CHAPTER 4

The Data Rights System

The new technological revolution has triggered changes to the economic and social order, and has also brought new challenges towards the existing legal system. In the era of digital civilization, data is the most important resource. It is thus particularly vital to fully tap into the value of rights on premise of data protection through stipulating data rights by system. The data rights system refers to rules and orders based on date rights, encompassing mainly the statutory law system, the data ownership system, the usufructuary system, the system of public interest data rights, and the sharing system of data rights. Among them, the statutory law system elevates data rights to rights admitted by law; the data ownership system breaks away with the existing framework of ownership and defines the powers and functions of data ownership; the usufructuary data rights system separates powers and functions of data ownership, and expands the value of data; the system of data rights for public interests embodies the transfer of data rights usufruct, through the acquisition, management, use and sharing of public interest data; and the sharing system increases the efficiency of data utilization.

All the five dimensions of the data rights system present their own side. Together, they form a system of protection and utilization for data rights. Undoubtedly, the establishment of the data rights system will uplift data rights to one of the fundamental civil rights of citizens in the era of digital civilization.

Statutory System of Data Rights

With rising awareness of rights, there comes a huge contradiction between people's call for data rights and the reality that data rights have not been recognized as legal rights. Therefore, it is of paramount urgency to establish

statutory system of data rights, so as to answer people's legal requirements of data rights. To do so, one prerequisite is to set up the definition and description of data rights in the legal system, thus transforming data rights from a realistic right to a legal right.

From idealistic data rights to actual data rights

In the history of jurisprudence, natural law has always been an enduring theory of Western legal philosophy. Natural law, in general, is the collection of all the basic and ultimate principles on justice, endowed by universal order and serving as the foundation for all statutory laws (Rong 2010). According to the theory of natural law, the world is made up of two parts, that is, the idealistic world and the actual world. Laws that regulate the idealistic and normative world are called normative laws and laws that regulate the actual world is called actual laws. Generally speaking, normative laws are eternal and absolute, which can be comprehended by human reason. Normative laws are therefore considered as a fair and just order against which all man-made laws must be examined and criticized. Hence, normative laws govern actual laws and are regarded as the origin of actual law (Chen 2003). 'Ideal' and 'actuality' have long been one of the core debates of natural law theory. As the core of jurisprudence, rights shall also be divided into idealistic rights and actual rights. Such a classification is the corresponding consequence and direct embodiment of normative laws and actual laws in the realm of rights (Fu, et al. 2012). Idealistic rights are people's demand of rights that originates from social life and rights that people should obtain within the foreseeable range. Hence, idealistic rights, the most primitive form of rights, is the spontaneous reflection of people's interests and needs as well as a value-based description of the rights that shall be possessed by people. Whereas actual rights, the ultimate form of rights in reality, is a depiction of rights that are actually enjoyed or acquired by people (Wen 1991).

Nowadays, against the backdrop that data have become a critical resource with significant political, economic and cultural value. data rights have also emerged as a basic right, evolving from both human rights and property rights and embody people's demands for survival and development in the era of digital civilization and also shows the "ought-to-be" nature of rights.

Up to date, data rights have not been elevated as a legal right, failing to meet people's expectations, which leads to multiple conflicts and antagonisms between idealistic data rights and actual data rights in social interactions. Hence, to transform idealistic data rights into statutory data rights is an inseparable step for carrying out idealistic data rights into realistic data rights.

Statutory data rights, a right unto itself, refer to the identification and allocation of idealistic data rights, through the prescription, confirmation, selection and arrangement by legislation. Idealistic data rights are considered as rights that should be enjoyed by people as reflected via moral propositions of data rights. Statutory data rights are data rights explicitly provided in laws through official legislative procedures. Compared with idealistic data rights, statutory data rights are featured by openness, explicitness, consistency, etc., and demonstrate much stronger publicity and credibility in moral sense than idealistic data rights. These advantages of statutory data rights mainly give credit to its carrier of data rights law. Meanwhile, idealistic data rights are protected mainly through people's belief, morality and social appraisal, etc. While statutory data rights are protected by the coercive power of state, a protection of last resort (Liu 2005). To put it another way, any conflicts or disputes concerning statutory data rights will be adjudicated by judiciary agency and law enforcement agency. Therefore, idealistic data rights must be transform into statutory rights to be fully realized so that they can satisfy people's needs in deed.

Nonetheless, statutory data rights are merely an institutional framework. Such a framework must be fully implemented and observed in daily life so that statutory data rights can be uplifted to actual data rights. The critical step of this uplifting process lies in the exploration of the intrinsic demands of subjects of data rights and in the linkage of such demands with the demand of social development. Hence, uplifting statutory data rights to actual data rights, that is, implementing the data right system in social life, holds the key to the realization of data rights.

The transition of data rights, from idealistic to statutory data right, and then to actual data rights, is a reflection of people's changing demands towards data-related interests in different stages. This transition is also an embodiment of the dynamic relations between unrecognized and recognized data rights, and between unrealized and realized data rights. Under certain conditions, idealistic, statutory and actual data rights are interconvertible.

The formulation of data rights law transfers idealistic data rights into statutory data rights; the implementation of data rights law transfers statutory data rights into actual data rights; the realization of actual data rights, in turn, triggers people's additional demands for new data rights. In this fashion, the cycle of the formulation, amendment and abolition of data rights laws is propelled continuously. Behind this cycle lies the meaning of statutory system of data rights.

Statutory principles

The moral proposition and system design of the statutory data rights must conform to the reasonableness principle. Data rights *per se* should be reasonable and justifiable interest demands that are recognizable and acceptable by the general public under certain realistic conditions, and are able to strike a balance among the complicated interests related to different data right owners. In the view of Western rationalism, rationality, the premise for legitimate rights, plays an important part in statutory rights. The same also applies to the legalization of statutory data rights. Therefore, in the legislative process, in order to meet the rational premise for the realization of data rights, legislators around the world must enact rational regulations to restrict and protect data rights. In judicial practice, law enforcement officers and judicial officers must provide rational protection for data rights. Such rational protection in judicial practice serves as a realistic guarantee for data rights. When infringement of data rights happens, people must develop a rational perception of data rights in seeking legal remedies. This is also critical for the realization of data rights. The sound operation of the statutory data rights system can be ensured only if such rational perception permeates into the legislative process, judicial practice and legal remedies for data rights.

Similar to property rights, data rights, in essence, is a procedural right that must be exercised and remedied in accordance with procedural rules. The core of data rights lies in the establishment of a procedure in which owners of data right may judge their interests and intention pertaining to data rights by way of equal participation. Therefore, data rights must conform to procedural rules and legalization of data rights calls for procedural priority. In the legalization process of data rights, the following features with regard to

data rights must be noted: spatial-temporal attribute, autonomous function, reasonableness requirement, participative subject and specific object. The system design of data rights must encompass at least: legislative procedure, judicial procedure, legal reasoning, practical negotiation, legal remedy, etc., so as to set forth the formulation, justification, practice and remedy of the data right regime. For data rights, its procedural justice is as important as its substantive justice. Equal emphasis needs to be attached to substantive and procedural justice of data rights, which is an inevitable objective as human march towards the era of digital civilization.

As early as in the Renaissance and the Enlightenment, the subjectivity theory has been providing a philosophical foundation for modernism. The subjectivity theory has thus become the underlying principle for the establishment of the modern right system. It recognizes the subject identity of human being, as the ultimate existence, from the perspectives of epistemology, existentialism and ontology. It also gives priority to human value (P. Chen 2018). In today's era of digital civilization, "data person" becomes the reflection of human beings in data space. Therefore, human should be the subject of statutory data rights. The freedom and dignity of human can be realized only by ensuring their rights and subject value. That is the subjectivity principle of statutory data rights, which gives play to the initiative and creativity of data right subjects and reflects their interest demands by expanding the scope of protection and by enriching the remedies. It is a process in which the value of data right subject is constantly recognized and reaffirmed, and the subjects' action facilitates the realization of their interests. All in all, the legalization of data rights must focus on the demands of the subjects, which serves as the fundamental principle. Data rights, once separated from "human," that is, the data right subject, become a mere formality or empty talk.

Content of statutory data rights

Statutory data rights require that the category and content of data rights and its effect shall be prescribed by laws rather than by other documents. This requirement is of great importance for the statutory system of data rights in the demarcation of data rights, the confirming of rights and duties, and the settlement

of disputes and so on. Thus, the statutory regime for data rights mainly encompasses three aspects: category, content, and validity of data rights.

First, the statutory regime for data rights is composed of different types of data rights. Therefore, the statutory regime includes the category of data rights. Statutory category of data rights refers to the types of data rights that shall be prescribed by laws. In addition, people are prohibited from creating any other type of data rights than the statutory categories, nor changing the type of data rights stipulated by laws in form of agreements. Statutory category of data rights, with the purpose of determining whether a type of right belongs to data rights in form of statutory law, encompasses the name and approach for establishing rights, as well as the system and other elements relevant to data rights as prescribed in law. Although people may set up data rights, the data rights they set up must conform to statutory category. The statutory regime for data rights is a compulsory stipulation of all types of data rights, which cannot be altered in other ways. Thus, people cannot establish or create data rights willfully.

Statutory category for data rights carries two implications. On the one hand, laws must stipulate the specific types of data rights, and people shall not create any other types not recognized by laws. The term "laws" here refers to normative documents formulated by the legislative body through legislative procedure. Moreover, data rights established by the judiciary or other authorities through normative documents or through individual cases that fall outside of the statutory category must be restricted. Only in this way can the statutory category of data rights have universal validity in guiding people's behavior to conform to legal provisions, and in leading legal practitioners to handle disputes over data rights properly, thus giving full play to the due functions of statutory category. On the other hand, statutory category of data rights refrains people from establishing data rights that fall outside the statutory category at will, nor does it allow people to alter the type of data rights as stipulated by applicable laws, that is, "excluding freedom of rights creation." The statutory category implies that, promise and agreement made between parties are invalid in establishing any new category and the parties involved cannot enjoy their self-created interests of data rights. Hence, provisions in agreement or written promises entered into by parties concerning the creation of new data rights are all invalid, and people shall not set up new data rights other than those statutory data rights recognized by laws.

Second, the statutory regimes of data rights shall include statutory content of data rights. Statutory content means that the content of data rights must be stipulated by laws. People shall not establish any other data rights inconsistent with the statutory content, nor shall they make agreements that are at odds with the mandatory provisions of laws. Statutory content and statutory category are inseparable from each other. Statutory content is the important and integral part of the statutory system of data rights, for the reason that if laws stipulate the category of data rights, the same stipulation must apply to the content accordingly. If people can arbitrarily change the content of data rights, it is in fact equal to creating a new type of data rights. If this happens, in spite of the category unchanged, the essence of the data right has already been altered. Therefore, the content of data rights shall be considered mandatory, and cannot be created or changed freely. This mandatory nature of statutory content serves to guarantee the statutory category. Data right category is the basic approach to understand data rights. Compared with content, data right category is more macroscopic and abstract, and helps people better observe, judge and grasp data rights. However, based on the mutually complementary relations of the category and content, judgment of data right category depends on the construction of the content. In general, category can be used to quickly locate the data rights. Only when the category of data rights is in dispute will people analyze the content. At that time, the content of data rights plays a fundamental role to help people accurately judge the category of data rights. Therefore, category and content of data rights shall be both statutory. A category of data rights without statutory content is illusory, and the content of data rights without statutory category is blind. Statutory data rights need to pass the "double tests" of both statutory category and content. Statutory content helps to clarify the content of data rights, reduce people's retrieval and negotiation cost, as well as confirming of rights and duties, and settlement of disputes, and improve the efficiency and fairness of justice. Although statutory content is mandatory, it does not completely exclude the autonomy of will and allows a certain degree of discretion. This is because the data rights regime has not reached the ultimate version and it still needs to be developed and changed with the advancement of the human society and civilization. Therefore, there must be room for the content of data rights to evolve in the future.

Third, the statutory regime for data rights shall also include statutory validity of data rights. On the one hand, the validity of data rights is a reflection of the intrinsic nature of data rights. Without the legal effects prescribed by laws, statutory category and content of data rights will undoubtedly be paralyzed in regulating and protecting data. On the other hand, the validity of data rights has two features, namely exclusivity and priority. Both exclusivity and priority have effects on third parties and are relevant to data security. Thus, the validity of data rights exclude human interference. In terms of the exclusivity of validity, data rights had validity against the other party and against all third parties. The only exception to exclusivity of data rights is a bona fide third party. Priority, essentially an exceptional nature of data rights, requires laws to provide clear provisions concerning the priority of data rights and to avoid any chaos in judicial practices. The validity of data rights can only be stipulated by laws and cannot be altered or expanded by promise or agreement. This means that: first, people must determine the validity of data right in accordance with laws; and second, people cannot change the legal provisions concerning the validity of data rights.

Statutory significance

Theoretically, legal provisions of data rights are the economic and social interpretation of data rights. To put it another way, interests are the external form of rights and as well as the socialization result of rights (Chen and Yin 2014). Therefore, the statutory system of data rights explicitly stipulates the interests of data rights. It connects idealistic data rights with actual data rights by transforming the data rights from a theory into specific and expectable statutory data rights. It also provides protection via the credibility and compulsion power of the state to ensure the realization of data rights. The statutory regime for data rights sets forth explicitly the ownership of data rights to prevent arbitrary formulation of new data rights on object data by any relevant parties, thus lowering operation costs and maintaining conciseness and stability of laws. Meanwhile, legal provisions of data rights are a reflection of people's evaluation of their own value and of the development of legal civilization and the legal system. Statutory data rights *per se*, embody

authority and value, and may serve as a code of conduct for the whole society to guide people's behavior in the correct direction.

Realistically, legalizing data rights is a process in which data rights are specified and realized. This process tracks the operation of law and serves as an important guarantee for the realization of data rights. The statutory regime for data rights encompasses a wide range of elements, for example, category and content, realization and termination, substantial data rights and procedural data rights, etc. Through the legislation of data rights, the connotation and denotation of data rights are defined; a regime of protection and utilization for data rights is formed; and the rights and responsibilities of parties are clarified and adjusted. Finally, any disputes that may arise concerning data rights may be settled more efficiently and properly. Especially, when the public power is in conflict with individual rights, statutory data rights will protect the rights of individuals, who are in a weaker position, and restrict the public power.

Institutionally, the statutory regime for data rights exerts influence on the basic economic system of a nation or a region. Were the ownership relations of data in a country or a region to become legal relations that consolidate and maintain normal economic and social relations and orders, data rights, ownership and the varieties and contents of data rights should be stipulated so as to adjust the ownership of data rights system. Meanwhile, in order to realize data rights both in legal system and in real life, the operability of data rights must be ensured. Detailed contents and explicit protection ways in statutory data rights can help people interpret and judge the original meaning in relevant provisions and legal cases. Only then can statutory data rights meet the moral propositions of normative data rights.

Statutory difficulties

Data rights *per se*, as a fundamental right to human survival and development, must be a justifiable and reasonable demand in consistent with institutional requirement and value orientation in real life. Therefore, the legalization of data rights is a dynamic process influenced by economic, political and cultural factors. Inevitably, this dynamic legalization process also faces multiple difficulties.

In terms of legal system, the components of data rights laws have a paramount impact on the successful realization of statutory data rights. First, some data rights related concepts, for example, rights and interests of data resources and data ownership have only been mentioned in certain theoretical studies and corporate practice, but never in provisions of an upper level law. Second, due to the lack of necessary and specialized legislation for data rights, there are major limitations in regulating data rights through existing legal approaches. Third, data rights lack explicit protection and judicial guarantee due to the missing substantive law and procedure norm. All the aforementioned difficulties constitute institutional barriers to legalizing data rights, thus impeding the establishment of the data rights regime.

In terms of ideology and culture, the current social ideology and culture may restrict the realization of statutory data rights. Despite the advent of big data era, public awareness of data, data rights and data rights law are yet to be aroused. Consequently, the absence of data culture will impede the establishment of normative data rights. Meanwhile, "pan-politicization" and "official-orientation" of mentality will also hinder the realization of statutory data rights, that is, the transformation of normative data rights to actual data rights. Therefore, in the age of digital civilization, citizens must change their way of thinking through the rational analysis of the relations among human beings, social order, state power and digital civilization. As a result, consciousness of data rights may take its root in all aspects of social life, thus promoting the development and progress of human civilization.

In terms of social development, statutory data rights are the reflection of the advancement of legal and social civilization. In the "era of data rights," despite the ever-expanding value of data, data rights have not yet drawn enough attention from all social sectors due to social and historical limitations. Hence, legalization of statutory data rights is lagging behind the trend of time. However, statutory data rights out of the social context or even ahead of social development carry no realistic meaning. Therefore, in order to interpret data rights faithfully, we must fully understand the background for the formulation of data rights law. Only via a thorough and objective analysis of the history and the current digital society as well as the background for the statutory regime for data rights, can we truly understand the realistic significance of statutory data rights.

Data Ownership System

Data ownership is the all-encompassing right to control data, and thus constitutes the core of the data rights system. From the institutional perspective, data ownership attaches data to specific owners, so that the former is under the control of the latter. Construction of the data ownership system not only helps to protect the interests of data rights owners, but also promotes the sharing and utilization of data in the whole society.

Mitigation of ownership

After the first industrial revolution, the emergence of non-physical ownership gradually disintegrated the land-centric physical ownership system. Ownership no longer depends on the existence of physical objects. Besides land ownership, copyright, trademark right, patent right, etc., came to be recognized as "intellectual property" and incorporated into the domain of ownership; moreover, incorporeal things (*res incorporales*) gradually became the object of rights. Incorporeal things, that is, things that do not have a physical form, can only be perceived through abstract thinking. In general, rights relevant to incorporeal things are classified into: a) rights directly stipulated by laws, such as creditor's rights and equity ownership; and, b) intangible property rights, including copyright, patent, trademark right and other types of intellectual property rights, as well as rights that emerged from information that embodies significant value. Under the current ownership regime, object of intangible property rights, such as intellectual property, credit information, personal data, trade secrets and other types of incorporeal things have not yet been recognized as objects of legitimate rights. Therefore, incorporeal things pose a great shock to the existing physical objects-oriented ownership regime.

Nonetheless, the incorporation of incorporeal things into the legal system can be dated back as early as to the primary stage of codification.[1]

1 The term "codification" here refers to the process of legislation and a formulation of legal codes.

At that time, peripheral attempts had been made to: a) identify certain incorporeal things as corporeal things (*res corporales*). These things shall be subject to regulations under the real right law; and, b) with reference to the ownership regime, identify certain incorporeal things as objects of ownership. Through these tentative efforts, rights relevant to incorporeal things have brought substantial changes to the existing ownership regime.

Incorporeal things facilitate the transcendence and breakthrough of the legal principle that "properties are tangible things." Consequently, the mitigation of both the close-ended and exclusive ownership regime and the principle of "one ownership for one object" must be mitigated accordingly. As far as the object type of rights is concerned, the closed and exclusive structure of traditional ownership is not suitable for incorporeal things in all aspects. The current ownership system emphasizes the subject's absolute and exclusive control over things. It limits the applicable scope of ownership, and restricts this control to only *res corporales* [corporeal things]. This is because rights over corporeal things can be exercised without the will or consent of others and without performance of relevant obligations. However, incorporeal things do not have such exclusivity. The reason is that the exclusive attribute will cause the ownership subject to enjoy the monopoly privilege, thereby hindering the effective allocation of resources, the freedom of competition, and the improvement of public welfare. Thus, the concept of ownership must be expanded and an ownership system applicable to incorporeal things needs to be established (X. Chen 2016, pp. 111–113).

It can be predicted that with the constant growth of production factors in the era of digital civilization, new forms of rights will constantly emerge, so will rights with great value and without a physical form. Data ownership regime, with data as the object, will also emerge as a new and independent type of ownership. Together with the existing physical property-oriented ownership regime, these two ownership regimes will constitute the future structure of ownership. Data ownership is established with the objectives of encouraging the sharing and utilization of data, and protecting the economic, social and sovereign value of data. Meanwhile, newly emerged rights, with data rights as a major category, will play an increasingly important position in economic and social life in the future. Hence, it is quite necessary to

provide legal guidance for data ownership. Subsequently, it is also an urgent task to reform the existing legal system, devising new laws and provisions to regulate and protect the lawful interests of data owners. It is also a severe challenge to the existing ownership system.

Subjects and objects of data ownership

Subjects of data ownership refers to people who enjoy interests over data, that is, natural persons and legal entities, or even public service units and states, that enjoy data rights in accordance with laws. The qualification of subjects of data ownership are prescribed by national laws. Qualification of subjects of data ownership, that is, legal personality, is the legal foundation for data stakeholders to be recognized as subjects of data ownership. Therefore, data subjects' qualification is the prerequisite for relevant data rights and obligations. Laws not only stipulate who are qualified to become data rights owners, but also set forth relevant legal standards for different data subjects. Data rights law is exactly a set of legal relationships, formed in adjusting legal interests over data resource among all subjects; and data rights are the materialization of such legal interests. Due to intangibility and replicability, data exist in various forms. Different from the traditional view of "one ownership for one object," it is believed that several subjects of data ownership can exist on one dataset and each subject has his or her own independent and complete data ownership instead of sharing one ownership. Therefore, data rights law shall formulate organization rules for subjects of data ownership, regulate behaviors among all subjects and dissolve problems such as disputes over data interests and negative externality.

Data ownership can be obtained legally via original acquirement or succession. Original acquisition of data ownership means a subject acquires data ownership when a set of data has been created. Subjects who enjoy data ownership through original acquisition encompass original obligees such as parities to an agreement, producers, fructus owners and pre-occupant of data, etc. Under such circumstances, data ownership must be acquired legally with legal authorization and based on production, fructus or preoccupation. Compared with traditional ownership, data ownership acquired through original acquisition is quite different because: when an investor of

data resource is also the producer of data, data ownership is quite certain and clear; but if not, not matter who owns the data, the investor or producer, or shared by them, the designation of data ownership must manage to strike a balance between public interests and private interests, that is, investor and producer. Such is the core issue that must be entertained carefully by the data rights law.

Essentially, succession of data ownership is the sharing of data ownership. However, due to the non-absolute delivery attribute of data, a data subject who obtains data ownership via succession cannot acquire complete ownership, leading to three scenarios: (1) the subject acquires the property rights of data, but not the personality rights of data; (2) multiple subjects share rights to control, utilize and benefit from the same dataset; and (3) each subject only enjoys data ownership within certain limited and prescribed scope. If only the original obligee is allowed to utilize data, the value of data cannot be maximized. Therefore, only through the flow and exchange of data, and through the support of other stakeholders, can the value of data be constantly expanded and created. In this sense, succession, rather than original acquisition of data ownership, is more important.

Objects of data ownership are independent, exchangeable and specific datasets with certain use value. Objects of data ownership have the following three characteristics: immateriality, replicability and non-absolute delivery. (1) Since datasets do not exist in physical forms, people can only recognize the existence of datasets in abstract ways. Hence, immateriality is the most fundamental attribute of objects of data ownership; (2) Datasets can be replicated at low cost, which allows several subjects to control and use data simultaneously, thereby expanding the value of data. Therefore, replicability is also a fundamental attribute; (3) Due to non-absolute delivery of data, control over datasets cannot be transferred completely.

Objects of data ownership are different from objects of intellectual property in the following ways: creativity, fixation on certain media, recognition by legal procedures and transparency (whether they need to be known publicly). Therefore, data ownership cannot be regulated with the same approach as that of intellectual property rights. From the perspective of data, the object of intellectual property is knowledge, the most optimized data that embodies the creative works of human. Therefore, data does not conform to the legal definitions of intellectual property right objects.

Functions of data ownership

Functions of data ownership refer to the rights which constitute the content of data ownership and are enjoyed by subjects of data ownership. As the core of data rights, functions of data ownership reflect the intrinsic value and substantiality of data ownership as well as the interests of data rights. Meanwhile, as subjects enjoy and exercise data ownership, the functions and role of ownership are demonstrated. Functions of data ownership include: the right to control data, the right to use data, the right to obtain profits from data, and the right to share data.

The right to control data means, the subjects of data ownership enjoy the right of domination over data. The right to control data enables subjects of data ownership to freely exercise their rights by putting data under legal control. People may obtain the right to control data either by creating data with relevant resources through labor and or by data sharing. Control is one of the ways for subjects of data ownership to dominate data, which strikes a balance between the natural attributes of data and the protection of data rights. Control over data is a right in rem (an absolute right available against the world at large). On the one hand, due to the immateriality of objects of data ownership, the existing possession system of ownership is inapplicable to data ownership. Therefore, subjects of data ownership can only dominate objects through actual control, showing both the protective effect and the preservation of the right of control over data. On the other hand, due to the reproducibility of data, the cost of data circulation is so low that the interests of data owners are vulnerable to infringement. Moreover, it is insufficiently effective to protect the right to control data from infringement through technological means alone. Therefore, only by legalizing the right to possess, can the interests of data be truly protected.

Using data is one of the basic means of utilizing data and a major way to dig into the value of data and to realize data interests. Therefore, the right to use data refers to the right of the subjects of data ownership to pursue the use value of data and realize their interests accordingly by using data. Based on the nature of data, the right to use data can be divided into two categories: the right to process and the right to replicate. Process, as a basic means of using data, helps to discover and increase value of data as well as to affirm the existence and meaning of data. Hence, the right to process is an important

type of right to use data. Admittedly, such a right can be shared, provided that users process the data in a prescribed manner and not replicate or share data at will. However, in order to increase the value of data, the volume of data must be expanded, consequently involving more users. Hence, due to its extremely low cost, replication becomes a major way to increase data volume. Therefore, replication is an important condition as well as means to utilize data. Replication re-renders the original data information completely, which is fundamental for data circulation. All in all, the right of replication occupies an important position in data ownership.

The right to obtain profits from data is the right of users to make profits through the using and sharing data. For example, data capitalization is a process to gain profits. The right to obtain profits from data is the economic realization of data ownership and the only way to realize value of data. It is featured by externality, long period and diversity, etc. First, externality is reflected by the ratio of the earnings of data ownership subjects by using and sharing data to the cost incurred in this process. It therefore determines the non-absolute nature of data. Therefore, necessary restrictions and exceptions must be prescribed for the right to gain profits from data, in order to strike a balance between individual rights and public interests. Second, it normally takes long periods to make profits from data. This is because value of data cannot be fully realized through a single use or consumption. Moreover, incoming and new data may interact with existing data, thus altering the value of data and bringing in new earnings. Meanwhile, data can be repeatedly used for long-term benefits without abrasion or wear. Data value will accumulate and increase overtime without reaching the maximum peak value. Third, diversity means that multiple ownership subjects may profit from the same data at the same time. The reasons behind is that the right to control data cannot be completely transferred and delivered from one subject to another.

Sharing is the ultimate utilization of data. The right to share refers to the right of data ownership subjects to consume and share data. It is the ultimate representation of data ownership and also the nature of data rights. The sharing of data ownership will not deprive data ownership subjects of their right to control data. Instead, independent data ownership is established through replication, thus conferring multiple subjects of data ownership the right to control and the right to use the same data. Moreover, the sharing of data rights will not undermine data value, but rather increase it. For

corporeal things, the right to share normally equals to the right to dispose, leading to the absolute or relative termination of the ownership. That is to say, the right to dispose corporeal things determines the termination of the ownership (Lu 2009, p. 373). As far as data is concerned, the existing ownership disposition system is no longer applicable to data protection and utilization given the fact that sharing gives full play to data value. The purpose for the establishment of data ownership is not to control data but to make effective use of data and fully tap into the value of data. Therefore, the right to share data focuses more on the utilization of data. It uplifts data utilization, through which people pursue the value of data, to an equally important position as data ownership.

Agreed use of data ownership

The natural attributes of data ownership object and modern data production activities determine that the direct use of data by rights-holders alone cannot bring the value of data into full play. The legitimate use by other people can augment the value of data. Among the multiple ways of legitimate use, agreed use is the most common way of using data resources. The agreed use of data respects the will of all parties and protect the interests of all parties, thus promoting reasonable and effective use of data. The agreed use system of data ownership encompasses licensed use of ownership and transfer of ownership, etc.

Licensed use of data ownership is the system in which the subject of data ownership allows others to use data under certain conditions. Under licensed use of data ownership, the subjects of data ownership will be changed. Also, certain relations of rights and obligations among the subjects of data ownership will be established. Essentially, such rights and obligations are contractual relations. Thus, the validity of contractual relations is based on agreements. The licensed use of data ownership actually creates an independent ownership that allows a single dataset to have multiple data ownerships. These different data ownerships can be utilized by different owners simultaneously.

For data users, licensed use of data ownership can be classified into: 1. exclusive licensing; 2. sole licensing; 3. non-exclusive licensing. Exclusive

licensed use means that, under certain conditions, the licensor grants a named licensee the right to use data. Any other person (including the licensor) other than the named licensee is excluded from exploiting the relevant right to use the data. The difference between exclusive licensing and sole licensing lies in whether the licensor (subject of data ownership) enjoy the right to use data. The answer is YES in sole licensing, but NO in exclusive licensing. In addition, non-exclusive licensing means that the subject of data ownership grants two or more subjects who are not mutually exclusive with the right to use data. In this sense, non-exclusive licensing is the best and the most popular way of exercising data ownership. Because of the replicability of data, only through the replication of data and non-exclusive licensing can the value of data be constantly expanded to ultimately meet the needs of social production.

Transfer of ownership is a system in which the subject of data ownership transfers the data ownership to others via means such as data transaction, donation, succession, etc., thus creating a special relation of rights and obligations between the transferor and the transferee. Transferability is the inherent rule of data ownership. Unlike licensing, the transferor of data ownership transfers all four rights of data ownership by data shear, that is, the right to control, use, make earnings and share data. After transfer of data ownership, the assignee enjoys all the four rights, thus becoming a new subject of data ownership. Hence, the transfer of data ownership does not create multiple owners on the same data. Instead, one new subject replaces the previous subject of data ownership. If the transferee is only granted with the right to control, use and make earnings from data, but not the right of sharing, the transferee cannot share the data to other users at his or her will. In this scenario, the transfer of data ownership is incomplete and is actually licensed use. In terms of the outcomes, licensed use of data ownership only enables the subject of data ownership to transfer part of the rights of use and make profits to another subject. Should data be violated, the original subject of data ownership would still assume the relevant legal person obligations; but for transfer of data ownership, the original subject transfers the complete data ownership, together with relevant legal person obligations to the transferee. As a result, the original data subject of data ownership has lost the right to control the transferred data.

Statutory use system of data ownership

Statutory use of data ownership, or restricted use of data ownership, is a special approach to use data. The natural attribute of immateriality allows data to involve more public interest. Therefore, it has to be restricted to strike a balance between public interests and personal interests. The statutory use system of data ownership encompasses a) fair use, b) statutory licensing, and c) compulsory licensing of data ownership. All these three categories reflect restrictions on the data ownership system.

Fair use is the strictest restriction on data ownership. The fair use regime of data ownership means that, under certain circumstances prescribed by laws, other people may use data owner's data without permission from the data owner. The data user does not have to pay fees for such use of data. Fair use of data ownership aims to safeguard public interests and to leave space for the public to use data fairly without doing harm to the fundamental interests of data owners.

Data rights do not only have private attributes, but also public attributes. If public rights become owned privately, public good will be damaged seriously. Therefore, the fair use regime of data ownership is quite necessary in guarantying that people can use data fairly for non-profit purposes, such as education, medicine, philanthropy and science research. In so doing, fair use effectively balances public and private data interests by channeling certain data interests towards the society. Fair use also prevents two circumstances: first, crippled data use due to data monopoly; and second, hampered data production due to the absence of data monopoly.

Statutory licensing is also a restriction, relatively weaker than fair use, on data ownership. Statutory licensing of data ownership means that, under certain circumstances prescribed by laws, other people may use data owner's data without permission from the data owner. The data user must pay fees for such use of data and must respect the other rights of the data owner. Statutory licensing confers people certain rights to use data, allows the people who meet certain legal requirements to use data and discharges restriction upon these qualified people. In this way, statutory licensing balances public and private interests. The difference between statutory licensing and fair use is: the former is statutory authorization for users of data who are mainly

profit-seeking; the latter is self-determined authorization and most users are not profit-seeking.

Compulsory licensing means that, under certain circumstances, a competent government organ compulsively allows someone else to use data owner's data without the consent of the data owner. The data user must pay fees for such use of data and must respect the other rights of the data owner. Compulsory licensing is involuntary, aiming at maintaining national and societal interests. Compared with statutory licensing, compulsory licensing is a special restriction system which must be decided by a statutory competent government organ. Generally speaking, compulsory licensing are rarely implemented except for national and societal interests, in that improper implementation of the compulsory licensing regime is a severe damage to the interests of data owners. Compulsory license focuses on public data and specific users. It has strong flexibility and explicit time limit. Statutory licensing aim at restricting the abusive use of data ownership and guaranteeing that the public can access and use data, thereby promoting social progress and development.

Usufructuary Data Rights

Usufructuary data rights are established for the purpose of solving the conflict between the ownership and utilization of data. It refers to the right to use and make profit from data owned by another person under certain conditions. Usufructuary data rights emerge as the output of transition from the right to control data to the right to use data. As a way to implement data ownership, usufructuary data rights help to realize the economic value of data rights.

Restricted ownership

Usufructuary data rights is a term referring to the right of one individual to use and enjoy the data of another. Usufructuary data rights are the rights conferred on individuals the by data owners to utilize data. Usufructuary

data rights emerge as the result of separation of certain rights of data ownership. In other words, certain rights of data ownership are separated and conferred from data owners to other individuals, thus establishing data rights for other people. Therefore, usufructuary data rights are created on the basis of data ownership, and the rights *per se* constitute restrictions on data ownership. Yet the usufructuary data rights, as an economic approach to implement data ownership, helps to realize the economic value of data ownership. Usufructuary data rights emerge as the main function of data rights shift from the right to control data to the right to use data. Hence, usufructuary data rights coexist with data ownership.

With the advent of the era of digital civilization, the scale of data resources continues to expand, making usufructuary data rights increasingly important. In general, the creation of usufructuary data rights are based upon the will or consent of data owners. When data owners cannot use data or effectively utilize data value, they share the data with others to use and make proceeds, so as to fully tap into the economic value of data. Despite the close connection between data ownership and usufructuary data rights, there are several distinctions as follows:

1. Nature of rights. Usufructuary data rights are data rights enjoyed by others while data ownership is data rights enjoyed by data owners. Data rights enjoyed by data owners are rights of domination over the data, that is, the all-encompassing data rights. Data rights enjoyed by others refer to rights created over data owned by another individual. Therefore, usufructuary data rights have attributes of rights enjoyed by others, such as time limits and limited functions.
2. Contents of rights. Usufructuary data rights are restricted data rights while data ownership is complete data rights. As data rights with restrictions, usufructuary data rights are restricted both in time and in functions. Usufructuary data rights mainly influence the value in use of data. Data ownership, on the other hand, are made up of data rights without time limit and limits over functions. Owners of usufructuary data rights only enjoy part of the rights of data ownership, excluding the right to share data in principle. Data ownership is made up of the most extensive rights of domination as well as all-encompassing rights over data.

3. Time limit. In terms of time limits, usufructuary data rights are data rights with time limits while data ownership without limits. Data ownership exists as long as data exist. That is to say, so long as data exists, data ownership will exist. Whereas usufructuary data rights generally have time limits and will cease to exist once the time limits expire.
4. Objects of rights. The objects of data ownership cover a wide range of data sets, which may all be owned by relevant subjects regardless of its use value. Whereas usufructuary data rights have a relative narrow range of objects, for the reason that the objects, usually certain data sets, must have use value for subjects of usufructuary data rights.
5. Ways of rights acquisition. Data ownership can be obtained in various ways, as long as the means are legitimate, either via original acquisition through producing and manufacturing data or via succession. In contrast, the acquisition of usufructuary data rights is strictly regulated by law. It can only be obtained via contractual agreement or legal mandates.

Characteristics of usufructuary data rights

Since usufructuary data rights are the rights established on the data of others, which is similar to the right over other person's property, it can be called *right over other person's data*. And it is also called restricted data rights for the reason that usufructuary data rights are supposed to dominate the underlying data within an agreed scope. The subject of usufructuary data rights can be a natural person, a legal person or an organization that enjoys the rights on the data of others, excluding the owner of data. This is because usufructuary data rights are the rights created over data owned by another individual. The object of usufructuary data rights, that is, data set, is characterized by immateriality, reproducibility and non-absolute delivery. With the diversification of data utilization methods, especially with the progress of science and technology as well as the innovation of system and mechanism, the value of data has been constantly increasing. In order to keep abreast with the ever-diversifying trend of data utilization and to improve the efficiency of data resource utilization, usufructuary data rights must be established. The creation and recognition of usufructuary data rights is the inevitable tendency due to the evolution of the data right system.

Right to use and right to make proceeds from data constitute the core of usufructuary data rights. On the one hand, usufructuary data rights mainly refer to the right to use and the right to make proceeds from data. When exercising data rights, the usufructuary right subjects can adopt different ways of utilization in accordance with the function of data sets or the purpose of data rights. Some usufructuary data rights are intended for the use of data *per se*, while others focus on the transaction of data. On the other hand, usufructuary data rights generally do not include the right to share the underlying data. However, the right holder has the legitimate right to share the usufructuary data rights. Sharing of the usufructuary data rights is conducive to improving the efficiency of data utilization. Along with the continuous innovation of data utilization and the constant progress of science and technology, the content of usufructuary data rights will also be enriched.

Usufructuary data rights are unique in nature, mainly manifested in the following aspects: a) usufructuary data rights are restricted data rights with a certain limitation in both time and quantity, which are not as rich in content as property ownership; b) usufructuary data rights are principal rights. Being independent of ownership and other data rights, usufructuary data rights do not exist on other data rights, nor transfer or eliminate with alternations of other data rights; and, c) usufructuary data rights are the terminable data rights with clear and definite term limitation in general. In essence, as a kind of restriction on data ownership, term limitation prohibits usufructuary data rights from existing permanently because it might lead to the hollowing out or even mere nominal existence of data ownership.

Content of usufructuary data rights

Usufructuary data rights are the rights to control the value-in-use of data of others. Here the word "others" refers to the subject of data ownership in principle. Usufructuary data rights comprise the domination of the value-in-use of data for the purpose of data utilization. From the legal perspective, sharing right is the most essential data right, which distinguishes data right from real right. In terms of usufructuary data rights, however, the rights to share the underlying data are excluded because usufructuary data rights are mainly the rights to use and to make earnings from data. Undoubtedly, to

use data effectively, the right holder enjoys the right to share the usufructuary data rights *per se* in accordance with laws on the premise that the ultimate ownership of data is not hindered. Such sharing is the sharing of rights, not the sharing of data. Specifically, the usufructuary data rights include the rights to control, to use and to make proceeds from data.

The only way to use data and make earnings is for the subject of data usufruct to control data. Control refers to the obligee's actual domination over the underlying data. A subject of data usufruct must obtain actual control before actually using data and making earnings to obtain the use value of data. Hence, the subject of data usufruct must take control of the underlying data. Since, only through the actual control of the underlying data can the use value of such data be utilized. Dominance over data without actual control does not lead to the actual use of data. Moreover, should disputes over data usufruct occur on data, the majority of these disputes are over the right to control data. This is because a subject of data usufruct can only use data and make earnings to obtain the use value of data based on the premise that the subject has actual control of data owned by another person.

Data usufruct aims at using data and making proceeds from data. The right to use data refers to the right to use data based on the nature and purpose of data and in accordance with laws or relevant agreements. Data usufruct is established to use data and seek for the use value of data. Proceeds comprise both natural fructus and statutory fructus through the use of data. The right to use and right to make proceeds always come together, for only through actual data using, can data generate rewards. On the one hand, the term of data usufruct, in jurisprudence, directly refers to the right to use data. Therefore, this type of data right focuses on the utilization of data owned by other people; on the other hand, data usufruct focuses on realizing the use value of data and satisfying various interests of subjects via such use. In this sense, data usufruct also comprises the right to make proceeds.

Subjects of data ownership shall not interfere with the rights of subjects of data usufruct. Once established, data usufruct becomes an independent right, thus forming restrictions on data ownership. As an independent type of data right, data usufruct enables its subject to achieve economic interests or other purposes by using data owned by others. There are absolute differences between interests pursued by subjects of data usufruct and subjects of data ownership.

However, such difference must be protected by laws and respected by subjects of data ownership. To this end, subjects of data ownership shall bear the obligation not to interfere with subjects of data usufruct in their legitimate behaviors such as exercising rights and pursuing interests concerning data. In addition, data usufruct is established based on data ownership. Although independent, data usufruct is confined by the will of subjects of data ownership. Without laws or contractual agreements, a subject of data ownership may arbitrarily interfere with a subject of data usufruct in the exercise of rights. In this case, rights of the subject of data usufruct cannot be guaranteed. Indeed, subjects of data usufruct, when exercising their rights, cannot undermine interests of subjects of data ownership. Since data usufructs originate from contracts, subjects of data ownership only share with subjects of data usufruct the rights and functions to control, use and make proceeds from data. Therefore, subjects of data usufruct must exercise their rights within the agreed scope, that is, using data and making profits. Undermining interests of subjects of data ownership by subjects of data usufruct will not only incur loss and waste of social resource, but also will result in the violation of the agreement to establish data usufruct.

Significance of usufructuary data rights

Usufructuary data rights are a basic type of data rights as well as an important type of rights over other person's data. With the development of economic and social production, the types of usufructuary data rights will continue to increase. Subsequently, the status of usufructuary data rights will become more prominent, serving an increasingly important role in the advancement of the economy and society.

Usufructuary data rights offer the best approach to effectively integrating public ownership with the market economy. Such an effective integration is an unprecedented practice of great significance in human history. Usufructuary data rights are one of the ways to realize this important integration. The government possesses a large amount of data resources. If those data resources fail to enter into the market, the goal of building the market economy cannot be fully achieved. Without altering data ownership, the usufructuary data rights regime helps to guarantee the free flow of data in

the market, so that civil subjects other than the state and collectives can make extensive use of data resources. Therefore, the usufructuary data rights regime is of special significance and value to China.

Usufructuary data rights give full play to the decisive role of digital economy in the economic and social production, leading to the efficient allocation of data resources. The separation of certain rights of data ownership constitutes both the foundation for the creation of usufructuary data rights and a way to the efficient allocation and utilization of data resources. Under the market mechanism, usufructuary data rights enable the free flow of data resources among the parties with the utmost need and capability to utilize data, so that parties with optimum condition and utmost capability will make full use of data resources. Thus, optimum allocation and utilization of data resources can be achieved, which helps to fully tap into the value of data resources. Moreover, data, as the most important factor of production in the era of digital civilization, are mostly possessed by the government. Only by implementing the usufructuary data rights, can those data resources enter into the market, where the data resources will be utilized with maximum efficiency under the market mechanism. It can be predicted that usufructuary data rights will play a great role in the era of digital civilization, and its functions will be constantly enriched.

Usufructuary data rights play an important part in properly protecting and utilizing data resources. The era of digital civilization witnesses an increasing demand for data resources as well as the expanding scale of data. The more subjects of usufructuary data rights exist on a single dataset, the more thoroughly this dataset is utilized, and the more data value may be generated. It is fair to say that, usufructuary data rights utilize data resources directly and bring data value into full play. Usufructuary data rights help to realize the rational utilization and effective protection of data resources. More specifically, usufructuary data rights can balance private and public interests as well as short-term and long-term interests, thus resolving the conflicts arising from the utilization of data resources among different data rights subjects and protecting interests of data rights.

The usufructuary data rights regime reflects an important trend of the development of data rights. In the era of digital civilization, efficient utilization of data must be uplifted to a position as important as data ownership. People will gradually abandon the civil law practice of emphasizing the right of domination and ownership, while giving more weight to the utilization of data

and focusing more on scenarios of data utilization. During the transitional process, the status of data ownership will gradually decline, and the previous priority given to "ownership" will shift towards "utilization." Usufructuary data rights are a manifestation of this shift towards "utilization," and the status of utilization of data will gradually get elevated, for the reason that modern production activities require that data resources must flow to the parties with the optimum condition and utmost capability so as to achieve the optimum allocation of data resources and give the fullest play to data value. It can be predicted that as the economy and society advance, usufructuary data rights will play an increasingly important role in the data rights regime. In addition, usufructuary data rights carry strong regional and national attributes, for the reason that the usufruct data rights regime of a nation must be built upon the basic economic regime of the nation. Therefore, every nation will have a unique usufructuary data rights regime, in which the types and functions of usufruct data rights vary due to the different histories, traditions, national conditions and geological conditions of the nation.

System of Data Rights for Public Interests

As a transferred usufructuary data rights, the concept of data rights for public interests has not yet be clearly defined in existing right regimes both at home and abroad. However, with regard to the utilization and protection of data, a definition of data rights for public interests is of obvious necessity. Data rights for public interests is an umbrella term that refers to a variety of public legal rights that are established by administrative authorities, public institutions, public welfare organizations, etc., in order to guarantee and increase public welfare.

Definition of data for public interests

In terms of legal mechanism, usufructuary data rights are the rights to confirm, utilize and protect data resources based on private rights. In the era of big data, the subjects of data are complex and diverse. In terms of

subjects, data can be divided into three major categories, that is, government data, legal person data and personal data. Public data, with government data as a major type, constitute the concept of data of public interests in jurisprudence. How effective data of public interests are developed and utilized largely determines whether the data resources can be utilized to the maximum extent. Therefore, rights of data of public interests should be scientifically and reasonably confirmed and sharing of public domain data owned by the government and other public institutions should be promoted, so as to provide critical spine and guarantee for the construction of the data rights regime.

The concept of data of public interests is also called public domain data in jurisprudence. The term public domain data, however, has not been well-defined and only some conceptual exploration has been made at home and abroad. According to the *UNESCO Draft Policy Guidelines for the Development and Promotion of Public Domain Information*, public domain information refers to "sources and types of data and information whose uses are not restricted by intellectual property (IP) and other statutory regimes and that are accordingly available to the public for use without authorization or restriction" (Xia 2005). In *Tennessee Open Records Act*, "'public information' means information that is written, produced, collected, assembled, or maintained under a law or ordinance or in connection with the transaction of official business" (Yang and Zhao 2007). In China, the concept of public domain data has not yet been defined by official documents. Some Chinese scholars have made theoretical analysis in scholarly literature. For example, Xia Yikun argues that public domain data is "a specific type of practical information, which refers to all the information with characteristic of public domain products, produced and applied to the public domain of society, managed by administration of public affairs in accordance with laws, and shared and used by all members of the society" (2005). Huo Guoqing believes that "In addition to information resources owned by government, public domain data also include information that are produced, collected, processed, disseminated or disposed by individuals, organizations, associations and communities that are required by government to perform administrative functions based on the sharing of public information resources" (2000). Yang Yulin proposes that public domain data are "the collection of various information resources generated by social organizations in public activities,

among which the information generated in official business constitutes the main part" (Yang and Zhao 2007).

From the perspective of jurisprudence, all data resources that can meet people's needs for data and are actually related to public interests can be categorized as data of public interests. Thus, data of public benefits originate from three sources: (a) government data produced in official business of government authorities; (b) data released to the public by enterprises and institutions; and (c) individual data lapsed into the public domain via spontaneous disclosure. Among them, government data are the most important component of data of public interests, for the reasons that government is the most important force to control the society and government owns 80 percent of all the data resources in the society. Data of public interests have two features: public and universal: 1. Data of public interests are public because administrative authorities, with the objective of safeguarding public interests of society and promoting equity, justice and freedom in society, provide free or low-price data services to the general public. The open access of data of public interests will provide abundant production resources for the society. Meanwhile, due to the reproducibility of data, the social cost of the consumption of data of public interests is very low. In addition, the original data content will not be damaged in data sharing and others' benefits will not be affected. 2. Data of public interests are universal in both content and source: (a) every individual, enterprise, public institution, and state authority are directly or indirectly connected with data of public benefits, thus becoming the sources of data of public interests; (b) every characteristic of things and state of motion can constitute data of public interests. These data safeguard public interests.

From the perspective of economic attributes, data is a private right. However, with regard to the results and influences caused by the exercise of rights, data also have public right attributes because data can also increase or decrease public interests. Therefore, private data rights should be restricted. Neither could data be 'monopolized' by individuals, nor can public interests be sacrificed for protecting individual data rights. Without the check and balance from public interests, private interests will become the dominant pursuit of the society and the data rights system will end up impeding social development. In existing legal systems, both public and private rights are regulated and protected by laws. One of the purposes is to protect individual

data rights, but what matters more is maintaining public interests, so as to use data sufficiently and expand the value of data. This is determined by the public right attribute of data of public benefits. The protection of individual data always involves public rights' consideration about national security, public security and data security. And the legitimacy of protection is also established on public law. The balance between private rights and public rights, which lays the foundation for data rights system, should be achieved by scientifically disposing rights and obligations of data through legislation, thereby coordinating relations between individual rights and public development and balancing all kinds of demands for data rights.

Content

Data rights for public interests are a transferred data usufruct. Data usufruct mainly emphasizes using data and making earnings from the perspective of private rights. Based on the protection and use of data for public benefits, the concept of data rights for public interest is proposed. Due to the absence of a definition of data rights for public interests both in Chinese and foreign legal literature, it is quite meaningful to define data rights for public interests when using and protecting data resources. On the one hand, a rational affirmation of data rights for public benefits can promote the maximum use of data of public benefits; on the other hand, data of public benefits are inherently public and universal, but in the end, it comes from individuals. Claiming for rights on data of public benefits can protect personality rights and property rights of individual data. Data rights for public interests is the genetic name of public legal rights established on data of public benefits by administrative authorities, public institutions and non-profit organizations to protect and increase public welfare in society.

Data rights for public interests are an important part of data rights system. As a type of data rights opposite from data usufruct, data rights for public interests mainly refer to rights that administrative authorities (mainly government), public institutions and non-profit organizations have to obtain, manage, use and share data of public benefits for public interests. In terms of legal attributes, data rights for public interests are a transferred data usufruct and fundamental rights for citizens. It is a new non-profit proposition about

data rights in public business, service and management. Legally, data rights for public interests are collectively owned by the all the people; administrative authorities (mainly government), public institutions and non-profit organizations are mere representatives in the exercise of the data rights for public interests. Protecting data of public benefits serves as the foundation of data rights for public interests, as well as an effective restraint on private rights. Data rights for public interests protect all citizens and the content of data rights for public interests will alter with the changes of citizens' demands for data of public interests. Therefore, data rights for public interests have certain uncertainty and elasticity. No matter to what extent big data develops, the ultimate purpose for establishing the system of data rights for public interests is to protect citizens' fundamental rights such as equality and freedom.

Data rights for public interests serve as the balance between public rights and private rights. Essentially, data of public benefits are owned by all citizens, therefore should be shared by all citizens in the premise that public interests are under proper protection. Data generated in the society contain both private and public contents, therefore cannot be easily classified as data of public benefits. Data rights for public interests should weaken individual ownership on data without damaging individual interests, so as to guard against data monopoly. Therefore, countries need to formulate relevant laws which can restrict private rights of data, but also protect data producers' creativity, thus striking a balance. Data rights for public interests are exactly the outcome of such a balance. Data of public benefits are both public and universal, making actual administrators of data of public benefits, such as administrative authorities (mainly government), public institutions and non-profit organizations, give priority to public interests while protecting individual rights and interests. Therefore, given individuals' sacrifice for public interests, the system of data rights for public interests, while balancing public and private right attributes, must make "fair," proper and legal compensation for individual interests on data rights.

Characteristics

Data rights for public interests are rights within the scope of public law. This is the fundamental characteristic that distinguishes data rights for public

interests from usufructuary data rights. Data rights for public interests are rights within the scope of public law, mainly manifested in the following aspects: a) the subjects of data rights for public interests include administrative authorities, public institutions and non-profit organizations and the object of data rights for public interests is data of public benefits; b) data rights for public interests aims to protect public interests and satisfy public demands for the interests of data of public benefits; and, c) such a characteristic is also reflected in the administrative license and administrative penalties in the acquisition and mandatory protection of data of public benefits as well as in the exercise of data rights for public interests.

Data rights for public interests contribute to the public welfare. The object of data rights for public interests is data of public benefits, which belongs to public domain data in jurisprudence, and is consequently under the management of administrative authorities, public institutions and non-profit organizations. Since the purpose of establishing and exercising of data rights for public interests is to safeguard public interests and to enhance public welfare, the subjects of data rights for public interests must observe this purpose when exercising data rights. As the term public interest indicates, the beneficiaries of data rights for public interests are composed of individuals, the general public, the society and the state. Since an individual forms a part of the public, society and nation, there is an interrelationship among different types of beneficiaries. It is fair to say that data rights for public interests are a collective right for public welfare.

Data rights for public interests are rights with limited domination. Specifically, data rights constitute absolute domination over data, whereas data rights for public interests have limited domination over data of public benefits given the fact that data rights for public interests are rights within the public law domain for public welfare. For example, in principle, the free flow of data of public benefits is prohibited during the period of public use. Moreover, personal data owners shall not impede the public use of data of public benefits, even if the owner waives the ownership over the personal data.

Data rights for public interests are rights of a non-inclusive nature. Although controlled by administrative authorities like government, data of public benefits, the object of data rights for public interests, are actually possessed by the public. Therefore, data of public benefits feature inseparable

effects, uncompetitive use and non-inclusive benefits. In accordance with relevant laws and regulations, the public can use data of public benefits, albeit under the management of administrative authorities, public institutions and non-profit organizations. In other words, it is prescribed by laws that the public may exercise data rights for public interests by using data of public benefits and make proceedings from it under certain conditions.

Data rights for public interests enjoy special remedies. The term "remedies" here refers to the legal remedies for the infringement of data rights for public interests, including civil remedy, criminal remedy and administrative remedy. Among them, in civil remedy, an injunction and financial compensation in form of compensatory damages shall be granted for the infringement of data rights for public interests. Criminal remedy mainly refers to criminal punishment for the infringement which constitutes a crime that brings serious harm to the society. Administrative remedy is the most effective redress in addressing the infringement of data rights for public interests, including administrative review, administrative adjudication, administrative litigation, and administrative compensation. By correcting and punishing the infringement of data rights for public interests, administrative remedy helps to maintain public order (Lu 2009, pp. 435–443).

Subjects of data rights for public interest

In order to safeguard data security and public interests, government, as the representative of public power, obtains and manages public domain data from various fields covering politics, economy, culture, society, ecology, etc., and controls 80 percent of all data resources in society. Government exercises data rights for public interests on behalf of the state, thus serving as the implementing subject of data rights for public interests. From a macroscopic view, the state can be considered as a platform; and the government, the manager of the platform, is in charge of managing clients' data. Moreover, due to the ubiquity and cross-industry nature of big data, data rights for public interests must exert a strong restraining force over personal data rights. That is to say, individuals enjoy the freedom of exercising personal data rights on the premise of meeting the requirement of data rights for public interests. In reality, however, data rights for public

interests are often abused for personal interests, thus constituting a security risk to personal data rights.

No research regarding the subjects of data rights for public interests has yet been conducted either at home or abroad. The simple classification of subjects of data for public interests into administrative authorities represented by government, public institutions and non-profit organizations has certain limitations. First, while data of public interests are managed and used by administrative authorities represented by government, public institutions and non-profit organizations, the public enjoys the right to use data of public interests. Specifically, people enjoy the informed consent of data and beneficiary rights of data use. Second, the subjects of data rights for public interests are administrative authorities, public institutions and non-profit organizations, which represent public interests; the right to use data of public benefits are enjoyed by any individual and organization, as long as the use is in the public interests; the right to manage data of public benefits are enjoyed by administrative authorities, public institutions and non-profit organizations. Therefore, the subjects of data rights for public interests should involve administrative authorities, public institutions, non-profit organizations and the public. In other words, the subjects of data rights for public interests are a compound and complex. Administrative authorities, public institutions and non-profit organizations are the nominal subjects in jurisprudence and the public is the actual subject of data rights for public interests.

Functions

With safeguarding public interests as the fundamental objective, functions of data rights for public interests should include: the right to access data, the right to manage data, the right to use data and the right to share data. Despite the fact that the public may use data of public interests to obtain corresponding economic benefits, data rights for public interests *per se* do not include the right to make proceeds from data. The reason is that such utilization of data of public interests, in essence, is exercising the usufructuary data rights of data of public interests, rather than exercising data rights for public interests. The only subjects that are qualified to exercise data rights

for public interests are representatives of the public, such as administrative authorities, public institutions and non-profit organizations, etc. In the process of exercising such right, these representatives of the public shall not use data of public interests to make proceeds. Therefore, the right to make proceeds is excluded from the functions of data rights for public interests.

The right to access data of public interests. It refers to the right of administrative authorities represented by government, public institutions and non-profit organizations, to obtain all kinds of data of public interests, through certain approaches and means, in accordance with relevant laws and regulations and in a timely, accurate and complete manner. Here, the subject of the right to access data of public interests is defined as administrative authorities represented by government, public institutions and non-profit organizations, for that these subjects exercise data rights for public interests on behalf of the public, and must obtain data of public interests they need from other administrative authorities, public institutions, social organizations and individuals in accordance with their statutory powers and manners. Statutory powers and manners require administrative authorities to follow three principles when obtaining data of public interests: legality, reasonability and efficiency.

(a) Legality or legitimate access requires that administrative authorities represented by government, public institutions and non-profit organizations must obtain authorization from relevant laws, and must act in accordance with relevant provisions of laws when they exercise the right to obtain data of public interests; and their powers, manner and procedures shall be legitimate. (b) Reasonability or reasonable access, on the one hand, requires administrative authorities represented by government, public institutions and non-profit organizations to obtain data of public interests for appropriate purposes; and on the other hand, it requires that the infringement on rights and interests of personal data to be minimized in order to achieve the balance between private and public interests. (c) Efficiency or efficient access requires that administrative authorities represented by government, public institutions and non-profit organizations to act cost-effectively and to bring as the maximum possible interests to citizens, countries and the society when exercising the right to access data of public interests.

Of course, the right to access data of public interests must be restricted, otherwise it will lead to unlimited expansion of the public right to data

and will cause great damage to the rights and interests of the people, society and country. Administrative authorities represented by government, public institutions and non-profit organizations must protect data security in the process of exercising their right to access data of public interests. If national security, trade secrets and personal privacy are undermined due to the exercise of such right, relevant administrative authorities must be held liable and must bear corresponding legal and administrative responsibilities (Wang and Fang 2006).

The right to manage data of public interests. Management of data of public interests means the management behavior taken by administrative authorities represented by government, public institutions and non-profit organizations in order to achieve the purpose of public use of data of public interests. The right to manage data of public interests refers to administrative power exercised by administrative authorities represented by government, public institutions and non-profit organizations, to manage data of public interests as objects, with the objective of realizing the public use of data of public interests. The right to manage data of public interests has the following characteristics: a) the objectives are to achieve public use of data of public interests, as well as to protect and promote public interests; b) exercising the right can be both positive and negative; positive exercise of the right means to unleash the potential of data of public interests for public purposes, while negative exercise of the right means to offset or stop behaviors that hinder the realization of public use of data of public interests; and, c) in essence, the right to manage data of public interests is an administrative power, which is the power of administrative authorities represented by government, public institutions and non-profit organizations to implement national laws and manage public interests.

In terms of legal nature, the right to manage data of public interests is also a legal obligation, for it is the administrative power exercised by administrative authorities represented by government, public institutions and non-profit organizations for the purpose of safeguarding and enhancing public interests and fulfilling administrative obligations. The management of data of public interests is the legal obligation borne by administrative authorities represented by government, public institutions and non-profit organizations to protect data rights for public interests. Therefore, data rights for public interests are an administrative power with the binding force in public law.

Meanwhile, the right to manage data of public interests protects the rights of the public to use data of public interests and limits the arbitrary behavior of administrative authorities.

The right to use data of public interests. The term "use" here refers to the utilization of data of public interests by administrative authorities represented by the government, public institutions and non-profit organizations in accordance with relevant laws and regulations, with the objective of performing administrative duties and functions. The right to use data of public interests, with an aim to safeguard and promote public interests through public use of data of public interests, constitutes the core of data rights for public interests. Therefore, the right to use data of public interests refers to the right exercised by administrative authorities represented by the government, public institutions and non-profit organizations to utilize data of public interests. When exercising the right to use data of public interests, certain principles must be abided by; otherwise the use value of data of public interests and public interests may be undermined due to the abuse of the right to use data.

First, the right to use data of public interests must be exercised in consistence with the configuration of data of public interests and purposes of public use, and within the scope of public interest demand. Second, the right to use data of public interests must be exercised in accordance with relevant laws and regulations and following the objective principles of data use. Since the purpose of the right is to safeguard and promote public interests, the administration of data of public interests must not impede other individuals' or organizations' bona fide use of data of public interests. Third, in order to safeguard public interests and national security, administrative authorities represented by the government, public institutions and non-profit organizations may cancel or change the purpose of public use of data of public interests.

The right to share data of public interests. It refers to the right to share data of public interests with others by the administration authorities of data of public interests. The term "others" here includes other administrative bodies, public institutions, companies and individuals, etc. Therefore, the right to share data of public interests can be classified into two ways: in a narrow sense, it means the right to share data of public interests within administrative bodies. The shared data still constitute data of public interests. The administrative bodies which participate in the sharing of the data

may exercise certain functions of data rights for public interests, that is, the right to use data and the right to manage data. In a different sense, it means rights to disclose data. To put it another way, it means the right to disclose data of public interests to companies, the general public and individuals by the administration authorities. In this process, the right to control data of public interests is obtained by companies, the general public and individuals. Data rights for public interests transform into data usufructuary rights. Thus companies, the general public and individuals can use data of public interests and make proceeds from them.

Sharing System

Data rights, as fundamental rights to human survival and development, are essentially sharing rights. Data rights reflect the integration of taking social responsibilities while enjoying data rights. Admittedly, data sharing rights cannot be realized without the assistance of relevant systems to resolve disputes that may arise in the process of data sharing so as to unleash the maximum value of data rights.

From open access to sharing economy

As science and technology advances, the human society has progressed from agricultural civilization to industrial civilization and then to digital civilization, gradually manifesting a sharing attribute in our production activities and lifestyle. The rise of open access movement and sharing economy have disseminated "sharing," a new development philosophy, from the field of science and technology to the field of economy, society, ideology and culture. The significance of sharing to everyday life and to the development of mankind has never been as clearly demonstrated as it is now. Since sharing has become a realistic pursuit that leads people to the future, the development of sharing will undoubtedly constitute the centric demand in the era of digital civilization.

Open access, a model of knowledge sharing, is a scientific movement aiming at promoting the sharing of research outputs that dates back to the late 1990s and in the early 2000s. The development philosophy of sharing is demonstrated in the following statements, that is, the 2001 *Budapest Open Access Initiative*, the 2003 *Bethesda Statement on Open Access Publishing* and the 2003 *Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities*. The *Budapest Open Access Initiative* provides that "by 'open access' to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself" (Hu 2013). On the one hand, the open access movement breaks away with financial barriers of knowledge by making scientific data available to the general public for free. On the other hand, the movement increases the availability of research outputs and removes user permission of academic resources. As the open access movement now thrives around the world with growing influence, the development philosophy of sharing has gained popularity among the general public.

The sharing economy is a representative of the various forms of the sharing movement. The concept was put forward by two sociology professors – Marcos Fairson of University of Texas and Joel Spaeth of University of Illinois. As represented by Uber in the United States and Didi, Mobike and ofo in China, these companies that emerged from the sharing economy have launched a subversive revolution in the field of transportation by taking advantage of the sharing economy and have changed the landscape of the global automobile and bicycle rental industry. The most fundamental feature of the sharing economy is the paid transfer of the right to use resources from institutions or individuals who own the resources to others. The transferor gets the payment, and the transferee uses the resources owned by others to generate value. In a narrow sense, the sharing economy refers to a business model in which the owner of resources temporally transfers the right to use existing goods to strangers with the objective of obtaining a certain reward and creating additional value (D. Lu 2017, pp. 135–136).

Open access and sharing economy both separate ownership and right to use, in a sense that an owner gives a portion of the right to use to the user,

while maintaining his or her ownership. In the traditional economy, ownership and the right to use are inseparable. In other words, only the owner enjoys the right to use. Open access and sharing economy have unshackled this pattern by creating a system in which the owner may transfer the right to use to others while maintaining his or her ownership. This sharing mechanism has resulted in a moderate separation of ownership and the right to use. As a result, it has not only stimulated the creativity of the whole society, but also continuously promoted the sharing of development achievements and the progress of human civilization. Open access and sharing economy, constitute a new and complex mechanism as well as a reflection of certain social institutions and mechanisms, such as economic objectives, industrial system, ownership system, property right system, income distribution system, as well as social security system and economic evaluation system. In the sharing economy, everything from system design to social production is based upon "sharing." Open access and sharing economy, in essence, is a system and development mechanism that encourages social innovation, stimulates economic creativity and brings benefits to all people. Together with corresponding values, social credit, social governance and legal protection, they constitute important bases for the sharing system (D. Lu 2017, pp. 138–139).

Proposition of shared data rights

The traditional legal system of real right is established on the concept of private ownership of property, with objective of maintaining exclusive ownership of property. The private or exclusive ownership of property forms an effective incentive mechanism, stimulates people's creativity and promotes the effective use of property. However, one of the goals of property right legislation, that is, "making the best use of everything" has not been fully realized until now. Now that open access and sharing economy have changed the way of using properties, the new trend has triggered people's reflection on the existing legal framework. In the traditional legal system of real right, due to the exclusive nature of real right and the principle of "one ownership for one object," sharing has not attracted enough attention. However, based on the review of the historical origin and current development of the real right system, it can be seen that the concept of sharing has already

penetrated into the use of properties, and has already become a basic and frequent approach for people to use properties.

How should we construct the system of shared data rights? How does the concept of shared data rights present itself in legal norms? How will data rights law adapt itself to the development philosophy of sharing in the future? Those questions and more are awaiting us. With the development of human society, the means of production evolve in two directions – some become more abundant, while others scarcer. On the one hand, it is of utmost necessity to share the scarce means of production, so as to raise the utilization efficiency. In this way, the limited means of production may benefit more people, appeasing the ever-growing demand for the scarce means of production. On the other hand, with respect to the abundant means of production, continuous decline of production cost or even zero cost renders exclusive use inutile and sharing a necessity. Data, an abundant means of production, can be reproduced for infinite value without abrasion. Moreover, the cost of data reproduction is so low that it can be neglected. Therefore, the core issue lies in how to make good use of data, and sharing offers the best solution.

Moreover, the new generation of technologies such as the Internet, big data, artificial intelligence, blockchain, etc., has changed the technological landscape that was once dominated by machinery and chemistry. Consequently, the existing balance of interests must be upset, causing challenges to the existing legal system. For one thing, due to the ineffectiveness of the existing legal system in tackling emerging problems relevant to data security, people have been troubled by infringement of data rights for a long period of time. For another, since the existing legal framework puts a restraint on standard data circulation, the accessibility of data and the right to free speech are limited, leading to the inefficiency of data utilization and insufficient exploitation of data value. Despite the fact that some technical problems have already been solved, people still doubt the applicability and rationality of the existing legal system. This is because, when data rights are concerned, technology only constitutes external factors and the self-contradictive legal system is the internal factor. Specifically, the existing ownership-centric legal system is no longer compatible to the development needs of the digital civilization. Therefore, a sharing-centric data rights regime, that is, data rights sharing system, must be introduced to realize the free, secure and fair circulation of data.

In the era of digital civilization, the most important technologies are sharing and connectivity. The core of these technologies is digitalization of everything. Along with the accumulation of data and calculation came the big data. It is worth pointing out that the term "big" is not used literally. Big, in this context, means the comprehensiveness and relevance of data. In other words, only comprehensive and relevant data can be turned into artificial intelligence. Therefore, this is a technological revolution initiated from demand and consumption. Demand brings consumption and then generates data–the most important means of production for the future. When data, a means of production, bring change to the production structure and reshape social relations, the division of labor no longer requires the exchange of scarce resources and labor contribution in the market, which makes the private rights regime meaningless. Human beings will usher into a new social order built on the data rights sharing system. The data rights sharing system makes it possible for the separation of data ownership and the right to use data, which bring about a new development mode of sharing – "ask not for ownership but for the right to use." Given multiple ownerships may exist on one data set, the immateriality of the objects and the multiplicity of subjects determine that data can only be effectively utilized on the premise of "sharing of data rights." Therefore, the data rights sharing system is a requisite for the era of digital civilization.

Content of shared data rights

Shared data rights shed light on the concept of data rights that strikes a balance between public benefits and private interests for the construction of civilized society. This concept also helps stimulate the creativity of the public to participate in the construction of the digital civilized society. The core of shared data rights is the balanced distribution of interests relevant to data rights. Any imbalanced distribution, in which public benefits of data rights drown out private interests, or the opposite, goes against the fundamental legal spirits of the digital civilization era. These fundamental legal spirits – freedom, equality, security and fairness – embody the primitive instinct in human nature. Thus, the imbalanced distribution of interests relevant to data rights will fundamentally discourage people's enthusiasm and initiative to

create more digital wealth. The sharing system of data rights is highly relevant to the era of digital civilization in the following aspects: 1. The sharing system of data rights changed people's traditional view of rights and outlook on data, that is, "weighing private interests over public benefits"; 2. The sharing system of data rights advocates a brand-new view of data rights that balances public benefits and private interests; 3. The sharing system of data rights fundamentally stimulate the enthusiasm, initiative and creativity of the public to participate in the construction of the digital civilized society.

When it comes to the utilization of data, we cannot ignore the sharing of data rights, which is the premise of data utilization. The sharing of data rights is the essential issue and requirement of the digital civilized society, as well as the core of building a new digital civilization order. The sharing system of data rights is an important component of the social system in the era of digital civilization. In the sharing system of data rights, altruism is taken as the guiding principle for the construction of digital civilization, which builds up a solid structural foundation for sharing society. From the perspective of social equity, the distribution of public benefits and private interests of data rights is the core of digital civilized society as well as the fundamental issue of institutional arrangement. The imbalanced distribution of public benefits and private interests of data rights will lead to the absence of fairness in the digital civilized society, and will ultimately bring about huge challenges and obstacles to the construction of digital civilization. Thus, the sharing system of data rights must ensure the balance between public benefits and private interests, and must reflect the fairness of the institutional arrangement. In this way, the relationship between public benefits and private interests of the subject of data rights is straightened out in the institutional arrangement. Hence, this balanced distribution lays a solid foundation and provides basic value orientation for the basic social system in the era of digital civilization. The distribution of public benefits and private interests of data rights must be absolute, objective and universal, and is free from any arbitrary human interventions. Any subjective, relative and excessive interpretation of the distribution of public benefits and private interests of data rights is tantamount to countermand and affront on the fairness of this system. Thus, the sharing system of data rights is of great historical value and practical significance in the construction of the new order of digital civilization.

The sharing system of data rights helps to reconcile the conflicts between different subjects of data rights and provides a scientific value basis for resolving the interest crisis of data rights. The sharing system of data rights adheres to the balance between public benefits and private interests of data rights, which provides a basic value-oriented basis for the construction of the digital civilized society as well as uplifts fairness the primary value of the basic social system in the era of digital civilization. Following the principle of balanced distribution of public benefits and private interests, the sharing system of data rights should establish laws and regulations that resolve conflicts among different subjects of data rights, and optimize the coordination mechanism for interests relevant to data rights among different subjects of data rights. The sharing system of data rights should also ensure that subjects of data rights have access to free expression of their interest appeals so as to resolve various social crises arising from conflicts of interests relevant to data rights. Ultimately, the subjects of data rights can "make every contribution and play their proper role." Meanwhile, the sharing system of data rights is conducive in addressing the challenges to social fairness and justice, such as imbalanced distribution of resources and opportunities as well as social inequality caused by the monopoly of data resources. By addressing these challenges, we will be able to optimize the allocation of data resources and achieve zero marginal cost. As a result, we will increase digital wealth and improve people's sense of acquisition, thus facilitating the coordinated socioeconomic development of the digital civilization era.

Structure of system of shared data right

From the principle of justice, the key to establishing the data rights sharing system lies in cultivating a sense of fairness, equality and sharing and the spirit of humanism.

The sense of fairness means to act fairly and impartially in adjusting interests among data rights subjects and balancing public benefits and private interests. Its objective is the fairness and impartiality in exchange of data rights interests among subjects. Therefore, when dealing with important issues relevant to the interests of data rights subjects, we should respect public opinions and avoid subjective and arbitrary interventions. The sense

of equality means to achieve the balanced distribution of rights and obligations of shared data rights. In other words, we should ensure an equivalence between rights and obligations relevant to data rights. Specifically, people cannot enjoy their data rights unless they undertake certain obligations; or only by assuming certain obligations can people enjoy certain rights. It is also true for public institutions, non-profit organizations and administrative authorities including governments.

The sense of sharing requires all the people to have empathy and altruism, as well as the consciousness of giving priority to sharing. For elites and advantageous groups, their success largely depends on the excessive use and control of data resources owned by the public. In this sense, the public and elites group complement each other. Therefore, the social elites and advantageous group must have a sense of sharing as well as giving part of their interests back to the society and providing aids to the vulnerable groups.

The spirit of humanism requires that the design of the data rights sharing system must adhere to the philosophy of "people-orientation" as well as humanistic ideas such as freedom, equality and fraternity. Only by highlighting the value of human, protecting human dignity and rights, and promoting the comprehensive development of human, can we truly understand the philosophical nature of data rights sharing. Then, we can share the fruits of digital civilization and tap into the passion and energy of data rights subjects to participate in construction of the digital civilized society, to create more digital wealth.

The establishment of the interest expression mechanism of data rights sharing. The data rights sharing system affirms that individuals may enjoy their legitimate interests of data rights. However, under certain circumstances, in the game between the public right attribute and the private right attribute of data rights, certain infringements might occur to the private data rights. Therefore, we need to establish the interest expression mechanism and understand the real needs and demands of data rights subjects upon data rights sharing, thereby ensuring the right direction for constructing the digital civilized society.

People's demands for data rights sharing can be classified into essential and non-essential demands. Essential demands for data rights sharing refer to people's demands to share data rights that are necessary, essential and fundamental for human survival and development. Essential demands apply to

all subjects of data rights. Non-essential demands refer to superior demands for human survival and development. Data rights satisfying and shared by Non-essential demands needs to be balanced to some proportion, for data rights are different from person to person. The classification of demands for data rights into essential and non-essential demands is quite meaningful for the establishment of the digital civilized society: Essential demands lay the foundation for social development and non-essential demands promote incremental development of the society. Essential demands are consequently more important than non-essential demands and should be given preferential protection. Therefore, in the construction of the data rights sharing system, in order to safeguard people's essential demands for shared data rights, the interest expression mechanism of shared data rights must be established and perfected.

Innovation and perfection of the primary protection system of data rights sharing, assistance and compensation for the vulnerable groups of data rights. Essentially, the sharing of data rights is about fairness. The utmost objective is to give each subject the rights and interests he or she deserves. The key is the balance between public benefits and private interests. The three points provide a structural foundation and logical premise as well as the necessary energy and impetus for people's enthusiasm and creativity to participate in the construction of the digital civilization. Currently, due to the lack of rules, in the process of administration or business operation, administrative authorities across the globe and enterprises of all industries have collected an enormous amount of data. In a sense, data monopolies exist everywhere in the world. Data unicorns, with the dominance over data resources, can easily encroach people's data rights. Therefore, in terms of power, people are in a vulnerable position. Nevertheless, people are the ultimate subjects of data rights, and should be the ultimate beneficiaries and the substantial objects of data rights protection. People's legitimate interests relevant to data rights are sacred and inviolable. Therefore, only by establishing the fundamental protection system of data rights sharing, administrative authorities and enterprises render part of data rights interests to people, particularly, assistance and compensation for the vulnerable groups ensure their legitimate data rights, can people's fundamental data rights be protected. To yield twice the result with half the effort, we need to select the priority and breakthrough for

the protection system of data rights sharing and lay a solid foundation for the data rights regime.

Difficulties in shared data rights

The construction of the data rights sharing system faces two challenges: relativism and vested interests. Relativism with regard to shared data rights refers to the mindset of certain individuals who arbitrarily misinterpret the essence of shared data rights to meet their self-interests. They upset the balance of public benefits and private interests by denying the absoluteness of shared data rights while exaggerating the relativity of shared data rights. Furthermore, they rebel against the data rights sharing system by distorting the system design and requirements, in order to adapt the system to meet their own interest demands. The other challenge is posed by vested interests. The existing data rights interests based on private rights have led to data monopoly to some extent, creating a substantial amount of data oligarch, that is, the vested interests. The shared data rights, however, emphasize the balance of public benefits and private interests, and constrain the traditional private rights to a certain degree, which consequently infringes upon the interests of the vested interests. In order to protect their interests, people with vested interests transfer their obligations of data sharing to others so that they can enjoy their interests of shared data rights without performing any obligations perpetually. Both relativism and vested interests seriously violate the philosophies and spirits of data rights sharing and pose huge obstacles to establishing the data rights sharing system. Therefore, relativism and vested interests must be guarded against.

It is difficult to embed the data rights sharing system into existing system. In order to implement the concept of the data rights sharing, it is essential to institutionalize data rights sharing and embed it in the existing system. Given that the existing legal framework is built on real right, and that the sharing of data rights and the exclusive nature of real right are fundamentally contradictory, the data rights sharing system may find itself incompatible with or in conflict with the existing legal regime. It will take a long time for data right sharing to be embedded in and adapted to the legal regime. This process is an arduous, complicated and time-consuming systematic project. It will strike a new balance between public benefits and private interests, and

will renovate the existing legal system. Admittedly, this project stands to disrupt the interests of some people and may even invoke conflicts of interests among subjects of the data rights, possibly causing havoc and even killing the budding data rights sharing system. In conclusion, in the institutional embedding of the data rights sharing, we must be highly proactive and prudent and prepare ourselves for a hard-won war. The conflicts between the data rights sharing system and the existing legal system must be approached with kid gloves, in order to ensure the compatibility of the existing system with the concept of data rights sharing.

The existing regime of rights protection, constructed on private rights and values ownership, restricts data rights sharing. As a result, this owner-centric regime protects the interests of owners. In the existing regime, whoever owns the "res properties" has a say. In other words, the objects dominate the subject of rights. However, human society progresses towards altruism. Sharing, which gives full play to data value, constitutes the essence of data rights. With sharing at its core, the data rights sharing system focuses on the affirmation and protection of data rights of data users. Consequently, the institutionalization of the shared data rights stands to be restricted by the existing regime of rights protection. Therefore, reforming the existing legal regime is necessary, otherwise the data rights sharing remain a concept and we cannot fully tap into the value of data rights sharing. Meanwhile, we should also innovate and improve the protection system of data rights and obligations, which is compatible with the concept of data rights sharing. By doing so, data rights sharing gets institutional safeguard and legal support; data users become the primary subjects of the shared data rights; the data rights sharing system cares more about human intention by letting data serve man; and ultimately, the system highlights the philosophy of "putting people first."

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