

Legal Dilemmas and Regulatory Design for Data Transactions

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Existing policies and institutional environment pay increasing attention to data transactions, but have yet to establish effective institutional support. As a result, they have failed to provide behavioral guidelines for the practice of data transactions. The main challenges in the construction of data transaction system are centered on the position of data in legal theory, the distribution model of rights and interests, the undefined legal nature of data transactions, the significant theoretical differences, and the insufficient top-level design of data transaction regulation and institutional system, which result in the inability to satisfy the needs of practice. Therefore, theoretical research should adequately respond to the practical demands of data economic activities from the perspective of data utilization, rather than data protection when constructing the distribution mechanism for data-related rights and interests, and distinguish the subject of the transaction to accurately define the legal nature of data transactions. Meanwhile, the functional position of data trading platforms should be clarified and systematic supporting regulations should be formulated.

Keywords: data, legal dilemmas, transaction, rules

Existing Policies and Institutional Environment for Data Transactions

Data, as an emerging factor of production, contains enormous economic and social value. The pursuit of greater development through data utilization and data flow has become the major focus of attention of all sectors of the society. At the same time, there are also many challenges. From an international comparative perspective, countries have enacted a series of laws and regulations to govern data transactions and utilization. China has also affirmed and supported the development of data trading market at both the policy and legislative levels. The *Outline of the “14th Five-Year Plan”* proposes to establish and improve the mechanism for trading of data property rights and industry self-regulation, and foster standardized data trading platforms and market participants. While significant progress has been made in the construction of data transaction regulations, a systematic, scientific, and effective data trading system has yet to be formed because of the controversy over theories of existing data jurisprudence and other practical difficulties. From the perspective of national policy direction, since the 18th National Congress of the Communist Party of China, China has attached great importance to data transactions as part of its work agenda, and actively adopted policy measures to promote the construction of pilot programs for data trading marketplaces. In August 2015, the State Council issued the *Outline of Actions for the Promotion of the Development of Big Data*, which explicitly stated that “it is necessary to guide

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the development of the big data trading marketplaces, and carry out the pilot programs for data trading marketplaces which could be practically applied”. In 2016, the *Circular of the State Council on the Issuance of the 13th Five-Year Plan for National Informatization* stated that the government will regard

the establishment of a sound institutional mechanism for the management of national data resources, and set up a system of policies, regulations and standards related to the accessibility of data, the protection of property rights and the protection of privacy, the improvement of the regulations for data assets registration, pricing, transaction, and intellectual property protection, and the exploration and cultivation of data trading marketplace

as one of the major work agenda and key projects. In 2016, the *Outline of the National Informatization Development Strategy* pointed out the imperative to develop information resources, release digital dividends, and explore the establishment of a system to protect the rights and interests of information assets. In 2019, the Fourth Plenary Session of the 19th Central Committee of the Communist Party of China made it clear for the first time that data could be considered a factor of production to participate in the distribution based on contribution. The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China, the *Opinions on Constructing a Refined Allocation System and Mechanism for the Marketization of Factors*, and the *Opinions on Accelerating the Improvement of the Socialist Market Economy System in the New Era* have further clarified the foundational and strategic status of data as a factor of production.¹ On August 12, 2020, the Ministry of Commerce issued the *Notice of the Ministry of Commerce on Issuing an Overall Scheme for Comprehensively Deepening the Pilot Programs for Innovative Development of Trade in Services (Commerce and Services TDC [2020] No. 165)*, which proposes to comprehensively explore the models of innovative development. With the support and guidance of the Cybersecurity Administration of China, the Ministry of Industry and Information Technology, the Ministry of Commerce, and the Securities and Exchange Commission, the pilot regions shall be responsible for promoting: the development of cross-border services based on the industrial Internet for the collection, storage, processing, analysis, mining, and trading of big data in the pilot regions; exploring rules and standards for the collection, desensitization, application, trading, and supervision of data services; and promoting the commoditization and securitization of data assets.

From the perspective of China’s data transaction legislation, the *Data Security Law* implemented on September 1, 2021, for the first time, stipulated a system for “data transactions”. Prior to this, China’s relevant laws and regulations and ministry-level regulations had never explicitly used the expression of “data transactions”, and mainly remained at the level of policy guidance. The *Data Security Law* begins with the phrase that “promoting the development and exploitation of data” is one of the primary purposes of the legislation, and stipulates that the state establishes and completes a system for data transactions and management.² For the first time, the data transaction system under data security regime has been proposed at the national legislative level, clarifying the legality of data transactions in the form of a law and emphasizing that the data transaction market

¹ The *Opinions of the Central Committee of the Communist Party of China and the State Council on Constructing a Refined Allocation System and Mechanism for the Marketization of Factors* dated March 30, 2020 recognizes data as the fifth major factor of production alongside land, labor, capital, and technology, and proposes to accelerate the cultivation of the data factor market, aiming to promote the opening and sharing of governmental data, enhance the value of social data resources, as well as strengthen the integration and security protection of data resources, among other things.

² Article 19 of the *Data Security Law* stipulates that the state shall establish a sound data transaction management system, regulate the conduct of data transactions, and foster data transaction markets.

is an important part of the construction of the market for data factors. It also specifies the service requirements for intermediary service organizations in data transactions.³ From the perspective of local legislation, Article 67 of the *Shanghai Data Regulations* adopted in 2016 also states that Shanghai will establish and operate a data exchange in the Pudong New Area in accordance with the requirements of the state. The aim is to encourage and guide market participants to conduct transactions through the data exchange in accordance with the law. On March 21, 2022, the National Development and Reform Commission issued the *Announcement on Collecting Opinions on Views on the Fundamental System of Data*, which covers four aspects, including the data property right system, the data factor's circulation and transaction system, the data factor's revenue distribution system, and the data factor's security and governance system, with a total of 28 articles. The Announcement proposes to construct a fundamental data system with the ultimate purpose of maximizing the value of data factors, promoting the development of the digital economy, and facilitating the sharing of the dividends of data development among all members of society. The primary objectives will focus on the optimization of the structure layout of data factors, safeguarding the equal use of data by all individuals and entities in the society, and promoting the compliant and efficient circulation and use of data. At the same time, it is recommended to set the major goal of empowering the real economy and facilitate the improvement of the environment for the development of the market for data factor and the enhancement of security and guarantee capabilities, thus breaking down institutional and institutional barriers hindering the supply, circulation, and use of data factors, and align with and lead the way for international high-standard digital rules. Although China attaches great importance to the development of data transactions, the construction of the data transaction system is still facing a major "bottleneck" in general.

Theoretical and Practical Dilemmas in the Establishment of Data Transaction System

The Legal Position and Nature of Data Have Not Been Clarified

The prerequisite for data transaction lies in the clear definition of the legal position and nature of data, without which there lacks an effective approach for the scaling up and legitimization of data transactions. In recent years, more than 20 data trading centers or data exchanges have been established in China, such as Guiyang Big Data Exchange, Shanghai Data Exchange, and Beijing International Data Exchange. However, from the current situation, the operation of these exchanges is not ideal in general. The main reason is that the legal nature of data is not clearly defined, which makes it challenging to establish rules for the distribution of data-related rights and interests, resulting in a lack of enthusiasm and initiative from related data enterprises to engage in transactions within these exchanges. Specifically, the following aspects are concerned:

The first issue is the legal definition of "data". In theoretical research and relevant practice, there are significant gaps in the understanding of the relationship between information and data. The "same nature" theory holds that there is no essential difference between information and data, and that they can be used interchangeably (Wang, 2017, p. 19; Guo, 2012, pp. 127-128); evidently, even if it is recognized that information and data represent a relationship between content and form, it is argued that in the era of big data they are inseparable and

³ Article 33 of the *Data Security Law* stipulates that organizations engaged in intermediary services for data transactions should, when providing services, require the data provider to explain the source of the data, audit the identities of both parties to the transaction, and keep records of the audits and transactions.

need to be interpreted coherently (Cheng, 2018, p. 105); in addition to the terms of personal information and personal data, a few scholars have directly embraced both, using the terms personal data information and information/data (Wu, 2016, p. 117; Hu, 2017, p. 3). The “distinction” theory argues that information and data are two expressions existing independently of each other (Lu, 2009, p. 277); information has a greater scope than data, and data instrumentalism is advocated (Mei, 2016, pp. 168, 181); alternatively, some view information as the content, while data as the symbol, advocating a strict distinction between the documents in relation to personal information and data (Ji, 2018, pp. 72-76.). In terms of comparative laws, the concept of data is more commonly used in the European Union, Germany, France, UK, Singapore, etc.,⁴ while the concept of information is used more often in Canada, Korea, and Japan.⁵ Conceptual ambiguity creates uncertainty, making it difficult to determine whether what one scholar refers to as “information” is the same as what another scholar refers to as “data”, and whether the consequential “right to information” is the same as the “right to data” in the other context. There is an urgent need to clarify the normative definition and interrelationship of information and data, which is also the basis for subsequent discussions on how to empower both (Peng & Yang, 2020, p. 80). This article is of the view that information is a collection of objects and their attributes, and “information” in personal information is centered on “identifiability”, and on whether or not the corresponding subject can be identified and thereby determine whether the rights and interests of his or her personal information are being infringed on. Information is the content and data carrier, and the relationship between the two is between the content layer and the symbol layer. Article 127 of the Civil Code provides that “Where other laws provide for the protection of data and network virtual property, it shall do so in accordance with its provisions”. Distinguishing between information and data helps to properly determine the reasonable approach to a problem so as to avoid confusion between two different approaches to solving the problem (Mei, 2020, p. 162).

The second issue is the objectivity and value-adding nature of data. While data may fall under various legal regulations such as property law, contract law, intellectual property law, competition law, and personal information protection law, it is difficult to explain all the attributes of data by simply matching it with the traditional objects of legal relations, such as behavior, objects, industrial and business marks, intellectual results, and so on, so that a clear definition of the object of data remains a theoretical challenge (Han, 2020, p. 97). The form of data is fluid. Data is different from other objects and any two or more metadata can be composed of datasets. Datasets are of different sizes and nature, and the diversity of combinations leads to different combinations of data with almost completely opposite characteristics. In addition, data is of value-adding nature. With the development of algorithmic technology, a lot of information can be mined on top of the original data to form new data products and new data business (Zhang, 2020). For example, many new legal big data businesses have been developed based on the “China Judgement Online”, which is a big data judgment disclosure system, and many innovative enterprise data products have been developed by utilizing the “National Enterprise Credit Information Publicity System”. New data products provide new value to the original data which indicates the

⁴ General Data Protection Regulation of the European Union, Federal Data Protection Act of Germany, Digital Republic Law of France, Data Protection Act 2018 of Great Britain, Personal Data Protection Act of Singapore.

⁵ Personal Information Protection Act of Canada, Personal Information Protection Act of Korea, Act on the Protection of Personal Information of Japan.

phenomenon of value-adding derived from the original data. This phenomenon poses higher requirements for the fairness and efficiency of the definition and determination of data rights and interests.

Then there is the issue of typification of data. Data typology is a prerequisite for defining data assets. The field of natural sciences divides data into: data from the physical world and data from human society according to the source of data; based on technical characteristics, data is divided into: structured data, semi-structured data, and unstructured data. The field of social sciences, on the other hand, assigns certain value judgments to data typology and analysis results, classifying data into: personal, corporate, and public data; sensitive and non-sensitive data, metadata and processed data; and basic and value-added data, etc. Therefore, the definition of data assets and transactions should in fact and thought be based on the typology of data in the natural and social sciences. As an object of value, a data asset bears a closer resemblance to the legal concept of “thing” or “property”. Structured data and semi-structured data, as well as enterprise data, public data, processed data, value-added data, etc., in the abovementioned data categories, have a generally recognized value due to the inclusion of labor (the use of algorithms or other processing activities, etc.). Precisely because of the value of data assets and their large volume in traditional industries and digital economy industries, it is of great significance to protect and regulate them from a legal point of view.

Significant Divergence in Models of Distribution of Rights and Interests in Data

The process of data generation and circulation involves different rights and interests of multiple subjects, and there are significant theoretical disagreements on how such rights and interests should be distributed. Existing studies and practices are mainly divided into two approaches: One is the empowerment model. This model adopts the existing rights model, compares the rights to data to a certain right, and then constructs the data rights and interests according to the characteristics of the existing right. The “empowerment model” approach has the color of “legal formalism”. Data is intangible and therefore cannot be an object under traditional civil law; however, it does exist as a physical substance and can be protected by applying the principles of property rights (Ji, 2018, p. 72). From the perspective of intellectual property rights, copyright and trade secret protection can basically be applied in the field of data. As for the “blank field” where the collection of big data is in the public domain without originality, a “limited right of exclusivity”, i.e., the right of public dissemination, can be set up (Cui, 2019, p. 3). In contrast to the above approach, which discusses from the viewpoint of existing types of rights, it has been argued that a completely new type of right should be constructed for data (Qi & Pan, 2015, p. 69). However, it is difficult for the new-type-right theory to break free from the stereotype of property rights in practice. Therefore, some people drew inspiration from the idea of division of rights in property law, i.e. the division of “self-property right-other property right” and in copyright law, i.e. the difference between “copyright-neighborhood right”, and set up a binary right structure of, i.e. the data creator who has the right of data ownership and the data processor who has the right to use the data. Therefore, the “right to use the data” was proposed (Shen, 2020, p. 110). The usual approach in the empowerment model is to adopt an approach that combines property law and intellectual property law to allocate the rights and interests in data. However, since data is intangible, it is difficult to apply property law; and since data is physical, it is difficult to apply the rules of copyright and trade secrets. As a result, the definitions and determination of data rights and interests have become self-contradictory and lack of focus.

The second one is the behavioral regulation model. This model refers to the delimitation of data rights and interests based on an analysis of the substantive rationale behind the data, with a focus on public order, and without emphasizing the property rights characteristics of the data itself (Shen, 2020, p. 115). It is a “legal substantivism” research approach. This regulatory model is a thorough behavioral regulatory model, which denies the objective nature of data, and thus challenges the possibility of distributing data rights and interest. It only takes data as network operating access or code. Legislation should take into account the requirements of freedom and development of citizens, businesses, and society, using mandatory public law to specify rules for the flow, sharing, storage, and processing of data (Mei, 2016, p. 183). The protection of enterprise data should be based on the maintenance of control over the data, which can be achieved through tort, contract, and competition laws to protect the various practical interests that may be involved in a competition around the control of the data (Mei, 2021, p. 1188). The behavioral regulation model recognizes the manifold characteristics of data and tends to define data interests from a substantive point of view; however, the definition of the scenario-based model it advocates and the definition of the types of data interests are also quite complex. Both models for the distribution of rights and interests are reflected in legislation. The *Shenzhen Special Economic Zone Data Regulations* adopts the empowerment model, stipulating that natural persons, legal persons, and non-legal-person organizations shall enjoy the property rights and interests stipulated in the laws, administrative regulations, and this regulation in relation to the data products and services generated by their lawful processing of data. The *Shanghai Data Regulation* adopts a combination of empowerment model and behavioral regulation model, whereby a natural person enjoys personality rights and interests in accordance with the law in respect of data involving his/her personal information, and a natural person, a legal person, or a non-legal-person organization enjoys property rights and interests in accordance with the law in respect of the data obtained by lawful means, as well as data products and services generated by their lawful processing of the data. The difference in legislative practice is a reflection in the reality of the controversy over the theory of the distribution of data rights and interests.

The design approaches to the distribution of data rights and interests in foreign countries mainly involve two aspects: One is to indirectly impact the utilization and circulation of data by strengthening the protection of personal information, and the other is to directly establish the rules of data transaction through legislation. However, there is no clarification of the legal position of data itself in the legislation. Countries and governmental organizations are aware of the importance of data, but since data does not have a physical carrier, and it is also different from intellectual property rights, which have a specific scope of regulation over the “fruits of human intellectual activity”. Since there are no set rules for the distribution of rights and interests in data in practice, countries and governmental organizations are first addressing the issues of data security and the use of personal information, which is a matter of individual rights and interests. Specifically, such practice is reflected in the clarification of the rules of the consent over data processing, the localized storage of data, the cross-border transfer of data, the extraterritorial jurisdiction, and other issues that have a clear impact on the rights and interests of the “individual” or the “state”.

Uncertainty in the Legal Nature of Data Transactions and Supporting Rules

The first issue is the legal nature of the data transaction activities. The legal nature of data transactions is an important basis for the structuring of the rights and obligations between the subjects of the transaction, while the

legal nature of data transactions itself is inherently influenced by the issue of the legal attributes of data. The *Information Security Technology Data Transaction Service Security Requirements* defines data transaction as “the act of exchanging data commodities with money or monetary equivalents between data suppliers and buyers with data commodities as the object of transaction”, and the *Interim Measures for the Management of Data Transaction in Tianjin (Draft for Public Opinion)* also has similar provisions. The aforementioned legislative practice is a meaningful exploration of the existing legislation on the definition of the legal nature of data transactions, and an attempt to provide clearer rules and guidelines for data transaction activities. However, although this kind of definition affirms the compensatory nature of data transactions, its concept still follows the traditional basic principle of “separation of property and debt”, which is quite different from the legal attributes of the data itself, and at the same time fails to take into adequate consideration of the diversity of data transaction activities. Although the *Shanghai Data Regulations* sufficiently recognizes the specificity and diversity of data transactions and emphasizes the need to “explore the establishment of a new type of comprehensive data transaction mechanism that is categorized and structured”, they do not clearly define the legal nature of data transactions. As a result, existing theories and practices have not reached a clear conclusion on the legal nature of data transactions.

Secondly, there is a lack of effective guidelines and regulations for data trading venues. On the one hand, data trading organizations lack a legally defined trading status, and the market is not willing to take the initiative to opt for such transactions. Existing data exchanges lack clear corresponding public functions, and basically avoid conducting compliance assessment and monitoring over data transactions, thus failing to provide credit endorsement for market participants. Therefore, in the absence of laws and regulations mandating that data transactions must be conducted through data exchanges, access to data exchanges will only increase transaction costs compared to direct point-to-point transactions; on the other hand, data exchanges are seriously homogenized. The establishment of trading exchanges lacks sensible planning and deployment, resulting in inefficient resource utilization. Especially after the “national big data strategy” was put forward in 2015, when there are still gaps in technology and legislation, the necessity and urgency of constructing data exchanges is wrongly prejudged. Under the conditions of insufficient understanding of the stage of industrial development and the lack of advanced experience, mature technology, and professional talents, it results in low-level, homogenized, and repetitive construction of data exchanges, reflecting homogenized characteristics in terms of transaction content and transaction subjects. Repeated construction, in terms of the content of the transaction, the main body of the transaction, is reflected in the characteristics of homogenization; another issue is the data exchanges’ overly dependence on government support. The exchanges have insufficient commercial operational capacity and very limited marketization and competitiveness.

Finally, there is a large gap in the supporting rules for data transactions. The supporting rules are unclear with regard to the allocation, pricing, and measurement of data rights and interests in the data transaction system, making it difficult to fully utilize the value of data resources. Data itself is a special and complex transaction object, involving the interests of multiple parties including government, enterprises, and individuals, and also involves the protection of personal information, data security, virtual property, and other multiple legal relationships. Different subjects of the data have different claims of interests. While supporting rules are the breakdown of the protection of the interests of different subjects, they are also an important pillar for the orderly

conduct of data transactions. Laws and regulations such as the *Data Security Law* and the *Personal Information Protection Law* only provide for rules on data and personal information processing, but do not provide clear rules on basic issues such as data ownership, pricing, measurement, and the rights and obligations of the parties to the transaction, which leads to a lot of uncertainty in data transactions.

Overall Conceptualization of the Design of Data Transaction Rules and Systems

As a new important factor of production, data plays an important role in the development of both emerging economic industries and traditional industries, and is the key to the innovation and change of industrial structure. Therefore, how to guide and regulate the circulation of data based on different scenarios through the construction of a scientific and reasonable data transaction system is extremely urgent and necessary (Ding, 2022, pp. 146-147).⁶ First of all, the legal attributes of data should be clarified. The issue of legal attributes of data is the underlying problem of data-related theory and practice. At this stage, the influence of traditional legal theory on the definition of legal attributes of data should be diminished, attempts to empowerment should be reduced, and the construction of the mechanism for the distribution of data-related rights and interests should be carried out more from the perspective of data utilization than data protection, so as to give full play to the value of data as a factor of production. Issues such as privacy infringement, public safety, and unfair competition that may arise in the process of data utilization can be prevented through supporting punitive mechanisms; secondly, the legal nature of data transactions should be accurately interpreted. The data transaction itself is affected by the legal nature of data, but this article advocates the analysis of data-related legal theory issues from the perspective of utilization, to avoid getting entangled in the data attribute debates, to distinguish between the subjects of the transaction, and to define the nature of the actions of the data transactions. For the right holders of data sources or stakeholders of non-operational data, their actions of transferring data outward should be defined as the licensed use of data, whereas the actions of transferring data outward by the subjects of operational data should be understood as data services, thereby constructing differentiated specific system rules for data transactions based on the different perspectives aforementioned. Thirdly, it is necessary to clarify the functional role of data exchange venues and establish systematic supporting rules. Data exchanges, as intermediary public institutions, can effectively reduce the transaction costs of market participants, foster trust among market participants (Merges, 2005, p. 1485), reduce the risk of default, and greatly encourage differentiated competition (Farboodi, Mihet, Philippon, & Veldkamp, 2019). As such, data transactions will be technically legalized. In this context, the legislation should clarify the position of data trading organizations, assign a clear regulatory authority for this industry, issue relevant guidelines and standards, and provide a clear legal definition of and unified supervision over the specific business rules for data transactions. At the same time, data trading organizations should be explicitly regarded as a legitimate channel to carry out data transactions, and the public functions of data trading organizations should be strengthened in terms of guaranteeing compliance and trustworthiness of data transactions, so that enterprises are guided to carry out orderly data transfers through data trading organizations.

Generally speaking, the construction of data transaction system and rules requires not only an accurate understanding of the jurisprudence position of data, but also a comprehensive response to the practical needs of

⁶ Real-world data transactions include different scenarios such as platform-based data transactions, database-based data transactions, collection and processing-based data transactions, and brokerage-based data transactions.

data transactions. The top-level design in legislation and the specific rules should be set to be accurate and elegant, which is a complex, challenging, and relatively lengthy legislative process. Despite this, the characteristics of data economic activities also require legal theory research and judicial, and legislative practice to provide timely and prompt solutions to the legal issues arising therein. Inevitably, this process will be full of contradictions and conflicts.

References

- Cheng, X. (2018). On individual data rights in the era of big data. *Social Sciences in China*, 39(3), 102-122+207-208.
- Cui, G. B. (2019). The basic theory of limited exclusion right of big data. *Chinese Journal of Law*, 41(5), 3-24.
- Ding, X. D. (2022). How to break the situation of data transaction—Paradox of aro information and legal response in data factor market. *Oriental Law*, 15(2), 144-158.
- Farboodi, M., Mihet, R., Philippon, T., & Veldkamp, L. (2019). Big data and firm dynamics. *AEA Papers and Proceedings*, 109, 38-42.
- Guo, Y. (2012). *Research on personal data protection law*. Beijing: Peking University Press.
- Han, X. Z. (2020). The dilemma of data rights and the way to crack it. *Oriental Law*, 13(1), 97-107.
- Hu, L. (2017). Property rights of “Information/Data” under the perspective of business models. *Journal of Shanghai University (Social Sciences Edition)*, 34(6), 1-14.
- Ji, H. L. (2018). The private law position and protection of data. *Chinese Journal of Law*, 40(6), 72-91.
- Lu, X. H. (2009). *The right to information property: A new wealth protection model from the perspective of civil law*. Beijing: Law Press.
- Mei, X. Y. (2016). The legal attributes of data and its civil law position. *Social Sciences in China*, 37(9), 164-183+209.
- Mei, X. Y. (2020). The legal significance of the distinction between the concepts of information and data. *Journal of Comparative Law*, 34(6), 151-162.
- Mei, X. Y. (2021). The original theory of corporate data interests: From property to control. *Peking University Law Journal*, 33(5), 1188-1207.
- Merges, R. P. (2005). A transactional view of property rights. *Berkeley Technology Law Journal*, 20, 1477-1520.
- Peng, C. X., & Yang, S. Y. (2020). On the hierarchy of rights and system construction of data, information and privacy. *Journal of Northwestern Polytechnical University (Social Sciences)*, 22(2), 79-89.
- Qi, A. M., & Pan, J. (2015). The establishment of data right, data sovereignty and the basic principles of big data protection. *Journal of Soochow University (Philosophy & Social Science Edition)*, 36(1), 64-70+191.
- Shen, W. X. (2020). On the right to data usage. *Social Sciences in China*, 41(11), 110-131+207.
- Wang, R. (2017). *The era of big data: Data protection and flow rules*. Beijing: Posts and Telecom Press.
- Wu, W. G. (2016). A critique of the theory of private protection of personal data and information under big data technology. *Political Science and Law*, 35(7), 116-132.
- Zhang, J. W. (2020). The legal nature of online big data products and their legal protection—An appraisal of the unfair competition dispute between Meijing Company and Taobao Company. *Journal of Soochow University (Philosophy & Social Science Edition)*, 41(1), 35-46+191.