

Research Article

Legal Model Construction Approach of Big Data Transaction Management in the Digital Information Perspective

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This paper constructs and applies the legal model of transaction management in the digital information perspective based on the approach of big data. To solve the problem, it is necessary to integrate various legal tools, construct an idealized legal model of big data transaction management, conduct interprofessional and interdisciplinary research on the big data transaction management problems that are difficult to be regulated by the existing legal norms, and selectively design and arrange the corresponding system, to provide the digital regulatory tools for the operation of the digital economy and promote the scientific and standardized development of the digital economy. Based on the decentralized blockchain platform, sealed bidding is used to achieve information isolation among nonconspiratorial data buyers, and through the big data auction algorithm, the purpose of the conspirators cannot be achieved and anticomplicity is realized. The model is based on smart contracts and combined with auction theory to achieve anticollision in the process of big data auctions. Based on the model, we construct an anticomplicity big data auction mechanism and dissect the big data auction algorithm. The correctness of the model and algorithm is demonstrated through simulation. After the data is hosted, the data will be completely owned by the big data trading center. In the data transaction process, the big data transaction center provides data resource information to data buyers, so that data buyers can select the required data. Second is the construction of a multilevel regulatory system in the administrative supervision of the construction of the central national security leading institutions led by the interregional collaborative regulatory system and in the industry self-regulatory supervision of the implementation of the data trading platform data trading supervision obligations. The balance between the development of the data trading industry and data trading security is comprehensively maintained from multiple perspectives of legislation and law enforcement.

1. Introduction

With the development of the digital economy, digital resources represented by big data began to gradually evolve into an important factor of production, integrating with other factors in the process of creating economic value, bringing changes to our life, work, and thinking [1]. And in the big data trading industry, the big data trading platform plays an important role and plays multiple functions. First, big data trading platform can promote data integration; a large amount of data concentration, organization, and cleaning can help strengthen data control capabilities so that enterprises improve the authenticity and reliability of data based on demand analysis. Second, the data transaction services provided by the big data trading platform can

improve the speed and scale of data circulation, so that the data can give full play to its value in the sale and transmission. Systematic regulation of big data trading platforms can solve the problems of scattered trading rules in big data trading within the platform, improve the safety and efficiency of trading within the platform, and promote the healthy development of big data trading. While there are innovative development in Internet applications, innovation and development of functions, and expansion of digital ideas to help human beings explore new cognitive fields faster, more efficiently, and more reliably, the frequency of use and flow of data is also increasing, forming a new economic form, that is, the digital economy, which has become the fastest-growing area of the global economy [2]. The digital economy has become the fastest growing area of the global

economy and is now the core driver of global economic growth.

With the rapid development of technology, data has become increasingly important. In today's high-speed development of the Internet, data is no longer a string of cold code but has become an important resource with great significance and value for individuals, enterprises, and the country. To promote the protection and utilization of data resources and advance the development of the data industry, it is not only of legal significance but also of practical significance to establish a legal protection system around the flow of rights in data transactions from the attributes and characteristics of data [3]. This shows that the big data trading center does not have the threat of retaining the data resources of the data owner. The concept of unwillingness to retain data is that big data trading centers can retain data, but they are unwilling and not motivated to retain data, which shows that big data trading centers have the potential threat of retaining data resources of data owners [4]. The data right is the basis of the right flow of data transaction, and the different types of data will lead to the different subjects of data right, the data right of the initial state of the underlying data belongs to the user, the data right of the data product belongs to the producer of the data product, while the data right in the transaction process will be transferred according to the agreement of the transaction agreement.

This paper aims to provide doctrinal support for the governance of big data transactions, especially those occurring within big data trading platforms, through a legal perspective, broaden the boundaries and observation perspectives of the development of big data rule of law, and enrich and improve the relevant theories. It is also hoped that this paper can provide innovative legal solutions or solutions to various dilemmas in big data transactions, promote the creation of a big data transaction environment with clear responsibilities and fairness and unity, and bring new impetus to the development of big data industry. Insisting on exploring the protection and development mode of data transaction from the attributes and characteristics of data will not only objectively benefit the development of the data industry but also promote the improvement of legislation so that the traditional law can adapt to the needs of the times in the data era. The protection of data transactions promotes each right subject to pay attention to and use their data rights, and on this basis, the data needs of different subjects are realized through trading, swapping, collecting, etc., and then gradually develop into industries and markets, and relying on private law to protect data transactions and then promote the development of data industries is also the main route for the development of data industries in other countries.

1.1. Related Work. Arguing that ownership may not be the appropriate framework for addressing people's anxieties and broader data protection and privacy rights and that control regimes and rights are a better perspective for considering the state of personal data, those who collect information have a far greater degree of control over personal data than

those who generate it [5]. Data subjects under data protection practices will not be sure what is happening to their data, while data controllers will always be free to collect, use, control, and further process data if they act following fair information principles [6]. In their view, when people are in the era of great social change, those traditional ethical norms are easily abandoned, and with the advent of the big data era, we need to establish new ethical norms based on big data, and we also need to adjust our ethical behaviors [7]. The possible privacy leakage problem is analyzed from the perspective of data application. He believes that human beings are moving toward the era of big data, and the application of data technology is closely related to people's lives, and all the people's behaviors will leave traces, which poses the risk of personal privacy being leaked, and people's privacy will face a great threat [8]. The issue of big data security risk was concerned and studied, and the occurrence of big data security risk and the possible future direction were also predicted.

The advent of the big data era has made people's need for data freer, but with data, freedom comes serious security risks. When people engage in online behaviors, whether it is search traces in search engines or information, photos, and audio videos shared on social networking platforms, these data traces will be saved forever by the network [8]. Therefore, we need to understand the importance of the "right to erasure" of data, which will be of great value and significance to our data security. Digital platforms in the digital economy serve data, and the relationship between the ability to process data and the development of digital platforms is proportional, while the two interact with each other [9]. Through their own unique factors, to express their own value, virtual property relies on data in terms of both expression and constituent elements. If there is no data, then there will be no virtual property, and data can exist independently of virtual property, and it is still the cornerstone of the Internet and continues to be used for other concepts and transaction services. The larger the share of digital platforms in the market, the more data they have, the more significant the output effect is, and the higher the requirement for their ability to extract, control, and analyze data [10]. If digital platforms cannot guarantee the provision of good data services, users in the market will choose alternative service providers, which is the development of the digital economy in society forced by digital platform competition [11].

Based on the profit-making nature of enterprises, the willingness and extent of enterprises' investment in economic activities depend on whether their data can be adequately in their activities, so enterprise data also deserve to be protected by a data protection mechanism. In addition to the security interests of data, there are other data interests worth protecting in the application and flow of data in different contexts, and the data governance model according to a single field can no longer meet the needs of data interest protection under the current development of the globalized digital economy. And data security is not only reflected in personal data security and privacy security but also in the security protection of national data, government data, and

social public data, and the problem of protection priority ranking will arise.

2. Algorithm Design for Big Data Transaction Management in Digital Information Perspective

The hosted transaction model is that each data owner hosts his or her data in the database of the Big Data Exchange, and then the Big Data Exchange trades with the data purchaser. The participants of the hosted transaction model are mainly the data owner, the Big Data Exchange, and the data buyer [12]. Before the data transaction, the data owner hosts the data resources it owns to the Big Data Exchange, and after the data is hosted, the Big Data Exchange will fully own the data. During the data trading process, the Big Data Exchange provides data resource information to the data purchaser so that the data purchaser can select the required data. After the data buyer has selected the required data and paid all the money, the Big Data Exchange will provide the data buyer with an interface to download the data resources so that the data buyer can obtain the data. The most characteristic of the hosted transaction model is that the subsequent application of the data is independent of the data owner, e.g., the object of the transaction, the number of transactions, etc. The rights and interests of the data owner depend entirely on the reputation of the Big Data Exchange.

Big data trading intermediary platforms, as trusted third parties, have expressed their unwillingness and lack of incentive to retain data resources. But the inability to retain data resources and the unwillingness to retain data resources are two completely different concepts. The concept of inability to retain data resources means that even if the Big Data Exchange wants to retain data, it cannot do so, which indicates that the Big Data Exchange is not a threat to retain the data resources of the data owner. With the improvement of enterprise data management capabilities, the new information generated will also increase. If the new information content belongs to the same category as the existing information content, it only increases the granularity of information management and does not change the relationship and status between information demand elements that do not need to be reidentified and selected. The concept of unwillingness to retain data is that Big Data Exchanges can retain data, but they are unwilling and unmotivated to do so, indicating that there is a potential threat to Big Data Exchanges to retain the data resources of data owners.

The NK model represents the whole system as a state space consisting of N system elements, and the system's adaptability to the environment or the effectiveness in the environment is called fitness. Each element of the system can be at a different level, and the combined performance of the N elements of the system determines the effectiveness of the system in the environment. In mathematical terms, a system with N elements $S = \{S_1^2, S_2^2, \dots, S_n^2\}$, each element S , has A alleles, i.e., A_i states, which are generally represented by different integers. When the alleles are in different states, that means the elements are in different states, and S_n^2 is used to

represent the system elements whose alleles are in different states. The state of the whole system can be represented by

$$s = s_1 s_2 \dots s_n. \quad (1)$$

All combinations of alleles constitute all possible states of the system, i.e., the design space of the system, which is an N -dimensional probability space [13]. A system S with different elements has a design space of different sizes, and the size of the design space is related to the size of the number of alleles contained in each element of S . The size of the state space of S can be calculated by

$$S = A_1 \cdot A_2 \cdot \dots \cdot A_N = \prod_{i=1}^N A_i. \quad (2)$$

In the NK approach, fitness is used to measure the utility of the system. Each system state corresponds to a fitness value of definite size. Each state in the system state space and its corresponding fitness value are linked together and mapped to the three-dimensional space.

Data is a fundamental concept in the field of the Internet, from the most basic code to data, to complex programs, and finally to the all-inclusive Internet. Data is always a fundamental concept to structure the entire complex world, as described in the movie; whoever controls the data in the future is the controller of the whole world. Data is both a fundamental concept of the Internet and a unit of measurement of the Internet. Any product that relies on the Internet can be expressed in terms of code and data, and data and code have become the metric of the Internet.

$$\rho_{CR} = \frac{\sum \lambda^2}{[\sum \lambda^2 - \sum \theta^2]}. \quad (3)$$

Code becomes a horizontal metric, like the radicals of characters, anything or product on the Internet is composed of code, while data becomes a vertical metric, the size of the data to describe the scale of the thing, through the horizontal and vertical boundary to enable people to visualize things on the Internet.

$$P(D) \geq \sum_{i=1}^m A_i^2 + \sum_{i=1}^m B_i^2. \quad (4)$$

It can be said that data is a separate and fundamental concept that is the cornerstone of the Internet, while the virtual property is an upgraded version of data, which is based on data and expresses its value through its unique factors. The virtual property relies on data in both its manifestation and composition and without data, there would be no virtual property, while data can exist separately from the virtual property and continue to serve other concepts and things as the cornerstone of the Internet.

$$\rho_{AVE} = \frac{\sum \lambda^2}{[\sum \lambda^2 + \sum \theta^2]}. \quad (5)$$

Although there are many types of data, based on the characteristics of data and data trading practices, data can be broadly classified into data in the public domain and data in

the private domain, data in the private domain can be classified into common data and private data, and the criteria for such data classification are based on the objective state of data and data trading practices.

The nonexclusivity and intangibility of data determine that part of data is a kind of data available to everyone, a kind of data in the public domain, which is not meant for data trading because this kind of data does not exist in the initial state of the right holder, no one can exercise the right to it, and no one needs to fulfill the relevant obligations to it, and anyone who needs it can use it at will, as shown in Figure 1.

Competition under the threshold of competition law refers to the activity of competition between operators in the commodity economy activities to obtain greater economic benefits. Although the market economy is market demand-oriented, which can optimize the allocation of resources in the market and enhance economic vitality and efficiency, the market itself cannot form an environment to maintain free and fair competition order; once the development of competition in the market economy reaches a certain level, monopoly and unfair competition will follow. If we only rely on the spontaneous formation of business ethics and rules to manage and regulate the market, we cannot guarantee the sustainable and healthy development of the market. The former affects not only the production process but also the process of making supply chain management decisions. The latter influences what information is used to make each decision, that is, through the Petri net to simulate the modeling and analysis of the supply chain business process and solve the strong correlation information in the supply chain.

Therefore, it is necessary to adjust and intervene in the state economic management department and regulate the unfair competition through competition law to provide a channel for relief of rights and interests for the subjects who suffer from unfair competition and to provide a favorable development environment for the market subjects and finally realize the substantial justice of market competition.

$$P_{\min} = \left| \sum_{i=1}^m A_i^2 - \sum_{i=1}^m B_i^2 \right|. \quad (6)$$

In this paper, we use information categories as the components of data systems rather than specific and detailed information as the information requirement elements. The reason is that there are numerous information requirements included in the digital transformation of the supply chain, and the specific information content will always change and increase as the management capability of the enterprise improves. Moreover, with the improvement of enterprise data management capability, the new information generated will also increase. If these new information contents belong to the same category as the existing information contents, it only increases the granularity of information management and does not change the relationship and status between information demand elements; then, it is not necessary to reidentify and select information demand elements. Using information categories as information requirement elements can avoid the impact on element selection arising from such common changes, as shown in Table 1.

The centrality and causality of each element are calculated based on the degree of influence and the degree of being influenced. The centrality of an element indicates the degree to which an element interacts with other elements in the system to form a combined influence and affected relationship. However, considering the intangibility and nonexclusivity of data, it should be considered that the ownership of data, the right to benefit from the data, and the right to use the data have the same basis and source of rights and are all generated based on the control of the data if the data can be controlled. The centrality of an element is expressed as the summation of the influences and influenced degrees of the element. The causality of an element indicates the net value of the influence of an element on other elements in the system. The causality of an element is expressed by subtracting the value of the influenced degree from the influence degree of the element.

$$\begin{aligned} m_i &= f_i - e_i, \\ n_i &= f_i + e_i. \end{aligned} \quad (7)$$

In the calculation results, the centrality of the element is always greater than 0. The greater the centrality of the element is, the more the element is involved in the interaction between the influencing and influenced elements in the system, and vice versa, the less. In the system, the greater the centrality of the elements involved in the interaction between elements, that is, the greater the degree of influence on the system, the more important the element in the system, that is, the relative importance in the information needs of the elements but large. The cause degree $n_i > 0$ of the element can be positive or negative when the cause degree of the element indicates that the element has a greater degree of influence on other elements in the system, called the cause element. When the cause degree of the element indicates that the element is influenced by other elements in the system to a greater extent, it is called the result element, as shown in Figure 2.

Synchronizer reflects the information backup in the business process and the conditions of business selection and is a powerful tool for Petri net when modeling business processes. When modeling the digital supply chain, the a-variation concurrency in T1 means that the digital supply chain management decision needs to obtain all relevant information before making a management decision, and the b-variation concurrency in T2 means that after a management decision is made in the digital supply chain management link, the decision result will affect all relevant information and make it updated and then ensure that the subsequent decision points can be based on the latest information.

When mapping the business processes of supply chain management, it is also necessary to consider the production methods of the company and the depth of information integration between the company and its partners [14]. The former affects not only the production process but also the process of making supply chain management decisions. The latter affects which information needs to be used in the process of making each decision. In other words, the

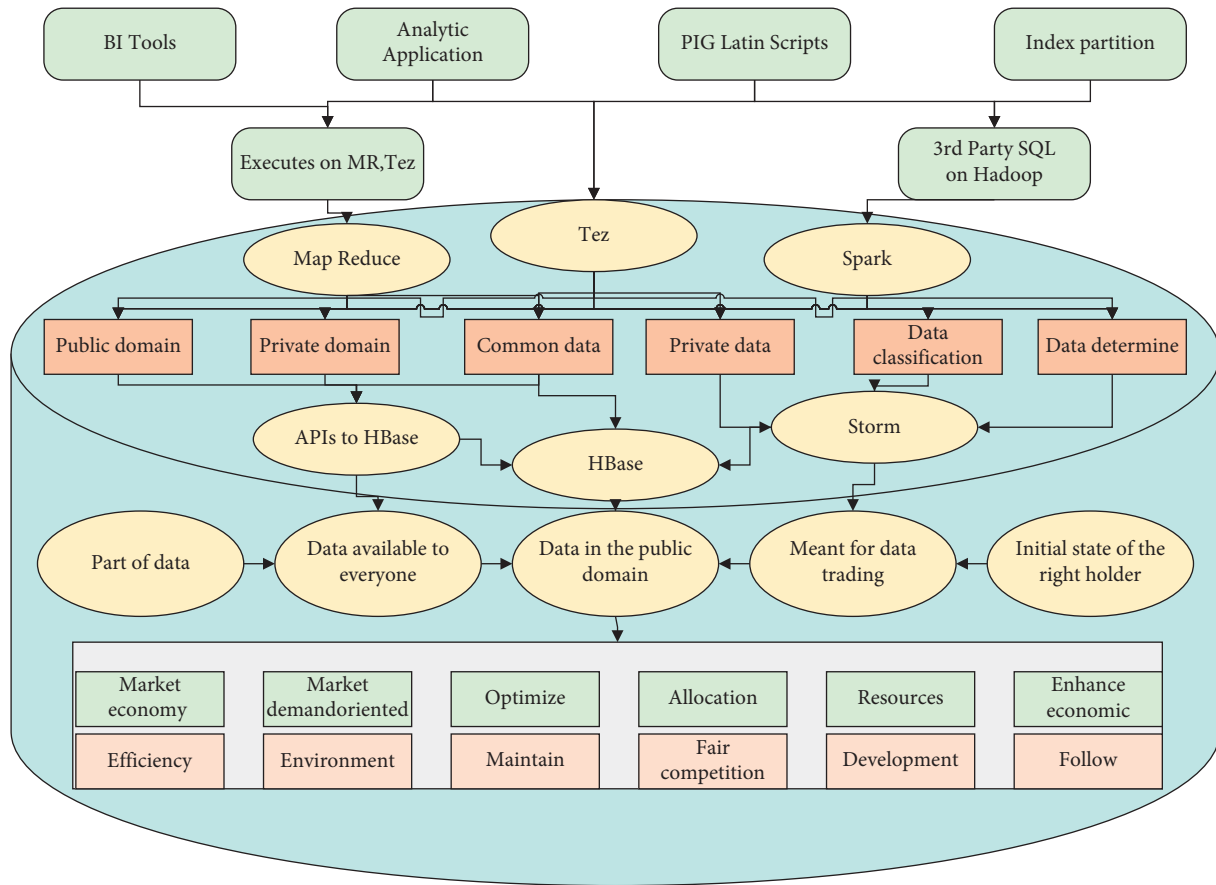


FIGURE 1: Big data transaction management algorithm framework.

simulation modeling and analysis of supply chain business processes through Petri nets solve for the strongly correlated information in the supply chain. The identified supply chain business processes need to be combined with the production methods of manufacturing companies, the content of cooperation between manufacturing companies and their partners, the specific decisions in the supply chain, and the information basis that needs to be obtained for each decision.

3. Transaction Management Legal Model Construction Design

First, the concept of the legal model of big data transaction management has theoretical value. On the one hand, the special properties of data determine that big data transactions will eventually develop into global transactions, and in this process, the legal model of big data transaction management can provide systematic and technical research and analysis for data rule of law issues in the field of general civil and commercial transactions and competition regulation, thus bridging the split state of existing data legislation [15]. The current data interaction is mainly carried out through online transactions, and the data transaction history in the cloud can even hide access traces. It is convenient and has many hidden dangers. The virtualization and electronic characteristics of the Internet space make the qualifications

of Internet subjects uneven, and the data source and data flow of data transactions are not guaranteed. On the other hand, the value of constructing a legal model lies in building a framework for the application of legality standards, designing legal elements, and building a new type of rights normalization system. The problems posed by new technologies can be effectively applied by the legal interests they are intended to protect and the original intent of the legal text formulation. For example, the regulation of data containing personality rights or property rights requires effective integration with existing legal norms, research, and analysis of the content of civil law and other legal disciplines, and the search for the theoretical basis and legal and technical regulatory paths for the integration of data management with existing legislative concepts, to achieve new interpretations of new issues. This is also to open the way to solve the problems that modern law can hardly cope with and to promote the paradigm transformation of traditional legal norms for the regulation of new types of behaviors.

Big data transactions in the digital economy are a kind of transaction behavior, which is carried out and completed in the market. Given that all kinds of mature commercial transactions today have their transaction models, then big data transactions will gradually form a big data transaction model with the expansion of the market and the increase of transaction behavior. However, due to the complexity of its

TABLE 1: Information requirement element system composition.

| Serial number | Elements of information needs |
|---------------|--|
| A1 | Information on the supply and consumption of raw materials |
| A2 | Production and processing of progress information |
| A3 | Production and processing of efficiency information |
| A4 | Production and processing of quality information |
| A5 | Production and processing of risk information |
| A6 | Dynamic Inventory Information |
| A7 | Returned Product Availability Information |
| A8 | Product production and quality traceability information |
| A9 | Dynamic capacity and equipment utilization information |
| A10 | Equipment reliability and maintenance needs information |
| A11 | Factory Environmental Control Information |
| A12 | Material Planning Information |
| A13 | Purchase order and outsourcing order information |
| A14 | MRO Component Ordering Information |
| A15 | Finished product delivery information |
| A16 | Resource Constraint Information |
| A17 | Supply Chain Performance Information |
| A18 | Supplier Performance Information |
| A19 | Demand information |
| A20 | Omnichannel Marketing and Sales Information |
| A21 | Customer feedback information short-term trend information |
| A22 | Material Planning Information |

transaction links and numerous risk points, it is difficult to form a transaction model spontaneously like traditional commercial transactions, so it needs to be constructed actively.

The model takes the data collection, storage, transmission, and application process under the big data transaction management scenario as the risk point and can realize the concrete and visualized management of big data transactions; with the risk module, transaction module, calculation module, and evaluation module as submodules, it can systematically organize the risk issues and form the framework of the legal model of big data transaction management; in response to the lack of data legislation at the present stage and the because of the lack of data legislation at the present stage and the need for optimization of the business environment, the legal elements of data ownership, market order, and legal responsibility are used to construct the module internally, as shown in Figure 3.

The legal model operates with each module as a gathering point, and the risk communication between the data processing process and the related legal elements (data ownership, digital market order, and legal liability) within the module and finally the iterative communication within the model form a closed loop through the risk supervision and evaluation system [16]. After that, risk disposal is performed; if the information provided is not sufficient, another iteration is performed on the risk point after modifying the scene parameters; risk decision point 2 is risk

disposal, which mainly depends on the effectiveness of the risk assessment. This will facilitate the effective combination of static legal regulation and dynamic new technology, which will help the ongoing data legislation and is the theoretical practice of the important assertion that “rule of law is the best business environment.”

It is necessary to confirm the content of data property rights around the characteristics of data and the general provisions of property rights and refer to the provisions of various data trading platforms to determine. The author believes that data property right is a right concept like property right and claim and is a new type of civil right, including two subordinate right concepts of data control right and data use right; data property right is also a comprehensive right, which has the attributes of both personal right and property right.

Data property rights can refer to as data rights, because data right is neither inclined to the perspective of property right like data ownership nor inclined to the Anglo-American property law system like a data property right, and data right has been expressed in the relevant papers, and its right connotation is mostly property right connotation, as shown in Figure 4. From the provisions of various platforms, the rights around data mainly include data ownership, data use rights, and data benefit rights, and the concept of property rights also emphasizes these three categories of rights, but considering the intangible and nonexclusive characteristics of data, it should be considered that the rights of data ownership, data benefit rights, and data use rights are based on the same basis and source and are all based on the control of data [17].

If one can control the data, one can objectively use and benefit from the data, and usually, the benefit and use of the data cannot be realized without having control over the data.

It is foreseeable that in the future, the frequency of data transactions will become faster and faster, and the same data may be sold to more than one subject, so if the contract is required to be concluded on a one-to-one basis, it will not only lead to low efficiency but also is not conducive to enhancing the value of data. The data trading platform will make technical processing of data trading according to the corresponding specific model, promote the standardization and typification of data trading, advance the efficiency of data trading, and promote the protection of the flow of data trading rights and interests.

4. Big Data Transaction Management Performance Results

Enterprises currently do not systematically manage the data generated in the supply chain, and whether certain data are collected depends mainly on whether there is a corresponding management module in the enterprise resource management software. Moreover, enterprises do not make specific requirements on attributes such as quality, frequency, and accuracy of data collection. In addition, even the data required to be collected in the resource management software are not comprehensively collected and updated in real-time. The level of business

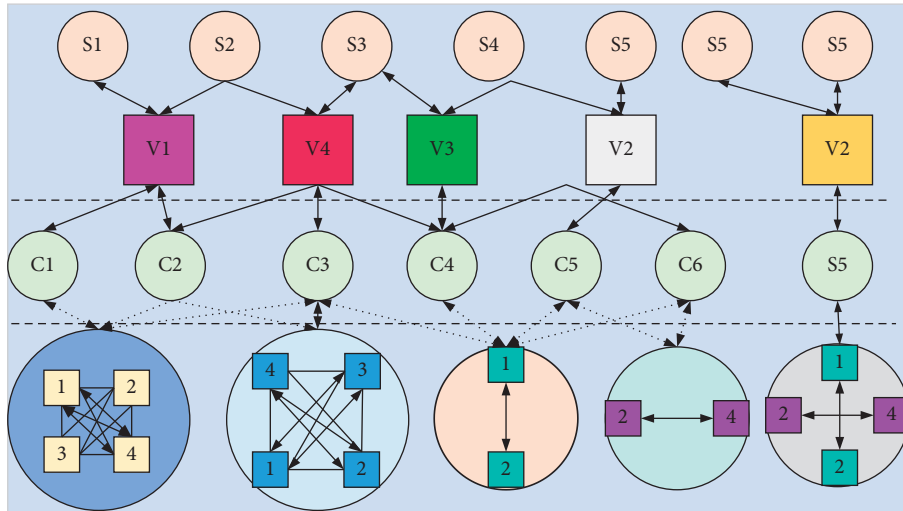


FIGURE 2: Interaction of process logic and management logic.

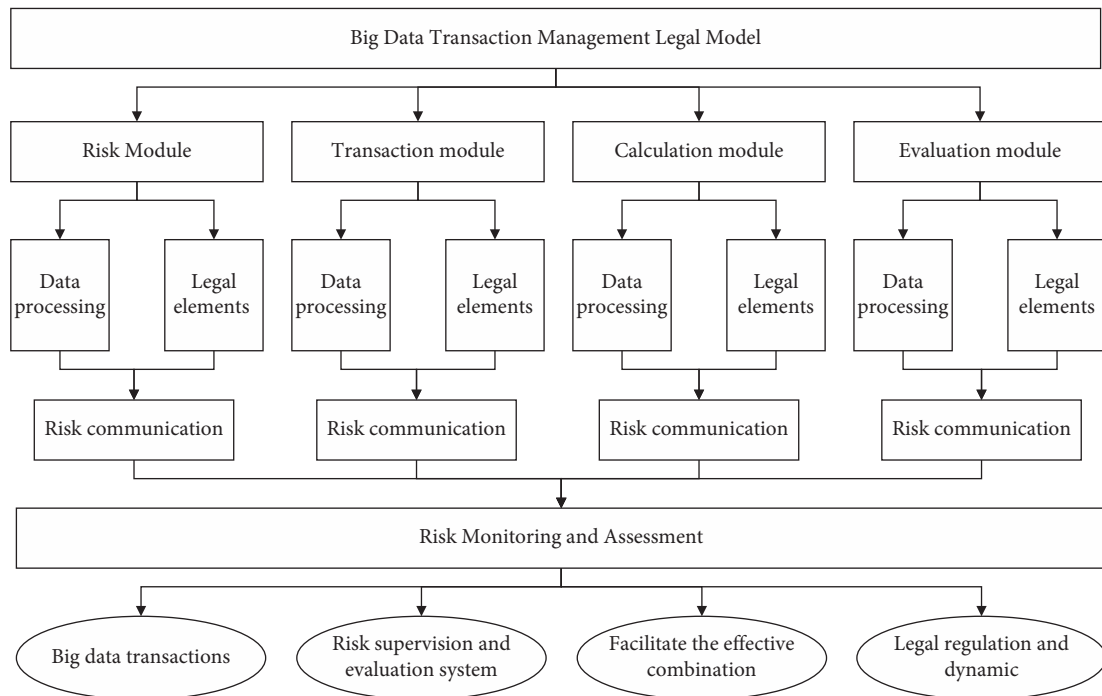


FIGURE 3: Legal model of big data transaction management.

process management that is affected by data management is also not optimized and improved. It enables enterprises to conduct demand analysis based on improving the authenticity and reliability of data. Secondly, the data transaction service provided by the big data transaction platform can improve the speed and scale of data circulation, so that data can give full play to its value in buying, selling, and transmitting. To realize the digital transformation of the supply chain, the data needs to be managed systematically first.

After the judges have scored the interactions between the information requirement elements with their professional knowledge and supply chain management

practices, the scores are averaged and rounded to obtain the direct influence matrix results as shown in Figure 5. The top 15 factors are the causal factors, indicating that these factors have a stronger influence on other factors compared to the influence of other factors. In particular, the top 4 factors, supplier performance information, plant environmental control information, equipment reliability and maintenance requirements information, and resource constraint information, are more ahead of other factors in terms of cause degree and show stronger initiative in the interaction of information needs, while rarely being influenced by other information factors. The good or bad management level of these information

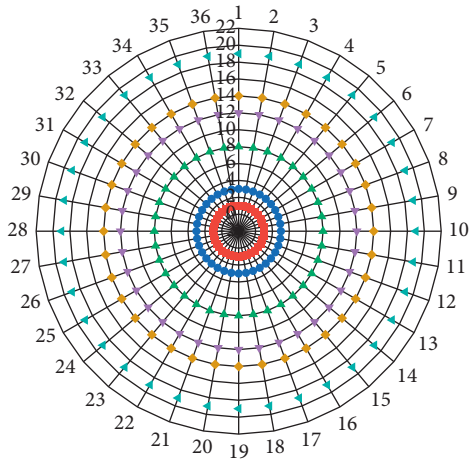


FIGURE 4: The better life snowflake.

demand elements can affect the quality and management level of other elements.

Improper management of elements can lead to amplified management errors on other elements. To reduce this impact, the cause element is the information that needs to be managed in a focused manner.

On the one hand, data transactions have hidden and invisible special characteristics, which require stronger regulatory measures; on the other hand, the whole process of data transactions is carried out virtually, which is more convenient to track the flow compared with traditional transactions. The data trading platform takes the corresponding regulatory obligations, adopts data flow tracking technology, ensures the traceability of data transactions in the platform, tracks the data flow, and helps to identify the parties or third parties that violate data security and personal information protection, which should be its dynamic regulatory responsibilities that are different from other third-party platforms, as shown in Figure 6.

The current data interaction is mainly carried out through online transactions, and the data transaction history conducted in the cloud can even hide the access traces. Convenience and at the same time hidden dangers abound, the virtualization of the Internet space, electronic characteristics of the Internet subject qualification varies, the data source of data transactions, and data flow are not guaranteed.

Once there is a data leakage or security crisis, it may be obstructed by technical barriers to pursue the upstream and downstream participants in the data trading industry chain, and some data interactions or transactions are concealed by technical camouflage under some legal interconnection behaviors, making it more difficult to identify the data trading infringement and the data trading industry chain. In addition to the difficulties, the workload is also huge.

The traditional regulatory approach has been unable to meet the needs of the development of the digital economy, and the legal model of big data transaction management is constructed through contract theory to solve this problem of obstacles to the application of traditional laws in the digital

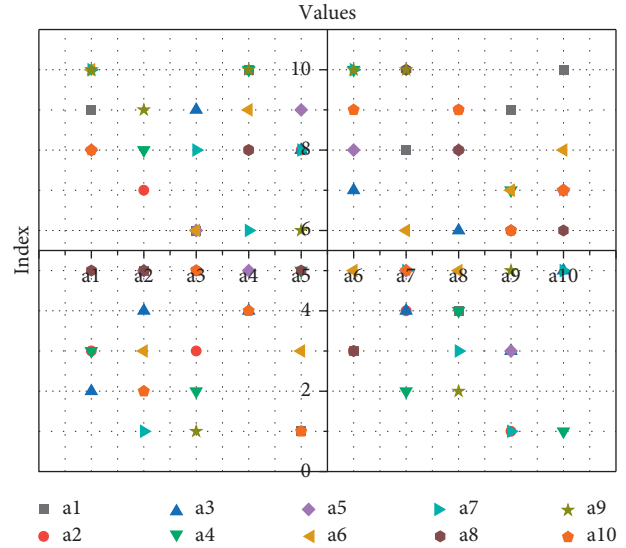


FIGURE 5: Expert scoring results of the relationship between information requirements elements.

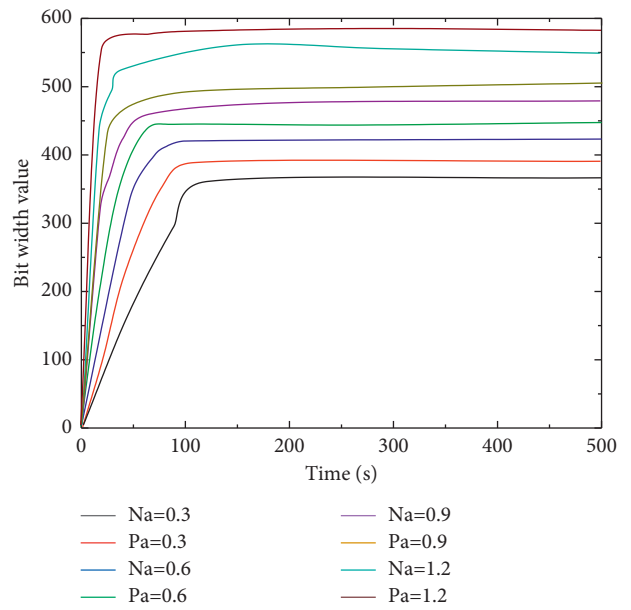


FIGURE 6: Model simulation results.

economy. At the same time, the two interact. The greater the share of digital platforms in the market, the more data they hold, the more significant the output effect, and the higher the requirements for their ability to extract, control, and analyze data. The market provides better services and data products.

Contract theory, which is the study of analyzing the economic behaviors and results between different people in a specific transaction environment, simplifies the transaction attributes to a certain extent by assuming conditions (pre-defined problems) and establishes a model to analyze the transaction process and derive results. Big data transaction is realized by platform algorithm technology, and algorithm

activity is also a legal behavior; when the legal model is introduced, the volitional behavior of the algorithm designer triggers to become a legal relationship to make predictions and decisions on big data transaction behavior, which is the construction process of legal model of big data transaction management, with predefined problems, legal elements, and regulatory procedures as the content of the construction process.

5. Results of the Performance Analysis of the Automated Accompaniment System

The part of regulation and evaluation of the legal model of big data transaction management is the construction of the calculation module and evaluation module, i.e., the process of the “data-law-artificial intelligence” module.

This is an important response to the effective connection between the overall legal model and its submodules, as well as an important element in the construction of the evaluation system of the digital business environment, which plays an important role in supporting and improving the design and implementation of specific reform programs to optimize the business environment. The specific process is as follows: firstly, the scenario is constructed based on the transaction module, then the data compliance calculation framework is constructed based on the calculation module, the risk identification is carried out through the evaluation module, and finally, the evaluation module leads to complete the supervision and evaluation of the whole legal model, as shown in Figure 7.

Two risk decision points need to be established among them to complete the process of risk communication between the data processing and legal elements within each module of the diagram to build a regulatory and assessment system. In the innovative development of Internet applications, the innovation and development of functions and the expansion of digital ideas help humans explore new cognitive fields faster, more efficiently, and more reliably. This section adopts the interactive research method of “theory formulation - practical verification theory improvement,” starting from analyzing the types of big data transactions, constructing the computational model, conducting risk assessment and certification of the data flow process, and identifying the risk problems and their solutions through the analysis of transaction characteristics and illegal behaviors. Then, we will design feasible algorithms and use simulation experiments to verify the legal and technical aspects of the data legal system and evaluation mechanism.

Risk decision point 1 is a risk assessment of the generic scenario, which is concluded if the risk assessment is effective in determining the risk to be reduced to an acceptable level, followed by a risk disposition; if the information provided is not sufficient, another iteration of the risk point is performed after modifying the scenario parameters; risk decision point 2 is the risk disposition, which depends mainly on the effectiveness of the risk assessment. Promote the creation of a big data trading environment with clear responsibilities, fairness, and unity,

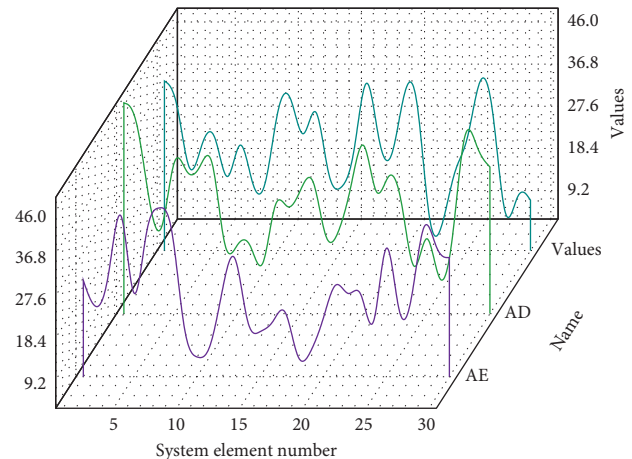


FIGURE 7: Reachable set, prior set, and a common set of system elements.

and bring new impetus to the development of the big data industry. Persistently starting from the attributes and characteristics of data, as well as exploring the protection and development model of data transactions, is not only beneficial to the development of the data industry objectively. The residual risk after risk disposal may not immediately reach an acceptable level, in which case another iteration of this risk assessment can be performed after changing the scenario parameters.

Confidentiality is intended to ensure that no one can interpret any communication between the parties or gain unauthorized access to the data. While confidentiality can be achieved through encryption, the confidentiality of off-chain communications between the user and IPFS must also be maintained. This ensures that only authorized users can access the data stored in the IPFS.

In the model, after a successful authentication handshake between the two parties, the message is encrypted and decrypted via a secure SSL session. This ensures mutual authentication between the user and IPFS. The use of blockchain and smart contracts in the model alleviates the burden of using Public Key Infrastructure (PKI) for encryption, as current PKI systems are centralized, lack transparency, and rely on trusted certificate authority in key distribution. In addition, each entity has a unique Ethernet address with an asymmetric public-private key pair, which can be used to encrypt messages transmitted over SSL sessions, as shown in Figure 8.

Data retention, anticomplicity, and antidata resale safeguard the rights and interests of data owners as a part of big data trading, respectively, thus helping to enhance the willingness of data owners to share and trade data, the success rate of big data auctions, the standardization of data resource circulation, and the value of data resources, which is conducive to the promotion of economic development, technological innovation, and social progress. The data right is the right of the data right holder to control and use the data, and it is the control and use of the personal rights and property rights carried by the data. Data rights are the basis for the transfer of rights in data transactions. Different

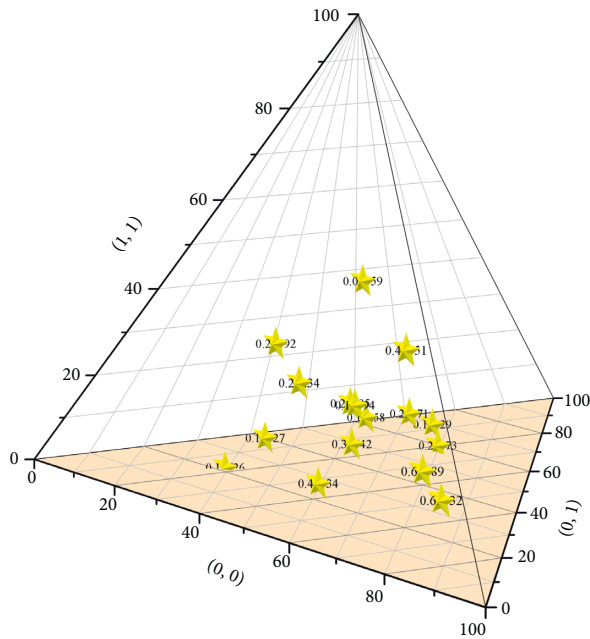


FIGURE 8: Model optimal optimization path.

types of data will lead to different ownership of data rights. The data rights of the underlying data in the initial state belong to the users, and the data rights of data products belong to the producers of the data products.

6. Conclusion

The three aspects listed in this paper form the foundational elements of a legal model for the regulation of big data transactions, and these structures will evolve as data technologies and legal systems evolve to dynamically adjust the regulation of data management. Thus, the legal model will evolve and will also require constant updating and maintenance. With the needs of the development of the digital economy, the simple borrowing model can no longer meet the needs of the development of the rule of law in economic construction. At this time, constructing a legal model is conducive to the effective combination of static legal regulation and dynamic new technology, which can tangibly regulate the invisible data flow risk. This is incomparable to other legal tools in solving the novelty problem and its impact on the depth level of the modern legal system, which will not only help the study of the positioning of data in the current legal system but will also help the introduction of computational models to assist in the solution of legal problems, thus realizing the interdisciplinary study of literature and science. The implementation of data trading platforms with special characteristics of data flow tracking and illegal content management of regulatory obligations is important. The design from different perspectives of data legislation and data regulation can balance more comprehensively the relationship between promoting data circulation and protecting individual rights and interests and safeguarding data security and promoting the orderly

and coordinated development of the big data trading market.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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