Research on the Application of Value-Added Services for Power Enterprise Data Based on Precise Data Ownership Confirmation Theory

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Abstract. This article focuses on the theory and application of precise data ownership confirmation in power enterprises and is divided into three main parts. Firstly, it elaborates on the theory of precise data ownership confirmation, introduces its concept and core values, and emphasizes the importance of data rights and interests in the path of enterprise data assets. Secondly, it attempts to build a research framework for precise ownership confirmation of enterprise data, guides enterprises to create nine basic data rights, identifies the main roles in the research framework, and constructs a complete enterprise data precise confirmation system. The third part conducts empirical analysis through case studies of value-added application services for power enterprise data, and explores how to apply the enterprise data ownership confirmation framework to confirm ownership and guide business processes in practical business. This article aims to provide practical guidance for power enterprises to apply precise data ownership confirmation theory in practice, so as to ensure that the assetization of enterprise data resources can be fully demonstrated.

Keywords: data ownership confirmation, data rights, three-body model of data, power bundle, enterprise management innovation

1 Introduction

With the rapid development of big data technology and the advent of the era of Artificial General Intelligence, enterprises have generated a large amount of data in their daily business. Among them, power companies, as important operators of national infrastructure, have gathered a huge amount of valuable data resources. Recently, the Ministry of Finance issued the "Interim Provisions on Accounting Treatment of Enterprise Data Resources" to the public, clarifying the scope of data resource recognition and accounting treatment applicable standards, officially opening the path of enterprise data resource assetization. By effectively incorporating these enterprise data as assets into the enterprise's Balance Sheet, significant economic and social benefits will be brought to the enterprise. However, the effective use of data resources must be based on the accurate ownership confirmation of data resources, and the problem of data ownership confirmation has become a prominent and difficult problem that needs to be solved urgently.

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The key factor to confirming rights lies in handling conflicts over data ownership. Solving data ownership issues requires clarifying basic concepts such as data, information, and rights, reaching consensus, and constructing a forward-looking theoretical, methodological, and institutional system to clearly define the content, ownership, rights system, and governance mechanism of data ownership.

In particular, the data resources of power enterprises are a multi-subject and multi-dimensional mixed collection of rights. Therefore, this requires us to accurately identify the rights of various rights subjects and conduct precise ownership confirmation throughout the entire process of data generation, processing, and rights governance of power enterprises.

According to the above background and issues, this article aims to explore and study the application of data value-added services for power enterprises based on precise ownership confirmation theory. We hope to provide guidance for the precise ownership confirmation and efficient utilization of data assets in power enterprises through in-depth research, promote the development of the power industry, and provide guidance for future research and practice.

2 Precision Data Ownership Confirmation Theory and Conceptual Explanation

In order to better solve the problem of data ownership conflicts, the first priority of this article is to reach a consensus definition and understanding of basic concepts such as data, information, and rights.

The term "data" in this article refers to "electronic data". According to the definition in the "Data Security Law of the People's Republic of China", data refers to electronic data that exists in binary code form in the computer and network fields, excluding traditional data such as paper[1]. The term "information" in this article refers to "information recorded electronically". The term "personal information" mentioned in the "Personal Information Protection Law of the People's Republic of China" is actually the abbreviation of "personal information"[2].

Narrowly speaking, the relationship between "data" and "information" indicates that data is the carrier of electronic information storage, and information is the content recorded in data electronically. Broadly speaking, data is a collection of classified information.,for example, in the "Data Security Law of the People's Republic of China", personal privacy, personal information, and confidential business information are classified according to information, and their full names should be personal privacy data, personal information data, and confidential business information data.

Rights, narrowly defined as" legal rights ", refer to rights determined by legal norms and have basic attributes such as legal provisions, protection, and autonomy. In this article, "rights" refer to broad rights, which exist in many fields such as social customs, morality, and law without the premise of the existence of law, but with legal protection as the best way[3]. It is specifically defined based on the eight legal basic concepts of Horfield, which will be elaborated in detail later. "Power" refers to the content of rights, which is a summary of the content and function of rights enjoyed by the subject of rights, and is a further subdivision of rights[4].

In terms of data rights theory, the ownership proposed by the Chinese academic community mainly revolves around personal rights, property rights, privacy rights, trade secret rights, intellectual property rights and other rights and interests, which are insufficient to cover the dynamic structure and diverse desires in the world of digital rights[5]. Also, whether the existing data rights theory is suitable for the development of artificial intelligence technology remains to be discussed. Some scholars have proposed that data and ownership logic have inherent conflicts, and based on the characteristics of data, ownership arrangements for data cannot be made similar to those for tangible objects[6]. It is necessary to choose an appropriate data rights theory to resolve current and future data rights conflicts.

Horfield's basic legal concept theory is more helpful for understanding conflicts of rights[7]. As one of the important representatives of the analytical legal school, Horfield, in his representative work "Basic Legal Concepts Applied in Judicial Reasoning", focuses on the confused concept of rights in the law, divided into two matrices including related and relative relationships, and proposes eight basic concepts, including claim, privilege, power, immunity, and corresponding obligations, no-rights, liability, and disability[8].

Hofield's theory has two important viewpoints. Firstly, the above eight concepts can clearly express and analyze all legal relationships and their nature. Any right claimed by a person can ultimately be classified into the above types. Secondly, legal relationships are relationships between people rather than between people and things. Therefore, the concept of "right in rem" is deconstructed as a legal relationship between individuals and multiple people, and the concept of "right in personam" is deconstructed as a legal relationship between individuals and another individual, which has strong practical operational significance[9]. In addition to the theory of data property rights, it provides a new way of defining the rights of multiple data subjects.

A three-variable model for defining the legal relationship of data rights. According to Hofeld's theory, any right can be described based on eight basic concepts and four sets of relative relationships. The three-variable legal relationship model is composed of two relative subjects A, B, and specific content X. Taking the relative legal relationship of "request right-obligation" as an example, the elements of the right are decomposed into the claimant [A] and the respondent [B] having the right to demand specific content [X]. Based on the model, conflicts of rights can be analyzed, such as when different claimants make the same or similar claims against the same respondent, and the respondent is unable to respond to these claims at the same time, the rights will conflict[10].

The core of data rights confirmation is to find a maximum common divisor at the bottom level, and construct a methodology for determining ownership and arranging series rights for data carriers, data content, corresponding data rights, and subject series rights. This methodology needs to meet the inherent characteristics of the data itself and conform to the inherent laws of data processing activities, especially considering the unique position and role of power enterprises in the market, which means, from the perspective of motivating power enterprises and promoting market development, we need to form a set of data management methods and logical systems based on precise rights confirmation theory, and this leads to the core content of our research. The actual situation has proved that compared with the leading position of the US and the European Union in algorithms, computing power, and data resources, China's Data-driven intelligent technology enterprises play a more significant role in promoting

economic development and innovation. This situation potentially reflects the importance of internal Incentive Mechanisms, as well as the role of external markets, laws, and policy mechanisms in promoting innovation and protecting rights and interests. Therefore, research based on precise rights confirmation theory can not only promote the effective management of power enterprise data, but also provide strong theoretical support for enterprise innovation and economic development.

3 Research Framework for Precise Ownership Confirmation of Enterprise Data

Enterprise data not only has instrumental value as a general object, but also aims to form a type of enterprise data oriented towards circulation and utilization[11]. The definition of enterprise data is to process and mine relevant data through algorithms on the premise that the processing and utilization of relevant data have a legal basis, making it data with (exchange) value and feasible technical interoperability[12]. Enterprise data includes data controlled by the enterprise and data held by the enterprise[13].

The theoretical framework for accurate data ownership determination based on this research aims to clearly define the boundaries of "rights" or "powers" of enterprise data. This framework has targeted answers to questions such as "which types of enterprise data have the possibility of being utilized", "how enterprise data should be utilized", and "how to implement data utilization". The implementation of this framework will be constrained by the development plans of data markets in different countries or regions, as well as corresponding policies and legal frameworks, among which the enterprise's own data resource endowment and core business model are also decisive internal factors.

By comparing and studying the data market development plans, policies, and legal documents of China and the European Union, we conclude that the enterprise data market system constructs complete data market rules by solving important issues such as "how to protect data rights subjects", "how to promote data value creation", and "how to ensure effective market governance". Although China has established six types of documents for the data power system, including laws, judicial interpretations, administrative regulations, local documents, departmental regulations and normative documents, national and industry standards, there are still inconsistencies in the classification and definition of power, which poses challenges to the accurate confirmation of enterprise data power.

Based on the three dimensions of the goal of the data market system: security protection, promotion of utilization, and balanced development, a rights protection mechanism for data principal, a value-added mechanism for information objects, and a power regulation mechanism for data markets can be constructed. These mechanisms can help us classify and define the mixed data rights of multiple subjects, dynamically divide the value-added rights and interests of data services formed by information object content processing, and adjust the power structure of participating subjects according to the development of different types of data markets such as regions and industries.

Under the legal system, the accurate data rights confirmation system of enterprises dynamically describes the actual data rights structure of enterprises. The system of rights is the

interactive crystallization of social complexity, rights concepts, systems, and practices. Based on the actual characteristics and usage needs of data, enterprises can create substantive data rights, such as data possession, use, production and processing, income, and disposal (with restrictions). Then, based on the purpose and method of use, such as public interest, consumer welfare, industrial ecological construction, etc., a configuration plan is formulated according to institutional constraints.

In practice, the enterprise data accurate confirmation framework can help draw the industrial chain map of enterprise data business activities, clarify the organizational structure of enterprise data business and management, and determine the necessary links such as confirmation and compliance for business development. Therefore, the "Enterprise Data Accurate Confirmation Framework System" is a dynamic data rights structure that describes enterprises in specific data resources and business scenarios, while the "Data Rights Legal System" is a static rights system structure defined and protected by public power under the legal system framework. By comparing the two systems, enterprises can observe the differences and rights conflicts between "business practice-legal system", adjust the data rights allocation plan in a timely manner, improve data compliance requirements, formulate decision-making plans, and provide a framework for analysis and research.

Regarding the structure of data rights, there are concepts such as power ball and power bundle in the academic community[14]. The concept of "power ball" is represented by data ownership and data usufruct rights, and is the theoretical basis adopted by the "standardized right confirmation path". It believes that rights are the complete, single, absolute, and autonomous rights of the subject to the object. The concept of "power bundle" comes from the theory of Hofield and others, which understands rights as a series of actions that the subject can take against others, describing what people can and cannot do with the resources they have, including but not limited to possession, use, change, transfer, etc., or to prevent others from infringing on their interests[15]. The structure of data rights can be based on eight basic legal concepts, described one by one according to the "three-variable model of rights and legal relationships", like a "power bundle" made of rights sticks, summarized to form a data rights system.

In terms of the concept of data rights bundle, enterprises can create various data rights, which are a series of actions that subjects can take against others. Based on the three-body model of data, nine basic rights are created by definition of the most important data social activities of enterprises, that is, nine data rights relationships form the basic framework of enterprise data rights, and the main roles of rights relationships are named. Different enterprises can improve and adjust the precise rights confirmation system framework according to their own situation and changes in the external market.

The main roles in the basic framework of the enterprise data precision right confirmation system include: first-order data providers, collectors, and storage providers, collectively referred to as data material "holders"; second-order information processors, distributors, and users, collectively referred to as information value "operators"; and third-order governance regulators, regulators, and dispute resolvers, collectively referred to as data rights "rulers"[10]. The enterprise data power infrastructure is constructed from bottom to top according to three levels, each of which is relatively independent and interrelated. Low-order power is the basis for realizing high-order power, and high-order power is the constraint of low-order power.

Among them, the first-order collector, second-order allocator, and third-order supervisor are the core roles in data power allocation decision-making, and vertically constitute the pillar of the enterprise data precision right confirmation system.

The basic framework for accurate confirmation of enterprise data has three main functions. Firstly, draw an industrial chain map of enterprise data business activities, identify internal and external related data rights subjects based on data activities; secondly, clarify the organizational structure of enterprise data business and management, adjust and optimize the scope of responsibilities of the company, departments, and positions according to business development and regulatory needs; thirdly, determine the necessary links such as confirmation and compliance for business development, and quickly collect key factors that affect business revenue, cost, and risk to improve decision-making efficiency.

The private rights agreement and public power protection for accurate confirmation of enterprise data are at the core of the research framework for accurate confirmation of enterprise data. Firstly, by referring to China's existing laws and regulations on intellectual property, anti-unfair competition, and anti-trust, enterprises can develop a data power system recognized by the judicial system according to their business needs, in order to incorporate data rights and interests into the protection scope of public power as much as possible. Furthermore, enterprises can clarify the rights and obligations between the supply and demand parties through contracts, and rely on the autonomy of private rights to resolve most of the rights contradictions and conflicts. Based on the recognition of the existing legal system, the data rights legal relationship constructed through agreements or contracts can serve as the evidence basis that the court can accept in the case of disputes over data ownership, thus ensuring that the rights and interests of enterprise data can receive effective judicial support and relief. This indicates that the "accurate confirmation" path has high practicality for the protection of enterprise data rights and can provide practical value-added service application solutions for power enterprises.

4 Case Study On The Value-added Application Of Power Enterprise Data Based On Precise Ownership Confirmation Framework

Power companies mainly face the following three main difficulties when conducting threat and risk assessment: Firstly, constantly updated rules, including laws, regulations, and judicial legal precedents, have a significant impact on the formulation and modification of evaluation standards. Secondly, the complexity of power grid data business is an important factor. The data resources in hundreds of projects involve various types of power users, enterprises, and power grid companies. Business customers include different types such as governments, power companies, financial enterprises, and industrial parks, making Compliance Evaluation of each project very difficult and requiring lawyers, business, and management professionals to participate in the evaluation. Thirdly, the traditional hierarchical approval model decreases the evaluation efficiency, and because each project requires a professional team to evaluate, the approval period tends to be longer, therefore lowering the evaluation accuracy and standardization. Facing the above challenges, the "accurate right confirmation theory" can provide useful guidance and response strategies for power companies in the value-added application of data.

Taking the data value-added service promoted by "electricity data plus finance" in a certain province in China, 2021 as an example, the "Enterprise Data Power Research Framework" is used to analyze the case of data value-added services for power enterprises.

Step 1: Analysis of Data Value-added Service Process

Financial Institution, as the demand side of data value-added services, can effectively solve the problems of difficult loans and financing for small and medium-sized enterprises by intuitively understanding the real operation status of enterprises and indirectly understanding the level of enterprise capital chain through data on enterprise electricity consumption, electricity payment data, etc., in order to avoid pre-loan and post-loan risks. Provincial power companies are data resource holders and processing users. Enterprise electricity consumption data involves commercial privacy and power grid security, and trustworthy data circulation technology is needed to achieve trustworthy and secure transmission of electricity data to the demand side. Small and medium-sized enterprises, as customers of provincial power companies' electricity consumption enterprises, are the equity parties of enterprise basic information and electricity consumption data, and are also customers of bank loans. They can authorize banks to access their electricity consumption data.

Step 2: Comparison of data business plan capabilities

From the perspective of data service-oriented enterprises, external power analysis is carried out by three-stage reverse method based on business processes. Based on the form of data service delivery and the classification and grading of data resources, the main external activities are determined, the legal relationships involving subjects and rights are clarified, and the legal concept analysis framework of Horfield's rights is applied, please check the Table 1. They are sorted out and included in the key power list one by one, and the source of legal effect is indicated as the basis for evaluating the legality of data business and the compliance of data processing activities.

In the data business design plan, the form of data service delivery determines the business model of data service-oriented enterprises, the original data source and information transmission delivery method, which will lead to the transfer of electricity data resources from the provincial power company to financial or government entities. The exclusive rights and interests of the provincial power company's data holding and operation will be reduced, and the power and influence in the data market will decrease. In small-scale businesses, because it does not trigger public interests, the provincial power company is the active party of power, and decides whether to provide this service based on the service agreement of the power enterprise and the value-added rights compensation plan provided by the bank. The classification and grading of data resources involved in the design plan directly affects the scope of power relationship subjects of data value-added services. Whether it will be included in the regulatory constraints of public power will cause the decision-making process of data business. From enterprise independent decision-making to the need for approval by regulatory departments such as the government, it may also be necessary to introduce third-party organizations for technical security and compliance audit evaluation, increasing the uncertainty of early investment costs and decision-making results.

Table 1. Data Empowerment Key List

Data Services Form of delivery	Data resources Classification and grading	Main activities External body	Data Empowerment Key List Comparison
Deploy business system (based on the original data source algorithm model verification information, do not transmit enterprise information)	Small-scale: Involving basic information of the enterprise, monthly electricity consumption, and historical electricity consumption data	Collection: Electricity enterprises	[Electricity-using enterprise] requests [Provincial Electric Power Company] to read electricity data rights: [Electricity-using enterprise] (right) - [Provincial Electric Power Company] (duty); legal effect is based on contract agreement (agreement should be attached)
		Use: Bank (passive power)	[Provincial Electric Power Company] requests [Bank] to provide authorization documents for electricity companies: [Provincial Electric Power Company] (right) - [Bank]; the legal effect is based on the electricity service agreement (with attached agreement) and data security law and other laws [Electricity Enterprise] Authorization [Bank] Power to read electricity data: [Electricity Enterprise] (power) - [Bank] (Liability); legal effect based on contract agreement (should be attached)
Data packet (transmission of enterprise basic information and historical electricity data) Data interface api (calling enterprise basic information and monthly electricity data)	Large-scale: promoting tens of millions of enterprises throughout the province, involving regional public data (whether it belongs to national important data, judged according to industry grading standards).	Regulation: Local government departments (may also involve industry or national regulatory agencies)	[Local government departments] supervise the relevant powers of [public data agencies]; the legal effect is based on the local government public data management regulations, and is refined into rights relations as needed. (Regulations should be attached)
		Use: Bank (active power)	[Bank] Request [Provincial Electric Power Company] Right to transmit data: [Bank] (right) - [Provincial Electric Power Company] (duty); legal effect is based on the contractual agreement between the two parties (agreement should be attached)

Step 3: Data business plan adjustment decision

How to maintain the legitimate rights and interests of enterprise data business autonomous decision-making? Data business plans can be adjusted and the initiative of enterprise data business can be strengthened by using new digital technologies and building internal compliance systems. Digital technology innovation and application, such as Privacy Computing and Trusted Computing, reduce original data sources and information data transmission included in hierarchical management, and this solution is the main method to enhance the autonomy of enterprise data business decision-making. In recent years, the statistics and analysis of national data value-added services by State Grid Corporation of China have less adopted the service mode of original data source and data call interface, but have integrated more innovative service models with single functional data products, such as

Data Analysis result SMS and Data Analysis report, and integrated functional system services, such as online platforms (web, app), visualization systems, business models, algorithm services, and derivative service products, such as technical consulting reports, Data Analysis services, technical testing services, business optimization services, etc.

However, new technologies cannot guarantee absolute security, and may not meet the value-added service needs based on original data sources. At the same time, it may also bring about a significant increase in technology-related costs. In this case, it may be necessary to redesign the power scheme, such as choosing a service model that increases compliance supervision, establishing an internal data business compliance system, or choosing to transfer some data rights through market-oriented means to avoid regulatory intervention. Finally, for multiple schemes, comprehensively compare their costs, benefits, and risks and finally make business decisions.

5 Conclusion

This article provides guidance for the precise management and value-added application of data resources in power enterprises by deeply exploring the practice and challenges of precise ownership confirmation theory in the application of data value-added services in power enterprises. Combining theoretical research and empirical analysis, we found that accurately defining data ownership and responsibilities, optimizing data quality and value evaluation methods, and introducing advanced technology are key elements for the successful application of data value-added services in power enterprises.

In practice, we have realized that accurate data ownership confirmation not only helps to increase the value of enterprise data assets, but also promotes innovation and development in the power industry. By constructing a reasonable data resource ownership confirmation framework and process, potential data utilization risks and conflicts can be reduced, and the rights and interests of enterprises, users, and relevant stakeholders can be protected.

Although this article provides a new perspective and strategic suggestions for the precise ownership confirmation theory research on the application of data value-added services in power enterprises, we still face some limitations in research and practice. For example, specific application scenarios may also involve other influencing factors, regulations, and policy updates. Therefore, future research can further explore the feasibility and development potential of precise confirmation theory in power enterprise data management from multiple dimensions.

In short, we believe that the research on the application of data value-added services for power enterprises based on the theory of precise data ownership confirmation not only provides useful reference for China's power enterprises in data management, but also helps to promote the innovation and sustainable development of the entire industry in the era of Big data and Artificial General Intelligence.

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