation of data as a new type of property. Judicial practice has similarly recognized the factual control attributes of data. In the "Taobao v. Meijing" case, the court determined that enterprise-aggregated data constitutes intangible property, enjoys independent property rights, and thus should be protected by law [2].

The data property rights system is precisely the legalized protection of the freedom of factual control, upgrading "technical control" to "legal exclusive rights," thereby providing institutional safeguards for clear ownership in data circulation. This transition from "fact" to "right" constitutes the legal foundation upon which the data property rights registration system is established.

2.1.3. Data property rights registration is a form of rights registration based on factual confirmation

The registration system serves as the instrument for transforming data property rights from "factual control" into "legal rights." Initially applied to the utilization and protection of property rights over things, registration has gradually developed into a comprehensive framework covering areas such as property rights and intellectual property rights, alongside the expansion of property right categories and the increasing complexity of commercial transaction forms. The modern registration system exhibits three major development trends: First, the scope of objects of registrable rights is

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continuously expanding, with new types of property, such as equity and copyright, as well as specific obligatory rights, like preemptive rights over real estate, becoming registrable objects. Second, registration helps clarify the content of the object of rights, especially in natural resource registration within real estate registration, which identifies the subject and content of the right and is more conducive to coordinating the development and protection of natural resources. Third, the legal validity of registration keeps strengthening, with some registrations, such as preliminary real estate registration, having legal force that can override changes in property rights.

On this basis, in order to realize the utilization and protection of data, it is fully feasible and legitimate to introduce the registration system into the field of data property rights. The "Twenty Data Measures" explicitly propose "exploring new approaches for data property rights registration," emphasizing that market entities "enjoy the rights to hold, use, and obtain benefits in accordance with laws and regulations." Data property rights registration provides a legitimacy basis for the factual control of data by confirming the fact of data possession and endows such control with priority and probative force against third parties in law.

2.2. The functional positioning of data property rights registration

2.2.1. Right confirmation function: proving the ownership status of data

As a new type of property, the content and scope of validity of data property rights are different from those of traditional property rights, and it is difficult for the existing legal system to provide adequate protection. In short, the Anti-Unfair Competition Law can only regulate competitive behaviour and does not provide any rights; its fallback clause gives too much discretion to judges, and it is unclear how to apply the law [3]. The Intellectual Property Law requires originality as a necessary condition for protection and excludes a large number of non-original data compilations from the scope of protection. The Personal Information Protection Law is mainly about personal rights, so it is in a different legal system from data property and does not directly protect the property interests of data processors.

Due to a relatively lack of institutions, the institutional value of data property rights registration is very high. A new provision in the law will be introduced that, to grant data processors the right of possession, use, benefit, and disposal directly, will be followed by clarification at the institutional level on how to attribute these rights among data sources and processors; thus, strong support will be provided for judicial adjudication, and the problem of "free riding" due to a lack of effective rights can be prevented. As an embodiment of rights, the registration certificate can be used to exercise one's legal rights and enable the other party in the contract to know who has the rights and what kind of rights they are.

2.2.2. Flow function: breaking down data information barriers

According to the Coase Theorem, to conduct property rights trading in the market, a certain level of clarity is needed. If the rights of the property are clear, there will be lower transaction costs and better allocation of resources [4]. However, at present, there are two main problems in data transactions: first, uncertainty over who owns the data; second, the need for both parties to pay high costs to verify the legitimacy of the data source and disposal authority. Second, quality concealment; it is not easy for buyers to confirm the quality and genuineness of the dataset. The two problems of information asymmetry are highly detrimental to the development of the data factor market.

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Data property right registration can help to reduce information asymmetry and promote the transparency of data transactions in an efficient manner. Registered information has the characteristics of public notice and credibility. The registration authority will verify that the registered information is true and legal, so potential data demanders will not have to bear the high cost of conducting its own investigation into the information. Registration certificates will record data sources, ownership status, and other information truthfully to help parties to the transaction verify the quality and compliance of the data promptly and make rational use of resources. A registration system can also be used to emit signals; after high-quality registered data has been generated, a positive signal will be released in the market to attract more market participants to participate in trading and thus form a virtuous cycle.

2.2.3. Protection function: safeguarding data transaction security

Compared with other objects of property rights, data has the characteristics of frequent circulation, many participating entities, and various forms; thus, there are many uncertainties for market entities involved in data transactions. Data providers are concerned about the misuse of product information and compliance risks in the authorized use; demanders worry that in the future, there will be disputes due to the lack of authenticity in the information and unclear ownership. The reason for this problem is that there is no reliable data transmission path, so the two sides of the transaction cannot be fully trusted.

Based on the overview, only the data that meet the registration requirements and do not have ownership disputes or legal risks will be included in the scope of data property right registration to reduce transaction risks at the source. At the time of the transaction, the registration certificate will be used to verify that the data is genuine and lawful. After the transaction is completed, the buyer can apply for transfer registration to become the new legal holder and thus enjoy the rights. Throughout the entire period of the transaction, it will be carried out according to the registration system to ensure the security of the transaction and build a reliable data circulation system under institutional support.

2.2.4. Governance function: incentivizing enterprise data compliance

Enterprise data is in a high-volume and high-fluidity state, and it often contains personal information, trade secrets, national security secrets, etc. In order to prevent the leak of personal information or other problems that could cause public disorder, enterprise data compliance has always been one of the tasks in data governance. With the issuance of the Personal Information Protection Law of the People's Republic of China and the Data Security Law of the People's Republic of China, enterprises have been obligated by law to comply with these provisions for data. However, in reality, many enterprises have not yet complied with the data regulations. The first reason for this is that the institutions do not offer adequate incentives for enterprises to comply. Second, the dispersed regulatory system cannot be used to determine how many enterprises have complied with the data regulation. Third, without a compliance organization, it will be difficult to implement the obligations for compliance.

The implementation of data property rights registration can solve the three problems mentioned above. First of all, the registration system is a good motivation. After building the data compliance management system, the company will register the compliant data as property rights for the purpose of financing and trading to obtain economic benefits. A Registration Certificate can be presented to show that the company has met the requirements. Second, the registration authority may hire

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external professional institutions to carry out compliance audits and provide the enterprise with a reference standard for compliance; thus, the company can learn how to strengthen its own compliance management. Finally, the need for registration itself motivates enterprises to strengthen their adherence to the law and establish good governance of "registration—compliance—re-registration" to raise the overall level of corporate data compliance.

3. Practical dilemmas of the data property rights registration system

For the data property rights registration system to transform factual control into legal rights, it depends on prerequisites such as clear objects, authoritative review, and credible results. While these conditions are generally met for traditional property rights, the characteristics of data, such as intangibility, non-exclusivity, and multi-subject participation, make factual control difficult to judge intuitively and review processed exceptionally difficult, thus giving rise to a series of practical dilemmas.

3.1. At the normative level: the absence of specialized legislation

The primary dilemma that the current data property rights registration system faces lies in the absence of high-level legislation. The lack of relevant specialized laws has led the registration system into a legitimacy dilemma characterized by "policy substituting for law [5]". As a policy document, the "Twenty Data Measures" cannot support the effective operation of the registration system when substantive laws fail to clearly define the types, content, and legal validity of data rights [6]. This situation triggers two types of structural contradictions: First, the ambiguity of the source of rights. The registration system itself cannot create rights but only prove them [7]. Existing laws such as the Civil Code of the People's Republic of China and the Patent Law of the People's Republic of China are products of the industrial era and find it difficult to respond to the new attributes of data rights such as non-rivalry and replicability, leaving the rights to own, process, and use, and operate without substantive legal basis. Registration authorities operating without authorization from superior legislation also face the awkward situation of unclear power sources. Second, the collapse of the hierarchy of legal validity. Local normative documents have a lower effect than administrative rules and face a constitutional challenge concerning "legal reservation for basic civil systems" under Article 8 of the Legislation Law of the People's Republic of China [8]. Although local registration explorations are proactive, the lack of upper-level legislative support makes the legal validity of their registration certificates difficult to be recognized universally, thereby constraining their application in key areas such as judicial adjudication, financing, and asset entry into balance sheets.

This absence represents a fundamental conflict between the industrial property paradigm and the characteristics of data elements. Data needs to be registered to become an asset, but legislative lag renders registration ineffective, failing to guarantee the legal validity of certificates in financing or balance sheet entries. The contradiction between legislative absence and institutional demand is a foundational problem that must be resolved first in the current construction of the data property rights registration system.

3.2. At the practical level: inconsistency in object definition and review standards

The data property rights registration system constitutes a critical infrastructure for activating the data factor market. Whether its operational standards are unified and standardized directly affects the

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system's effectiveness. However, current operational standards fall into a predicament of anomie, mainly reflected in the inconsistency of object definition and review mechanism, which severely hinders data rights confirmation and circulation.

3.2.1. Inconsistency in object definition

The clear definition of the registered object is the prerequisite for rights confirmation, yet there are obvious divergences among local regulations. For example, Guizhou uses "data resources," Hainan and Shandong use "data products," Guangdong uses "data assets," Shanghai uses "data elements," and Beijing and Jiangsu use "data sets." This conceptual confusion reflects different understandings of the focus of rights confirmation at different stages of the data value chain: "data resources" emphasize the possession of raw data, "data products" focus on processed derivative forms, and "data assets" refer to ownership objects with economic value [9].

This conceptual ambiguity results in a lack of comparability among registration contents. Registration of data resources emphasizes scale and source, as stipulated in the "Shenzhen Interim Measures for the Administration of Data Property Rights Registration," which requires that "if it is a first-time registration of data resources, a basic information sheet for the data resources shall be submitted, mainly including data source, data scale, the industry or field it belongs to, the geographical coverage, time span, etc." In contrast, registration of data products focuses on processing methods and application scenarios. The "Shandong Data Trading Platform Data (Product) Registration Rules" defines data registration as concerning "valuable data, or valuable content or services provided based on data." Different object standards lead to difficulties in cross-regional mutual recognition and blur the boundaries among the rights to own, process, and operate, thereby plunging the institutional design of the "separation of three rights" framework into conceptual ambiguity [10].

3.2.2. Inconsistency in review mechanisms

The review standards form the foundation of the public credibility of registration, but the divergence in review mechanisms leads to ambiguity regarding responsible entities. The main controversy lies in whether the registration authority should undertake formal review or substantive review, and if substantive review is implemented, whether the responsibility can be transferred to a third party [11]. Local practices are also divided. Shandong and Guangdong require registration authorities to carry out substantive review on data source legality and content authenticity, while Beijing, Zhejiang, Shenzhen, and other places adopt a "formal review and third-party substantive review" model, assigning the task of verifying data compliance to business entities such as law firms and authentication institutions.

The model of "formal review and third-party substantive review" is supposed to reduce administrative pressure, but there is no qualification norm for the third-party institution, and its legal effects on the review opinion are also unclear. There has also been no liability investigation system for false reviews. Even in the system of administrative review, the registration authorities have not been able to effectively collect and verify all the data that rely on administrative powers. Without accountability, the public will lose faith in the registration certificates and thus fail to use them as proof of ownership.

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4. Improvement pathways of the data property rights registration system

In response to the dual dilemmas of legislative absence and inconsistent operational standards mentioned above, the improvement of the data property rights registration system requires constructing a legal empowerment system at the normative level and unifying object classifications and review standards at the practical level, thereby developing a systematic solution.

4.1. At the normative level: constructing a dual-layer system of legal empowerment and administrative regulation implementation

To address the dilemma of rights hollowing out caused by the absence of high-level legislation, specialized legislation should be enacted to establish the substantive legal status of data property rights, providing the registration system with a clear basis in superior law. Specifically, it can be advanced from the following two aspects: First, amend civil legal norms to add "data property rights" as a type of object. The Civil Code of the People's Republic of China or future revisions of the relevant civil laws should explicitly specify the nature, content, and subjects of data property rights, establish a rights bundle structure consisting of the right to possess data resources, the right to process and use data, and the right to operate data products, and thus resolve the problem of a lack of a legal basis for the "separation of three rights" framework. This is about the actualization of law empowerment and forms the basis for the operation of the registration system. Second, relevant regulations should be formulated to define the objects of registration based on a "dynamic asset attribute standard," and administrative regulations should specify the main content of the object, procedures, validity, and authority of registration, etc., to establish a vertically integrated administrative system under the China National Intellectual Property Administration, and give the registration certificate four dimensions of authority: ownership proof, financing pledge, asset accounting recognition, and judicial evidence. In line with Article 8 of the Legislation Law of the People's Republic of China on the principle of legal reservation, this way can be promoted through administrative regulations to add operating details and move from policy-based implementation to legally effective enforcement.

4.2. At the practical level: establishing nationally unified operational standards and a third-party review mechanism

4.2.1. Establishing a nationally unified system for object classification and registration

To address the current problem of registration objects caused by the conflation of concepts such as data resources, data products, and data assets, a hierarchical classification standard should be constructed based on the principles of the data value chain. It is recommended that the national data regulatory authority take the lead in formulating the guidelines for the classification of objects of data property rights registration, dividing registration objects into three levels: data resources, data products, and data assets. First, the data resource is the raw data collected and not yet processed. At the time of registration, the legal basis for the source and a compliance audit report should be provided, and relevant information should be included in this report. Second, Data products are derived datasets that have been processed many times and have specific applications. Describe the process and the reason for using it when registering. Third, data assets are property rights-based data that can be included in the balance sheet after the assessment and confirmation of rights for financing. A value assessment report and an ownership certificate need to be filed with the

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registration. The three levels are in line with the logic of the data value chain and have different registration rules for different types of data to promote cross-regional data interoperability.

4.2.2. Introducing a third-party substantive review mechanism

On the one hand, if the registration authority only conducts formal review, data of varying quality can all pass the review and be registered. Potential partners would then need further consultation and evaluation to identify truly valuable data signals, which undoubtedly increases the difficulty of transforming data from an asset into capital and also introduces potential transaction risks for both parties involved. Therefore, is it feasible for the registration authority to directly conduct substantive review of data? Currently, China's data property rights registration system is still in its infancy. Both enterprises and individuals can apply for property rights registration, resulting in an unprecedentedly high enthusiasm for registration and a flood of data to the registration authorities. It is foreseeable that, given the persistently high number of trademark and patent applications and the escalating review pressures, imposing an obligation of substantive review of data property rights on the registration authority would bring new challenges.

On the other hand, since the entities applying for data property rights registration in China are primarily enterprises, and the vast majority of valuable data is also held by enterprises, enterprises tend to register their property rights over valuable data to release commercial signals, attracting potential partners, and thereby promoting data circulation. Therefore, they are fully capable of bearing the costs arising from the introduction of third-party review without abandoning property rights registration due to such costs. Adjusting the review costs based on data types can also differentiate and tier data holders, transforming property rights registration into a valuable signal and improving the utilization efficiency of data resources.

In summary, whether from the perspective of alleviating the pressure on registration authorities or from the viewpoint of enhancing transaction efficiency through signal release, it is indeed necessary to introduce a third party for substantive review. Under this mechanism, the registration authority conducts preliminary formal reviews to ensure basic compliance of data property rights registration, while third-party institutions undertake the responsibility of substantive review, conducting in-depth investigations and assessments of the authenticity, legality, and utility of the data. Admittedly, to ensure the quality of data property rights registration, clear objective criteria must also be established, including the requirements that data must be lawfully obtained, substantially processed, practically useful, and have reached substantial scale, in order to prevent situations in practice where the data provided fails to meet the agreed quality or involves tampering or falsification, thereby preventing the data buyers' utilization purpose from being achieved or even causing related property damage.

5. Conclusion

The data property rights registration system is a key component in the construction of basic data systems. Starting from the jurisprudence of factual control, this paper has revealed the legitimacy of the transition of data property rights from "technical control" to "legal exclusive rights," and systematically analyzed its multidimensional values in terms of rights confirmation, circulation, protection, and governance. Further analysis reveals that the crux of the current institutional construction lies in the hollowing out of legal validity due to the absence of specialized legislation, as well as the operational anomie caused by the confusion of object definitions and review standards. In light of this, normative improvements must be made promptly in the special superior

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legislation, and practical measures should have a unified classification criterion for object standards and a third-party substantive review mechanism. In this way, the registration of data property rights may hope to overcome the problem that it is merely a policy substitute for law and suffer from fragmented standards, truly becoming an institutional driver to unlock the potential of data and protect the digital economy.

The construction of the system for data property right registration should be based on relevant theory and practice. At the theoretical level, it is necessary to clarify further the nature, structure, and scope of data property rights to provide a solid legal basis for the registration system. In practice, based on the results of the pilot programme, experience and regulations will be accumulated step by step to build a unified national registration system. Through combining theory and practice, in the future, the data property rights registration system will be an important driver to unlock the potential of data and reshape digital production relations, continuing to promote the high-quality development of the digital economy.

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