Big Data Property Rights Confirmation Scenario and Its Applicability of Rights Confirmation Technology

Haijun Zhao* and Yanlin Wang
School of Information, Guangdong University of Finance and Economics, China

*Corresponding author email: zhaohj.gdufe.edu.cn

Abstract. The rapid development of the new generation of information technology constantly promotes the value appreciation and realization of big data, and the demand market for big data transactions is forming gradually. As the basis of big data transaction, the ownership of data property is worthy of wide attention in academic circles. This paper summarizes and analyses three scenarios of big data property rights confirmation and their tasks and work content, discusses five technical means and their applicability of big data property rights confirmation, and probes into the construction of large data information property rights evaluation model in the changeable dynamic environment. It is hoped that this paper will provide scientific reference and guidance for the future work of big data right confirmation.

Keyword: Big data; Information property rights; Property rights confirmation scenario; Rights confirmation technology; Value assessment of property rights.

1. Introduction
With the rapid development and wide application of modern information technology such as Cloud Computing, 5G, IPV6, and the Internet of things, "Information Explosion" has become the norm. The explosive growth of social information resource and the diversification information consumption demand suddenly pushed today's society into the "big data era" which causing "social information resource" quickly replaced by "big data resource" to become a popular word. Meanwhile with the gradual excavation of the value of big data resource and the gradual establishment of the exchange market, big data resource has begun to be transformed into big data assets, and the problem of property rights confirmation of big data is gradually attached importance by the industry and academia. Relevant literature studies show that the issue of big data information property rights confirmation has become a hot topic in information science and information property rights research [1][2]. The fourth plenary session of the 19th central committee of the communist party of China (CPC) gave the policy guidance firstly that "data can participate in the distribution as a factor of production according to its contribution", which further stimulated the public to accelerate the legislation of data property rights confirmation, strengthen the protection of data property rights, and promote the transaction of data property rights [3]. Big data property rights confirmation is not only the scope of data quality and subject responsibility to be considered in the construction of big data information resource, but also the scope of rule of law practice in dealing with infringement and rights protection in big data information integration service and consumer market, and more importantly, the technical and economic scope of big data circulation and property rights value exchange. We call them respectively the scope of confirming the property rights of big data quality responsibility, the scope of confirming the property rights of big data safeguarding practice, and the scope of confirming the property rights of big data value exchange, which run through the whole life cycle of big data production, storage,
processing, integration, circulation, consumption and its reprocessing, reintegration and re-circulation to undertake and play different historical missions including different tasks and work content of rights confirmation, showing different scenarios of data property rights confirmation. The purpose of this paper is to analyze and study the scenarios of big data property rights confirmation corresponding to the three categories of rights confirmation as well as the applicability of rights confirmation technologies and route measures.

2. Big Data Property Rights Confirmation Scenarios
The scenario of big data property rights confirmation means the occasion and scene of property rights confirmation of big data. Property rights of big data is also known as property rights of big data information or property rights of big data information resource. In previous studies, we divided information resource into three types according to the production mode of information resource: independent property rights information, accompanying property rights information and non-property rights information[4][5]. Similarly, according to the production mode of big data, it can also be divided into independent property rights data, accompanying property rights data and non-property rights data. Big data property rights confirmation needs to identify and confirm the property rights type composition, property rights ownership subject and value of property rights in the subject "big data aggregation" that needs to be confirmed. The target "big data aggregation", which usually needs to confirm the rights, is not only the raw material source of information resource construction and information product processing, but also the object of information dissemination and information consumption, as well as the subject matter of big data circulation market transaction. On this basis, we can differentiate the three scenarios of big data property rights confirmation truly: big data property rights confirmation in the scenario of information resource construction and information product processing, big data property rights confirmation in the scenario of information dissemination and information consumption, and big data property rights confirmation in the scenario of big data circulation and transaction.

3. Tasks and Work Content of Big Data Property Rights Confirmation in Different Scenarios

3.1. Big Data Property Rights Confirmation of Information Resource Construction and Information Product Processing Scenario
The basic task of information resource construction and information product processing is information collection and orderly processing, the goal is to identify the sources of all kinds of information and ensure the accuracy and reliability of data and the traceability of quality responsibility, the key basic work is the scientific indexing of all kinds of information entities and the standardization of metadata. In this regard, the information resource management and library and information community has established a scientific, strict processing system and work system. However, information indexing and the standardization of metadata in the big data environment are faced with the challenge of huge human and material input and technical realization, so a set of corresponding system solutions is urgently needed to solve the crisis. In addition, the information is always in a rapid, expansion and complex recycling which is "flow -- use -- processing -- re-flow -- re-use". Information forms such as zero intelligence, primary intelligence, secondary intelligence and multiple processing intelligence, as well as types of property rights including independent property rights information, accompanying property rights information and non-property rights information coexist with the same information resource construction and information product processing institutions. The structure of information property rights and ownership of property rights are complicated. How to do property rights indexing of information entities with different granularity, different states, different formats and different sources in the construction of information resource and processing of information products under the big data environment has become a big realistic problem because of the industry still lacking a complete information property rights indexing standard system and effective working mechanism. Therefore, we believe that the most urgent task at present is to establish and improve the standard system of information property rights indexing and effective information property rights indexing mechanism. On this basis, every information resource construction and information product
processing institution should not only do a good job in normal information indexing and orderly processing, but also do a good job in information property rights indexing of its own information resource construction and information product processing according to the classification standards of independent property rights information, accompanying property rights information and non-property rights information, and also can handle the work of backtracking and re-indexing of various information sources and information entities of non-property rights information. The current need is to build a scientific and complete digital rights management information system (DRM)\(^6\) to ensure the standardization management of information property rights indexing work. The purpose of information property rights indexing is to clarify the persons responsible and ownership of rights and interests for information resource and quality of information products and to ensure its traceability; Secondly, to prevent infringement and prepare for their potential rights protection; Thirdly, to provide warrant support for information resource construction and information product processing institutions' information property rights evaluation and commercial operation. Information property rights indexing is essentially the self-confirmation of the ownership structure and quality responsibility of the organization's information resource and products, which is the basic step of information property rights confirmation. The key step is to evaluate the value of information property rights, including the evaluation of the agency's own property rights information and the value evaluation of accompanying property rights information. The specific tasks and work content are shown in table 1:

**Table 1.** Specific tasks and work content of information resource construction and information product processing institutions

| Information property rights confirmation task | Work content |
|-----------------------------------------------|--------------|
| **1) Study and establishment of Information property rights indexing standard system and working mechanism** |
| ① Establishment of Information property rights indexing standard | Information property classification standard, Information property category ID code, Attributes and description criteria of information property rights indexing data element, Information property rights indexing template, The encapsulation format of information property rights indexing elements, Perform entity classification and identification specifications in the data traceability model, Specification for classification and identification of activities in the data traceability model, The formulation of the data set and its parameters in the data traceability model, etc |
| ② Establishment of working mechanism of information property rights indexing | Legislation on information property rights indexing, Business process specification for information property rights indexing, Information property rights machine automatic indexing mechanism, Working mechanism of manual indexing of information property rights, Construction and Application of Digital Rights Management System (DRM) |
| **2) Information property rights indexing** |
| ① Indexing of independent property rights information | Basis 1) Apply specification and working mechanism of information property rights indexing to index and encapsulate the data sets or data products whose property is independent with independent property attributes in the process of information resource construction and information product processing of the organization. |
| ② Indexing of accompanying property rights information | Basis 1) Apply specification and working mechanism of information property rights indexing to index and encapsulate the data sets or data products whose property is accompanying with accompanying property attributes in the process of information resource construction and information product processing of the organization. |
| ③ Indexing of non-property rights information | Basis 1) Apply specification and working mechanism of information property rights indexing to index and encapsulate the data sets or data products who do not have property with non-property attributes in the process of information resource construction and information product processing of the organization. |
3) Information property rights Classification

|   | Basis 2) Apply information property rights indexing and special data traceability technique (such as ProVOC traceability technology, property right clustering based on machine learning, etc.) to cluster the independent property rights information resource owned by the institution and establish the corresponding classification mapping database. |
|---|---|
| 1 | Clustering of independent property rights information |
| 2 | Clustering of accompanying property rights information |
| 3 | Clustering of non-property rights information |

4) Information property rights valuation

|   | Basis 3) Apply information property rights classification to evaluate the value of the independent property rights of the institution scientifically. |
|---|---|
| 1 | Independent property rights information valuation |
| 2 | accompanying property rights information valuation |
| 3 | Non-property rights information valuation |

Generally, the independent property rights information is represented as the basic business information or the original information directly generated in the business process; The accompanying property rights information is the secondary information formed by processing and calculating the basic business information and the extracted non-property rights information according to certain order rules and statistical operation rules. Therefore, it determines the difference between the pattern and model of property rights value evaluation of independent property rights information and accompanying property rights information, which needs to be evaluated separately. We define the total value of the property rights of our information assets as V. The value of independent property rights information is defined as $V_z$. Accompanying property information value is defined as $V_b$. The acquisition and procurement cost of non-property rights information is defined as $V_f$. Cost of production of primary business information is defined as $V_s$. The processing cost of secondary information is defined as $V_i$. The external spillover value of independent property rights information is defined as $V_{zy}$. The external spillover value of accompanying property rights information is defined as $V_{by}$. The data quality coefficients corresponding to the information of different property right types are $\delta_{sq}$, $\delta_{jq}$, $\delta_{fq}$ respectively Then:

$$V = V_z + V_b + V_f \delta_{fq}$$  \hspace{1cm} (1)
$$V_z = (V_s + V_{zy}) \delta_{sq}$$  \hspace{1cm} (2)
$$V_b = (V_j + V_{by}) \delta_{jq}$$  \hspace{1cm} (3)
$$V = (V_s + V_{zy}) \delta_{sq} + (V_j + V_{by}) \delta_{jq} + V_f \delta_{fq}$$  \hspace{1cm} (4)

(the evaluation model of $V_s$, $V_{zy}$, $V_j$ and $V_{by}$ are given later, in which the size of $V_{zy}$ and $V_{by}$ are determined by their potential market demand capacity, and the values of $\delta_{sq}$, $\delta_{jq}$ and $\delta_{fq}$ are calculated.
according to the national standard of "GB/T 36344-2018 information technology -- data quality evaluation index”).

3.2. Big Data Property Rights Confirmation of Information Dissemination and Information Consumption Scenario

In the environment of big data on the Internet, information infringement and information property rights protection incidents occur frequently in the process of information dissemination and consumption. In the judicial aspect, to deal with information infringement and information property rights protection issues, the first is to get evidence of infringement, and the second is judicial judgment. Whether the evidence of infringement or judicial judgment, both need to confirm the rights of big data information.

Information dissemination refers to the process that the information controller will transmit and disseminate the original property rights information, secondary property rights information and outsourcing information to the outside world. According to the prevailing information security laws at home and abroad, the information controller must fulfill the "data security obligation” in the process of information dissemination [7]. Data security obligations include personal information protection obligations, business secret information protection obligations and state secret information security obligations, Etc. Information infringement in information dissemination can be divided into three types: personal private information infringement, business secret information infringement, and illegal leakage of state secret information.

Information consumption refers to information utilization, including information acquisition, information resource integration, and information resource utilization. Information infringement in information consumption can be roughly divided into three types: infringement in information acquisition, infringement in information resource integration, and infringement in information resource utilization.

In the scenario of information dissemination and information consumption, the rights to confirm big data is to carry out Scientific forensics, judicial confirmation, and the assessment of infringed rights and interests according to relevant information laws and regulations and take certain technical measures. The specific tasks and work content are shown in table 2:

| Rights confirmation tasks | Work content |
|--------------------------|-------------|
| Information property rights confirmation in information dissemination | 1. Information forensics of personal private information |
| 2. Judicial decisions on information property rights protection | Memorial compensation for infringement of personal private information |
| Information property rights confirmation in information consumption | 1. Information forensics in information acquisition |
| | Memorial compensation for infringement of business confidential information |
| | Penalties for illegal leakage of state secret information |

Table 2. Specific information property rights confirmation tasks and work content in the information dissemination and consumption scenario
To determine whether information infringement has occurred during information dissemination or whether to fulfill the "security obligation on data", evidence shall be obtained. For different transmission methods, corresponding technical means are generally adopted to electronic forensics, such as electronic forensics transmitted by computer networks, electronic forensics transmitted by mobile communication, and electronic forensics transmitted by radio and television, etc. Although the process steps of obtaining evidence have certain common characteristics, the strategies, tools and technical means of obtaining evidence are different due to the different cases, objects and circumstances of forensics [8]. As shown in table 3:

**Table 3.** Comparison of electronic forensic process and work content of information infringement on computer network and mobile phone communication

| Electronic forensic process of information infringement in computer network communication | Procedure | ① Preparation stage | ② Crime scene protection | ③ Crime scene investigation | ④ Data security |
|---|---|---|---|---|---|
| Computer data forensics process | Corresponding work content | Understand the case, legal documents and preparation of forensic tools | Security protection, fixed records, isolated objects, key crime sites and tools protection | Switch machine processing, memory data extraction, encrypted data extraction, storage computer | Online mirroring, static fixing |

| Network platform data forensics process | Procedure | ① Preparation stage | ② Conceived | ③ Computer remote investigation | ④ Evidence fixed |
|---|---|---|---|---|---|
| Corresponding work content | Familiar with the network environment, clarify the inspection objectives, and prepare screen recording tools | Record the inspection time and clear the local browse cache information | Track site routing information and verify the veracity of the site being surveyed | Page fixed, calculate the hash value of electronic data |

**Electronic forensic process of information infringement in mobile communication**

| Procedure | ① Preparation stage | ② Crime scene protection | ③ Crime scene investigation | ④ Data extraction |
|---|---|---|---|---|
Corresponding work content
Legal license, tools and program preparation
Signal shielding, keep state, isolate mobile phone
Mobile phone inspection, peripheral search, confirmation of key evidence
Methods, techniques, contents and evidence custody

Table 4 lists the domestic famous electronic data forensics service provider "Meiah pico" part of the electronic data forensics technology and the function of tools and equipment. Whether it is the infringement of personal private information in information dissemination, or the infringement of business secret information and the illegal leakage of state secret information, all can be confirmed by means of electronic data forensics, providing scientific basis for judicial judgment and punishment compensation.

**Table 4. Comparison of electronic data forensics technology equipment and function**

| Electronic evidence collection working method | Core technologies and tools | Brief introduction of main functions |
|---------------------------------------------|-----------------------------|-------------------------------------|
| Crime scene investigation                   | DC-8610S Anti-fraud Guardian Electronic Material Evidence Rapid Investigation System | Multifunctional integrated information quick mining and quick survey equipment, which integrates on-site rapid survey, point-to-point accurate rapid mining, computer rapid mining, mobile phone collection, material evidence management, and case management. Meet the needs of fast-track information acquisition, electronic data forensics, and physical evidence entry. Data connection background system can perform data aggregation, analysis, research and mining, and realize front-end and back-end integration, on-site and laboratory linkage. |
|                                             | DC-8811 Forensics Rubik's Cube. V3 | Portable equipment with comprehensive reconnaissance and forensics capabilities. It integrates read-only analysis, high-speed hard disk replication, batch forensics, fast forensics analysis, dynamic simulation, and parallel processing technologies. It can quickly complete on-site computer, mobile phone, and video rapid investigation, and can be docked. Forensic analysis of laboratory fixing, analysis, simulation, etc. |
|                                             | DC-8670 multi-channel high-speed acquisition system | Multi-channel computer hard disks can be obtained at high speed without disassembling the machine. Using multi-channel acquisition technology, the actual acquisition speed is as high as 50GB / min or more. At the same time, the product can also be connected to forensic equipment, and the obtained hard disk can be read-only for forensic analysis and intuitive browsing. |
| Laboratory forensics                        | DC-8680 Genie Computer Cache System | Portable, easy-to-use, high-speed and efficient computer evidence cache site survey equipment. |
|                                             | Dc-8202 high speed hard disk replication system | Set of replication, mirroring, recovery, validation, erasure and other functions and multi-channel parallel processing of high-speed hard disk replication and field access to portable evidence fixed equipment. With copy, do not disassemble copy, mirror, restore, check, erase, keyword search and other functions. Replication speeds up to 18GB/min. |
|                                             | FS-2100P Laboratory Forensics Comprehensive Management System | A comprehensive management platform for laboratory case information and business processes built on the basis of the current requirements for the construction of electronic data forensics laboratories with the goal of standardization, IoT, and intelligence. |
FM-Lab Mini Forensics
King Kong Distributed Forensic Analysis System

A high-speed intelligent distributed forensic analysis system applied to electronic data forensics laboratories, highly integrated distributed computing and massive storage modules, supporting distributed computing of aggregated equipment capabilities, and creating a high-speed intelligent distributed forensics laboratory.

CT-2210 Face Recognition Development Kit

A development kit that integrates camera real-time data acquisition, face detection and face recognition. The interface in the development kit can be called as needed to implement the functions of face detection and face recognition.

The basis for judging whether there is information infringement in the information acquisition link, information resource integration link, and information resource utilization link of information consumption is whether there is a valid license of the information property owner and whether the license conditions are strictly enforced in each link of information consumption. They are called information acquisition permission, information integration permission, and information use permission. If the license of the information owner is not obtained or the license conditions are violated, the information infringement shall be deemed. Specific manifestations of infringement and available judgment methods are shown in table 5:

**Table 5. Strategies for confirming information infringement at various stages of information consumption**

| The link of information consumption | Specific behavior of information infringement | Methods and strategies of Judgment |
|------------------------------------|-----------------------------------------------|----------------------------------|
| ① The link of information acquisition | Interception, illegal purchase, illegal collection, etc. | Electronic data forensics, license authentication |
| ② The link of information resource integration | Illegal collection, unprincipled crawler-like integration, deliberately removing or tampering the person in charge of information production or indexing marks’ property and indexing data elements’ property of original information when entering the warehouse, etc. | Data traceability, reversible hidden mark extraction, electronic data forensics, license authentication, blockchain authentication, intelligent inspection based on machine learning, digital rights management technology applications |
| ③ The link of information resource utilization | Information release and processing against the will of the information owner, providing information service without desensitization, development and utilization beyond the conditions stipulated in the license contract, etc. | Data traceability, electronic data forensics, license authentication, blockchain rights verification, intelligent inspection based on deep learning, and application of digital rights management technology |

Although information infringement is a normal behavior in information dissemination and information consumption in the real world, judicial action for information property rights protection usually occurs only on the premise of reporting and filing a case. It is often associated with cases, and the objects of infringement evidence and judicial judgments are often limited to the actual case scope. Therefore, the object of value assessment of data property rights in the information property rights protection scenario can only be limited to the scope of the subject matter of infringement confirmed by evidence collection, that is, only the value assessment of rights loss due to infringement can be carried out, which is different from the evaluation of information property rights of the institution in the information resource construction and information product processing scenario.
3.3. Big Data Property Rights Confirmation in Big Data Circulation and Transaction Scenario

New big data circulation and trading places are springing up all over the places during the wave of big data capitalization, there are government-mediated big data exchanges, such as Guiyang big data exchange, or enterprise-regulated like Data Tang, or industry alliance-regulated such as big data trading platform in Zhongguancun. The premise of big data circulation and value exchange is to have clear ownership and discrimination mechanisms of property rights, which is the regulatory system of big data property rights confirmation. At present, there is a lack of legal system for big data property rights confirmation and big data transaction in China. The maintenance of big data transaction order can only be carried out according to the current information and business regulations. It is urgent to develop the technology, standard system, business process, work specification of big data property rights confirmation, and also the standard system of big data property rights value evaluation. Therefore, our purpose is to summarize the comparison of property rights confirmation tasks and work content from some specific data information in big data circulation and transaction scenario, which are shown in Table 6:

| Property Confirmation Tasks | Rights Confirmation | Work content |
|-----------------------------|--------------------|--------------|
| ① Investigation and formulation of technical standards for big data property rights confirmation | Technology system of big data property rights confirmation, rule system of big data transaction, construction standard of big data transaction platform, disclosure specification of big data information, description standard of transaction data in big data transaction platform, trace-ability model and technical standard of big data property rights, data quality evaluation index of transaction data set in big data transaction platform, value evaluation model and indicator system of transaction data set in big data transaction platform, investigation and development of business process and rules for rights confirmation of big data. |
| ② The legitimacy test of big data circulation | To judge if the transaction data is desensitized and to the test of desensitization level, whether the property rights of the transaction data is clear, whether the property rights structure of the transaction data set is within the range of reasonable use, whether the derivative data has the source license, etc |
| ③ Big data property attribute clustering | Based on the information property index standard or machine learning and in-depth learning to intelligent differentiate the clusters and measurement statistics for labor or computer from independent property information, accompanying property information and non-property information |
| ④ Evaluation of big data property | According to the property rights structure of transaction data, scientific evaluation is carried out according to the value evaluation model of independent property rights information, accompanying property rights information and non-property rights information |
| ⑤ Judicial judgment on safeguarding rights of big data transaction | Based on the rights confirmation and evaluation, during big data transaction, evidence for the infringement behavior will be taken, the loss value of the infringement will be evaluated and the penalty will be decided according to the relevant laws and regulations |

The investigation and formulation of big data transaction, technology and standard system of big data property rights confirmation need the joint efforts and collaborative work of national information management department, national standardization management department, big data production enterprise, big data technology service enterprise, big data information integration and consulting service organization and big data transaction platform operation organization. While the evaluation models and methods for big data property rights need the collaboration between academy and industrialization. In this research article[9], we have analyzed the research results from experts and scholars in the field of data assets evaluation, which can be roughly divided into four schools: school of traditional intangible assets evaluation, school of intangible assets evaluation method improvement, school of quantitative impact factor evaluation and school of algorithm evaluation. These methods are
valuable scientific reference and practical significance for big data property evaluation. However, nowadays the big data transactions are characterized of high complexity and fast dynamics, so that we need to consider how to build a dynamic model of big data property evaluation from the dynamic perspective according to big data re-synthesis and re-circulation, so as to provide more scientific theoretical guidance and technical support for continuous and consistent big data transactions. Therefore, we propose the following solutions, as shown in Table 7:

**Table 7. Big Data Property Rights Value Evaluation Model and Index Selection in Transaction Circulation Scenario**

| Data type of the transaction | Property rights Categories | Valuation Models | Indicator Selection and Related Instructions |
|-----------------------------|---------------------------|------------------|---------------------------------------------|
| Continuous streaming data, intermittent streaming data, basic business data | Independent Property Rights | \[ V_z = (V_x + V_y) \delta N_x \] | The definitions of \( V, V_z, V_b, V_f, V_s, V_j \), \( V_{by}, \delta N_x, \delta N_t, \delta b_z \) are the same as before. Meanwhile, define \( M_z \) as the data capacity of the independent property rights information, \( m_z \) as the native data capacity produced per unit time, \( T \) as the data production time, \( \alpha_z \) as the application appreciation coefficient of native data (data production cost per unit capacity), \( \beta_z \) as the application appreciation coefficient of native data (the ratio of application appreciation rate and social average application appreciation rate in this field), \( N \) as the number of potential users in the market, \( n \) as the number of users permitted by the contract, \( M_j \) as the data capacity of accompanying property information, \( m_j \) as the secondary data capacity produced per unit time, \( \alpha_j \) as the cost coefficient of secondary data, and \( \beta_j \) as the application appreciation coefficient of secondary data. |
| Data Processing Product | Accompanying Property Rights | \[ V_h = (V_t + V_b) \delta N_t \] | |
| Arbitrary Data Set | Mixed Property Rights | \[ V = [m_z T \alpha_z + V_x N^2 \beta_z (n/N)] \delta N_x + V_f \delta N_f \] | |

In view of the cyclic and changeable characteristics of big data production, circulation, reprocessing and re-circulation, we consider the value evaluation of independent property rights information, accompanying property rights information and mixed property rights information of any data set separately, so as to be suitable for big data asset transactions under different circumstances. If it is the transaction of the property rights of the original data, the independent property rights value evaluation model is selected; If it is secondary data property rights transaction, the accompanying property rights value evaluation model is selected; If the data set is arbitrary, the hybrid property valuation model is selected to implement cluster accounting using intelligent clustering methods based on machine learning and deep learning. Therefore, we proposed an intelligent contract solution for data property rights confirmation in literature [10], tried to build a data property rights confirmation classifier and created "intelligent contract SC1 for data property rights confirmation based on quality and quantity" and "intelligent contract SC2 for data property rights confirmation based on property value and attribution".

The property rights value of big data is not only reflected in its usability, but also in its external spillover value. Therefore, Metcalfe’s Law is introduced here to set the number of potential market users index \( N \) of big data assets; Set a consumption coefficient indicator \( (n/N) \) with taking the actual value obtained by the data buyer into account; Application of different types of big data in different industries and fields will produce different effects and economic benefits, so the application appreciation coefficients \( \beta_z \) and \( \beta_j \) are also set, and statistical calculation is required for different industries and fields.
The use value of data is related to data quality. National Standard GB/T 36344-2018 proposed the evaluation index system and calculation method of six dimensions, including standardization, completeness, timeliness, accuracy, consistency and accessibility. According to this, the data quality factors $\delta_{sq}$, $\delta_{jq}$, and $\delta_{fq}$ of the three different data types can be calculated separately.

4. Functional Analysis of Big Data Property Rights Confirmation Technology

Through analysis of previous research results, the technical means used for property rights confirmation of big data can be roughly summarized as follows: five types of technology such as data citation technology, data traceability technology, reversible information hiding technology, electronic data forensics technology and block chain technology, as well as an auxiliary tool -- data property rights management information system. Data citation technology is a technical means to track the data output source by the indexing marks of scientific data in academic literature or related scientific research achievements and related data products. Data traceability technology is a technical means to track the data quality, trace data owners and record data changes. Various data traceability models such as 3W model [11], 7W model [12][13] have been generated successively, and standard systems such as OAIS [14] and Standards [15] have been formed. Reversible information hiding technology is a method based on lossless data compression to embed tag information into carrier media in a reversible way to protect its intellectual property and copyright. Electronic data forensics, originated from judicial expertise, is based on the evidence extraction and fixation technology of the trace of the actor's electronic information, widely used in the field of information property rights protection and intellectual property protection now. Block chain technology is a chain data recording means which is recognized common maintenance, not easy to tamper, not easy to forge, with a timestamp and information traceability. Data Property Rights Management Information System (DMS) is an extension of digital rights management system (DMS). It is a management information system that standardizes and controls the metadata of relevant elements of data original rights and the elements of subsequent data property rights changes. From the perspective of function, data citation technology is suitable for the retrospective confirmation of fine-grained document entities, database entities and related data processing products; Data traceability technology is suitable for the retrospective confirmation of multimedia information entities and databases and their subsequent changes; Reversible information hiding technology is more suitable for the backtracking of a single fine-grained information entity, a single electronic media or a single database; Electronic data forensics technology is suitable for the tracking and forensics of electronic information and its changing track carried by all electronic information media; And block chain technology can only effectively verify and confirm the rights of data information recorded by block chain technology or verified by block chain technology. The construction of the data property rights management information system needs to study the technical principle and working practice of the above five information property rights confirmation methods seriously, so as to establish and improve the metadata and data element system of big data property rights management as soon as possible, and utilize the function of assisting in rights confirmation when it is applied.

5. Conclusion

Regulation construction is the most important part in industry development. The hot era of big data is giving birth to a new industry -- the rights of big data verification. There are more and more institutions and enterprises to conduct commercial operation around the business of big data property rights verification. However, the policies, regulations and industry standard system on the business of big data property rights verification have not been completely established, which means the regulatory construction is still a long way to go. Therefore, no matter what scenario is used to confirm the rights of information, the first problem to be solved is the legitimacy of the business, and then the construction of technical standards and code of conduct system, which includes not only the construction of technical standards and work specifications for property rights indexing of big data information, but also the construction of technical standards and work specifications for rights confirmation of big data, as well as the construction of a data property rights management information system with complete functions and friendly and easy to use. The current expediency is to apply the
above five methods of information property rights confirmation to meet the needs of big data property rights confirmation in different scenarios flexibly and comprehensively. In the scenario of information resource construction and information product processing, the central task of big data property rights confirmation is to actively participate in the construction of the technical standard and work specification system of information property rights indexing, and to do a good job in the property rights indexing and property rights value evaluation of the information resource and information products of the enterprise; In the scenario of information dissemination and information consumption, the work of big data property rights confirmation is driven by the demand for information property rights protection, and the most appropriate way to work is to comprehensively absorb all available electronic technology means for electronic data forensics, and conduct value evaluation within the confirmed scope of the invasion; In the big data circulation and transaction scenario, if the transaction is clear original basic business data and secondary processing data, then the value confirmation is carried out directly according to the independent property rights information assessment model and the accompanying property rights information assessment model. If it is a mixed data set, property rights clustering should be conducted by machine learning and deep learning according to the flexible use of the above five kinds of rights confirmation technology and the data property rights confirmation classifier and related intelligent contracts, and then calculate property rights according to the assessment model of mixed data set. It is worth mentioning that block chain technology has the inherent data property information indexing function and powerful data property rights audit function. Meanwhile, it will also produce certain governance function to the work of data property rights confirmation. Therefore, it is necessary to use block chain technology in information resource construction, information property rights protection, big data transaction scenario and information property rights confirmation, so as to make future big data property rights confirmation work simpler and easier.

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